(E. MARICOPA)
RWCD FLOODWAY REACH 4
MISC DATA
.VOID COMPS
.NOTES
.QTYS

1985 CHANDLER, AZ

121.940

(E. MARICOPA)

RWCD FLOODWAY

REACH 4

MISC DATA

- VOID COMPS
- NOTES
- QTYS

1985

CHANDLER, AZ

VOID

COMPS

R4

ARIZONA RWCD REACH 4
D. Thackeray 6/18/84
STABLE EARTH CHANNELS / CRITERIA

PROBLEM: SUMMARIZE CRITERIA RELATING TO STABILITY OF EARTH CHANNELS IN COHESIVE MATERIAL.

ANALYSIS: 1. TR 25 (FIG 6-1)

STABLE BED	- NO
SIGNIF. SED. LOAD > 1MM	- NO
BOUNDARY ≤ SAND SZ	- YES
LONG FLOW	- NO
DISCRETE PART.?	- NO

PROCEDURES { ALLOWABLE VEL. / TRACTIVE STRESS / TRACTIVE POWER

FIG 6.2

2. ALLOWABLE VEL

Q = 6900; b = 150; z = 3; S = 0.00097
A = 1197; V = 5.76 FT/S; P = 194.3; R = 6.16

100 YR

ASSUME PI = 10, SED. FREE

BASIC V (GM, CL, SC)	2.5
FREQUENCY FACTOR (F)	1.64
VOID RATIO (Ce)	1.0
ALIGNMENT (A)	1.0
DEPTH (D)	1.14

V = 4.67 FT/S

ARIZONA RWCD REACH 4

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STABLE EARTH CHANNELS / CRITERIA

FIG (6-2)

2. ALLOWABLE VEL. (CONT.)

100 YR

SEDIMENT LADEN:

PI = 10 ; SC, CL

$\sqrt{6} = 4.0$

$V = 4 \times 1.64 \times 1.14 = 7.48$ FT/SEC

PI = 0; ML

$V = 3.5(1.64)(1.14) = 6.54$ FT/S

ALLOWABLE VELOCITY PER FIG 7-4 & FIG 7-5, "OPEN-CHANNEL HYDRAULICS", VEN TE CHOW (FROM USBR PAPERS, 1935).

$C = 0.7$:

	BASIC VEL	DEPTH CORR	
SANDY CLAY =	3.3	1.13	3.73
LEAN CLAYEY SOIL =	2.7	1.13	3.05

ARIZONA RWCD REACH 4
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STABLE EARTH CHANNELS / CRITERIA

3. TRACTIVE STRESS:

a. $\tau_o = WRS$ $W = 62.4$, $R = 6.16$, $S = 0.00097$

$= 62.4(6.16)(0.00097)$

$\tau_o = 0.373$ psf

b. ALLOWABLE τ_o (PER FIG 7-11 CHOW, FROM USSR DATA, 1936)

$e = 0.7$:

LEAN CLAYEY	0.120	lb/ft²
SANDY CLAY	0.200	lb/ft²

c. ALLOWABLE τ_o (PER FORTIER & SCOBEY, TABLE 7-3, CHOW)

	CLEAR H_2O	WATER TRANSP. SILT	
STIFF CLAY	0.260	0.460	lb/ft²
ALLUV. SILT	0.260	0.460	lb/ft²

ARIZONA RWCD RCH4

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STABLE EARTH CHANNELS / CRITERIA

EQUATIONS FROM SEDIMENT TRANSPORT TECHNOLOGY

6.12 $u_* = \sqrt{\tau_0/\rho}$

6.14 $u_* = \sqrt{gRS}$

6.15 $u_*' = \sqrt{gR'S}$

6.16 $u_*'' = \sqrt{gR''S}$

6.17 $u_*^2 = u_*'^2 + u_*''^2$

ARIZONA RINCO REACH

D. THACKERAY 6/21/ed

STABLE EARTH CHANNELS / TRACTIVE STRESS

PROBLEM: check TRACT. STRESS

ANALYSIS: 1. $V = 5.762$

$\nu_0 = .0000164$ ($T = 42°F$)

$\rho = 1.94$ lb-sec^2/ft^4

$S_e = 0.00097$

$k_s = D_{65} = 1.0$ mm $= 3.2808 \times 3$ FT

TR25 p6-24

2. use TR 25 ch 6 procedure

$V^3/g\nu S_e = (5.762)^3/32.16(1.64\times10^{-5})(0.00097)$

$= \underline{3.739 \times 10^8}$

$V/\sqrt{gk_sS_e} = 5.762/\sqrt{32.16(3.281\times10^{-3})(0.00097)}$

$= \underline{570}$

FIND $V/\sqrt{\tau/\rho} = 22.6$

$\tau = \left(V/22.6\right)^2 \rho$

$= (5.762/22.6)^2\ 1.94$

$= \underline{0.126}$ psf

OK

AR12 RWCD RCH 4
D THACKERAY 6/21
STABLE EARTH CHANNELS /CRITERIA

TRACTIVE STRESS (PER TR25)

ρ = 6900
b = 150
z = 3
S = 0.00097
n = 0.027

V = 5.76
A = 1197
D = 7.00
P = 194.27
R = 6.16

D_{65} MM	REF TRAC. STRESS	REF. TRAC. POWER
0.001	0.0503	0.290
0.01	0.0679	0.391
0.074	0.0844	0.486
0.1	0.0852	0.491
0.5	0.108	0.620
1.0	0.127	0.729
2.0	0.146	0.841
5.0	0.175	1.009

ARIZONA RWCD REACH 4
THACKERAY 6/22/84
STABLE EARTH CHANNELS / CRITERIA

SCHROEDER AND HANSEN "INTERIM REPORT ON CHANNEL DETERIORATION STUDY OF NATURAL AND ARTIFICIAL DRAINAGEWAYS IN REPUBLICAN, LOUP, AND LITTLE SIOUX RIVER AREAS - NEBRASKA AND IOWA" USBR 1953
(p III-19 & III-20

LIMITING TRACTIVE FORCE ON THE BED FOR EPHEMERAL CHANNELS (ALONG THE RECOMMENDED DESIGN CURVE FOR PI=6 IS 0.650 lb/ft²)

FOR A WET CHANNEL $\tau = 0.070$ lb/ft² WHEN PI=6.

LIMITING BANK TRACTIVE FORCE FOR PI=6 IS 0.45 lb/ft²

'STABLE EARTH CHANNELS' CONTAINS THE COMMENT THAT THE SCATTER OF THE DATA PRECLUDES ITS USE FOR DESIGN. THE AUTHORS HOWEVER DEFINE DESIGN LIMIT CURVES ON THE PLOTTED DATA AND THE SCATTER APPEARS NO WORSE THAN FOR OTHER PROCEDURES.

ARIZONA
D THACKERAY 6/84

RVCD RCH 4

STABLE EARTH CHANNELS / CRITERIA

D470

Mirtskhulava Eqn. (7.140 - SIMONS)

$$U_{per} = \log\left(\frac{8.8d}{D}\right) \frac{2gM}{2.68n}\left[(\gamma_s - \gamma)D + 1.25 c f K\right]^{1/2}$$

M = working condition coeff. of aggregates

$$n = 1 + \frac{D}{5\times10^{-5}(0.3D)}$$

D = D_{50} grain size (mm)

d = flow depth (M)

g = gravitational acceleration

γ_s = specific weight of particle

c = factor of cohesion T/M^3

K = homogeneity factor (=1)

cf = the mean value of the cohesion at the rupture "fatigue" limit

ARIZONA
OT

RWCD #4

9/24/84

3 3

3. RESISTANCE TO ABRASION:

INFORMATION IS CONTAINED IN A BIA RESEARCH AND DEVELOPMENT BULLETIN TITLED "DAM CONSTRUCTION AND FACING WITH SOIL-CEMENT" BY P.J. NUSSBAUM AND B.E. COLLEY REGARDING RESISTANCE OF SOIL CEMENT TO ABRASION BY SWIFT-FLOWING, DEBRIS-LADEN STREAMS.

THE CONCLUDING STATEMENT IN THE PORTION OF THE BULLETIN REGARDING ABRASION IS: "SOIL-CEMENT CANAL LININGS ARE GENERALLY ONLY EXPOSED TO FLOWS NOT CARRYING SAND AND GRAVEL LOADS OR DEBRIS AND THUS MAY BE CONSTRUCTED WITH THE MINIMUM AMOUNT OF CEMENT AS DETERMINED FROM STANDARD TESTS".*

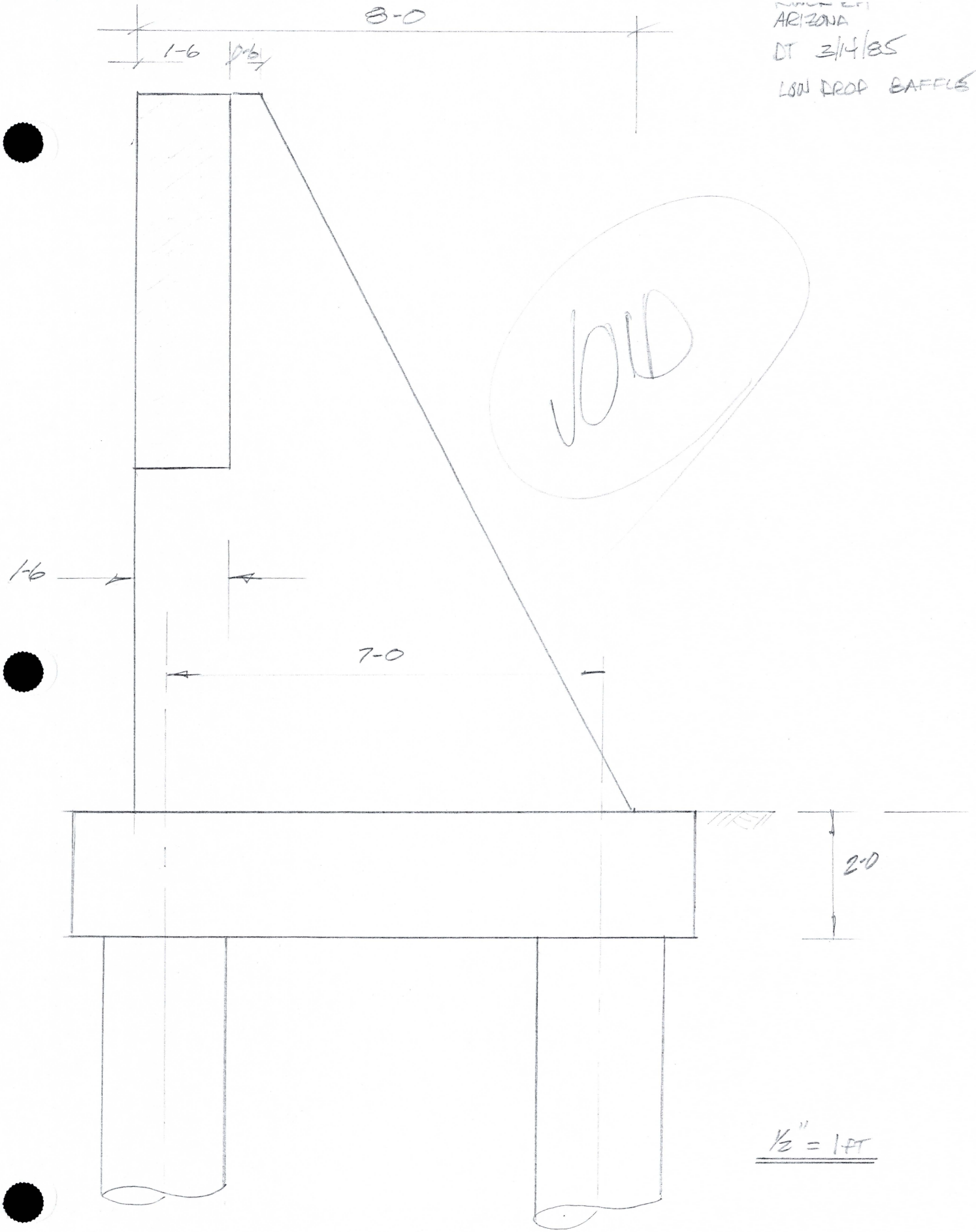
THE REPORT ON THE SUPPLEMENTAL GEOLOGIC INVESTIGATION AND SAMPLING OF THE RWCD FLOODWAY REACH 4, JUNE 1983, INCLUDES IN THE RECOMMENDATIONS AND CONCLUSIONS:

"THE FLOODWAY IS CONSIDERED TO BE ONE IN WHICH ONLY A 'CLEAR WATER' FLOW IS TO BE ANTICIPATED. NO FORMAL SEDIMENT DELIVERY RATE STUDY WAS MADE DURING THIS INVESTIGATION, BUT A RECONNAISSANCE OF EXISTING CONDITIONS AND REFERRAL TO PART 20 OF A TRIP REPORT DATED 3-21-83 SEEMS TO VALIDATE THIS CURRENT OPINION."

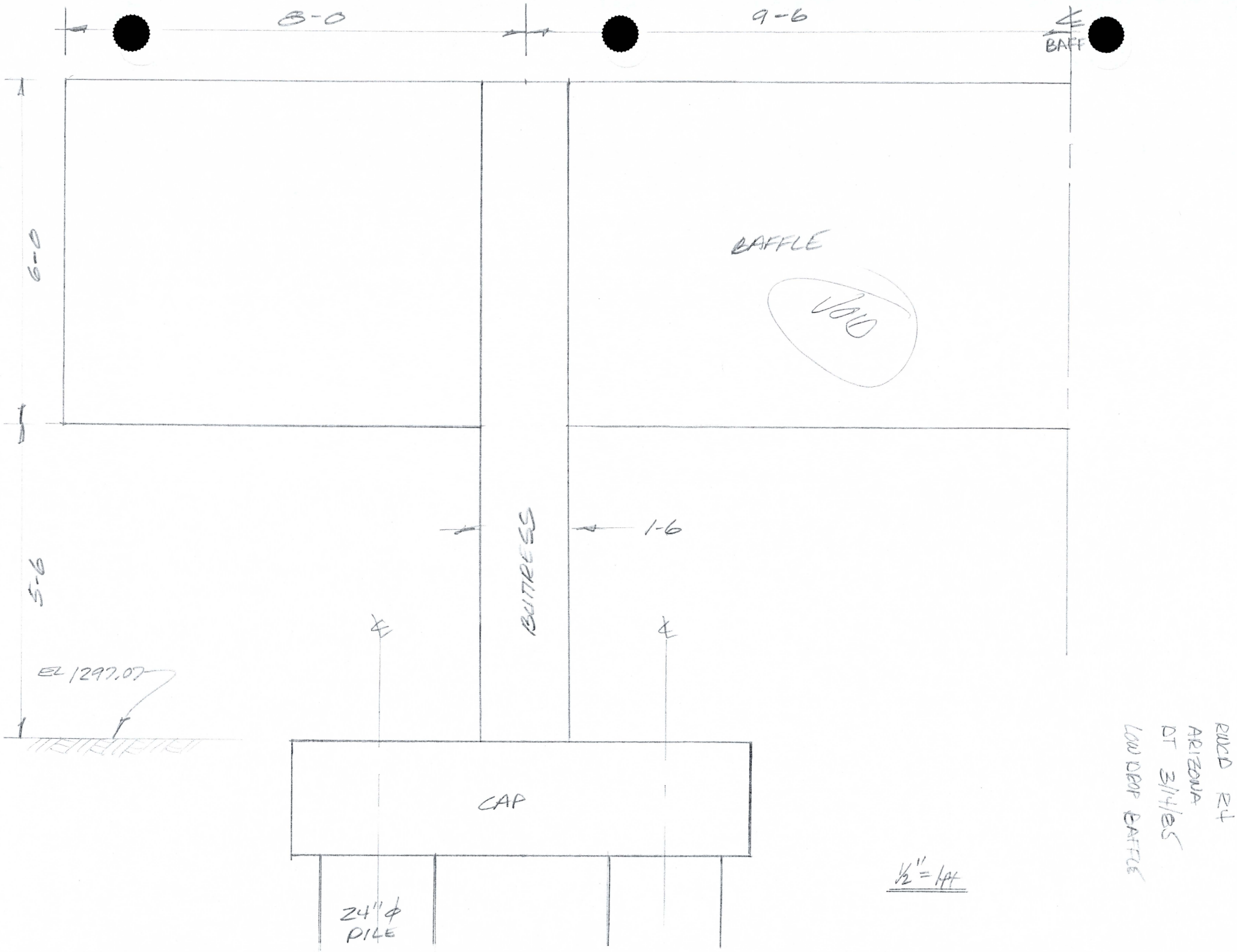
CONSIDERING THE ABOVE, IT MAY BE CONCLUDED THAT LOSS OF SOIL-CEMENT LINING DUE TO WATER FLOW OR ABRASION WOULD NOT BE SIGNIFICANT IN THE PORTION OF REACH 4 FOR WHICH IT IS PROPOSED.

*AND "FLOWS NOT CARRYING DEBRIS WILL OF THEMSELVES HAVE LITTLE OR NO EROSIVE EFFECT ON SOILS STABILIZED WITH EVEN MINIMAL AMOUNTS OF CEMENT"

ARIZONA
DT 3/14/85
LOW DROP BAFFLES



1/2" = 1-FT



RWCD R4
ARIZONA
DT 3/14/85
LOW DROP BAFFLE

WELDED JOINTS & FILLET WELDS

T

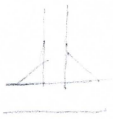
≤ 1/4	1/8
≤ 1/2	3/16
≤ 3/4	1/4

$R_w = t_e (0.30 F_u)$ $\quad t_e = 0.707a$

$= 0.707(0.30) t_e F_u$

$= 0.212 (a) (F_u)$

$\sigma_{max\ eff\ 2\ lines} : \sigma_{max\ eff} = 1.89 \frac{F_y t_2}{F_u}$



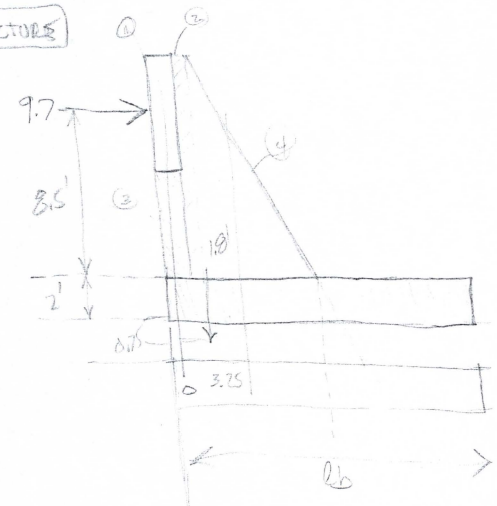
1/6 WELD

	REG	
DI A		
DI 1	10	FU
FU?	9	FY
SIS 10	8	

42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
NATIONAL

TRY A SPREAD FOOTING WITH DEADMAN TO RESIST SLIDING.

½ OF STRUCTURE

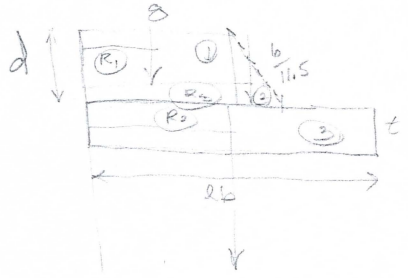


				ARM	M
½ BAFFLE		$32(6)(1.5)/2 =$	144	21.60	0
PER	③	$(5.5)(1.5)^2 =$	12.38	1.85	0
	②	$6.5(11.5)(1.5) =$	5.63	1.29	1.29
	④	$(11.5)(6)(1.5)/2 =$	77.63	11.64	3.25	37.83
				R 21.6k		39.12

$\bar{X} = 39.12/21.6 = 1.81$ ft

FOR γ_{clay} $R = 21.6\left(\frac{150-62.4}{150}\right) = 12.6$ KIPS

FOR GREATER DEPTH + BASE



	VOL	WT	ARM	M
STEM	$8d(1.5)$	$8d(1.5)\gamma$	4	$8d(1.5)\gamma(4) = 48d\gamma$
TRIANG	$b/11.5\ d^2/2$	$b/11.5\ d^2/2\ \gamma$	$8+\frac{2}{11.5}d$	$\frac{b}{11.5}(d^2/2)\gamma\left(8+\frac{2}{11.5}d\right) = \frac{b}{11.5}d^2(8+\frac{2}{11.5}d)\gamma$
BASE	$t\,l_b \times w$	$t \times l_b \times w \times \gamma$	$l_b/2$	$t \times l_b^2 \times w \times \gamma_2 = \frac{1}{2}t\,w\,\gamma\,l_b^2$

TRY: $d = 4$
$l = 20$
$t = 2$
$w = 18$
$\gamma = 87$

STEM	8(4)(1.5)	48	4.176	4	16.70
TRI		4.17	0.363	8.7	3.16
BASE	2(20)(18)	720	62.640	10	626.4
			67.179		646.26

$\bar{X} = 9.62$

NEGLECT STEM & TRIANG, ADD SOIL & GR RF' $\gamma_b = 46 pcf$

THEN

SOIL&GR	4(20)(18)	1440	64.8	10	648
Σ			129.4		1294

$\bar{X} = 10$

TOTAL

$$\Sigma M_s = 9.7(17.5)(8.576) + 12.61(2.81) + 1294 \quad -129.4 \text{ ARM}$$

$$0 = 2461 + 35.4 + 1294$$

$$\text{ARM} = 3791/129.4 = 29 \text{ NG}$$

TRY: $d = 4$
$\ell = 20$
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$\gamma = 87$

STEM	8(4)(6.5)	48	4.176	4	16.70
TRI		4.17	0.363	8.7	3.16
BASE	2(20)(18)	720	62.640	10	626.4
			67.179		646.26

$\bar{X} = 9.62$

NEGLECT STEM & TRIANG, ADD SOIL & GR REF $\gamma_b = 45$ pcf

THEN

SOIL&GR	4(20)(18)	1440	64.8	10	648
Σ			129.4		1294

$\bar{x} = 10$

TOTAL

$\Sigma M_o = 9.7(17.5)(8.576) + 12.61(2.81) + 1294 \quad -129.4 \text{ ARM}$

$0 = 2461 + 35.4 + 1294$

ARM $= 3791/129.4 = 29$ NG

TRY 4 piles/PIER

2 VERT US

2 BATTERED OS 1 HORIZ : 4 VERT.

SKIN FRICTION

BY CORRELATION W/ HIGLEY RD
USE MEAN B.C = 40

$Q_s = \Sigma p \Delta L f$

p = perimeter = $\pi D = 2\pi = 6.28$ ft

$\Delta L =$

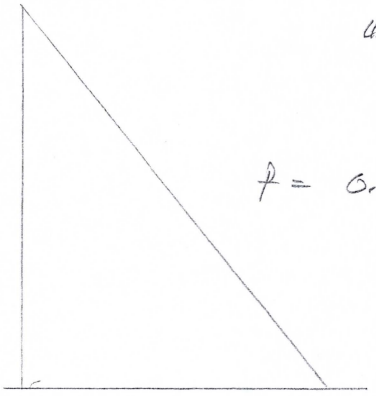
$f = K \sigma_v' \tan\delta$

USE $\gamma_b = 50$ pcf

$\sigma_v = 50L$

$f = 0.182(50)L = 9.09L$

$\delta = 20$
$\phi = 30$
$K = 1 - \sin 30 = 0.5$
$\tan\delta = 0.364$
$K\tan\delta = 0.182$



$Q_s = \int_0^L pf\,dL$

$= \int_0^L 6.28(9.09L)\,dL$

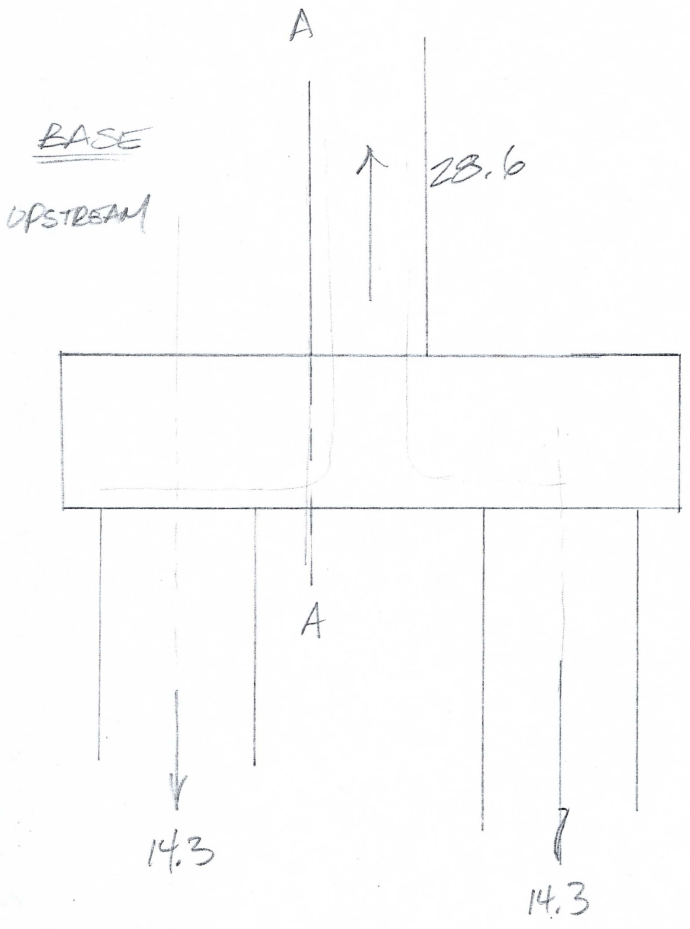
$= \frac{57L^2}{2}$

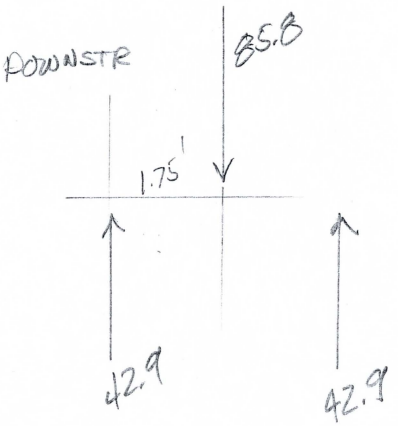
$= \frac{57(20)^2}{2}$

$= 11.4$ kips

TRY $L = 25$

$Q_s = 28.571 L^2$





$M = 75$ ft-k
$\times 1.8$
135 ft-k

$\frac{135}{90} = 1.5$ ft width w/ min of Moride Strength

$M_{AA} < 14.3k \times 1.75' = 25$ k-ft

for $d = 21.5$ min gives, $\boxed{A_s = 1.3\ in^2}$ $M_o = 90$ ft-k/FT

CHECK SHEAR

CHECK OVER 3/4 d π t $= 3/4(24)\pi(24) = 1357\ in^2$

$V_c = 1357(2)\sqrt{4000} = 172k$

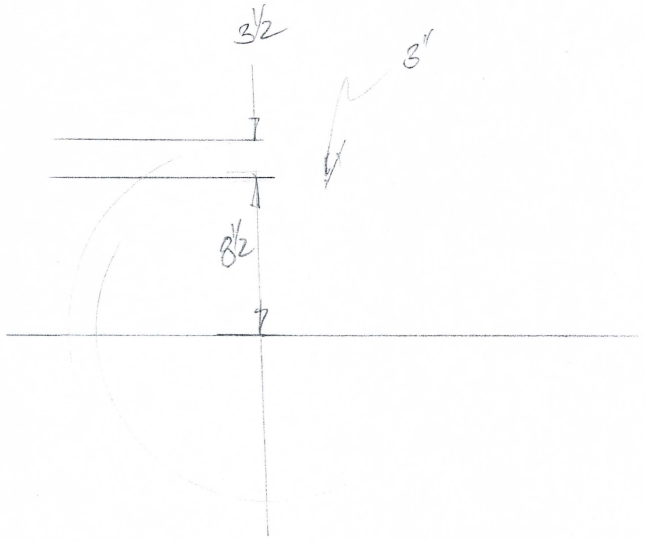
Check $\frac{0.85 V_c}{2} = 72.9k$ OK

USE #8 @ 6" cc Both FACES E.W.

RUCU R4 | LOW DROP BAFFLE

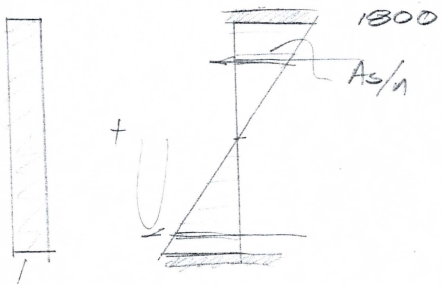
PILES = P_o Pat/pile = 42K

M@ top ≈ 42K × ½d = 420 FT-K



WORKING STRESS

- ASSUME STEEL IS CONCENTRATED IN A RING: OF d = 17"
- USE TRANSFORMED SECTION
- FIND STRESS & M WHEN $\sigma = 0.45\sqrt{f'_c}$ = 1800 psi

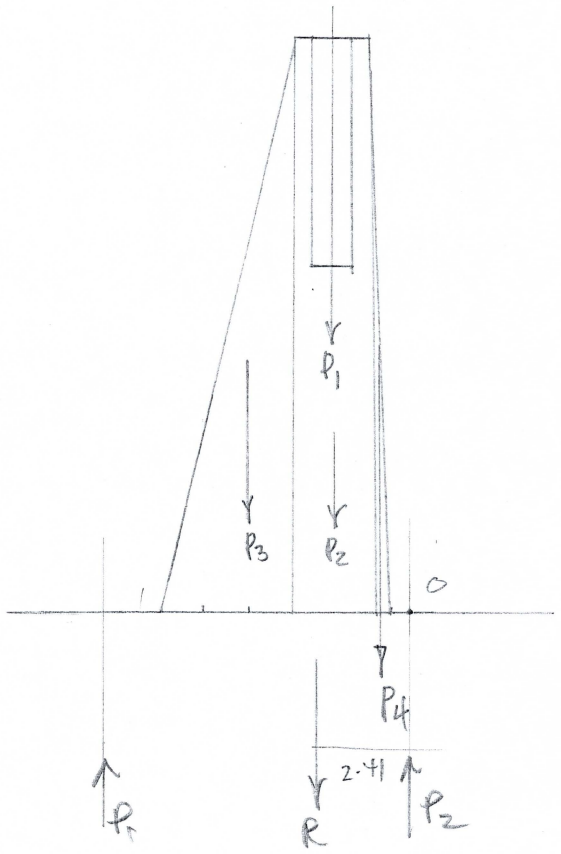


$\frac{42{,}900}{\frac{\pi(24)^2}{4}} = 95$ psi

$M_c = \frac{I_c f_c}{y} = \frac{\frac{\pi d^4}{64}(1800)}{12} = 203.6$ K-ft

42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE
NATIONAL

VERT



LOAD	WT		ARM	M
P_1	$(17.5-1)(6\times1)(150-62.4)$	= 8672	2	17345
P_2	$(2)(14.5)(1.5)(150-62.4)$	= 3811	2	7621
P_3	$(3.5)(14.5)(1/2)(1.5)(150-62.4)$	= 3334	4.167	13894
P_4	$(0.5)(14.5)(1/2)(1.5)(150-62.4)$	= 476	0.833	397
		16293		39257

$$ARM = \frac{39257}{16293} = 2.41 \text{ ft}$$

$$P_1 = \frac{39257}{8} = 4907 \text{ k}$$

$$P_2 = 16293 - 4907 = 11,386 \text{ k}$$

42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE
MADE IN U.S.A.
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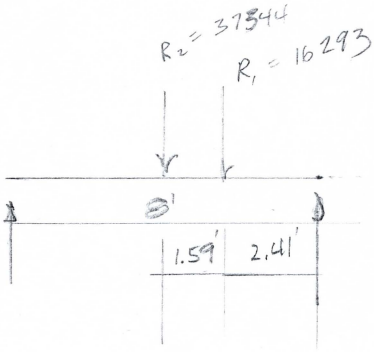
CHECK SPREAD FOOTING REQUIREMENTS:

- TRANSFER D.L. TO CENTER:



R = 53637

$M = 16{,}293 \times 1.59 = 25.9$ K-F

$M_{LAT} = 169.75$

195.65 K-F

$\sigma_M = \frac{M_u}{I} = \frac{195.65(10/2)}{(10^3/12)8} = 1467$ psf

$q = 53{,}637/80 = 670$ psf

→ TRY 12 x 10 base

- ADDL WT CONC $(120-80)\,e7.6(1.5) = 5256$ #

GR $40(87.6)(2) = 7008$

SOIL $40(140-62.4)1 = 3104$

15368

SR = 69005

$q = SR/120 = 575$ psf

$$\sigma_M = \frac{My}{I} = \frac{196(6)}{(12)^3/12)\,10} = 0.816\ psf$$

42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
NATIONAL

ARIZONA RWCD R4 | DT 3/13/85 | LOW DROP BAFFLE

RESOLVE LOADS (USE ΣL, 150 #/ft³

	ITEM	VOL	WT	ARM	M_o
P_1	BAFFLE	6(1)(32) = 192	28.8k	0	0
P_2	PIER	1.5(2) 11.5 = 34.5	5.18	0.5	2.59
P_3	COUNTER	2(11.5)1.5 = 34.5	5.18	2.833	14.67
P_4	BASE	10(8)(1.5) = 120	18.0	5	90.00

$R = 57.16K$ $\quad \Sigma M_o$ 107.26 K-ft

$$\bar{x} = \frac{107.26}{57.16} = 1.87'$$

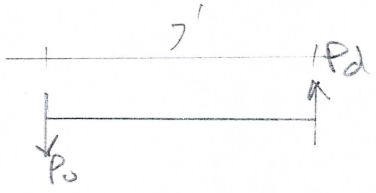
Shift Resultant to ℄

$$M_R = R \times (5 - \bar{x}) = 57.16(5 - 1.87) = 178.5 \text{ k-ft}$$

M DUE TO HWR. LOAD ON BAFFLE:

$$\frac{169.75}{1.8}(8.5) = 801.6 \text{ K-ft}$$

CONVERT TO PILE LOADS (W/G L.F. = 1.8)



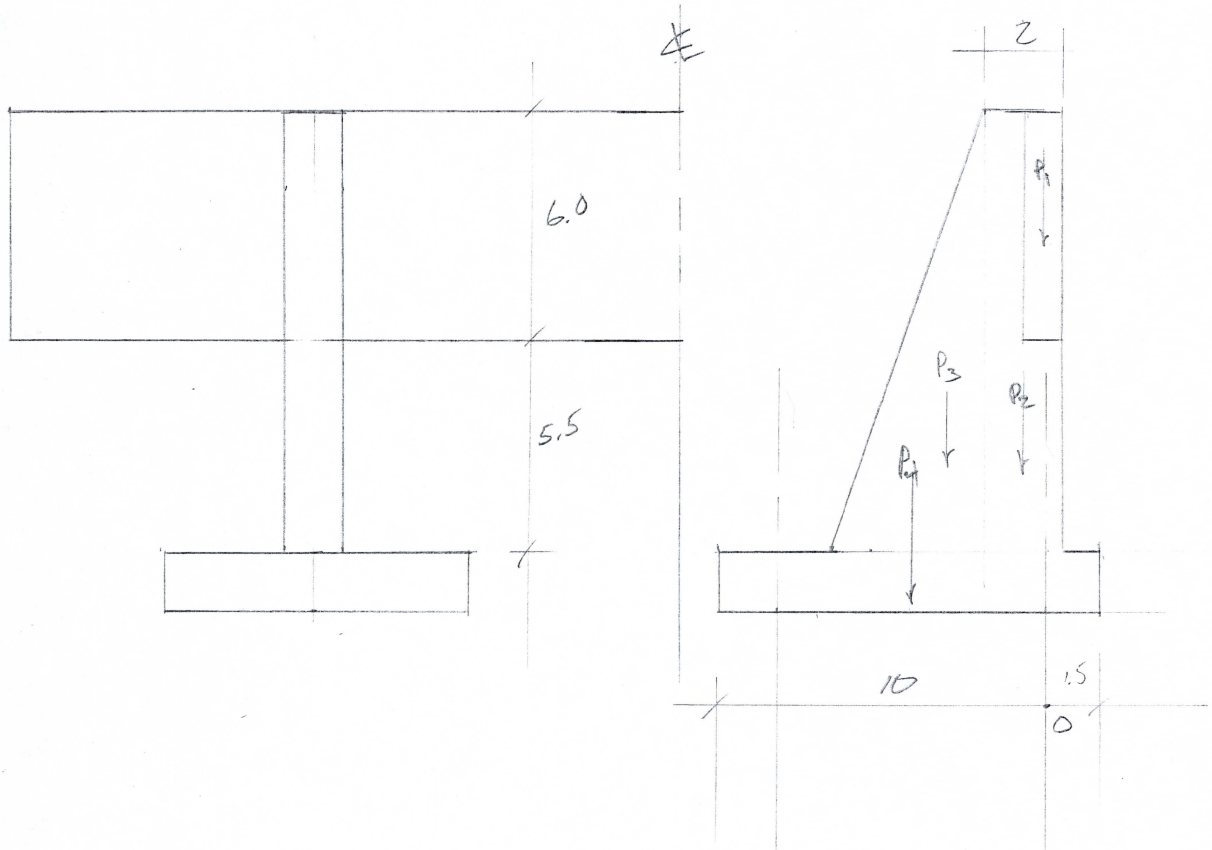
$P_D = P_d = M/7 = 801.6/7 = 114.5k$

PER PILE $P = \frac{1}{4}(57.2 \pm 114.5)$

$P = 14.3 \pm 28.6k$

42.9K OR −14.3K

TRY WITH PILE CAP TOP AT BASIN INVERT EL =



42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
NATIONAL

ARCHITECT RINCK RY | DT 3/13/85 | LOW DROP BAFFLE

TRY 16" PILE CONC.: $E = 300$ ksi

$$I = \frac{\pi d^4}{64} = \frac{\pi (16)^4}{64} = 3217 \text{ in}^4$$

Check lateral capacity:

NAVDOCKS OM 7.2

°REL. STIFFNESS

$$T = \left(\frac{EI}{f}\right)^{1/5} = \left(\frac{(300{,}000)(3217)}{11.574}\right)^{1/5} = 38.39$$

$f = 10 \text{ tons/ft}^3$

$= \frac{10(2000)}{1728}$

$= 11.574 \text{ lb/in}^3$

$P = 23.6$ kips actual

LENGTH $= 20 < 38.39$ ∴ PILE IS RIGID

USE $k_p = 2$

3-39 P72 "Drilled Piers"

$$P_u = 1.5 \gamma d_s L^2 k_p = 1.5(100)(1.33)(20)^2 2 = 106.4 \text{ k}$$ OK

42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE
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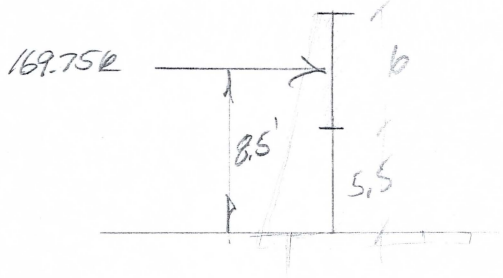
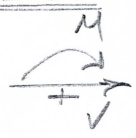
SUPPORTS:

ASSUME RESULTANT ACTS THROUGH MID HEIGHT OF BAFFLE.



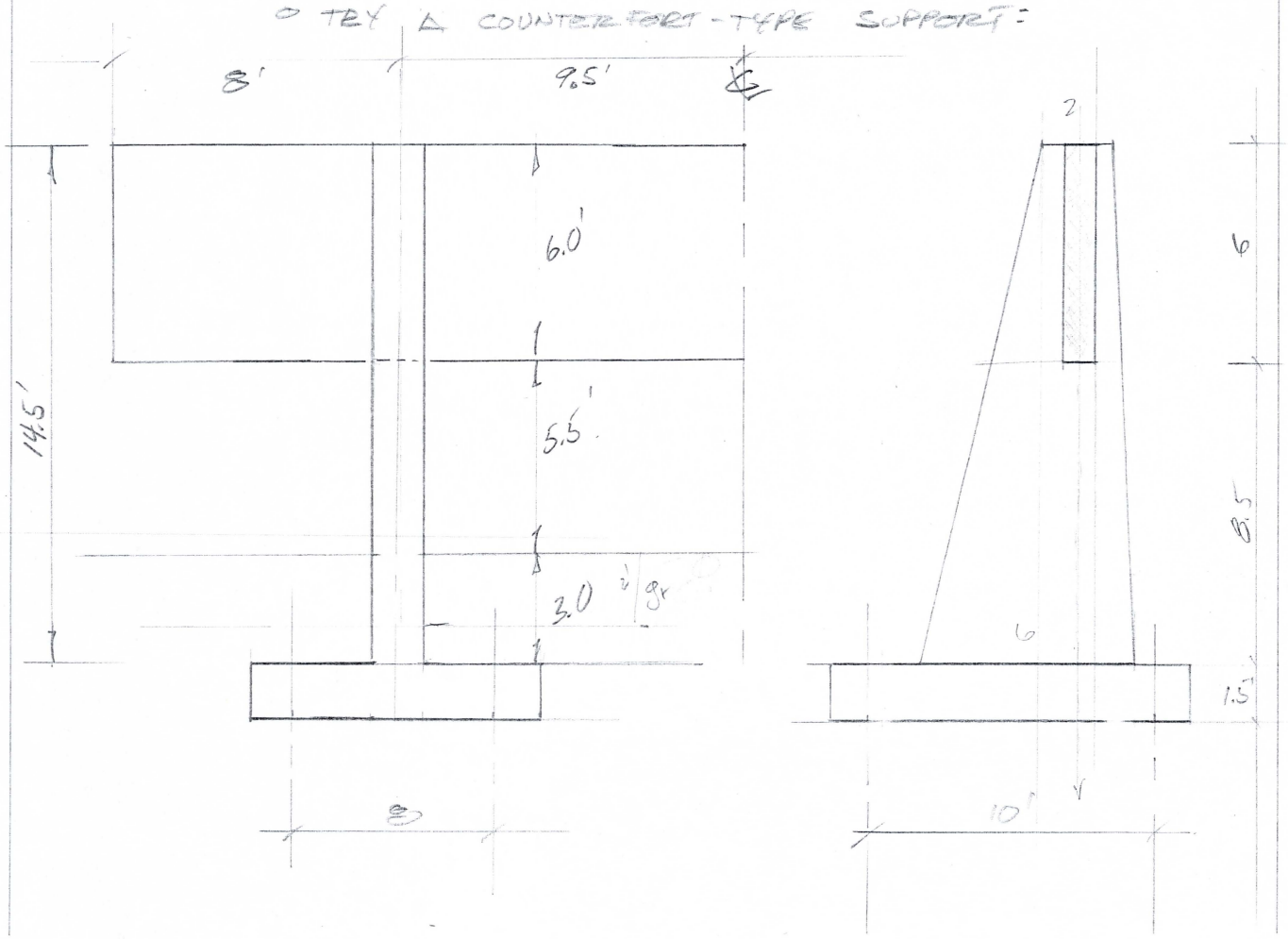
TRANSFER TO BASE:



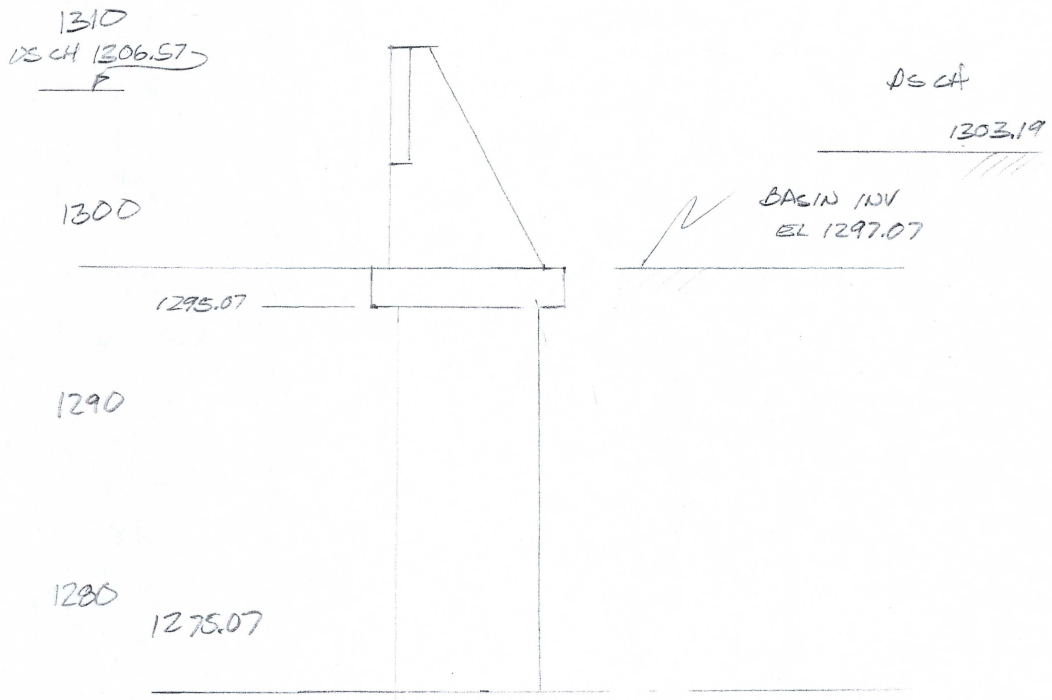
$M_u = 169.75 \times 8.5 = 1443$ ft-k

$V_u = 169.75$ k

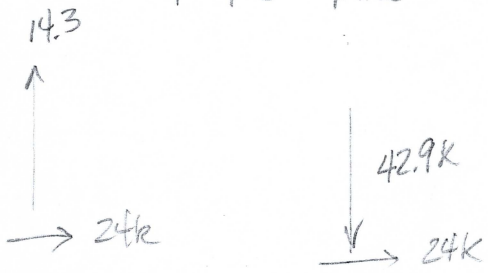
- M TOO LARGE FOR (2) SINGLE PIERS
- TRY A COUNTERFORT-TYPE SUPPORT:



ARIZONA RWCD #4 | DT 3/13/85 | LOW DROP BAFFLE



$\text{Load per pile of piles} = \frac{170}{1.8(4)} = 24k$



42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
MADE IN U.S.A.
NATIONAL

LATERAL RESISTANCE:

FOR RIGID PILE W/ FIXED HEAD:

EQ 3-39 p. 72 "Drilled Piers"

$$P_u = 1.5 \gamma_s L^2 K_p \qquad \text{Use } \gamma = \gamma_b = 50 \text{ pcf}$$

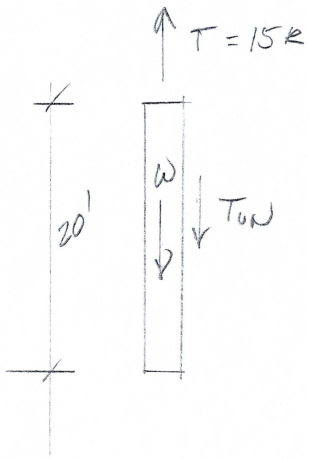
$$= 1.5(50)(2)(20)^2 5$$

$$= \underline{300 \text{ k}}$$

$FS = 3$ gives P_{all} 100k ea

ROLLOUT

DAS "PRINCIP of FND ENGRG" p 379



$$W_B = \pi 20 (150 - 62.4) = 5.5 \text{k}$$

$$T_{UN} = \int_0^L (f_s p) dz \qquad f_s = K_u \sigma_v' \tan\delta$$

$$f_u = 1.25 \text{ Fig } 8.25(b)$$

$$= 1.25 (50z) \tan 20$$

$$= 22.7z$$

$$= \frac{\pi 2 (22.7)(20)^2}{2}$$

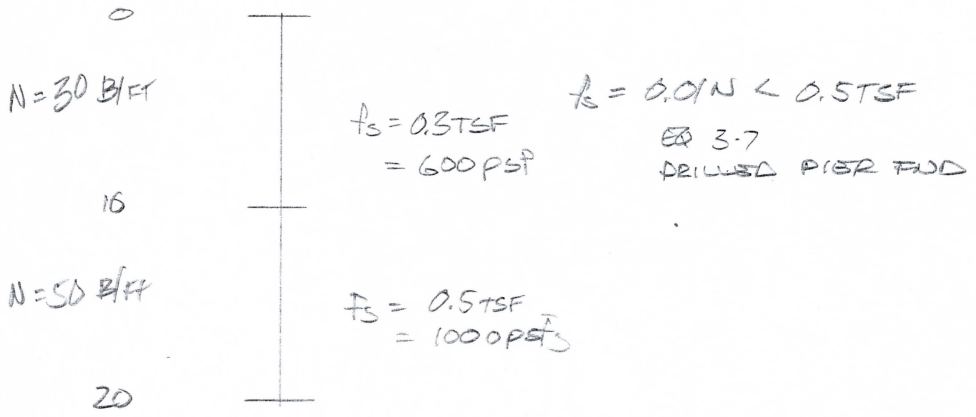
$$= \underline{28.5 \text{ kips}}$$

$$W_B + T_{UN} = \underline{34 \text{ kips}} \text{ ea}$$

AKIZONA
RWCD R4

DT 3/14/85

CHECK FRICTIONAL RESISTANCE BY
CORRELATION WITH OTHER EXPLORATIONS,



$$P_s = \Sigma \pi d \Delta L f_s$$

$$= \pi(2)(10(600) + 10(1000))$$

$$= 100.5 \text{ kips}$$

$F_S = 2$ $P_{all} = 50k$ ok

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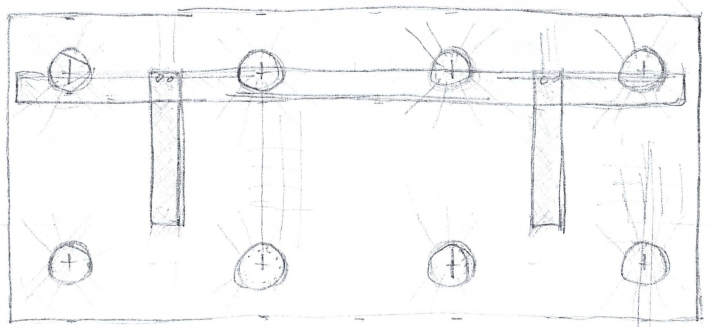
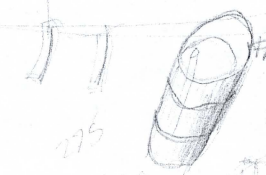
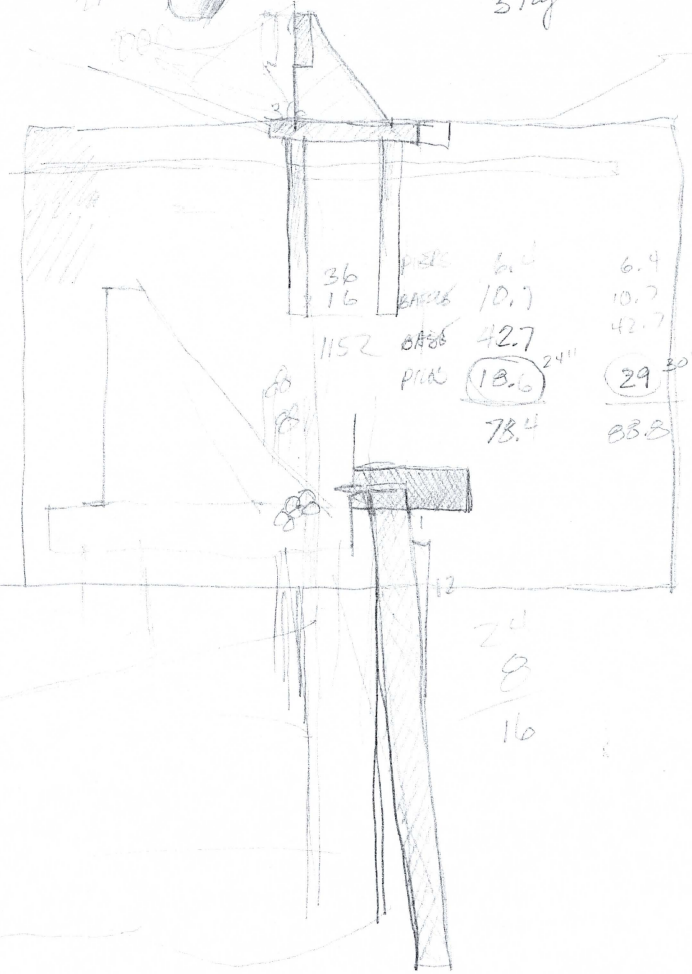
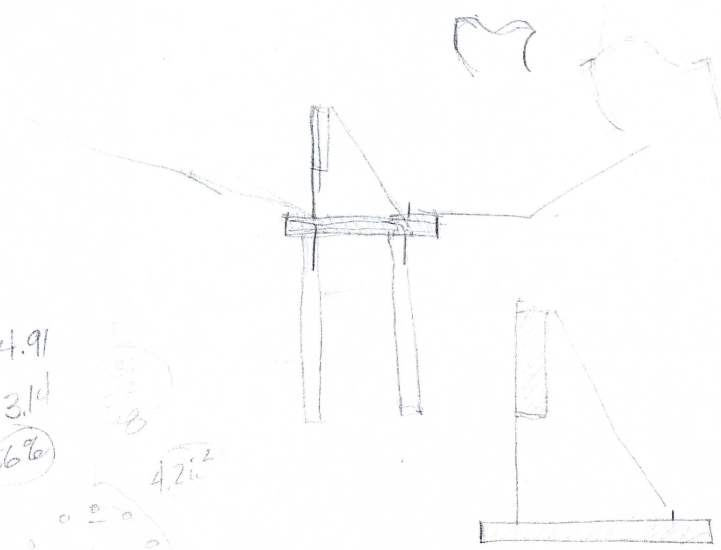
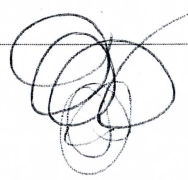
42-389 200 SHEETS 5 SQUARE
Made in U.S.A.
NATIONAL


7.5
20
7.5









COMPACTED EARTH LINING SUMMARY

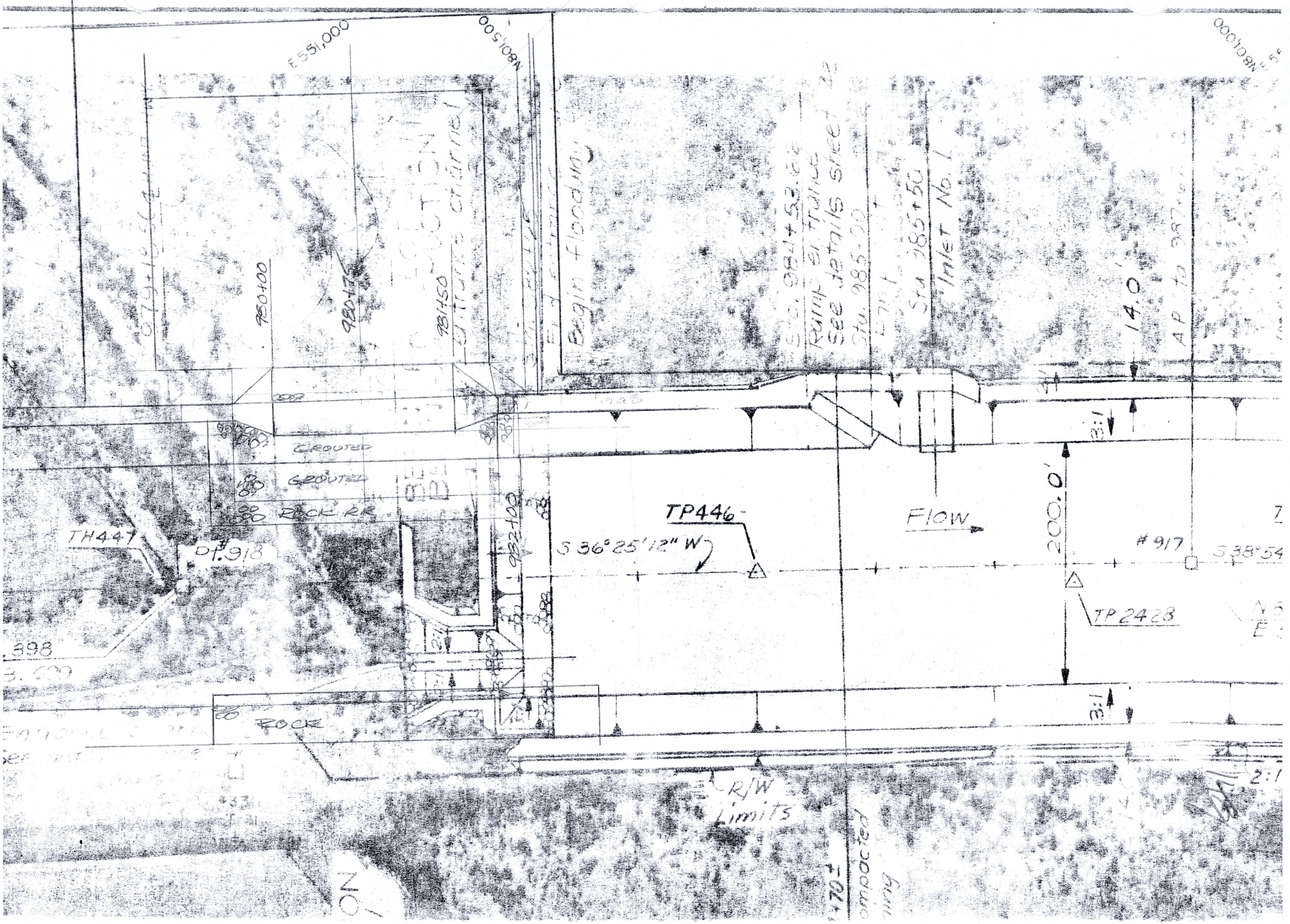
VDD

LINING & LENGTH (ft)

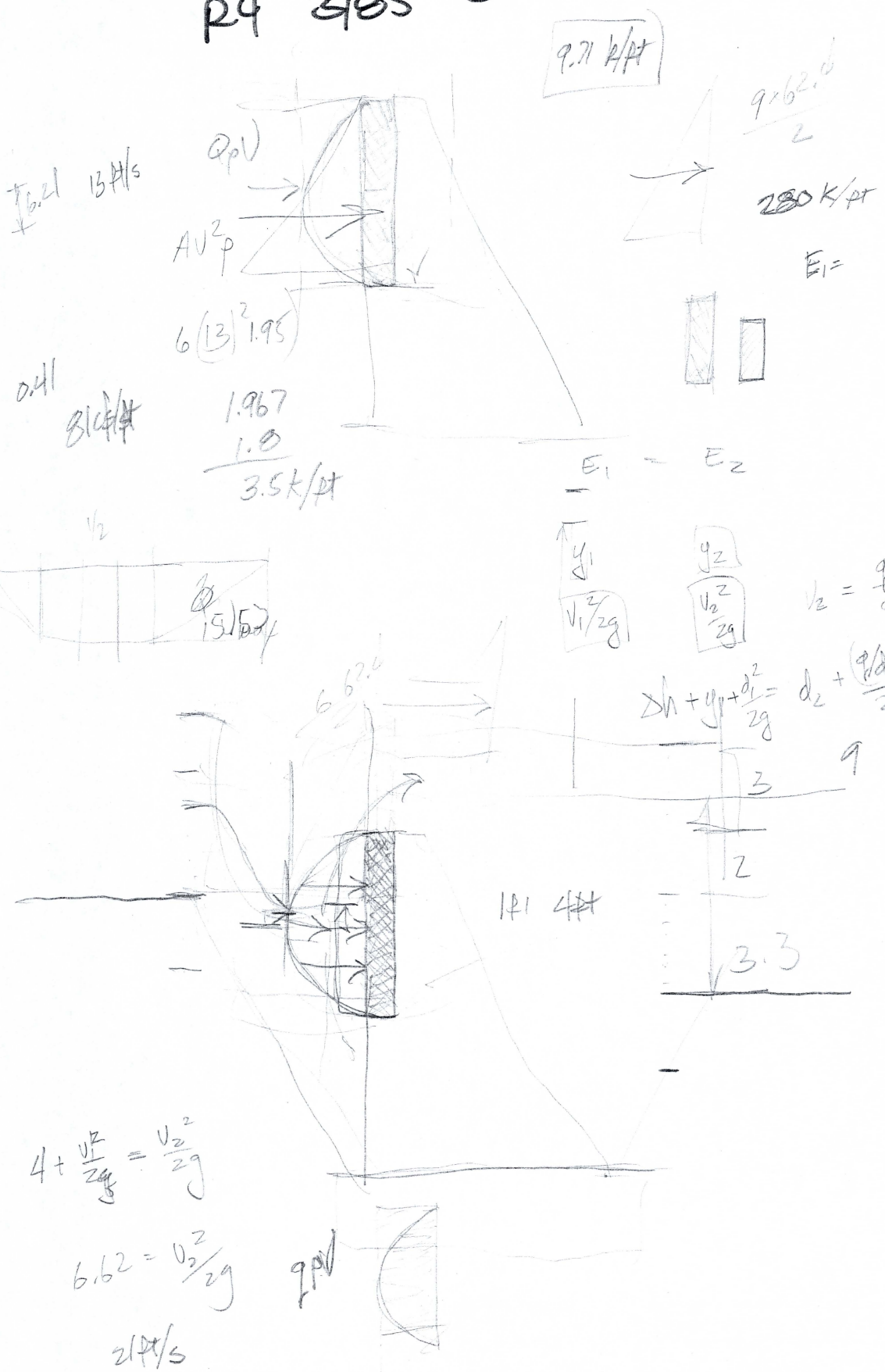
STATIONS FROM	TO	NO	BOTTOM ONLY	SIDE ONLY	BOTTOM & SIDE
555+00	559+00		400		
559+00	580+00	2100			
580+00	588+00		800		
588+00	655+00	6700			
655+00	662+00			700	
662+00	698+00	3600			
698+00	724+00		2600		
724+00	735+00				1100
735+00	739+00		400		
739+00	744+00	500			
	TOTAL	12900	4200	700	1100
		68%	22%	4%	6%

Σ = 18900

42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
NATIONAL Made in U.S.A.


E 551,000
N 801,500
Begin Floodline
Sta. 984+32.66
Rehab. El. Inlet
See Details Sheet
Sta. 985+00
Sta 985+50
Inlet No. 1
14.0'
AP to 897.5
3:1
GROUTED
GROUTED
ROCK RR
TH447
DH 918
TP446
S 36°25'12" W
FLOW
200.0'
#917
S 38°54
TP2428
398
ROCK
R/W
Limits
2:1

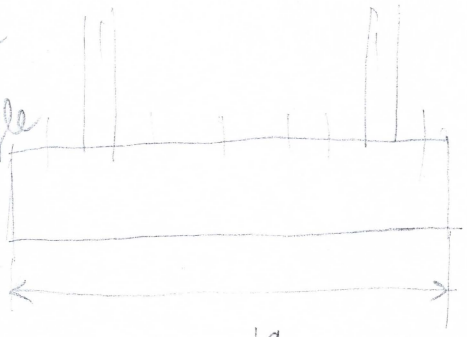
BAFFLE SKETCHES
R4 3/85 DT.

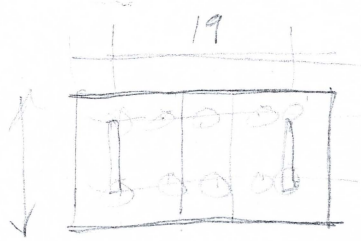


20 x 10 ft

15 sq base
6 piers
11 sq baffle
piles 88 sq

120 sq
30
$42,000





13.49

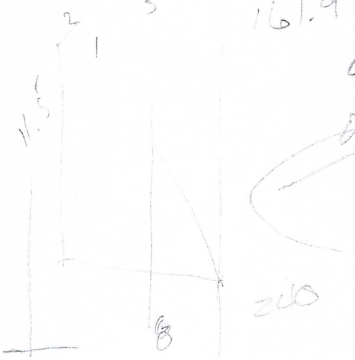
161.9

47 #/ft

$23/ft + $40

$65/ft

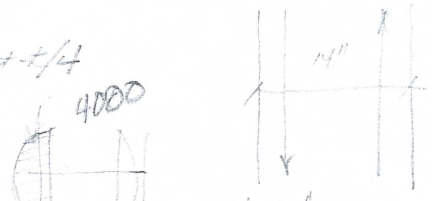
$15,600 piles



425 ft-k
20
1700 ft-k/ft
16

170x10

283 ft-k

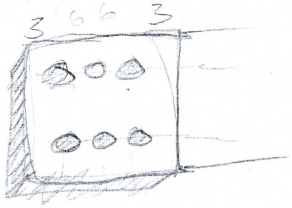


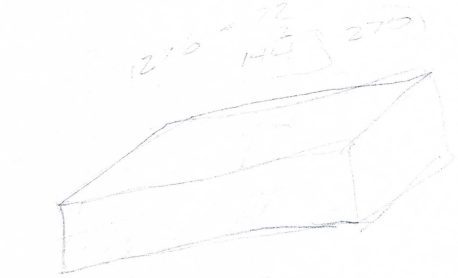
4000

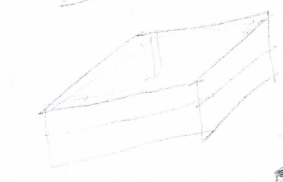
$14 A_s f_y = M$

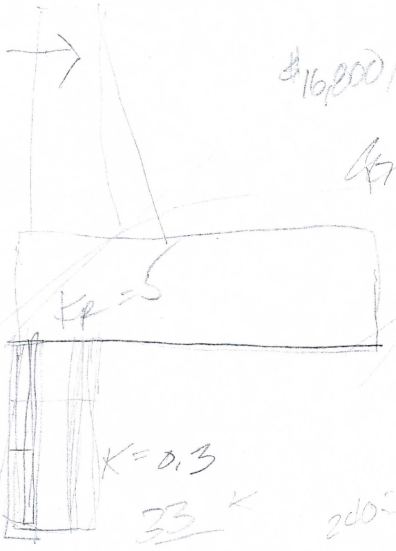
$$A_s = \frac{M}{\frac{14}{12} f_y} = \frac{283}{\frac{14}{12} 36}$$

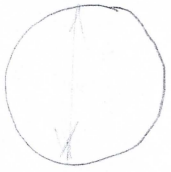
$$= 6.75 \text{ in}^2$$

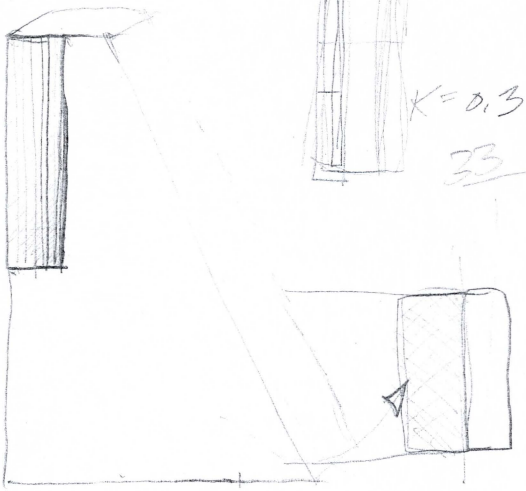




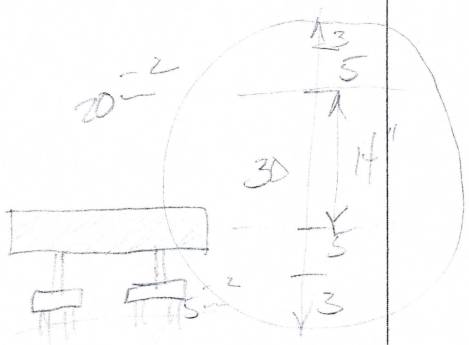




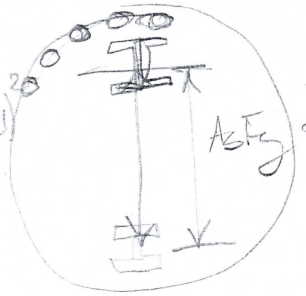




70 #/ft



$\frac{170 \times 10}{4}$



M = 450 K-ft

$A = bd + 2d^2$

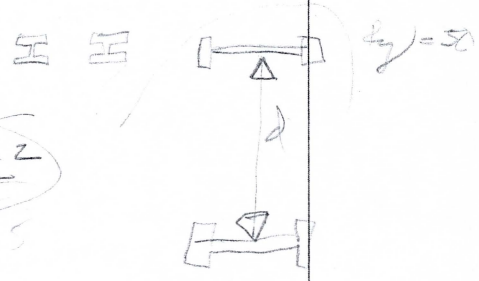
$= 70(6.21) + 2.5(6.21)^2$

$= 531$

$d_c = 6.21$

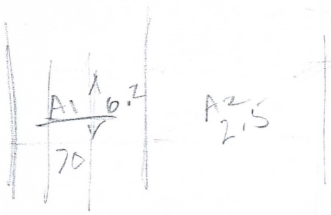
$V_c = 13$ ft/s

$\frac{M}{S} = \frac{450(12)}{36(15)} = 10 \frac{in^2}{in}$

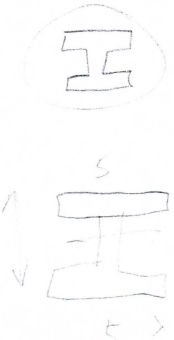


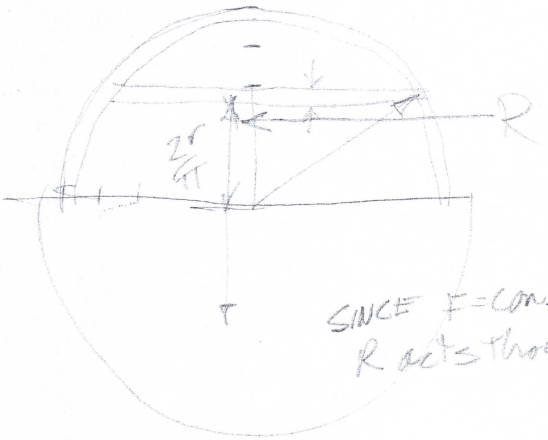
$A_1 = 70d$

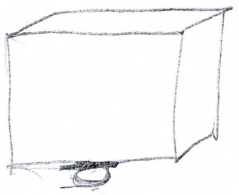
$q = \rho V_c$



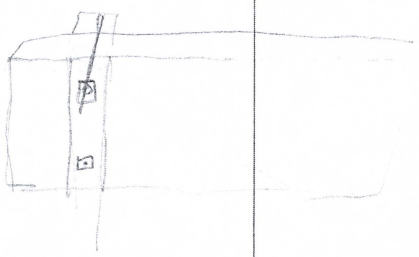
$\frac{35}{70}$





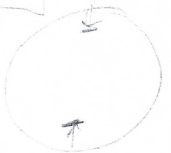


SINCE F=const
R acts thru centroid



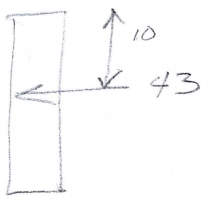
$R = P_g A_s$

$= 40 A_s$



$\text{Arm} = \frac{4r}{\pi} \sim 1.3r \sim 24.7 = 17\text{in}$

$A_s = \frac{\pi d t}{2}$



50

L=12.5

$M = \text{Arm} \times R$

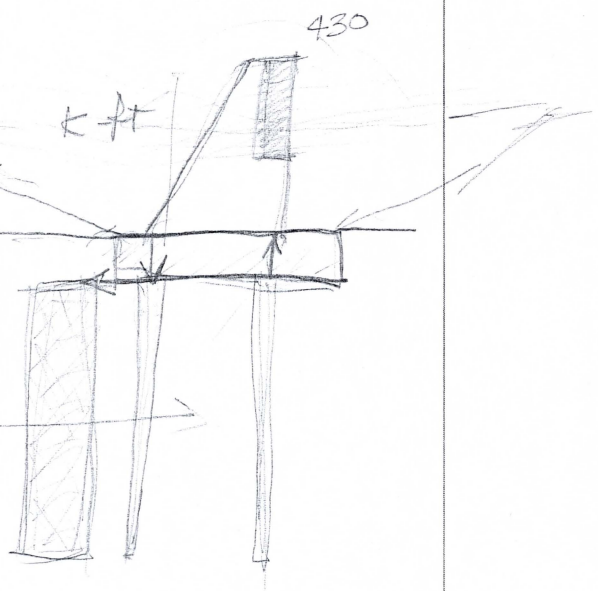
$= \frac{17}{12}(40)\left(\pi \frac{17}{12}\right) t \quad k\text{-ft}$

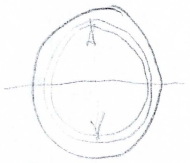
$M = 252\ t\ k\text{-ft}$

$= 4\pi 36\ t$

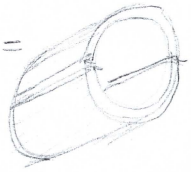
$= 452\ t$

$t =$



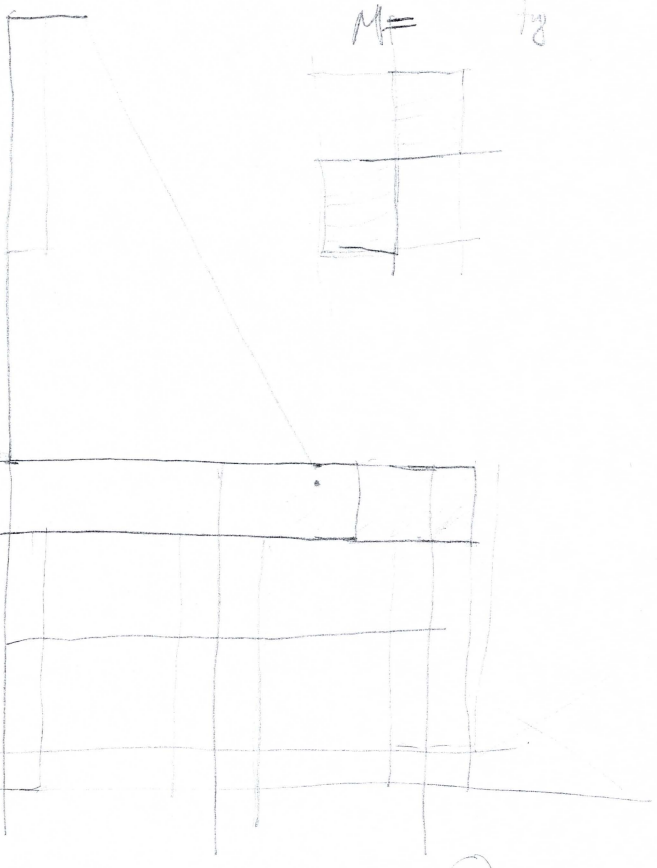


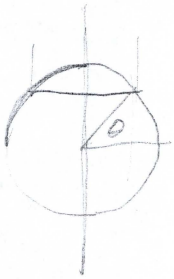
STEEL ONLY $I =$



$\frac{\pi}{4}(r_o^4 - r_i^4)$

$M =$ P_{fg}





$dy = \delta r$

$\frac{170^K \rightarrow}{6}$

3,

$\frac{120}{9} = 13.3\,u_f$

$\times 2$

$26\,u_f$

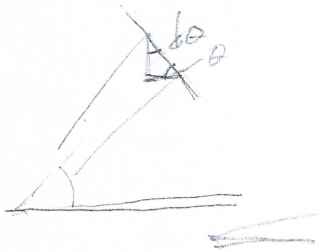
$28.3^K/ft$

10

28.3

283.4^K $\frac{120^K}{13.3}$ u_f

$\frac{360}{9}$



θ

$\delta\theta$

$M = \int_0^Y w\,dy\,f_{fg}\,y$ $\qquad dy = d\theta \sin\theta$

TOPICS:

- RECT PLATE - NAVIER
  - LEVY
  - POINT
  - UNIF.
- CIRC. PL - AXISYMM
  - ASYMM
- MINDLIN

OTHER

- BC
- FOURIER SERIES

- GOVERNING EQN

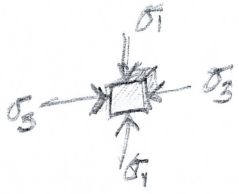
$$\frac{\partial^4 w}{\partial x^4} + 2\frac{\partial^4 w}{\partial x^2 \partial y^2} + \frac{\partial^4 w}{\partial y^4} = \frac{q}{D}$$

$$\frac{\sigma}{y} = \frac{M}{I} = \frac{E}{R} \; ; \; \sigma = \frac{My}{I} \qquad R = \frac{1}{K} = \frac{1}{\frac{\partial^2 w}{\partial x^2}}$$

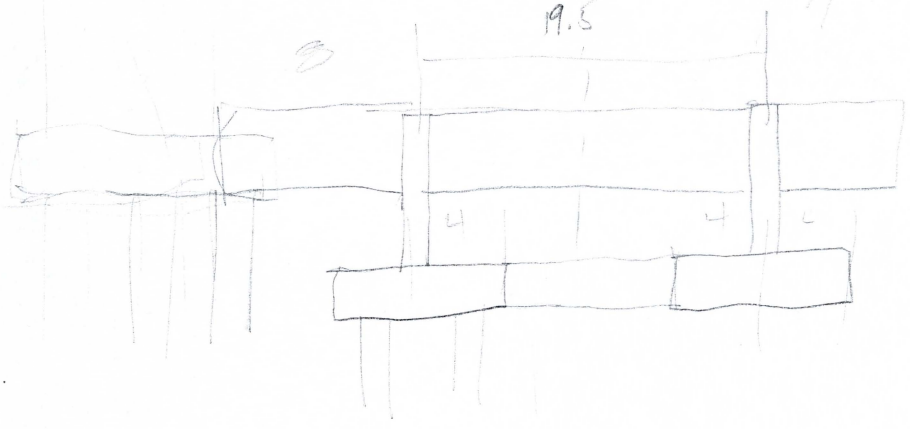
$$M = EI\frac{\partial^2 w}{\partial x^2}$$

$$M_x = \int_{-t/2}^{t/2} Kz^2 dz = \frac{Kt^3}{12}$$

$$\sigma = y\frac{\partial^2 w}{\partial x^2}$$

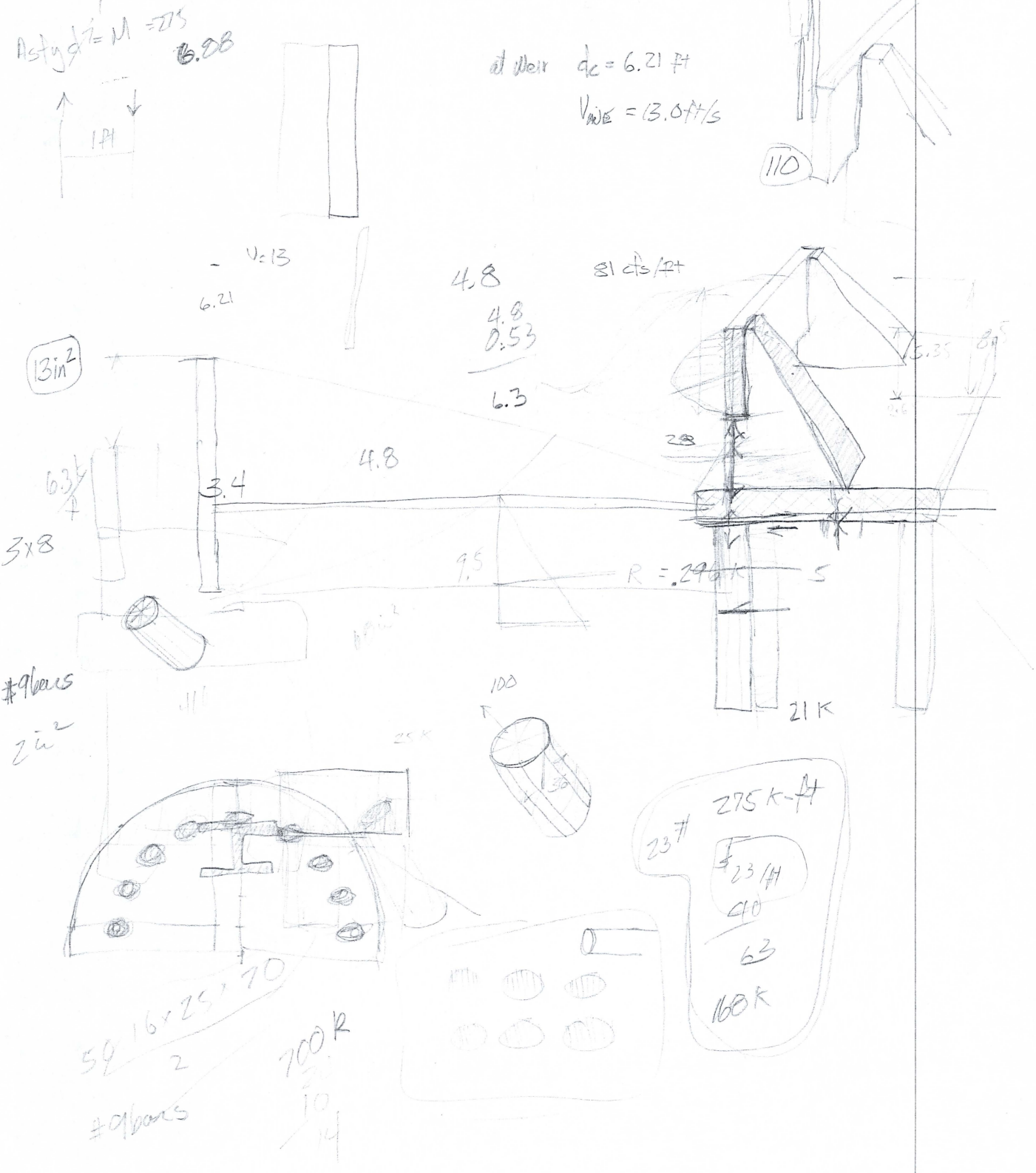


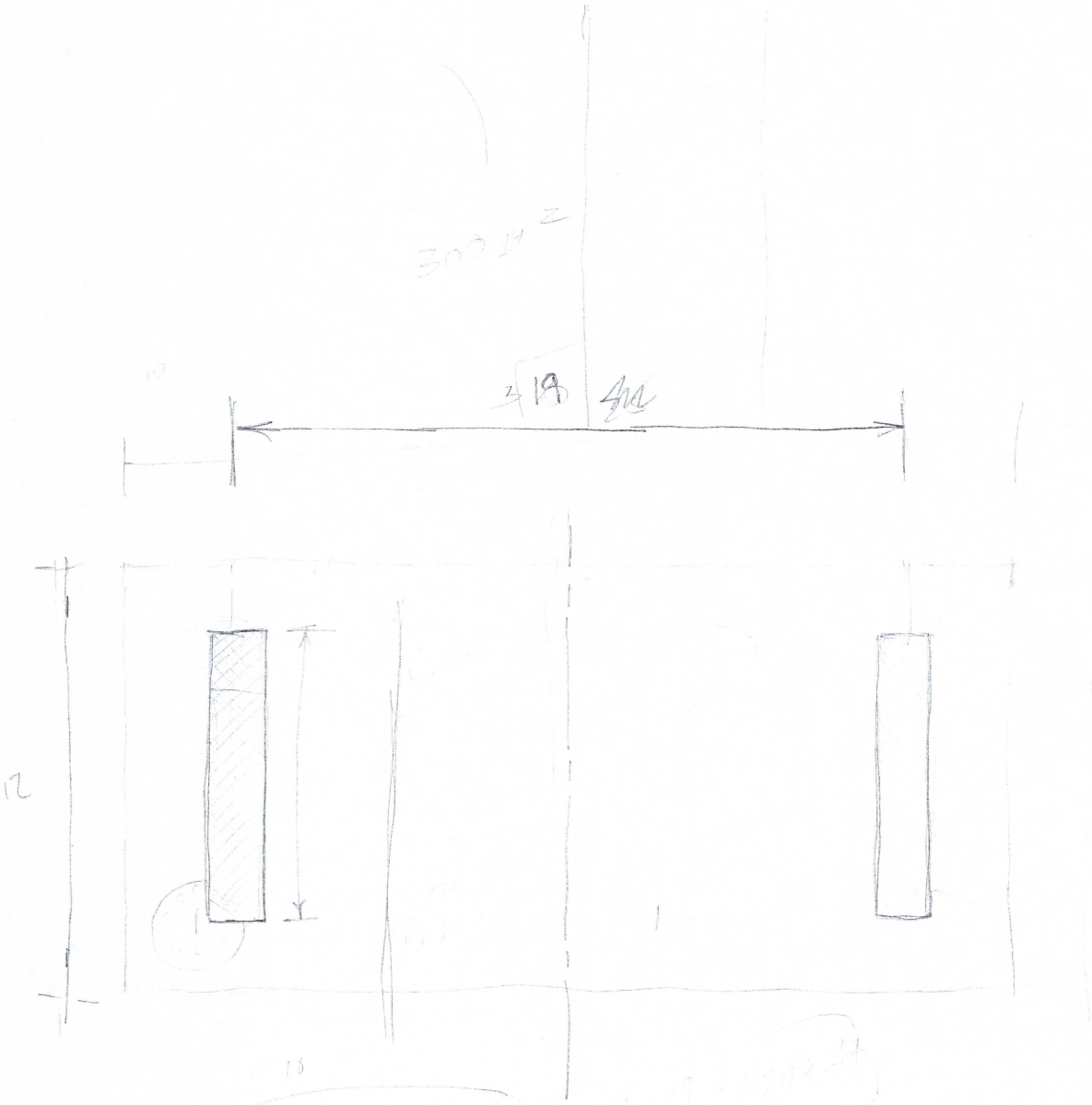
$$D = \text{R Stiffness} = \frac{EI}{(1-\nu)^2/2}$$



Recheck basic assomptions:

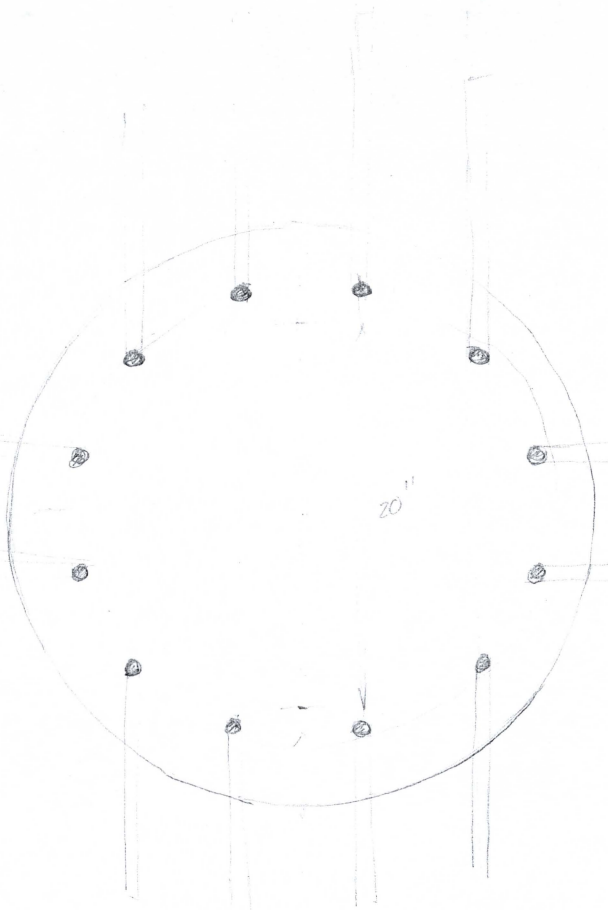
Hydraulic Load on Baffle:





BAFFLE	10.67
PIERS	6.39
BASE	~~18~~ 27.2
PILES	18.6
	~~5~~ 10 ~~8~~

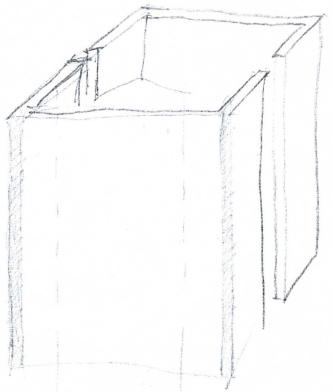
$20,251



A_c

12 #9 — $\approx 12 in^2$

$A_s = \frac{3.15}{50} \frac{12}{20} = 3.78 in^2$



30" PILE

$1 in^2$ st $\approx$ 1.71/ft

$23/ft 1 ot 8 30' to 24"

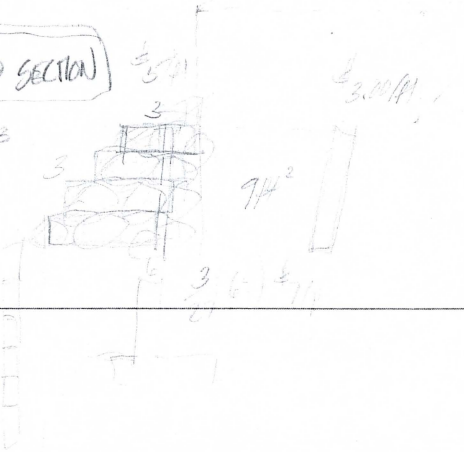
$ 63.63

$ 40.72

USE 24" w/ SOLID SECTION

12 #/ft³

84 ft³ / sack



ARIZONA RWCD RC4	DT 3/17/85	LOW DROP BAFFLE

TRY WITH BASE AT SURFACE:

SOLVE FOR l_b WITH $W = 18$; $t = 2$

$$\Sigma M_A = 0 = 12.61(2.76) + \frac{l_b^2}{8}(18)(8)(0.087) - \frac{2}{3}l_b(12.61 + l_b(18)(2)(0.087)) + 9.7(17.5)(10.5)$$

$$0 = (1782 + 34.8) + 1.566 l_b^2 - 8.406 l_b - 2.088 l_b^2$$

$$0 = 1816.8 - 8.406 l_b - 0.522 l_b^2$$

FIND $l_b = 51.5$ ft NG

USE PILES

CHOW EQU 16-13

Q	B	Z	D	V	R	S	
6500	50	2	8.51	11.39671	480.53	.2898879	
6500	50	2	8.2	11.938	480.53	.3159146	
6500	50	2	7.94	12.42623	480.53	.3352498	0,0009
6500	50	2	7.71	12.8869	480.53	.3454391	0,0010
6500	50	2	7.51	13.31148	480.53	.3793377	0,0011
6500	50	2	7.33	13.7143	480.53	.3969321	
6500	50	2	7.16	14.11414	480.53	.4385616	
6500	50	2	7.28	13.82988	480.53	.4210745	

CHOW EQN 16-13

```
10 REM****** TR25 TRAPEZOIDAL CHANNEL SUPERELEVATION
15 WIDTH "LPT1:",132
20 G=32.16
30 CLS
40 REM **ALT. INP.    INPUT "ENTER Q,B,Z     ",Q,B,Z
42 DATA 6500,50,2
44 READ Q,B,Z
45 LPRINT "Q" TAB(16) "B" TAB(31) "Z" TAB(46) "D" TAB(61) "V" TAB(76) "R" TAB(91)"S"
47 INPUT "ENTER RADIUS OF CURVATURE    ",R
50 INPUT "ENTER DEPTH    ",D
60 A=B*D+Z*D*D
70 V=Q/A
80 B1=B+Z*D
90 V=Q/A
100 S=V*V/G*(20/3*R/B1-(16*(R/B1)^3)+(4*(R/B1)^2-1)^2*LOG((2*R+B1)/(2*R-B1)))
110 LPRINT Q,B,Z,D,V,R,S
120 GOTO 50
```

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: E.B.ALDERMAN DATE: 3/25/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.001250

552+00

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
4+ 0.00	6500.00	75.00	2.00	5.83	9.44	886.2	7.33	1310.29	1319.73	0.000	0.000	0.000
4+ 5.00	6500.00	71.88	2.00	5.98	9.37	849.0	7.66	1310.30	1319.67	0.484	0.000	
4+10.00	6500.00	68.75	2.00	6.13	9.29	811.1	8.01	1310.30	1319.59	0.510	0.000	
4+15.00	6500.00	65.63	2.00	6.29	9.19	772.5	8.41	1310.31	1319.50	0.540	0.000	
4+20.00	6500.00	62.50	2.00	6.46	9.08	732.8	8.87	1310.32	1319.40	0.574	0.000	
4+25.00	6500.00	59.38	2.00	6.65	8.95	691.8	9.40	1310.32	1319.27	0.614	0.000	
4+30.00	6500.00	56.25	2.00	6.85	8.79	649.1	10.01	1310.33	1319.12	0.662	0.000	
4+35.00	6500.00	53.13	2.00	7.06	8.59	604.0	10.76	1310.33	1318.93	0.722	0.000	
4+40.00	6500.00	50.00	2.00	7.28	8.33	555.1	11.71	1310.34	1318.67	0.799	0.000	

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: E.B.ALDERMAN DATE: 3/25/85 CHECKED BY:_____ DATE:_____

n= 0.014 So= 0.001000

551+60

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
4+40.00	6500.00	50.00	2.00	7.28	8.33	555.1	11.71	1310.34	1318.67	0.000	0.000	0.000
4+45.00	6500.00	50.00	2.00	7.28	8.33	555.1	11.71	1310.35	1318.67	0.799	0.000	
4+50.00	6500.00	50.00	2.00	7.28	8.33	555.2	11.71	1310.35	1318.68	0.799	0.000	
4+55.00	6500.00	50.00	2.00	7.28	8.33	555.2	11.71	1310.36	1318.68	0.799	0.000	
4+60.00	6500.00	50.00	2.00	7.28	8.33	555.3	11.71	1310.36	1318.69	0.799	0.000	
4+65.00	6500.00	50.00	2.00	7.28	8.33	555.3	11.71	1310.37	1318.70	0.799	0.000	
4+70.00	6500.00	50.00	2.00	7.28	8.33	555.3	11.70	1310.37	1318.70	0.799	0.000	

VOID

Q=6500
d=8.59

Run #2

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: ALDERMAN DATE: 3/14/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000167

553+00

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
553+00 1+ 0.00	6500.00	90.00	2.33	5.20	8.59	945.2	6.88	1310.85	1319.44	0.000	0.000	0.000
1+ 5.00	6500.00	88.50	2.32	5.26	8.57	928.7	7.00	1310.85	1319.42	0.458	0.000	
1+10.00	6500.00	87.00	2.30	5.31	8.55	912.0	7.13	1310.85	1319.40	0.467	0.000	
1+15.00	6500.00	85.50	2.28	5.37	8.53	895.2	7.26	1310.85	1319.38	0.477	0.000	
1+20.00	6500.00	84.00	2.27	5.42	8.51	878.4	7.40	1310.85	1319.36	0.487	0.000	
1+25.00	6500.00	82.50	2.25	5.48	8.48	861.5	7.55	1310.85	1319.34	0.498	0.000	
1+30.00	6500.00	81.00	2.23	5.54	8.45	844.5	7.70	1310.86	1319.31	0.509	0.000	
1+35.00	6500.00	79.50	2.22	5.61	8.43	827.4	7.86	1310.86	1319.28	0.520	0.000	
1+40.00	6500.00	78.00	2.20	5.67	8.40	810.1	8.02	1310.86	1319.25	0.533	0.000	
1+45.00	6500.00	76.50	2.18	5.74	8.37	792.8	8.20	1310.86	1319.22	0.546	0.000	
1+50.00	6500.00	75.00	2.17	5.81	8.33	775.4	8.38	1310.86	1319.19	0.559	0.000	
1+55.00	6500.00	73.50	2.15	5.88	8.30	757.9	8.58	1310.86	1319.16	0.574	0.000	
552+40 1+60.00	6500.00	72.00	2.13	5.95	8.26	740.2	8.78	1310.86	1319.12	0.589	0.000	

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: ALDERMAN DATE: 3/14/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= -0.014250

552+40

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
552+40 1+60.00	6500.00	72.00	2.13	5.95	8.26	740.2	8.78	1310.86	1319.12	0.000	0.000	0.000
1+65.00	6500.00	70.50	2.12	6.02	8.32	733.5	8.86	1310.79	1319.11	0.593	0.000	
1+70.00	6500.00	69.00	2.10	6.10	8.39	726.3	8.95	1310.72	1319.10	0.597	0.000	
1+75.00	6500.00	67.50	2.08	6.18	8.45	719.0	9.04	1310.65	1319.09			

1+85.00	6500.00	64.50	2.05	6.34	8.56	702.5	9.25	1310.50	1319.07	0.614	0.000
1+90.00	6500.00	63.00	2.03	6.43	8.62	693.7	9.37	1310.43	1319.05	0.621	0.000
1+95.00	6500.00	61.50	2.02	6.52	8.67	684.5	9.50	1310.36	1319.03	0.628	0.000
2+ 0.00	6500.00	60.00	2.00	6.61	8.72	674.9	9.63	1310.29	1319.01	0.636	0.000

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: ALDERMAN DATE: 3/14/85 CHECKED BY: _____ DATE: _____

n= 0.014 So= 0.000857

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
2+ 0.00	6500.00	60.00	2.00	6.61	8.72	674.9	9.63	1310.29	1319.01	0.000	0.000	0.000
2+ 5.00	6500.00	59.29	2.00	6.65	8.67	664.2	9.79	1310.29	1318.96	0.649	0.000	
2+10.00	6500.00	58.57	2.00	6.70	8.62	653.2	9.95	1310.30	1318.92	0.662	0.000	
2+15.00	6500.00	57.86	2.00	6.74	8.56	642.0	10.12	1310.30	1318.86	0.676	0.000	
2+20.00	6500.00	57.14	2.00	6.79	8.50	630.5	10.31	1310.31	1318.81	0.691	0.000	
2+25.00	6500.00	56.43	2.00	6.83	8.44	618.6	10.51	1310.31	1318.75	0.707	0.000	
2+30.00	6500.00	55.71	2.00	6.88	8.37	606.4	10.72	1310.32	1318.69	0.724	0.000	
2+35.00	6500.00	55.00	2.00	6.93	8.29	593.7	10.95	1310.32	1318.61	0.744	0.000	
2+40.00	6500.00	54.29	2.00	6.98	8.21	580.3	11.20	1310.32	1318.53	0.765	0.000	
2+45.00	6500.00	53.57	2.00	7.02	8.11	566.2	11.48	1310.33	1318.44	0.788	0.000	
2+50.00	6500.00	52.86	2.00	7.07	8.00	551.1	11.80	1310.33	1318.34	0.816	0.000	
2+55.00	6500.00	52.14	2.00	7.12	7.87	534.4	12.16	1310.34	1318.21	0.848	0.000	
2+60.00	6500.00	51.43	2.00	7.18	7.71	515.2	12.62	1310.34	1318.05	0.888	0.000	
2+65.00	6500.00	50.71	2.00	7.23	7.47	490.6	13.25	1310.35	1317.82	0.946	0.000	
2+70.00	6500.00	50.00	2.00	7.28	7.46	484.2	13.42	1310.35	1317.81	0.961	0.000	

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: ALDERMAN DATE: 3/14/85 CHECKED BY: _____ DATE: _____

n= 0.035 So= 0.000857

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
2+ 0.00	6500.00	60.00	2.00	6.61	8.72	674.9	9.63	1310.29	1319.01	0.000	0.000	0.000

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: ALDERMAN DATE: 3/14/85 CHECKED BY: _____ DATE: _____

n= 0.035 So= 0.000857

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
2+ 0.00	6500.00	60.00	2.00	6.61	2.00	128.0	50.78	1310.29	1312.29	0.000	0.000	0.000

SUBCRITCAL TRANSITION ANALYSIS

RWCD4 Changed to Grouted Rock at 552+00 to 551+30 (Bridge)

COMPUTED BY: ALDERMAN DATE: 3/14/85 CHECKED BY: _____ DATE: _____

n= 0.035 So= 0.000857

STATION 552+0	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
552+0 2+ 0.00	6500.00	60.00	2.00	6.61	8.72	674.9	9.63	1310.29	1319.01	0.000	0.000	0.000
2+ 5.00	6500.00	59.29	2.00	6.65	8.70	666.9	9.75	1310.29	1318.99	0.645	0.000	
2+10.00	6500.00	58.57	2.00	6.70	8.68	658.8	9.87	1310.30	1318.98	0.654	0.000	
2+15.00	6500.00	57.86	2.00	6.74	8.66	650.7	9.99	1310.30	1318.96	0.664	0.000	
2+20.00	6500.00	57.14	2.00	6.79	8.63	642.5	10.12	1310.31	1318.94	0.673	0.000	
2+25.00	6500.00	56.43	2.00	6.83	8.61	634.3	10.25	1310.31	1318.92	0.684	0.000	
2+30.00	6500.00	55.71	2.00	6.88	8.59	626.0	10.38	1310.32	1318.90	0.694	0.000	
2+35.00	6500.00	55.00	2.00	6.93	8.56	617.6	10.52	1310.32	1318.88	0.705	0.000	

2+45.00	6500.00	53.57	2.00	7.02	8.51	600.7	10.82	1310.33	1318.84	0.728	0.000
2+50.00	6500.00	52.86	2.00	7.07	8.48	592.1	10.98	1310.33	1318.81	0.741	0.000
2+55.00	6500.00	52.14	2.00	7.12	8.45	583.4	11.14	1310.34	1318.79	0.754	0.000
2+60.00	6500.00	51.43	2.00	7.18	8.42	574.7	11.31	1310.34	1318.76	0.767	0.000
2+65.00	6500.00	50.71	2.00	7.23	8.39	565.9	11.49	1310.35	1318.73	0.781	0.000
2+70.00	6500.00	50.00	2.00	7.28	8.35	557.0	11.67	1310.35	1318.70	0.796	0.000

5SH 30

5S1 + 30

VOID

SUBCRITCAL TRANSITION ANALYSIS

Run 1

RWCD4

COMPUTED BY: ALDERMAN DATE: 3/14/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000900

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
553+00												
555+00 1+ 0.00	6500.00	90.00	2.33	5.20	8.59	945.2	6.88	1310.85 ~~100.00~~	108.59	0.000	0.000	0.000
1+ 2.00	6500.00	89.40	2.33	5.22	8.58	938.4	6.93	100.00	108.58	0.453	0.000	
1+ 4.00	6500.00	88.80	2.32	5.24	8.57	931.5	6.98	100.00	108.57	0.457	0.000	
1+ 6.00	6500.00	88.20	2.31	5.27	8.56	924.6	7.03	100.01	108.57	0.461	0.000	
1+ 8.00	6500.00	87.60	2.31	5.29	8.55	917.7	7.08	100.01	108.56	0.464	0.000	
1+10.00	6500.00	87.00	2.30	5.31	8.54	910.8	7.14	100.01	108.55	0.468	0.000	
1+12.00	6500.00	86.40	2.29	5.33	8.53	903.9	7.19	100.01	108.54	0.472	0.000	
1+14.00	6500.00	85.80	2.29	5.35	8.52	896.9	7.25	100.01	108.53	0.476	0.000	
1+16.00	6500.00	85.20	2.28	5.38	8.51	890.0	7.30	100.01	108.52	0.480	0.000	
1+18.00	6500.00	84.60	2.27	5.40	8.50	883.0	7.36	100.02	108.51	0.485	0.000	
1+20.00	6500.00	84.00	2.27	5.42	8.49	876.1	7.42	100.02	108.50	0.489	0.000	
1+22.00	6500.00	83.40	2.26	5.45	8.47	869.1	7.48	100.02	108.49	0.493	0.000	
1+24.00	6500.00	82.80	2.25	5.47	8.46	862.1	7.54	100.02	108.48	0.498	0.000	
1+26.00	6500.00	82.20	2.25	5.50	8.45	855.1	7.60	100.02	108.47	0.502	0.000	
1+28.00	6500.00	81.60	2.24	5.52	8.44	848.1	7.66	100.03	108.46	0.507	0.000	
1+30.00	6500.00	81.00	2.23	5.54	8.43	841.0	7.73	100.03	108.45	0.512	0.000	
1+32.00	6500.00	80.40	2.23	5.57	8.41	834.0	7.79	100.03	108.44	0.516	0.000	
1+34.00	6500.00	79.80	2.22	5.59	8.40	826.9	7.86	100.03	108.43	0.521	0.000	
1+36.00	6500.00	79.20	2.21	5.62	8.39	819.8	7.93	100.03	108.42	0.526	0.000	
1+38.00	6500.00	78.60	2.21	5.65	8.37	812.7	8.00	100.03	108.41	0.531	0.000	
1+40.00	6500.00	78.00	2.20	5.67	8.36	805.6	8.07	100.04	108.39	0.537	0.000	
1+42.00	6500.00	77.40	2.19	5.70	8.34	798.5	8.14	100.04	108.38	0.542	0.000	
1+44.00	6500.00	76.80	2.19	5.72	8.33	791.3	8.21	100.04	108.37	0.548	0.000	
1+46.00	6500.00	76.20	2.18	5.75	8.31	784.2	8.29	100.04	108.36	0.553	0.000	
1+48.00	6500.00	75.60	2.17	5.78	8.30	777.0	8.37	100.04	108.34	0.559	0.000	

1+52.00	6500.00	74.40	2.16	5.83	8.27	762.6	8.52	100.05	108.31	0.571	0.000
1+54.00	6500.00	73.80	2.15	5.86	8.25	755.4	8.60	100.05	108.30	0.577	0.000
1+56.00	6500.00	73.20	2.15	5.89	8.23	748.1	8.69	100.05	108.28	0.583	0.000
1+58.00	6500.00	72.60	2.14	5.92	8.22	740.9	8.77	100.05	108.27	0.590	0.000
552+40 1+60.00	6500.00	72.00	2.13	5.95	8.20	733.6	8.86	~~100.05~~ 1310.86	108.25	0.596	0.000

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: ALDERMAN DATE: 3/14/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= % 1.701411834604692D+38

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
~~1+56.00~~	~~6500.00~~	~~90.00~~	2.33	~~5.20~~	~~6.00~~	~~624.0~~	~~10.42~~	100.00	~~106.00~~	0.000	0.000	0.000

SUBCRITICAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: ALDERMAN DATE: 3/14/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.001000

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
552+40 1+60.00	6500.00	72.00	2.13	5.95	8.20	733.8	8.86	1310.86 ~~100.05~~	108.25	0.000	0.000	0.000
1+65.00	6500.00	70.50	2.12	6.02	8.14	714.6	9.10	100.06	108.20	0.614	0.000	
1+70.00	6500.00	69.00	2.10	6.10	8.08	694.9	9.35	100.06	108.14	0.634	0.000	
1+75.00	6500.00	67.50	2.08	6.18	8.02	674.8	9.63	100.07	108.08	0.656	0.000	
1+80.00	6500.00	66.00	2.07	6.26	7.94	654.3	9.93	100.07	108.01	0.680	0.000	
1+85.00	6500.00	64.50	2.05	6.34	7.85	633.1	10.27	100.08	107.93	0.707	0.000	
1+90.00	6500.00	63.00	2.03	6.43	7.76	611.1	10.64	100.08	107.84	0.737	0.000	
1+95.00	6500.00	61.50	2.02	6.52	7.65	588.2	11.05	100.09	107.73	0.772	0.000	
552100 2+ 0.00	6500.00	60.00	2.00	6.61	7.52	564.0	11.52	1310.29 ~~100.09~~	107.61	0.812	0.000	

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: ALDERMAN

n= 0.014 So= 0.000900

	STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
52+00	2+ 0.00	6500.00	60.00	2.00	6.61	7.52	564.3	11.52	1310.29 100.09	107.61	0.000	0.000	0.000
	2+ 5.00	6500.00	59.29	2.00	6.65	7.40	547.8	11.87	100.09	107.49	0.842	0.000	
	2+10.00	6500.00	58.57	2.00	6.70	7.23	528.1	12.31	100.10	107.33	0.883	0.000	
55+95	2+15.00	6500.00	57.86	2.00	6.74	6.95	498.9	13.03	100.10	107.06	0.951	0.000	

6. STATION = 200.00 7. STATION = 270.00
8. BOTTOM WIDTH = 60.00 ft 9. BOTTOM WIDTH = 50.00 ft

10. SIDE SLOPE = 2.000 11. SIDE SLOPE = 2.000
12. INVERT EL. = 100.09 13. INVERT EL. = 100.15

14. DEPTH = 0.000 ft 15. DEPTH = 0.000 ft
17. INCREMENT = 5.00

CRITICAL DEPTH = 6.611 CRITICAL DEPTH = 7.280

ENTER 1 FOR TRANSITION ANALYSIS 2 TO CHANGE INPUT 3 FOR NEW OPTION ? 1

Downstream Channel Depth ? 7.52

CONTROL IS TRANSFERED TO CRITICAL DEPTH AT THE UPSTREAM CHANNEL Dc =
6.787705148239536
UPSTREAM SPECIFIC FORCE IS GREATER THAN THE DOWNSTREAM SPECIFIC FORCE
A JUMP WILL FORM UNLESS THE GEOMETRY OF THE JUNCTION IS CHANGED

HIT RETURN TO CONTINUE ?
Illegal function call in 4315
Ok

VOID

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: E.B.ALDERMAN DATE: 3/25/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000333

555+00

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
1+ 0.00	6500.00	175.00	3.00	3.43	8.99	1815.7	3.58	1310.80	1319.79	0.000	0.000	0.000
1+ 5.00	6500.00	175.00	2.83	3.43	8.98	1799.0	3.61	1310.80	1319.78	0.226	0.000	
1+10.00	6500.00	175.00	2.67	3.44	8.96	1782.4	3.65	1310.80	1319.76	0.227	0.000	
1+15.00	6500.00	175.00	2.50	3.44	8.95	1765.9	3.68	1310.81	1319.75	0.229	0.000	
1+20.00	6500.00	175.00	2.33	3.44	8.93	1749.4	3.72	1310.81	1319.74	0.230	0.000	
1+25.00	6500.00	175.00	2.17	3.45	8.92	1732.9	3.75	1310.81	1319.73	0.232	0.000	
1+30.00	6500.00	175.00	2.00	3.45	8.90	1716.6	3.79	1310.81	1319.71	0.234	0.000	

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: E.B.ALDERMAN DATE: 3/25/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000286

554+70

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
1+30.00	6500.00	175.00	2.00	3.45	8.90	1716.6	3.79	1310.81	1319.71	0.000	0.000	0.000
1+35.00	6500.00	175.00	2.00	3.45	8.90	1716.8	3.79	1310.81	1319.72	0.234	0.000	
1+40.00	6500.00	175.00	2.00	3.45	8.91	1717.0	3.79	1310.81	1319.72	0.234	0.000	
1+45.00	6500.00	175.00	2.00	3.45	8.91	1717.3	3.79	1310.81	1319.72	0.234	0.000	
1+50.00	6500.00	175.00	2.00	3.45	8.91	1717.5	3.78	1310.82	1319.72	0.234	0.000	
1+55.00	6500.00	175.00	2.00	3.45	8.91	1717.7	3.78	1310.82	1319.73	0.234	0.000	
1+60.00	6500.00	175.00	2.00	3.45	8.91	1718.0	3.78	1310.82	1319.73	0.233	0.000	
1+65.00	6500.00	175.00	2.00	3.45	8.91	1718.2	3.78	1310.82	1319.73	0.233	0.000	
1+70.00	6500.00	175.00	2.00	3.45	8.91	1718.4	3.78	1310.82	1319.73	0.233	0.000	

1+75.00	6500.00	175.00	2.00	3.45	8.91	1718.7	3.78	1310.82	1319.74	0.233	0.000
1+80.00	6500.00	175.00	2.00	3.45	8.91	1718.9	3.78	1310.82	1319.74	0.233	0.000
1+85.00	6500.00	175.00	2.00	3.45	8.92	1719.1	3.78	1310.83	1319.74	0.233	0.000
1+90.00	6500.00	175.00	2.00	3.45	8.92	1719.4	3.78	1310.83	1319.74	0.233	0.000
1+95.00	6500.00	175.00	2.00	3.45	8.92	1719.6	3.78	1310.83	1319.75	0.233	0.000
2+ 0.00	6500.00	175.00	2.00	3.45	8.92	1719.8	3.78	1310.83	1319.75	0.233	0.000

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: E.B.ALDERMAN DATE: 3/25/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000200

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
554+00												
2+ 0.00	6500.00	175.00	2.00	3.45	8.92	1719.9	3.78	1310.83	1319.75	0.000	0.000	0.000
2+ 5.00	6500.00	170.00	2.00	3.52	8.91	1673.1	3.89	1310.83	1319.74	0.240	0.000	
2+10.00	6500.00	165.00	2.00	3.59	8.90	1626.1	4.00	1310.83	1319.73	0.247	0.000	
2+15.00	6500.00	160.00	2.00	3.66	8.88	1579.1	4.12	1310.83	1319.72	0.255	0.000	
2+20.00	6500.00	155.00	2.00	3.73	8.87	1532.0	4.24	1310.83	1319.70	0.264	0.000	
2+25.00	6500.00	150.00	2.00	3.81	8.85	1484.8	4.38	1310.84	1319.69	0.273	0.000	
2+30.00	6500.00	145.00	2.00	3.89	8.84	1437.5	4.52	1310.84	1319.67	0.282	0.000	
2+35.00	6500.00	140.00	2.00	3.98	8.82	1390.0	4.68	1310.84	1319.66	0.293	0.000	
2+40.00	6500.00	135.00	2.00	4.08	8.80	1342.5	4.84	1310.84	1319.64	0.304	0.000	
2+45.00	6500.00	130.00	2.00	4.17	8.78	1294.9	5.02	1310.84	1319.61	0.316	0.000	
2+50.00	6500.00	125.00	2.00	4.28	8.75	1247.1	5.21	1310.84	1319.59	0.329	0.000	
2+55.00	6500.00	120.00	2.00	4.39	8.72	1199.2	5.42	1310.84	1319.57	0.343	0.000	
2+60.00	6500.00	115.00	2.00	4.51	8.70	1151.2	5.65	1310.84	1319.54	0.359	0.000	
2+65.00	6500.00	110.00	2.00	4.63	8.66	1103.0	5.89	1310.84	1319.51	0.376	0.000	
2+70.00	6500.00	105.00	2.00	4.77	8.63	1054.6	6.16	1310.84	1319.47	0.395	0.000	
2+75.00	6500.00	100.00	2.00	4.91	8.59	1006.1	6.46	1310.85	1319.43	0.416	0.000	
2+80.00	6500.00	95.00	2.00	5.07	8.54	957.4	6.79	1310.85	1319.39	0.439	0.000	
2+85.00	6500.00	90.00	2.00	5.24	8.49	908.5	7.16	1310.85	1319.34	0.466	0.000	
2+90.00	6500.00	85.00	2.00	5.42	8.44	859.3	7.56	1310.85	1319.28	0.496	0.000	

3+ 0.00 6500.00 75.00 2.00 5.83 8.30 760.5 8.55 1310.85 1319.15 0.568 0.000

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: E.B.ALDERMAN DATE: 3/25/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000167

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
553+00												
3+ 0.00	6500.00	75.00	2.00	5.83	8.30	760.5	8.55	1310.85	1319.15	0.000	0.000	0.000
3+ 5.00	6500.00	75.00	2.00	5.83	8.32	762.9	8.52	1310.85	1319.17	0.566	0.000	
3+10.00	6500.00	75.00	2.00	5.83	8.35	765.2	8.49	1310.85	1319.20	0.563	0.000	
3+15.00	6500.00	75.00	2.00	5.83	8.37	767.5	8.47	1310.85	1319.22	0.561	0.000	
3+20.00	6500.00	75.00	2.00	5.83	8.39	769.8	8.44	1310.85	1319.24	0.559	0.000	
3+25.00	6500.00	75.00	2.00	5.83	8.41	772.1	8.42	1310.85	1319.26	0.557	0.000	
3+30.00	6500.00	75.00	2.00	5.83	8.43	774.3	8.39	1310.86	1319.28	0.554	0.000	
3+35.00	6500.00	75.00	2.00	5.83	8.45	776.5	8.37	1310.86	1319.31	0.552	0.000	
3+40.00	6500.00	75.00	2.00	5.83	8.47	778.7	8.35	1310.86	1319.33	0.550	0.000	
3+45.00	6500.00	75.00	2.00	5.83	8.49	780.9	8.32	1310.86	1319.35	0.548	0.000	
3+50.00	6500.00	75.00	2.00	5.83	8.51	783.0	8.30	1310.86	1319.37	0.546	0.000	
3+55.00	6500.00	75.00	2.00	5.83	8.53	785.1	8.28	1310.86	1319.39	0.544	0.000	
3+60.00	6500.00	75.00	2.00	5.83	8.55	787.2	8.26	1310.86	1319.41	0.542	0.000	

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: E.B.ALDERMAN DATE: 3/25/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= -0.014250

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
552+40												
3+60.00	6500.00	75.00	2.00	5.83	8.55	787.2	8.26	1310.86	1319.41	0.000	0.000	0.000
3+65.00	6500.00	75.00	2.00	5.83	8.67	800.3	8.12	1310.79	1319.46	0.530	0.000	
3+70.00	6500.00	75.00	2.00	5.83	8.78	813.1	7.99	1310.72	1319.50	0.518	0.000	
3+75.00	6500.00	75.00	2.00	5.83	8.90	825.7	7.87	1310.65	1319.54	0.508	0.000	
3+80.00	6500.00	75.00	2.00	5.83	9.01	838.1	7.76	1310.58	1319.58	0.498	0.000	
3+85.00	6500.00	75.00	2.00	5.83	9.12	850.3	7.64	1310.50	1319.62	0.488	0.000	

3+95.00	6500.00	75.00	2.00	5.83	9.33	874.2	7.44	1310.36	1319.69	0.470	0.000
4+ 0.00	6500.00	75.00	2.00	5.83	9.44	885.9	7.34	1310.29	1319.73	0.461	0.000

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: E.B.ALDERMAN DATE: 3/25/85 CHECKED BY:_____ DATE:_____

n= 0.014 So= 0.001250

552+00

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
4+ 0.00	6500.00	75.00	2.00	5.83	9.44	885.9	7.34	1310.29	1319.73	0.000	0.000	0.000
4+ 5.00	6500.00	71.88	2.00	5.98	9.35	847.4	7.67	1310.30	1319.65	0.485	0.000	
4+10.00	6500.00	68.75	2.00	6.13	9.26	808.1	8.04	1310.30	1319.56	0.513	0.000	
4+15.00	6500.00	65.63	2.00	6.29	9.15	767.7	8.47	1310.31	1319.46	0.544	0.000	
4+20.00	6500.00	62.50	2.00	6.46	9.02	726.0	8.95	1310.32	1319.33	0.581	0.000	
4+25.00	6500.00	59.38	2.00	6.65	8.85	682.4	9.52	1310.32	1319.17	0.626	0.000	
4+30.00	6500.00	56.25	2.00	6.85	8.65	636.1	10.22	1310.33	1318.98	0.680	0.000	
4+35.00	6500.00	53.13	2.00	7.06	8.38	585.3	11.10	1310.33	1318.71	0.753	0.000	
4+40.00	6500.00	50.00	2.00	7.28	7.96	525.1	12.38	1310.34	1318.30	0.861	0.000	

SUBCRITCAL TRANSITION ANALYSIS

RWCD4

COMPUTED BY: E.B.ALDERMAN DATE: 3/25/85 CHECKED BY:_____ DATE:_____

n= 0.014 So= 0.001000

551+60

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
4+40.00	6500.00	50.00	2.00	7.28	7.97	525.1	12.38	1310.34	1318.31	0.000	0.000	0.000
4+45.00	6500.00	50.00	2.00	7.28	7.97	525.5	12.37	1310.35	1318.31	0.860	0.000	
4+50.00	6500.00	50.00	2.00	7.28	7.97	525.8	12.36	1310.35	1318.32	0.860	0.000	
4+55.00	6500.00	50.00	2.00	7.28	7.98	526.1	12.35	1310.36	1318.33	0.859	0.000	
4+60.00	6500.00	50.00	2.00	7.28	7.98	526.4	12.35	1310.36	1318.34	0.858	0.000	
4+65.00	6500.00	50.00	2.00	7.28	7.98	526.7	12.34	1310.37	1318.35	0.858	0.000	
4+70.00	6500.00	50.00	2.00	7.28	7.99	527.1	12.33	1310.37	1318.36	0.857	0.000	

SUPER ELEVATION – TR 25

CURVE RADIOS

Q	B	Z	D		V	R 0 91 S	
6500	50	2	8.51		11.39671	1645.13	.10418
6500	50	2	8.2		11.938	1645.13	.1127332
6500	50	2	7.94		12.42623	1645.13	.1207183
6500	50	2	7.71		12.8869	1645.13	.1284885
6500	50	2	7.51		13.31148	1645.13	.1358536
6500	50	2	7.33		13.7143	1645.13	.1430223
6500	50	2	7.16		14.11414	1645.13	.150313
6500	50	2	7.28		13.82988	1645.13	.1451119
Q	B	Z	D		V	R 0 91 S	
6500	50	2	8.51		11.39671	961.12	.1795903
6500	50	2	8.2		11.938	961.12	.1944706
6500	50	2	7.94		12.42623	961.12	.2083828
6500	50	2	7.71		12.8869	961.12	.2219397
6500	50	2	7.51		13.31148	961.12	.234807
6500	50	2	7.33		13.7143	961.12	.2473476
6500	50	2	7.16		14.11414	961.12	.2601185
6500	50	2	7.28		13.82988	961.12	.2510061
Q	B	Z	D	S	V	R 0 91 S	
6500	50	2	8.51		11.39671	480.53	.3654515
6500	50	2	8.2		11.938	480.53	.3964149
6500	50	2	7.94	0.0009	12.42623	480.53	.4254678
6500	50	2	7.71	0.0010	12.8869	480.53	.4538769
6500	50	2	7.51	0.0011	13.31148	480.53	.4809317
6500	50	2	7.33		13.7143	480.53	.5073854
6500	50	2	7.16		14.11414	480.53	.5344127

SOIL CONSERVATION SERVICE

STATE		PROJECT		
Arizona		Williams Chandler W.S. - RWCD Flood.		
BY	DATE	CHECKED BY	DATE	JOB NO.
Burton	9/23/74			
SUBJECT				SHEET 1 OF 43
Work Plan Design				

For stability analysis group soils into following groups:

Group	Associated Correlations
A	1, 3
B	2, 12, 33
C	5, 13, 14, 19, 25, 26, 30
D	6
E	8
F	9, 11
G	15, 24
H	16
I	17, 31, 32
J	18 - Siltstone
K	20, 22, 23
L	21
M	27
N	28
O	29

ARIZONA DWCD REACH 4

DT 12/12/84

PRELIMINARY HYDRAULIC DESIGN - LINED SECTION

1

HYDRAULICS:

100yr

4.40

$Q = 6500$ $n = 0.012$ $b = 50$ $z = 2$ $\alpha = 1$

$d_c = 7.28$
$S_c = 0.001227$
$V = 13.83$ FT/S
$0.7S_c = 0.0008589$
$1.3S_c = 0.0015951$

	S	d	A	V	S/Sc	FD* (FT)
	0.0007	8.51	571	11.4	0.57	—
	0.0008	8.20	545	11.9	0.65	—
*	0.0009	7.94	523	12.4	0.73	0.39
	0.0010	7.71	504	12.9	0.81	1.13
	0.0011	7.51	488	13.3	0.90	1.60
	0.0012	7.33	474	13.7	0.98	1.81
	0.0013	7.16	461	14.1	1.06	1.75
	0.001227	7.28		13.8	1.0	1.82

FD^*: $H_w = 0.25 d_c \left[1 - 11.1 \left(\frac{S_o}{S_c} - 1\right)^2\right]$

TR 25 p5-4

ARIZONA RWCD REACH 4

DT 12/12/84

PRELIMINARY

HYDRAULIC DESIGN - LINED SECTION 2

N 10yr

Q =	1625	d_c =	3,07	
n =	0,012	S_c =	0,0015386	
b =	50	A =	172,35	
z =	2	V_c =	9.428	

	S	d	A	V	S/Sc	Fb
	0.0007	3,86	223	7.28	—	
	0.0008	3.72	213	7.61	—	
*	0.0009	3,59	205	7.91	—	
	0.0010	3,48	198	8.19	0.65	
	0.0011	3,39	192	8.45	0.71	0.08
	0.0012	3,30	187	8.69	0.78	0.35
	0.0013	3.23	182	8,92	0.84	0.56
	0.0015386	3.07	172	9.43	1.00	0.77

ARIZONA RNCD R4

DT 1/24/85

PRELIMINARY HYDRAULIC DESIGN

CHECK HYDRAULICS FOR:

Q=6500	n=0.014	n=0.012
n=0.014	S=0.0009	S=0.0009
S=0.0009	b=50	b=50
b=45	z=2	z=2
z=2		
d=9.09	d=8.65	d=7.94
A=574.08	A=582	A=523
V=11.32	V=11.16	V=12.4

$\frac{V^2}{2g}+d = 10.58$

CHECK FREEBOARD

TR25 p5-4 $S = \frac{V^2(b+2zd)}{2(gR_c - 2zV^2)}$ MIN $R_c = 480.53$

$$= \frac{(11.16)^2(50+2(8.65)(2))}{2(32.16(480.53)-2^2(11.16)^2)}$$

$$= \underline{0.35 ft}$$

d + 10% = 1.1(8.65) = 9.52

SOPER 0.35

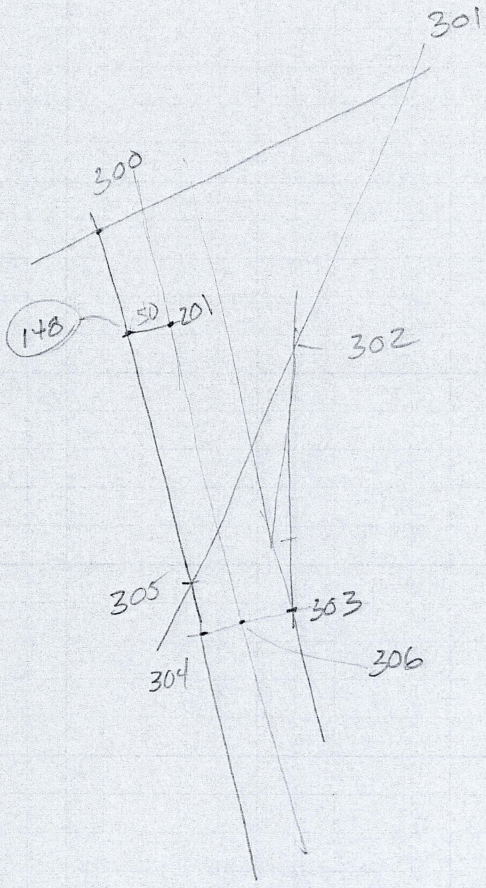
9.87 FT

REVISED D = 11 FT

- USE CHANNEL DEPTH = ~~10.0~~ THROUGHOUT. (DISCUSS IN DES. REP. - ACTUAL FREEBOARD IS MUCH GREATER DUE TO AROXIMITY OF THE RNCD CANAL DOWNSLOPE ~~Parallel~~ TO THE FLOODWAY ALIGNMENT. THE 10% + FB IS TO TOP OF LINING ONLY.

- ENV COOR
- NC
- LAND TR
- RI

204 51 39
157. 30



VOID

PROBLEM: LOCALIZED HIGH ENERGY LOSS DEEP RESULTS IN A JUMP IN THE PLANNED TRANSITION. T

ANALYSIS: TRY TO ELIMINATE THE JUMP BY:

1. REDUCING THE AMOUNT OF ENERGY TO BE DISSIPATED (IE LOWER INLET HGL AND RAISE OUTLET HGL)

2. ATTEMPT TO MAKE ENERGY LOSS MORE UNIFORM BY INTRODUCING A "HUMP" IN THE CHANNEL AND ADJUSTING THE SIDE FLARE.

3. RETAIN OVERALL TRANSITION LENGTH AT 300 FT.

SOLUTION:

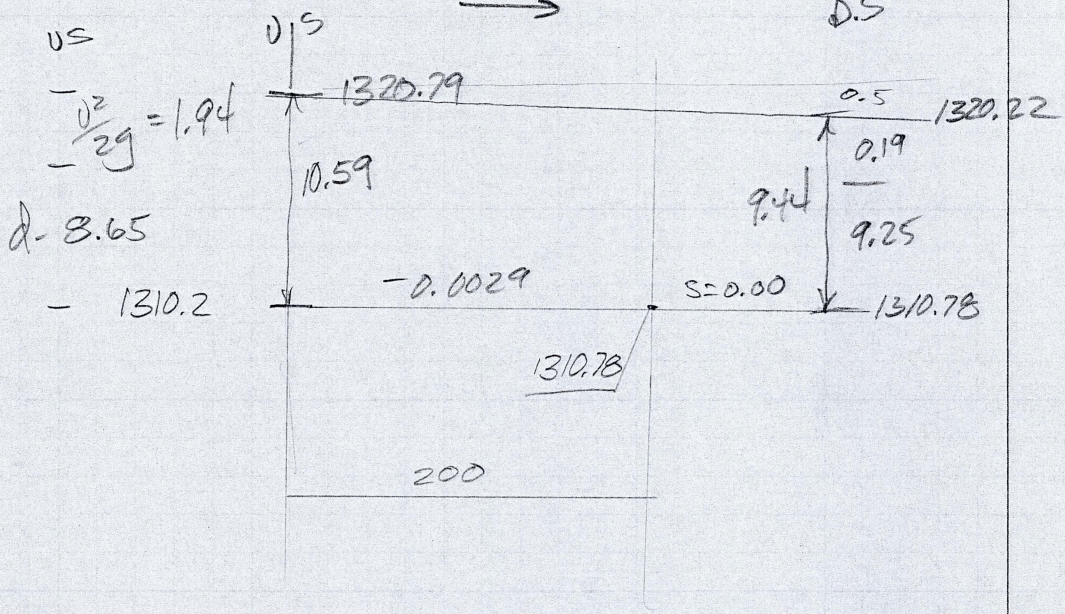
1. MAKE THE FOLLOWING GRADE ADJUSTMENTS

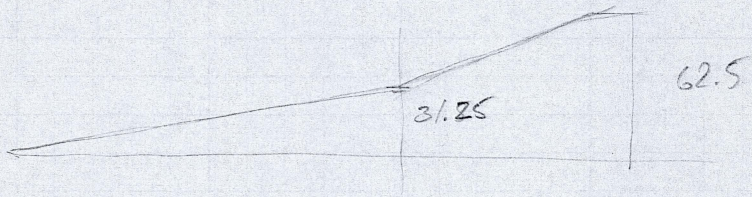
STA	S	INV EL	B	Z
626+00	0.00025	1309.02	175	3
555+00		1310.78		
552+00	0.0009	1310.20	50	2
493+60		1315.46		

2. AS A TRIAL:

LOCATE HUMP @ 2/3 PT IN TRANSIT AND ASSUME 2/3 OF LOSS OCCURS ABOVE

- APPROX EGL'S FLOW →





3. TRANSITION

STA	Δ	b	z	INV EL
552+00	5	50	2.02	1310.20
+05	5	51.56	2.03	1310.21
+10	5	53.13	2.03	1310.23
+15	5	54.69	2.05	1310.24
+20	5	56.25	2.07	1310.26
+25	5	57.81	2.08	1310.27
+30	5	59.38	2.10	1310.29
+35	5	60.94	2.12	1310.30
+40	10	62.50	2.13	1310.32
+50	10	65.63	2.17	1310.35
+60	20	68.75	2.20	1310.37
+80	20	75.00	2.27	1310.43
553+00	20	81.25	2.33	1310.49
+20	20	87.50	2.40	1310.55
+40	20	93.75	2.47	1310.61
+60	20	100.00	2.53	1310.66
+80	20	106.25	2.60	1310.72
554+00	20	112.5	2.67	1310.78
+20	20	125.0	2.73	
+40	20	137.5	2.80	
+60	20	150.0	2.87	
+80	20	162.5	2.97	
555+00		175.0	3.00	1310.78

$z = \frac{x}{300} + 2$

$b = 50 +$

VOID

Q= 1625 Run 3

depth of flow began at normal depth.

SUBCRITCAL TRANSITION ANALYSIS

RWCD REACH4

COMPUTED BY: EARL ALDERMAN DATE: 3/15/85 CHECKED BY: _____ DATE: _____

n= 0.035 So= 0.000250

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
555+00												
1+ 0.00	1625.00	175.00	3.00	1.38	4.77	902.0	1.80	1310.80	1315.57	0.000	0.000	0.000
1+ 5.00	1625.00	172.75	2.98	1.39	4.76	890.6	1.82	1310.80	1315.56	0.153	0.000	
1+10.00	1625.00	170.50	2.97	1.40	4.76	879.1	1.85	1310.80	1315.56	0.155	0.000	
1+15.00	1625.00	168.25	2.95	1.41	4.76	867.7	1.87	1310.80	1315.56	0.157	0.000	
1+20.00	1625.00	166.00	2.93	1.43	4.76	856.3	1.90	1310.81	1315.56	0.159	0.000	
1+25.00	1625.00	163.75	2.92	1.44	4.76	844.9	1.92	1310.81	1315.56	0.161	0.000	
1+30.00	1625.00	161.50	2.90	1.45	4.75	833.5	1.95	1310.81	1315.56	0.164	0.000	
1+35.00	1625.00	159.25	2.88	1.47	4.75	822.1	1.98	1310.81	1315.56	0.166	0.000	
1+40.00	1625.00	157.00	2.87	1.48	4.75	810.7	2.00	1310.81	1315.56	0.168	0.000	

1+50.00	1625.00	152.50	2.83	1.51	4.75	787.9	2.06	1310.81	1315.56	0.173	0.000
1+55.00	1625.00	150.25	2.82	1.52	4.75	776.6	2.09	1310.81	1315.56	0.176	0.000
1+60.00	1625.00	148.00	2.80	1.54	4.74	765.2	2.12	1310.82	1315.56	0.179	0.000
1+65.00	1625.00	145.75	2.78	1.55	4.74	753.8	2.16	1310.82	1315.56	0.182	0.000
1+70.00	1625.00	143.50	2.77	1.57	4.74	742.5	2.19	1310.82	1315.56	0.184	0.000
1+75.00	1625.00	141.25	2.75	1.59	4.74	731.1	2.22	1310.82	1315.56	0.187	0.000
1+80.00	1625.00	139.00	2.73	1.60	4.74	719.8	2.26	1310.82	1315.56	0.190	0.000
1+85.00	1625.00	136.75	2.72	1.62	4.73	708.4	2.29	1310.82	1315.56	0.194	0.000
1+90.00	1625.00	134.50	2.70	1.64	4.73	697.1	2.33	1310.82	1315.56	0.197	0.000
1+95.00	1625.00	132.25	2.68	1.65	4.73	685.7	2.37	1310.82	1315.55	0.200	0.000
554+00 2+ 0.00	1625.00	130.00	2.67	1.67	4.73	674.4	2.41	1310.83	1315.55	0.204	0.000

SUBCRITICAL TRANSITION ANALYSIS

RWCD REACH4

COMPUTED BY: EARL ALDERMAN DATE: 3/15/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000250

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
2+ 0.00	1625.00	130.00	2.67	1.67	4.73	674.4	2.41	1310.83	1315.55	0.000	0.000	0.000
2+ 5.00	1625.00	128.00	2.64	1.69	4.73	664.0	2.45	1310.83	1315.55	0.207	0.000	
2+10.00	1625.00	126.00	2.61	1.71	4.72	653.6	2.49	1310.83	1315.55	0.210	0.000	
2+15.00	1625.00	124.00	2.59	1.73	4.72	643.1	2.53	1310.83	1315.55	0.214	0.000	
2+20.00	1625.00	122.00	2.56	1.74	4.72	632.7	2.57	1310.83	1315.55	0.218	0.000	
2+25.00	1625.00	120.00	2.53	1.76	4.72	622.3	2.61	1310.83	1315.55	0.221	0.000	
2+30.00	1625.00	118.00	2.51	1.78	4.71	611.8	2.66	1310.83	1315.55	0.225	0.000	
2+35.00	1625.00	116.00	2.48	1.80	4.71	601.4	2.70	1310.83	1315.54	0.229	0.000	
2+40.00	1625.00	114.00	2.45	1.82	4.71	591.0	2.75	1310.83	1315.54	0.233	0.000	
2+45.00	1625.00	112.00	2.43	1.84	4.70	580.6	2.80	1310.84	1315.54	0.238	0.000	
2+50.00	1625.00	110.00	2.40	1.87	4.70	570.2	2.85	1310.84	1315.54	0.242	0.000	
2+55.00	1625.00	108.00	2.37	1.89	4.70	559.8	2.90	1310.84	1315.54	0.247	0.000	
2+60.00	1625.00	106.00	2.35	1.91	4.69	549.4	2.96	1310.84	1315.53	0.252	0.000	
2+65.00	1625.00	104.00	2.32	1.94	4.69	539.0	3.02	1310.84	1315.53	0.257	0.000	

2+75.00	1625.00	100.00	2.27	1.99	4.68	518.2	3.14	1310.84	1315.53	0.267	0.000
2+80.00	1625.00	98.00	2.24	2.01	4.68	507.8	3.20	1310.85	1315.53	0.273	0.000
2+85.00	1625.00	96.00	2.21	2.04	4.68	497.4	3.27	1310.85	1315.52	0.279	0.000
2+90.00	1625.00	94.00	2.19	2.07	4.67	487.1	3.34	1310.85	1315.52	0.285	0.000
2+95.00	1625.00	92.00	2.16	2.10	4.67	476.7	3.41	1310.85	1315.52	0.291	0.000
3+ 0.00	1625.00	90.00	2.13	2.13	4.67	466.4	3.48	1310.85	1315.52	0.298	0.000

5538.00

SUBCRITCAL TRANSITION ANALYSIS

RWCD REACH4

COMPUTED BY: EARL ALDERMAN DATE: 3/15/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000250

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
2+ 0.00	1625.00	130.00	2.67	1.67	4.73	674.6	2.41	1310.83	1315.55	0.000	0.000	0.000
2+ 5.00	1625.00	128.00	2.65	1.69	4.73	664.4	2.45	1310.83	1315.55	0.207	0.000	
2+10.00	1625.00	126.00	2.63	1.71	4.73	654.3	2.48	1310.83	1315.55	0.210	0.000	
2+15.00	1625.00	124.00	2.62	1.73	4.72	644.1	2.52	1310.83	1315.55	0.214	0.000	
2+20.00	1625.00	122.00	2.60	1.74	4.72	633.9	2.56	1310.83	1315.55	0.217	0.000	
2+25.00	1625.00	120.00	2.58	1.76	4.72	623.8	2.61	1310.83	1315.55	0.221	0.000	
2+30.00	1625.00	118.00	2.57	1.78	4.72	613.6	2.65	1310.83	1315.55	0.225	0.000	
2+35.00	1625.00	116.00	2.55	1.80	4.71	603.5	2.69	1310.83	1315.55	0.229	0.000	
2+40.00	1625.00	114.00	2.53	1.82	4.71	593.3	2.74	1310.83	1315.55	0.233	0.000	
2+45.00	1625.00	112.00	2.52	1.84	4.71	583.2	2.79	1310.84	1315.55	0.237	0.000	
2+50.00	1625.00	110.00	2.50	1.87	4.71	573.0	2.84	1310.84	1315.54	0.241	0.000	
2+55.00	1625.00	108.00	2.48	1.89	4.70	562.9	2.89	1310.84	1315.54	0.246	0.000	
2+60.00	1625.00	106.00	2.47	1.91	4.70	552.8	2.94	1310.84	1315.54	0.250	0.000	
2+65.00	1625.00	104.00	2.45	1.93	4.70	542.6	2.99	1310.84	1315.54	0.255	0.000	
2+70.00	1625.00	102.00	2.43	1.96	4.69	532.5	3.05	1310.84	1315.54	0.260	0.000	
2+75.00	1625.00	100.00	2.42	1.98	4.69	522.4	3.11	1310.84	1315.54	0.266	0.000	
2+80.00	1625.00	98.00	2.40	2.01	4.69	512.3	3.17	1310.85	1315.53	0.271	0.000	
2+85.00	1625.00	96.00	2.38	2.04	4.69	502.1	3.24	1310.85	1315.53	0.277	0.000	
2+90.00	1625.00	94.00	2.37	2.06	4.68	492.0	3.30	1310.85	1315.53	0.283	0.000	
2+95.00	1625.00	92.00	2.35	2.09	4.68	482.0	3.37	1310.85	1315.53	0.289	0.000	

5544.00

SUBCRITCAL TRANSITION ANALYSIS

RWCD REACH4

COMPUTED BY: EARL ALDERMAN DATE: 3/15/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000167

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
3+ 0.00	1625.00	90.00	2.33	2.12	4.68	471.9	3.44	1310.85	1315.53	0.000	0.000	0.000
3+ 5.00	1625.00	88.50	2.32	2.15	4.67	464.2	3.50	1310.85	1315.52	0.301	0.000	
3+10.00	1625.00	87.00	2.30	2.17	4.67	456.5	3.56	1310.85	1315.52	0.306	0.000	
3+15.00	1625.00	85.50	2.28	2.19	4.67	448.9	3.62	1310.85	1315.52	0.311	0.000	
3+20.00	1625.00	84.00	2.27	2.22	4.66	441.2	3.68	1310.85	1315.52	0.317	0.000	
3+25.00	1625.00	82.50	2.25	2.25	4.66	433.5	3.75	1310.85	1315.52	0.323	0.000	
3+30.00	1625.00	81.00	2.23	2.27	4.66	425.8	3.82	1310.86	1315.51	0.329	0.000	
3+35.00	1625.00	79.50	2.22	2.30	4.66	418.1	3.89	1310.86	1315.51	0.335	0.000	
3+40.00	1625.00	78.00	2.20	2.33	4.65	410.4	3.96	1310.86	1315.51	0.342	0.000	
3+45.00	1625.00	76.50	2.18	2.36	4.65	402.7	4.04	1310.86	1315.51	0.349	0.000	
3+50.00	1625.00	75.00	2.17	2.39	4.64	395.0	4.11	1310.86	1315.50	0.356	0.000	
3+55.00	1625.00	73.50	2.15	2.42	4.64	387.3	4.20	1310.86	1315.50	0.363	0.000	
3+60.00	1625.00	72.00	2.13	2.45	4.64	379.6	4.28	1310.86	1315.50	0.371	0.000	

SUBCRITCAL TRANSITION ANALYSIS

RWCD REACH4

COMPUTED BY: EARL ALDERMAN DATE: 3/15/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= -0.014250

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
3+60.00	1625.00	72.00	2.13	2.45	4.64	379.6	4.28	1310.86	1315.50	0.000	0.000	0.000
3+65.00	1625.00	70.50	2.12	2.48	4.71	379.4	4.28	1310.79	1315.50	0.369	0.000	
3+70.00	1625.00	69.00	2.10	2.52	4.79	378.8	4.29	1310.72	1315.51	0.367	0.000	
3+75.00	1625.00	67.50	2.08	2.55	4.87	378.0	4.30	1310.65	1315.51	0.365	0.000	
3+80.00	1625.00	66.00	2.07	2.59	4.94	376.8	4.31	1310.58	1315.52	0.364	0.000	
3+85.00	1625.00	64.50	2.05	2.62	5.02	375.5	4.33	1310.50	1315.52	0.363	0.000	

3+95.00	1625.00	61.50	2.02	2.70	5.17	371.9	4.37	1310.36	1315.53	0.362	0.000
4+ 0.00	1625.00	60.00	2.00	2.75	5.24	369.7	4.40	1310.29	1315.53	0.363	0.000

SUBCRITCAL TRANSITION ANALYSIS

RWCD REACH4

COMPUTED BY: EARL ALDERMAN DATE: 3/15/85 CHECKED BY:_____ DATE:_____

n= 0.035 So= 0.000857

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
4+ 0.00	1625.00	60.00	2.00	2.75	5.25	369.7	4.40	1310.29	1315.54	0.000	0.000	0.000
4+ 5.00	1625.00	59.29	2.00	2.77	5.24	365.7	4.44	1310.29	1315.54	0.367	0.000	
4+10.00	1625.00	58.57	2.00	2.79	5.24	361.7	4.49	1310.30	1315.54	0.371	0.000	
4+15.00	1625.00	57.86	2.00	2.81	5.23	357.7	4.54	1310.30	1315.54	0.376	0.000	
4+20.00	1625.00	57.14	2.00	2.83	5.23	353.6	4.60	1310.31	1315.54	0.380	0.000	
4+25.00	1625.00	56.43	2.00	2.85	5.23	349.6	4.65	1310.31	1315.54	0.385	0.000	
4+30.00	1625.00	55.71	2.00	2.87	5.22	345.6	4.70	1310.32	1315.54	0.390	0.000	
4+35.00	1625.00	55.00	2.00	2.90	5.22	341.6	4.76	1310.32	1315.54	0.395	0.000	
4+40.00	1625.00	54.29	2.00	2.92	5.22	337.6	4.81	1310.32	1315.54	0.400	0.000	
4+45.00	1625.00	53.57	2.00	2.94	5.21	333.6	4.87	1310.33	1315.54	0.405	0.000	
4+50.00	1625.00	52.86	2.00	2.97	5.21	329.6	4.93	1310.33	1315.54	0.411	0.000	
4+55.00	1625.00	52.14	2.00	2.99	5.21	325.7	4.99	1310.34	1315.54	0.416	0.000	
4+60.00	1625.00	51.43	2.00	3.02	5.20	321.7	5.05	1310.34	1315.54	0.422	0.000	
4+65.00	1625.00	50.71	2.00	3.04	5.20	317.7	5.11	1310.35	1315.54	0.428	0.000	
4+70.00	1625.00	50.00	2.00	3.07	5.20	313.8	5.18	1310.35	1315.55	0.433	0.000	

S.196

4+94.00	1625.00	50.00	2.00	2.75	5.20	313.8	5.18	1310.37	1315.57	0.000	0.000	0.000
4+95.00	1625.00	50.00	2.00	3.07	5.19	313.7	5.18	1310.37	1315.57	0.434	0.000	
4+96.00	1625.00	50.00	2.00	3.07	5.19	313.6	5.18	1310.37	1315.57	0.434	0.000	
4+97.00	1625.00	50.00	2.00	3.07	5.19	313.5	5.18	1310.38	1315.57	0.434	0.000	
4+98.00	1625.00	50.00	2.00	3.07	5.19	313.3	5.19	1310.38	1315.57	0.434	0.000	
4+99.00	1625.00	50.00	2.00	3.07	5.19	313.2	5.19	1310.38	1315.57	0.435	0.000	
5+ 0.00	1625.00	50.00	2.00	3.07	5.19	313.1	5.19	1310.38	1315.57	0.435	0.000	

SUBCRITCAL BRIDGE PIER ANALYSIS

RWCD REACH4

COMPUTED BY: EARL ALDERMAN DATE: 3/15/85 CHECKED BY:_____ DATE:_____

4+94.00	1625.00	50.00	2.00	0.00	5.20	313.8	5.18	1310.37	1315.57	0.000	0.000	0.000
4+95.00	1625.00	50.00	2.00	3.07	5.19	313.7	5.18	1310.37	1315.57	0.434	0.000	
4+96.00	1625.00	50.00	2.00	3.07	5.19	313.6	5.18	1310.37	1315.57	0.434	0.000	
4+97.00	1625.00	50.00	2.00	3.07	5.19	313.5	5.18	1310.38	1315.57	0.434	0.000	

4+99.00	1625.00	50.00	2.00	3.07	5.19	313.2	5.19	1310.38	1315.57	0.435	0.000
5+ 0.00	1625.00	50.00	2.00	3.07	5.19	313.1	5.19	1310.38	1315.57	0.435	0.000

SUBCRITCAL BRIDGE PIER ANALYSIS

RWCD REACH4

COMPUTED BY: EARL ALDERMAN DATE: 3/15/85 CHECKED BY:_____ DATE:_____

2/27/85 • WORK REMAINING •

DESIGN

- TEMP INL'S & JCT — SECTIONS & DETAIL LOOSE ROCK R.P.
- POWERLINE DROP — R/C WEIR CR. WALL G.R. SPEC
- R/C LINING — VERIFY THICKNESS & REINF JOINT DETAIL INLET TRANSITION PANELS DRAINAGE
- OUTLET TRANSITION — GROUTED ROCK SECTIONS & DETAILS GROUTED ROCK SPEC.
- LOW DROP — BAFFLE DESIGN WEIR CR.-WALL G.R. ROCK CR. LOOSE ROCK RR.
- EARTH CHANNEL — EXTENT OF EARTH LINING DETAIL TYP SECTIONS
- SIDE INLETS — COMPLETE LAYOUT SHEET @ RETENTION PAVING S.I IN R/C SECTION
- MISC. RELOCATIONS, RAMPS, CULVERTS

42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
Made in U.S.A.
NATIONAL

1/15/85

PWCD RCH 4 DRAFTING

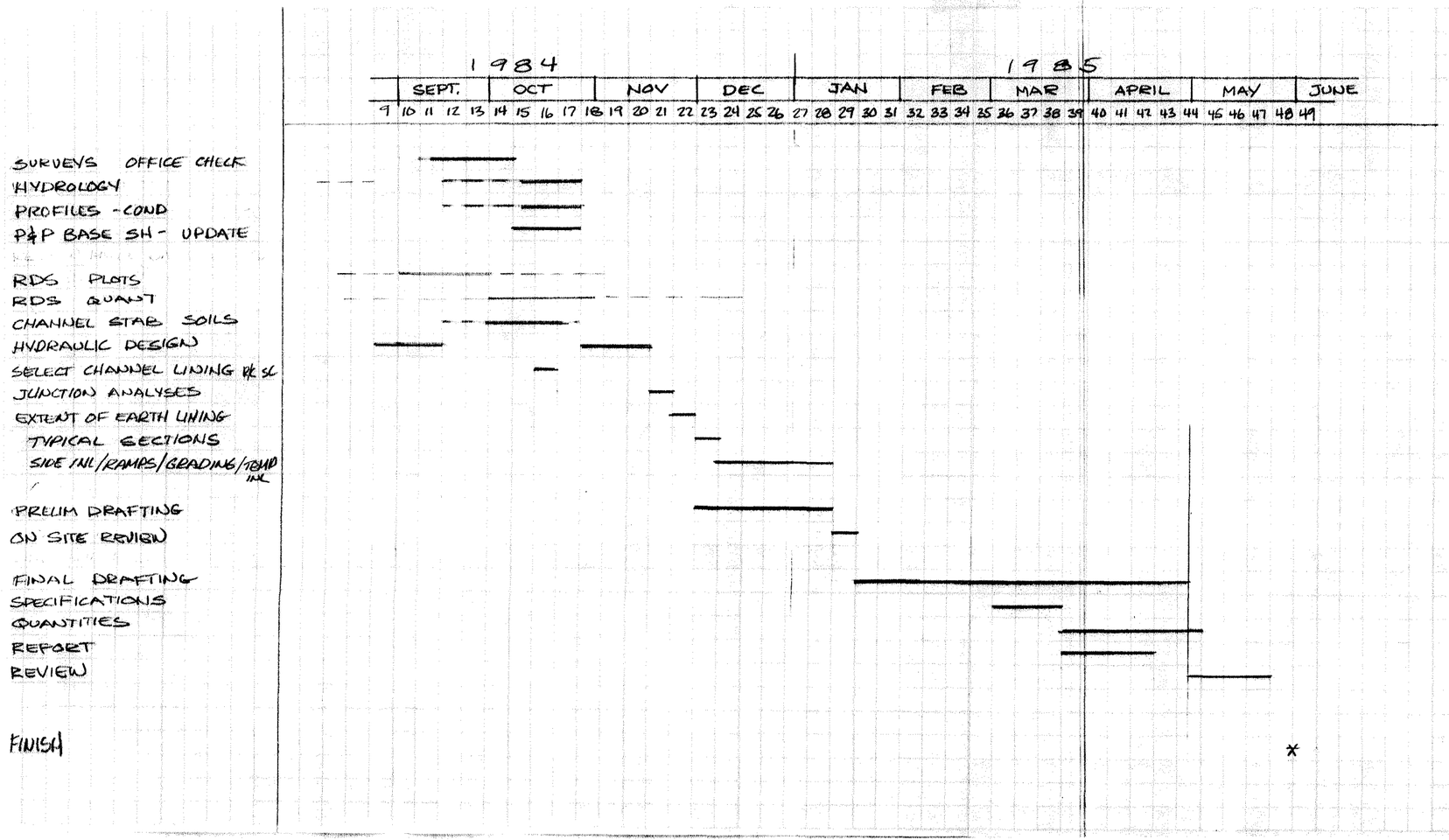
DRAWINGS	SH
• COVER	1
• LOC	1
• PLAN & PROF	12 (3 WKS FEB 4?)
~~TEMP~~	
• TYP SECTIONS	2
• RIC LINED SECTIONS	1
~~TEMP DETAIL~~	
~~DRAINAGE DETAIL~~	
3D • JUNCTION LAYOUT	1
DETAILS	2
~~• DRAINAGE LAYOUT~~ → (RITTENHOUSE LAYOUT / DET)	1 / 1
~~DRAINAGE DETAIL~~	
• DROP STRUCT LAYOUT	1
DETAILS	1
• SIDE INLETS	1
• RAMPS & MISC DET	1
• ~~EROS~~ MISC. (TEMP INL.)	1
• SPOIL DISPOSAL	1

(POWERS - WILLIAMS' LAYOUT - DET - 1) ?D

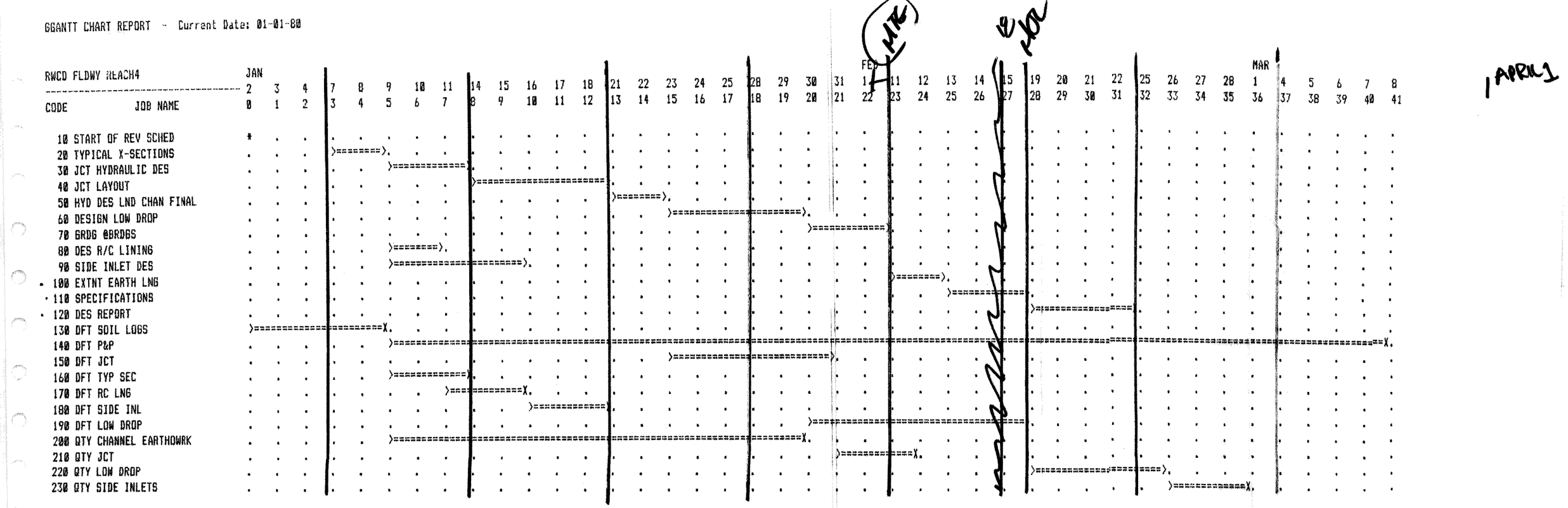
Yes

TOTAL 26 (30)

ARIZONA
RINCO REACH 4
OF
REACH 4 EXT TO GUADELUPE RD.



GGANTT CHART REPORT - Current Date: 01-01-80



APRIL 1

SYMBOL DEFINITIONS:

0 PROJECT START	)===) CRITICAL
S DATE DEPENDENCY	)---) NON-CRITICAL
X TERMINATOR	....) SLACK
* MILESTONE	):::) FINISHED

GANTT CHART REPORT - Current Date: 01-01-80

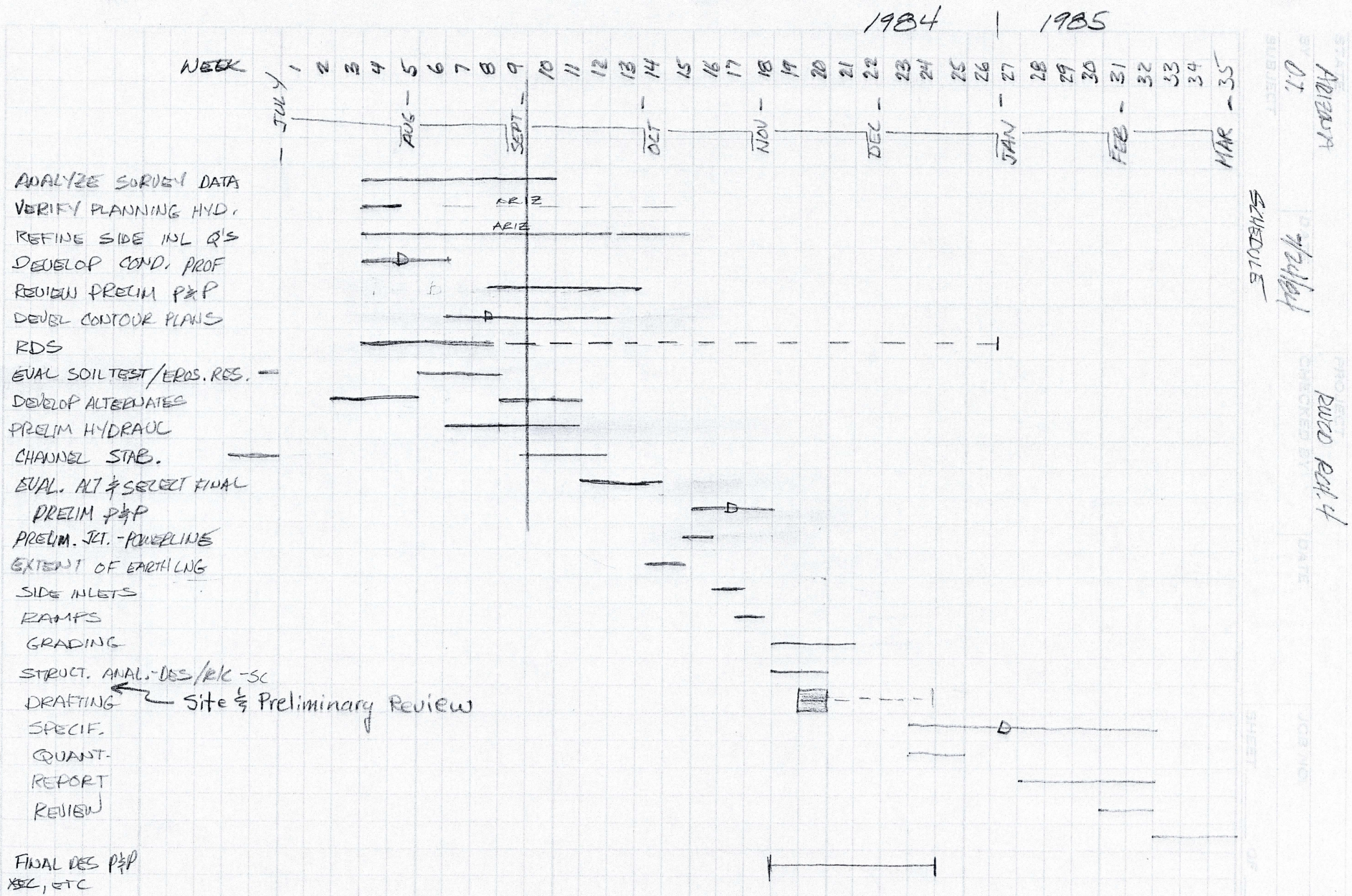
REACH 4 EXTENDED TO GUADELUPE RD.

DT
7/30/84

	JOB	TIME	WHO
	SURVEYS	1 WEEK	DT
	HYDROL	6 WK	ARIZ
	CONT PROF	3 WK	DRAFT
	REVIEW & MOD BASE SHEETS	4 WK	DRAFT
	RDS CONTOUR & XSEC	4 WK	EBL
	SOILS ANAL	1 WK	DT
	CHAN STAB	1 WK	DT
	WSP CHANNEL - AND DES	2 WK	DT
	CH LINING DES,	1 WK	DT
	TYP SECTIONS RAMPS, GRADING	2 WK	DT
	SITE & PRELIM REVIEW	1 WK	DT
		30 WK	
	SIDE INLET DES	1 WK	DT
	TEMP INLET DES	1 WK	DT

DRAFTING

		DWGS/SH	
21	PLAN & PROF SH.	3	62
2	COVER & LOC	2	4
3	TYP SECTION	2	6
1	SIDE INL.	2	2
3	JUNCTION	4	12
2	WILLIAMS RD - ROWERS RD	4	8
2	SP RR RITEN HOUSE	4	8
3	OTHER BRIDGES	4	12
3	SPOILS, ETC	3	9
			STAFF DAYS


1984
1985
WEEK
1 JULY
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14 OCT
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17
18 NOV
19
20
21
22 DEC
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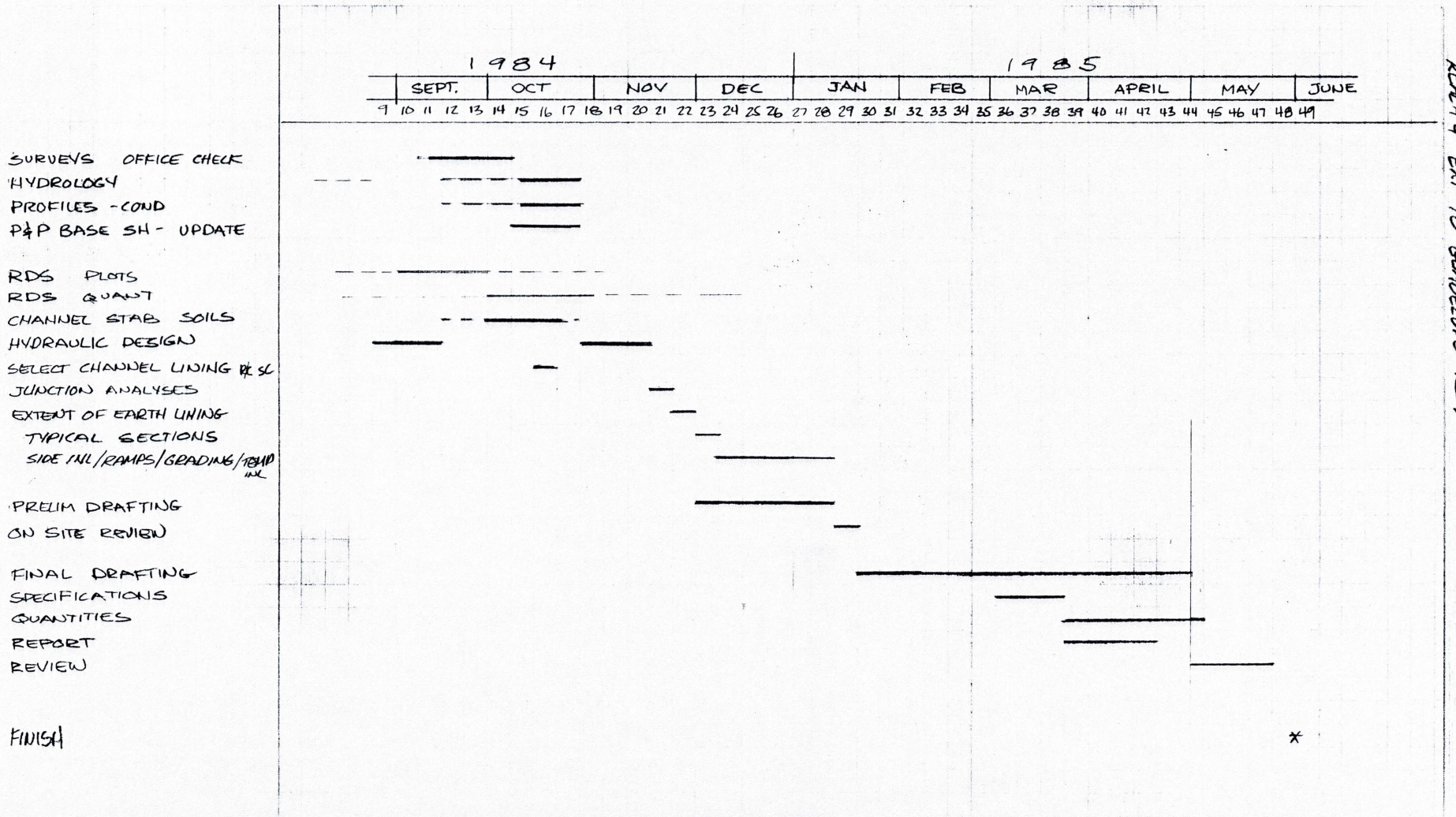
27 JAN
28
29
30
31 FEB
32
33
34
35 MAR
ANALYZE SURVEY DATA
VERIFY PLANNING HYD.
REFINE SIDE INL Q'S
DEVELOP COND. PROF
REVIEW PRELIM P&P
DEVEL CONTOUR PLANS
RDS
EVAL SOIL TEST/EROS. RES.
DEVELOP ALTERNATES
PRELIM HYDRAUL
CHANNEL STAB.
EVAL. ALT & SELECT FINAL
PRELIM P&P
PRELIM. JCT. - POWERLINE
EXTENT OF EARTHLNG
SIDE INLETS
RAMPS
GRADING
STRUCT. ANAL. - DES/RLC - SC
DRAFTING
SPECIF.
QUANT.
REPORT
REVIEW
FINAL DES P&P
SPEC, ETC
Site & Preliminary Review

ARIZONA DT — RINCO REACH 4

REACH 4 EXT TO GUADELUPE RD.



R3 SPECS

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 1, Clearing and Grubbing

(1) This item shall consist of clearing and grubbing of all areas shown on the drawings and staked in the field.

(2) If waste materials are disposed of by burying, they shall be buried a minimum of 18 inches below the existing ground surface in the waste disposal areas shown on the drawings. When disposal is complete, the waste disposal areas shall be smoothed and graded to blend into the surrounding terrain.

(3) If materials removed from the cleared and grubbed area are to be burned, burning shall be carried out in accordance with Pinal County Health Department regulations.

(4) Measurement and payment will be by Method 1.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

(a) Subsidiary Item, Structure Removal

(1) This item shall consist of the removal and disposal of the existing concrete pad, irrigation ditch lining, and conduit between Sta 800+00± and Sta 802+50±; the concrete irrigation ditch lining between Sta 860+60± and 863+25±; the concrete pump pad at Sta 947+35±; the rock riprap in the temporary inlet structure between Sta 976+00 and 977+25; all fences and other structures marked for removal.

(2) In Section 2, Marking, Method 2 shall apply.

(3) In Section 3, Removal, Method 2 shall apply.

(4) Waste materials shall be buried a minimum of 18 inches below the existing ground surface in the waste disposal areas shown on the drawings. When disposal is complete, the waste disposal areas shall be smoothed and graded to blend into the surrounding terrain.

(5) No separate payment will be made for this item. Compensation for this work will be included in the payment for Bid Item 1, Clearing and Grubbing.

3. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

(a) Bid Item 2, Mobilization

(1) This item shall consist of the mobilization of the Contractor's equipment and forces for construction of the Floodway and appurtenances.

(2) Measurement and payment will be in accordance with Section 2.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 3, Water

(1) This item shall consist of furnishing and applying all water necessary for performance of the work described in this contract.

(2) Water may be obtained from the Roosevelt Water Conservation District Higley, Arizona (Grant Ward Telephone 963-3414).

(3) Measurement and payment shall be in accordance with Section 6.

1. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Removal of Water

(1) This item shall consist of the removal of surface and ground water from the construction area shown on the drawings.

(2) No advance plan of dewatering will be required.

(3) No separate payment will be made for the removal of water. Compensation for this work will be included in the payment for Bid Items 4, 5, 6, 7, and 8.

12. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 4, Channel Excavation, Common

(1) This item shall consist of all excavation required to construct:

(a) The floodway, including temporary inlet, between Stations 743+00 and 977+25 centerline of floodway, as shown on the drawings.

(b) The maintenance ramps at Station 747+45, 803+48, 869+40, 916+40, and 919+40.

(2) In Section 5, Use of Excavated Material, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Material, Method 1 shall apply. Suitable materials resulting from this excavation and not required for Bid Item 7, Structure Backfill, and Bid Item 8, Earth Fill, shall be spoiled in the areas shown on the drawings, and as specified in Subsidiary Item, Spoil Disposal.

(4) Measurement and payment will be by Method 2, and will include compensation for Subsidiary Item, Removal of Water, and Subsidiary Item, Spoil Disposal.

b. Bid Item 5, Basin Excavation, Common

(1) This item shall consist of all excavation required to construct:

(a) The sediment basin and inlet channel, as shown on the drawings.

(b) The side inlet basin, adjacent to the drop structure between Sta 856+60± and Sta 859+40± as shown on the drawings.

(2) In section 5, use of excavated material, Method 1 shall apply.

(3) In section 6, Disposal of Waste Material, Method 1 shall apply.

(4) In section 11, Measurement and Payment, Method 1 shall apply.

c. Bid Item 6, Structure Excavation, Common

(1) This item shall consist of excavation required for the installation of the side inlets, the sediment basin pipe outlet, the side inlet basin, the drop structure, the retaining wall, the side inlet weirs, and the turnout structure, as shown on the drawings.

(2) In Section 5, Use of Excavated Materials, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Materials, Method 1 shall apply.

(4) Measurement and payment will be by method 1, and will include compensation for Subsidiary Item, Removal of Water.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performanced in conformance with this specification and the construction details are:

a. Bid Item 7, Structure Backfill

(1) This item shall consist of placing and compacting backfill around the following structures, as shown on the drawings:

(a) The side inlet weir at Sta 842+35±.

(b) The sediment basin outlet pipe at Sta 841+50.

(c) The drop structure at Sta 857+00.

(d) The side inlet weir at Sta 858+70.

(e) The retaining wall at Sta 934+50.

(2) Backfill material shall consist of suitable CL's, ML's, SC's and SM's (Unified Soil Classification System) obtained from the required excavation as approved by the Engineer. The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dryweight basis, in accordance with ASTM D 1140.

(3) In Section 6, Compaction, Class A shall apply. The fill matrix shall be compacted to at least 95 percent of the maximum density obtained in Method A, ASTM D 698 (Standard Proctor Test) or the Rapid Compaction Test (Test No. S-6) SCS National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be three (3) inches.

(5) The maximum thickness of a layer before compaction shall be six (6) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 4 and 7, and will include compensation for Subsidiary Item, Removal of Water. Deduction in volume will be made for embedded conduit and appurtenances.

b. Bid Item 8, Earth Fill

(1) This item shall consist of placing and compacting all earth fill required to construct the floodway between Stations 743+00± and 977+25± as shown on the drawings.

(2) Fill material shall consist of suitable CL's, ML's, SC's, and SM's (Unified Soil Classification System) obtained from the required excavation, as approved by the Engineer.

The general location of suitable materials is as follows:

From Sta 748+00± to Sta 770+00 generally laying between 6.0 and 11.0 feet below ground line.

From Sta 770+00± to Sta 778+00± generally laying between 10.0 and 12.0 feet below ground line.

From Sta 810+00± to Sta 976+00± generally laying between 1.0 and 8.0 feet below ground line.

(3) In Section 6, Compaction, Class A shall apply. The fill matrix shall be compacted to at least 95 percent of the maximum density obtained in compaction tests of the fill materials performed by Method A, ASTM D 698 (Standard Proctor Test) or Rapid Compaction Test (Test No. S-6) SCS National Engineering Handbook, Section 19.

(4) The maximum size of rock fragments incorporated in the fill shall be six (6) inches.

(5) The maximum thickness of a layer before compaction shall be nine (9) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 1 and 7, and will include compensation for Subsidiary Item, Removal of Water.

c. Subsidiary Item, Spoil Disposal

(1) This item shall consist of placing or stockpiling all spoil in the spoil disposal areas, as shown on the drawings.

(2) Spoil material shall consist of all material resulting from the required excavations not needed to construct the floodway.

(3) Section 6, Compaction, does not apply to this item.

(4) Spoil material shall be placed in layers not to exceed two (2) feet in depth.

(5) The finished surface shall not vary more than one-half (0.5) foot, plus or minus, from the average grade, except that in the areas adjoining the right floodway berm, the finished surface shall not vary more than 0.2 foot, plus or minus, from the grades given on the drawings.

(6) Spoil shall be placed to the maximum allowable limits shown on the drawings or as stated by the Engineer:

(a) Along the right floodway berm.

(b) Adjacent to the Sediment Basin and in the old Queen Creek channel between Sta835+00± and Sta. 854+00±.

Spoil in excess of the above limits shall be placed in the remaining designated areas.

(7) No special moisture content for spoil material will be required.

(8) No separate payment will be made of spoil disposal. Compensation for this work will be included in the payment for Bid Item 4, Channel Excavation, Common.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 9, Drain Fill

(1) This item shall consist of furnishing and placing the fine drain fill and coarse drain fill materials in the locations shown on the drawings.

(2) In section 2, Materials, Method 1 shall apply.

(3) The gradation of the fine drain fill shall meet the following requirements:

Sieve Size	Percent Passing
3/8	100
No. 4	95-100
No. 8	80-100
No. 16	50- 85
No. 30	25- 60
No. 50	5- 30
No. 100	0- 10
No. 200	0- 5

(Note: Material meeting ASTM Specification <33, Fine aggregate, will meet these gradation requirements.)

(4) The gradation of the Coarse Drain Fill shall meet the following requirements:

Sieve Size	Percent Passing
1-1/2"	100
1"	70-100
3/4"	50- 90
1/2"	36- 72
3/8"	26- 56
No. 4	0- 20
No. 200	0- 5

(Note: MAG Specification 710 for open graded base course, designated F1-1/2, has substantially similar gradation requirements.)

(5) In Material Specification 521, Item 3 Grading, the limitation regarding percentage of material finer than a No. 200 sieve shall not apply.

(6) Drain fill shall be placed in horizontal layers not to exceed 18 inches deep.

(7) In Section 6, Compction, Class III shall apply.

(8) The moisture content shall be maintained in a range, as determined by the Engineer, that will minimize segregation.

(9) The material passing the #200 sieve shall be non-plastic.

(10) Measurement and payment will be in accordance with section 8.

26. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 10, Concrete

(1) This item shall consist of furnishing, forming and placing all concrete required to construct the inlet box appurtenant to the sediment basin outlet pipe, the sediment basin weir crest wall, the drop structure at Sta 857+00, the side inlet weir crest wall at Sta 858+70, and the retaining wall at Sta 934+50.

(2) Preformed expansion joint filler shall conform to Material Specification 536 and ASTM D 1752 and shall be either Type I or Type II.

(3) Joint sealing compound shall be Type II, Class A conforming to Material Specification 536 and Federal Specification TT-S-227.

(4) Waterstops shall be Class II, Type E, size 19.

(5) In Section 3, Classes of Concrete, and Section 5, Design of the Concrete Mix, Method 2 shall apply. Concrete shall be Class 4000X.

(6) Coarse aggregate shall be size No. 67, in accordance with ASTM C 33.

(7) In Section 15, Construction Joints, Method 1 shall apply.

(8) In Section 18, Removal of Forms, Method 1 shall apply.

(9) All exposed surfaces shall be finished in the following manner:

Upon patching and pointing all holes, as directed in Section 19, the surface shall be promptly covered with polyethylene film, wet burlap or wet cotton mats. If polyethylene film is used, the film shall be held securely to the surface by means of weights, adhesive, or other suitable means. Only white polyethylene film for covering will be acceptable. When the mortar is used in patching and pointing has set sufficiently, the surface shall be uncovered and thoroughly rubbed with either a float or a carborundum stone until the surface is

covered with a lather. Cork, wood or rubber floats shall be used only on surfaces sufficiently green to work up such lather; otherwise, a carborundum stone shall be used. During the rubbing process, a thin grout composed of one (1) part cement and one (1) part of fine sand may be used to facilitate producing a satisfactory lather; however, this grout shall not be used in quantities sufficient to cause a plaster coating to be left on the finished surface. A portion of the required cement for grout shall be white, as required to match the color of the surrounding concrete. Rubbing shall continue until irregularities are removed and there is no excess material. At the time a light dust appears, the surface shall be brushed or sacked. Brushing or sacking shall be carried in one direction, so as to produce a uniform texture.

(10) Curing compound shall be Type 2 conforming to Material Specification 534 and ASTM C 309.

(11) Measurement and payment will be by Method 2, and will include compensation for subsidiary item structure drains.

b. Bid Item 11, Cement

(1) This item shall consist of furnishing and handling all cement required to construct the concrete items in Bid Item 10.

(2) Cement shall be Type 11 or 11A.

(3) Measurement and payment will be by Method 2.

c. Subsidiary Item, Structure Drains

(1) This item shall consist of furnishing and installing the PVC pipe drains and drain guards appurtenant to the sediment basin outlet pipe at Sta 841+50±, the drop structure at Sta 857+00, and the retaining wall at STA 934+50 as shown on the drawings.

(2) The 4" diameter PVC pipe and fittings shall conform to ASTM D 3034, Type PSM PVC sewer pipe and fittings, SDR 35, Perforations (1/2" dia.) shall be as specified in ASTM D2729.

(3) No separate payment will be made for structure drains. Compensation for this work will be included in Bid Item 10, Concrete.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 12, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of the inlet box appurtenant to the sediment basin outlet pipe, the sediment basin with crest wall, the drop structure at Sta 857+00, the side inlet weir crest wall at Sta 858+70, and the retaining wall at Sta 934+50.

(2) All steel bars shall be Grade 60.

(3) Measurement and payment will be by Method 1.

II. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and construction details are:

a. Bid Item 13, 24-inch Diameter Reinforced Concrete Pipe, Class III

(1) This item shall consist of furnishing and installing all pipe for the basin outlet at RWCD Floodway Sta 841+50, as shown on the drawings.

(2) Pipe shall conform to the requirements of Material Specification 542 and ASTM C 76. The pipe shall be Class III.

(3) Pipe shall be furnished with bell and spigot joints equipped with endless "o" ring type gaskets of circular cross-section.

(4) Cement shall be Type II.

(5) In Section 5, Joining Bell and Spigot Pipe, Method 1 shall apply.

(6) In Section 9, Pressure Testing, Method 1 shall apply

(7) Measurement and payment will be by Method 1 and will include payment for subsidiary items, Metal Work, and Cleaning and Painting Metal Work.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 14, Loose Rock Riprap

(1) This item shall consist of furnishing and placing all loose rock riprap, including bedding in the floodway and appurtenant structures as shown on the drawings. The general location follows:

(a) The temporary flooding inlet.

(b) The canal turnout at Sta 731+49±.

(c) The sediment basin.

(d) The drop structure at Sta 857+00.

(e) The retaining wall at Sta 934+50.

(2) The rock shall be graded as follows:

Particle Size (Inch)	Percent Passing (by Dry Wt.)
18	100
15	60-100
12	50- 75
9	15- 50
6	10- 40
4	5- 20
3	0- 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

U.S.Sieve Size	Percent Passing (by Dry Wt.)
3"	100
1-1/2"	70-100
1	60-100
3/4"	55- 90
3/8"	45- 65
# 4	30- 50
# 16	0- 30
# 10	0- 10
#200	0- 5

The coefficient of uniformity (Cu) shall be less than or equal to 20. The Cu is, for any sample, the ratio of the size for which 60 percent is finer (D60) and the size for which 10 percent is finer (D10).

13. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 15, Grouted Rock Riprap

(1) This item shall consist of the furnishing and placing of grouted rock riprap and bedding at inlet Nos. 1 through 27 and 29 and 30, as shown on the drawings and staked in the field.

(2) The rock shall be graded as follows:

Particle Size (Inch)	Percent Passing (by Dry Wt.)
18	100
15	60-100
12	50- 75
9	15- 50
6	10- 40
4	5- 20
3	0- 10

(3) Rock shall be either hand or equipment placed.

(4) Bedding beneath riprap shall be graded as follows:

U.S.Sieve Size	Percent Passing (by Dry Wt.)
3"	100
1-1/2"	70-100
1	60-100
3/4"	55- 90
3/8"	45- 65
# 4	30- 50
# 16	0- 30
# 10	0- 10
#200	0- 5

(5) In Section 6, Design of the Grout Mix, the Contractor shall be responsible for proportioning the mix. The grout shall consist of Portland cement, fine and coarse aggregate, water and an air-entraining agent. The cement content shall be 5 1/2 bags per cubic yard of concrete. The maximum nominal size of coarse aggregate shall be 3/4 inch . The slump shall be within the range of 6 to 10 inches. The air content (by volume) of the grout mixture at the time of placement shall be five (5) to seven (7) percent. At least five (5) days prior to placement of grout, the Contractor shall furnish the Engineer with a statement of the mix proportions for approval.

(6) Cement shall be Type II or IIA.

(7) Measurement and payment will be by Method 1.

(5) In Section 6, Design of the Grout Mix, the Contractor shall be responsible for proportioning the mix. The grout shall consist of Portland cement, fine and coarse aggregate, water and air-entraining agent. The cement content shall be 5 1/2 bags per cubic yard of concrete. The maximum nominal size of coarse aggregate shall be 3/4 inch. The slump shall be within the range of 6 to 10 inches. The air content (by volume) of the grout mixture at the time of placement shall be five (5) to seven (7) percent. At least five (5) days prior to placement of grout, the Contractor shall furnish the Engineer with a statement of the mix proportions for approval.

(6) Cement shall be Type II of IIA.

(7) Measurement and payment will be by Method 1.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 16, Guardrail

(1) This item shall consist of fabricating and installing the guardrails as shown on the drawings and staked in the field.

(2) The rail elements, terminal sections, bolts, nuts and other fittings shall conform to the specifications of AASHTO M-180, except as modified in this specification. The edges and center of the rail element shall contact each post or block. Rail element joints shall be lapped not less than 12-1/2 inches and bolted. The rail metal shall be open hearth, electric furnace, or basic oxygen steel and, in addition to conforming to the requirements of AASHTO M-180, shall withstand a cold bend, without cracking, or 180 degrees around a mandrel of a diameter equal to 2-1/2 times tht thickness of the plate.

(3) Bolts shall have shoulders of such shape as will prevent the bolts from turning.

The rail element shall have full bearing at joints. When the radius curvature is 150 feet or less, the rail element shall be shaped in the shop.

(4) The rail elements, terminal sections, bolts nuts, and other fittings shall be galvanized.

(5) Posts, including blocks, shall be construction grade, Douglas Fir, free of heart center and shall be given a preservative pressure treatment in accordance with Federal Specification TT-W-571J except that for creosote or creosote solutions, the net retention shall be at least 8 pounds of the creosote preservative per cubic foot of post. Posts and blocks shall be cut to length and bored for boltholes before treatment.

(6) The posts ahall be firmly placed in the ground. The space around posts shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted.

(7) The bolted connection of the rail element to the post shall withstand a 5,000 pound pull at right angles to the line of the railing. The metal work shall be fabricated in the shop, and no punching, cutting or welding will be permitted in the field. Terminal sections shall be installed in accordance with the manufacturer's rcommendations.

Surplus excavated material remaining after the guard railing has been constructed shall be disposed of.

(8) Section 6 Measurement and Payment shall not apply. The railing will be measured by the linear foot from end to end along the face of the railing including terminal sections. Payment for furnishing materials and installing guard rails complete, in place, including excavation and backfill for posts and painting will be made on the basis of the price bid per linear foot.

b. Subsidiary Item, Metal Work

(1) This item shall consist of fabricating and installing the basin outlet trash rack as shown on drawings.

(2) The trash rack shall be fabricated of structural steel conforming to the requirements of ASTM A 36.

(3) The trash rack shall be painted in the manner specified in Construction Specification 82.

(4) No separate payment will be made for this item. Compensation will be included in Bid Item 13, 24-inch Diameter Reinforced Concrete Pipe, Class III.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Cleaning and Painting Metal Work

(1) This item shall consist of cleaning and painting the designated metal items in Bid Item 16, guardrail, and subsidiary item metal work.

(2) In Section 3, Surface Preparation, Method 2 shall apply.

(3) In Section 4, Painting Systems, Paint System I shall apply for the basin outlet trash rack, subsidiary item, metal work. Paint System D shall apply for the guardrails in Bid Item 16, except that Type II paint shall be used in placed of Type 2 for the priming coat and the top coats shall be white.

(4) No separate payment will be in made for this item. Compensation will be included in the payment for Bid Item 13 and Bid Item 16.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 17, 5-Foot High Chain Link Fence

(1) This item shall consist of furnishing and installation of the 5-feet high chain link fence, including gate, as shown on the drawings.

(2) In Section 2, MATERIALS, the chain link fabric shall be 12 gage and provide knuckled selvage and bottom and top edges. The gate shall be 14-feet wide by 5-feet high double leaf with a lockable combination spring latch and plumber rod of approved design.

(3) In Section 3, INSTALLING FENCE POSTS, line posts shall be located at approximately equal intervals between corner posts. No interval shall exceed 10 feet.

(4) Concrete for installation of posts and appurtenances shown on the drawing shall meet or exceed the requirements for class 2500X concrete as defined in specification 31. No tests will be performed.

(5) In Section 4, INSTALLING WIRE FENCE, no barbed wire will be required.

(6) In Section 5, MEASUREMENT AND PAYMENT, measurement and payment shall be by Method 1.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 18, Surveys

(1) This item shall consist of furnishing personnel, equipment, materials and performing surveys required for:

(a) Construction layout

(b) Computation of quantities

(c) "As-Built" construction drawings

(2) The Contractor shall provide the Government Representative a statement of qualifications, including specific experience of each of the survey personnel assigned to the job.

(3) The Contractor shall provide the Government Representative schedule of surveys to be performed each month.

(4) In Section 5, Construction Surveys and Measurements, all entries in the bound field notebooks shall follow the format shown on pages 2-40 and 2-42 of the Soil Conservation Service National Engineering Handbook, Section 19.

(5) In Section 6, Staking, the location and marking of stakes shall follow the format shown on pages 2-13, 2-15, 2-17, and 2-20 of the Soil Conservation Service National Engineering Handbook, Section 19.

(6) Payment will be in accordance with Section 8.

COMPUTATION SHEET
SCS-ENG-522A
Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Ag. PROJECT Roosevelt Watershed Cons. District

BY CSS DATE 2/11/85 CHECKED BY CSS DATE JOB NO.

SUBJECT Summary Reach 4 Excavation and Fill Quantities. SHEET 1 OF 2

Excavation: From Sta 556+00 section 187
To Sta. 595+00 section 229

Volume of Excav. = 233,137 yds^3

Sta 600+00 section 244
Sta 675+00 section 323

607103
263987
343,116

Volume of Excav = 343,116 yds^3

Total Excav. 576,253 yds^3

Back fill

From Sta 556+00 to 595+00 — 20,725 yds^3

Sta 600+00 to 675+00 — 77,993

Total Fill 98,718 yds^3

Excavation:
Sta 677+00 section 325 to
Sta 744+00 section 404 — 364,678 yds^3

Backfill
Sta 677+00 section 325 to
Sta 744+00 section 404 — 46,741 yds^3

COMPUTATION SHEET
SCS-ENG-522A
Rev. 9-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Az. PROJECT

BY CBB DATE 2/11/05 CHECKED BY DATE JOB NO.

SUBJECT Reach 4 Excavation and Backfill. SHEET 2 OF 2

Excavation:

233,137
343,116
364,678
940,931 yds^3

Backfill:

20,725

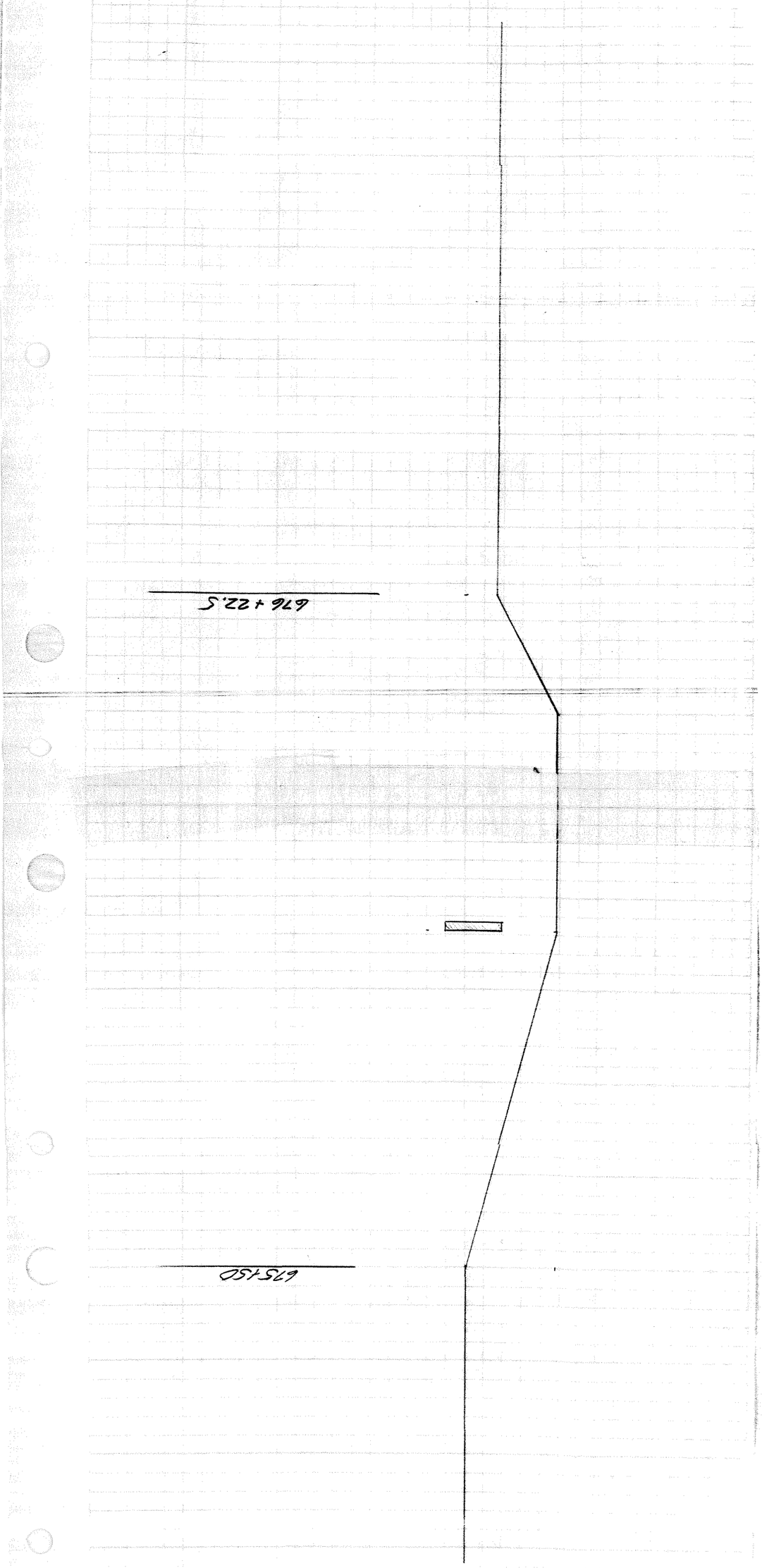
72,993

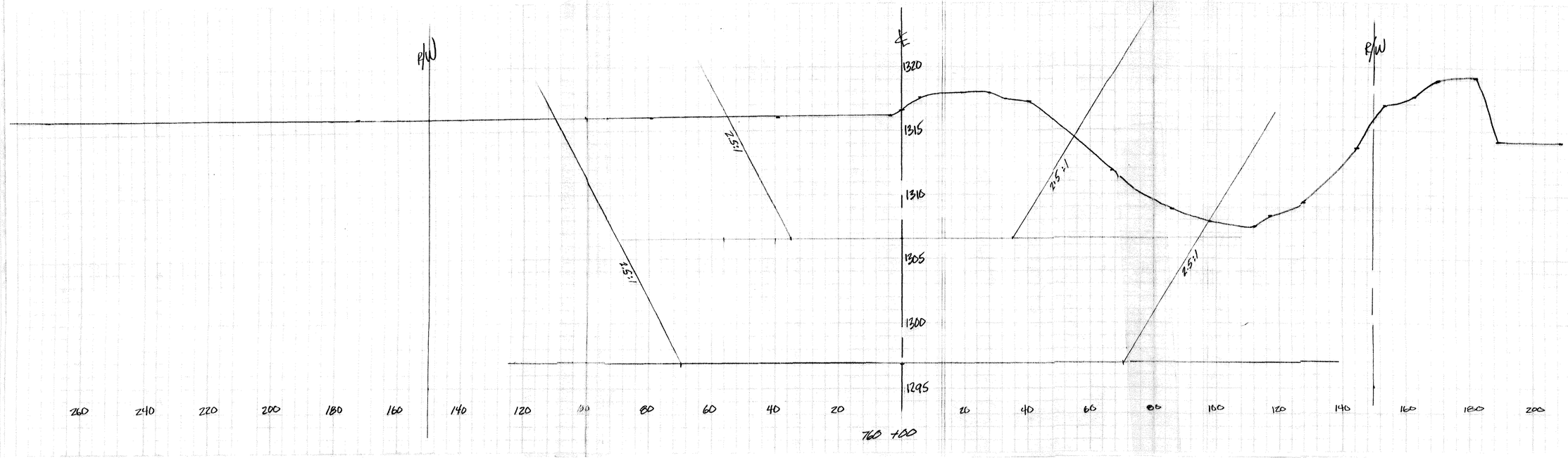
46,761
145,479 yds^3

ARIZONA
DT
LOW DROP

11/19/84

RWCD R4
JMT
2/85





ARIZONA
DT
11/23/84
RW CD
DMK
R 4
2/84

ARIZONA
DT 11/26/84

RWCD Rd

TRANSITIONS AT LCN DROP

- USE ~ 12½° CONVERGENCE & DIVERGENCE

Tan 12½ = 0.222 ∴ FLARE = 1/.222 = 4.5:1

- U.S. CHANNEL WIDTH = 150 FT
  WEIR CR = 70
  LONG. 80 FT
  TRANSIT L = 80 (4.5/2)
  = 180 FT

NG

USE AS SHOW ON LAYOUT DT 2/20/85

ARIZONA RWCD REACH 4

DT 1/3/05

TYPICAL SECTIONS

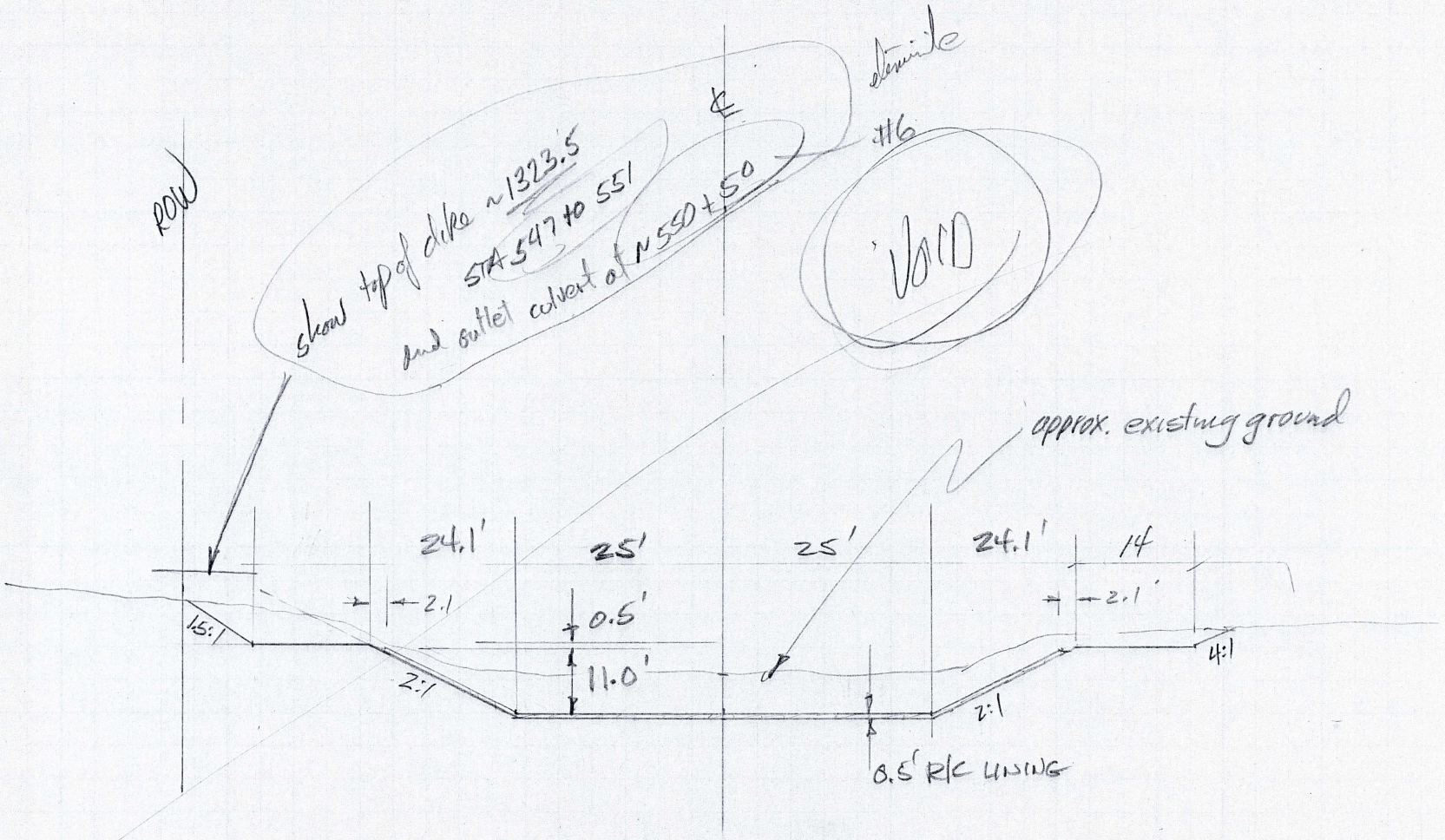
VOID

DESIGN DEPTH

STA	WIDTH B (FT)	Z	Q100 FLOW DEPTH d (FT)	DESIGN CHANNEL DEPTH D (FT)	D/d
744+00	200	3	8.45	10.5	1.24
742	150	3	8.32	"	1.26
676+22.5	150	3	8.20	"	1.28
675+00	70	3	8.42	"	1.25
627+00	150	3	8.47	"	1.24
626+00	175	3	8.54	"	1.23
555+50	175	3	9.01	"	1.17

CHECK SECTIONS

NATIONAL
42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
Made in U.S.A.

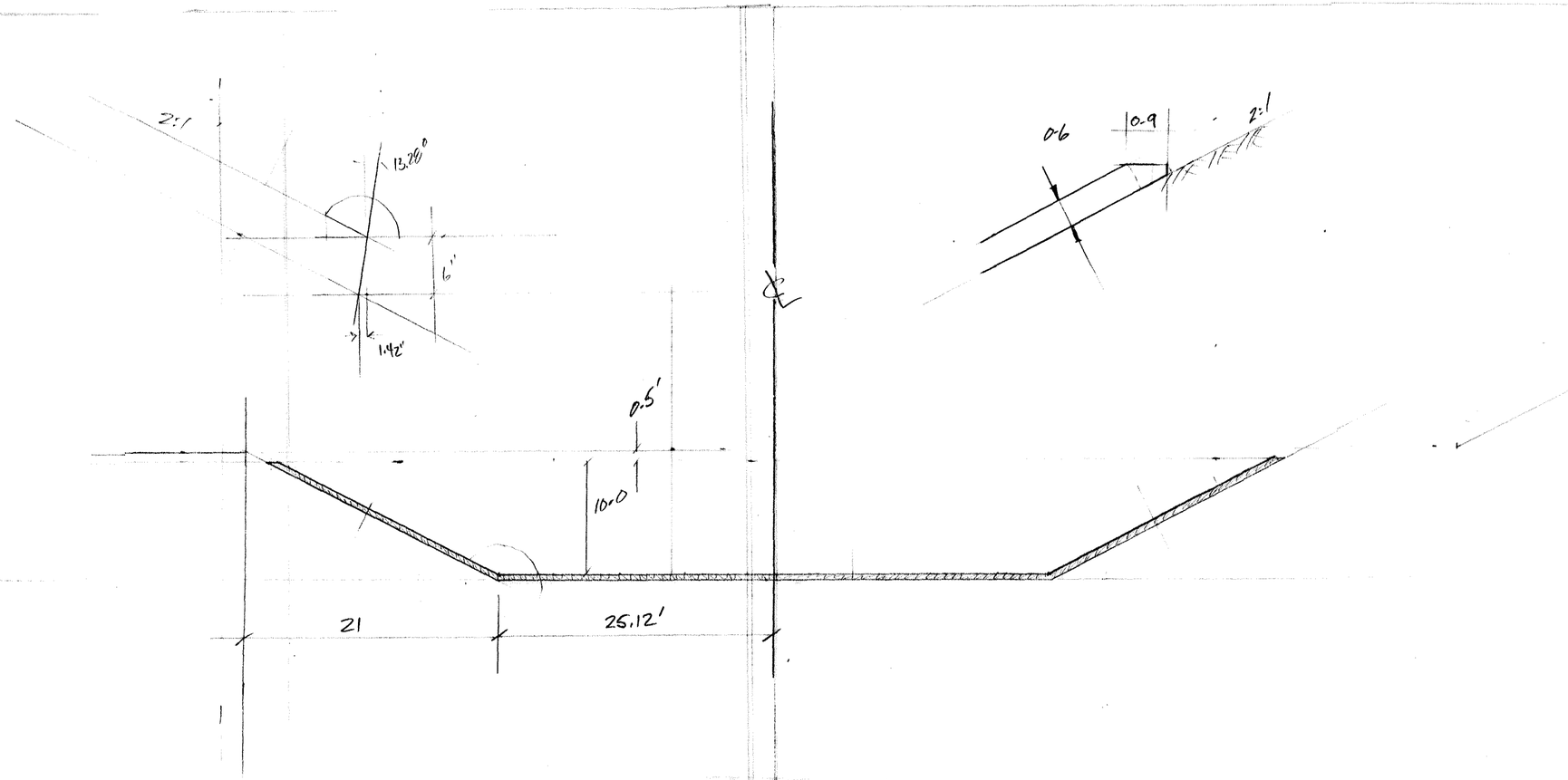


TYPICAL SECTION
(not to scale)

approx STA 544+00 to 550+00

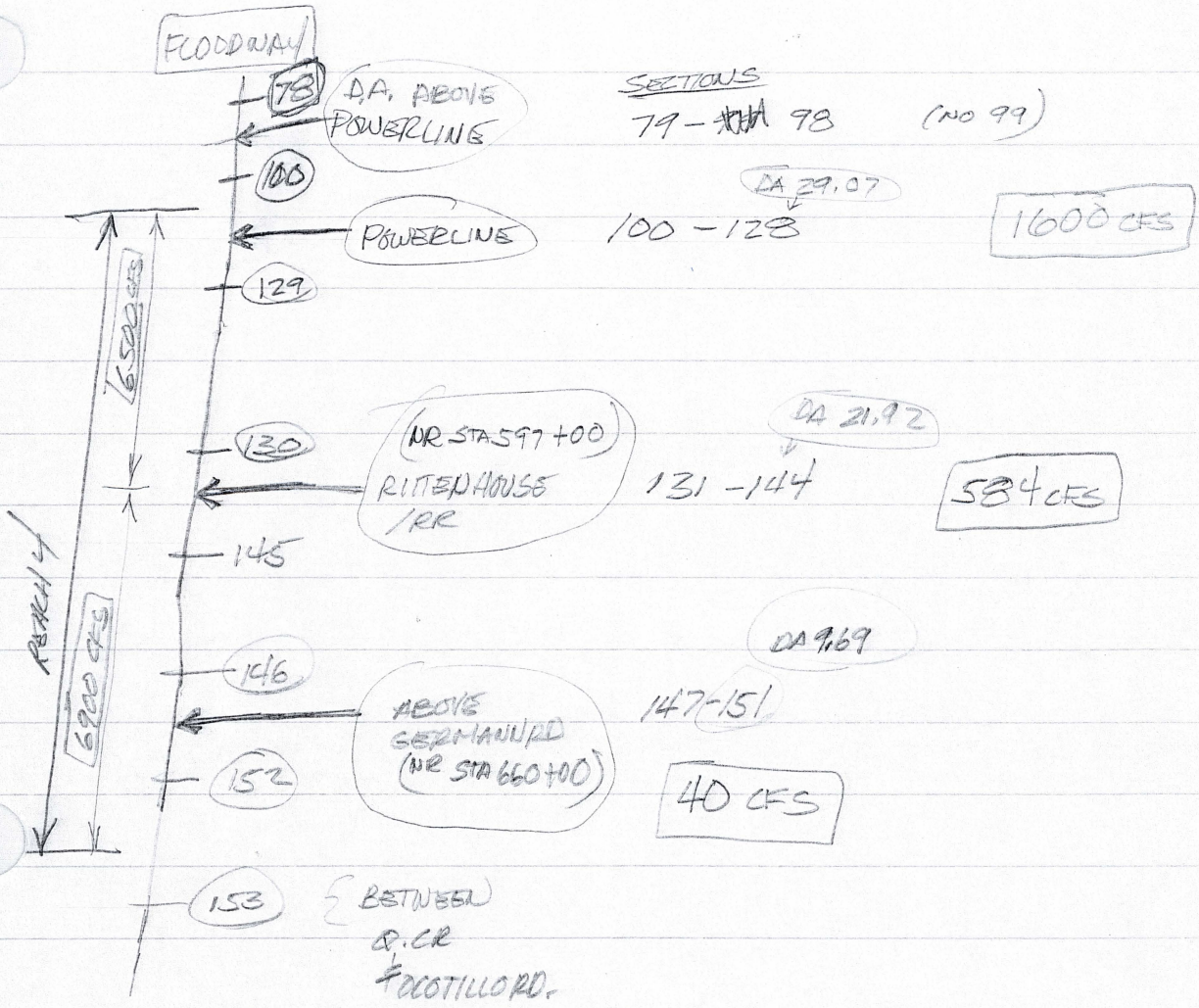
RWCD REACH 4
DT 2/05
R/C LINING TYPICAL SECTIONS

42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE



RANCHO RCH 4
DT
7/24/84

TR-20 SCHEMATIC
(FROM "HYDROLOGY STUDIES")

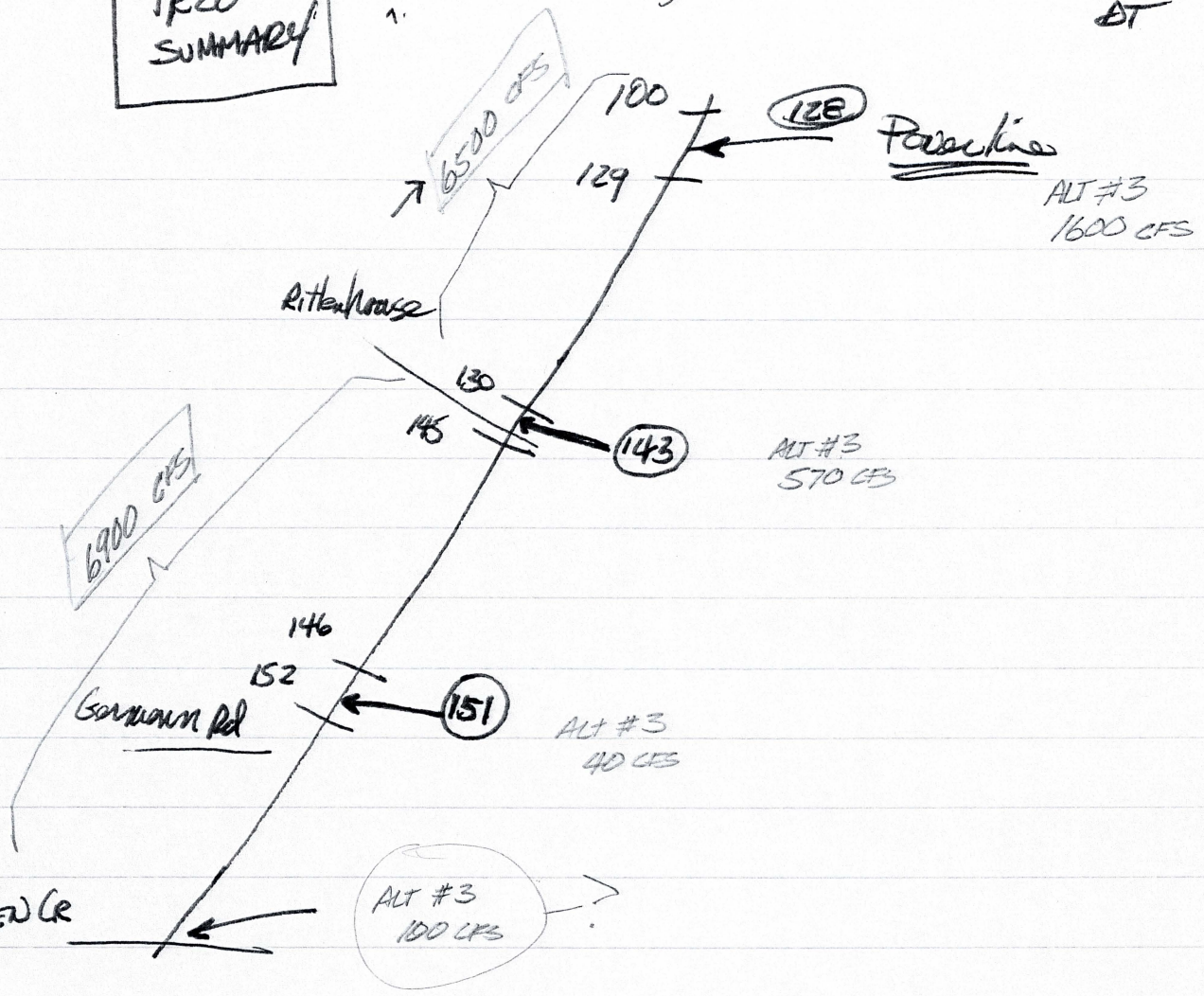


TR20 SUMMARY

1.

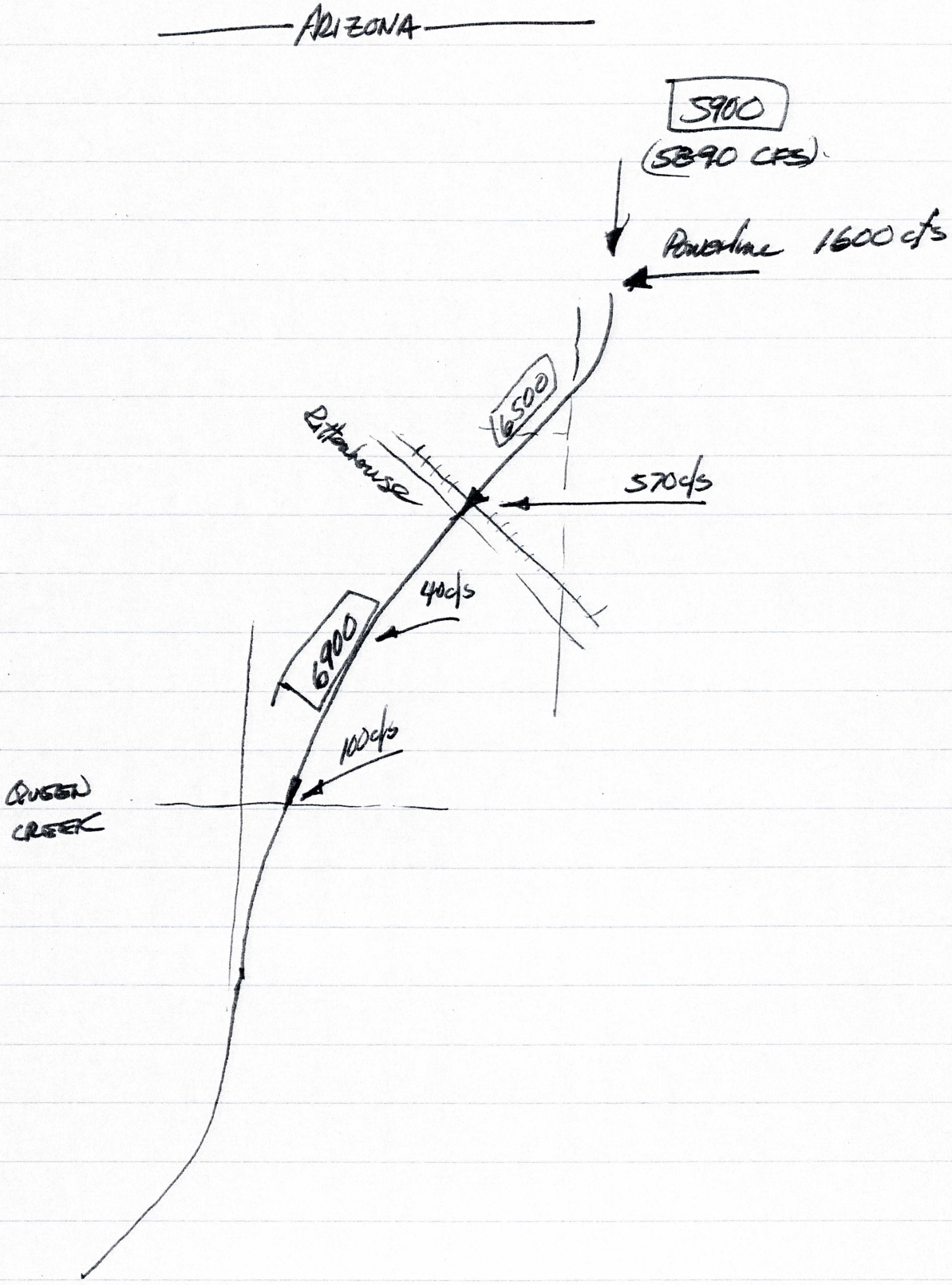
590

DNCO EC4
ST



		STORM 1	STORM 2
	ALT 3 IR	Q 100 CFS	Q10
	100	5861.16	1427.07
POWERLINE	128	1600.29	400.01
	129	6436.33	1621.58
	130	6343.21	1618.71
RITTENHOUSE	143	584.03	137.97
	145	6845.70	1672.19
	146	6771.38	1670.31
GERMANO	151	40.04	0.0
	152	6790.80	1670.31
?	151	99.01	

RWCD RCH 4


ARIZONA
5900
(5890 CFS)
Powerline 1600 cfs
6500
Pittenhouse
570 cfs
40 cfs
6900
100 cfs
QUEEN CREEK

PLOT DATA
OT
7/24/02

5106 INLETS

POWERLINE DAM 145.1 M.[2]

1. POWERLINE FLOODWAY

1.A GOLF COURSE DRAIN NR STA 513+00

2. BETWEEN NMS. FLD. & POWERS RD NR STA 547+00

3. MID SEC 36 T1S R6E NR 569+00
↓
NR 577+00

4. RITTEN HOUSE:

U.S. OF RR
D.S. OF RR
D.S. OF HWY

5. DRAINAGE FROM STST 629+00 } ?
or 645+00 }

6. DR. FROM STST 680+00 ?

7. @ HIGLEY RD 715+00 ?

8. @ CR. RD. ER 746+00 ?

ARIZONA AMCD RCH 4

D.T. 7/24/84

HYDROLOGY

PROBLEM: PROPOSE FLOW CONDITIONS FOR ANALYSIS AT JCT WITH POWERLINE FLOODWAY AND AT SIDE INLET ALONG RR. ABOVE RITTENHOUSE RD.

ANALYSIS: 1. THE BASIC HYDROLOGY CONSISTS OF TR-20 RUNS CONTAINED IN TWO REPORTS TITLED "HYDROLOGY STUDIES" OF NOV 1976 AND MAY 1977.

2. THE RESULTS OF ALT. 3 OF THESE RUNS WERE USED AS DESIGN (FROM PLANNING) VALUES. THESE VALUES WERE ROUNDED.

3. THE RELATIVE TIMING OF PEAKS IN THE SIDE INLETS AND CHANNELS IS PROBLEMATIC. FOR DESIGN AND JUNCTION ANALYSIS

FREQ.	CASE	Q D.S. OF JCT	IN SIDE INL	IN CH U.S.
100	1	DSMAX	SIDEMAX	DSMAX - SIDEMAX
100	2	DSMAX	DSMAX - USMAX	USMAX
10	3	DSMAX	SIDEMAX	DSMAX - SIDEMAX
10	4	DSMAX	DSMAX - USMAX	USMAX

DSMAX = DESIGN FLOW DOWNSTREAM OF JCT.

SIDEMAX = " " IN SIDE INLET

USMAX = " " UPSTREAM OF JCT.

ARIZONA RDWCD REACH 4
D.T 7/24/84

SOLUTION:

1. POWERLINE

TR20 RESULTS

	Q100	Q10	TR20 10
DS MAX	6436	1622	129
SIDE MAX	1600	400	128
US MAX	5831	1427	100

DESIGN:

CASE	Q DS OF JCT	SIDE INL.	Q US OF JCT	
1	6500	1600	4900	
2	6500	600	5900	← TR20
3	1650	400	1250	
4	1650	200	1450	

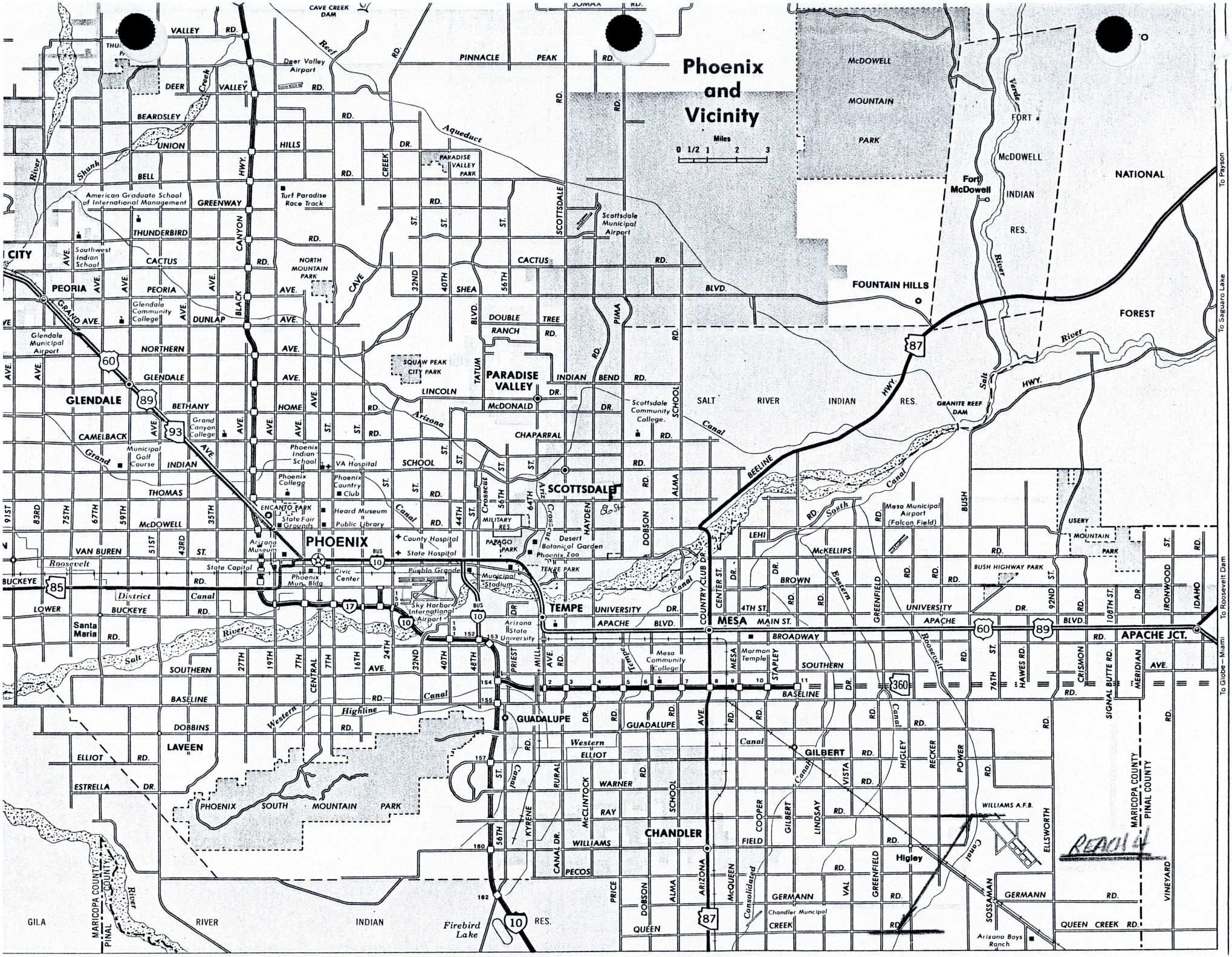
2. RITTENHOUSE

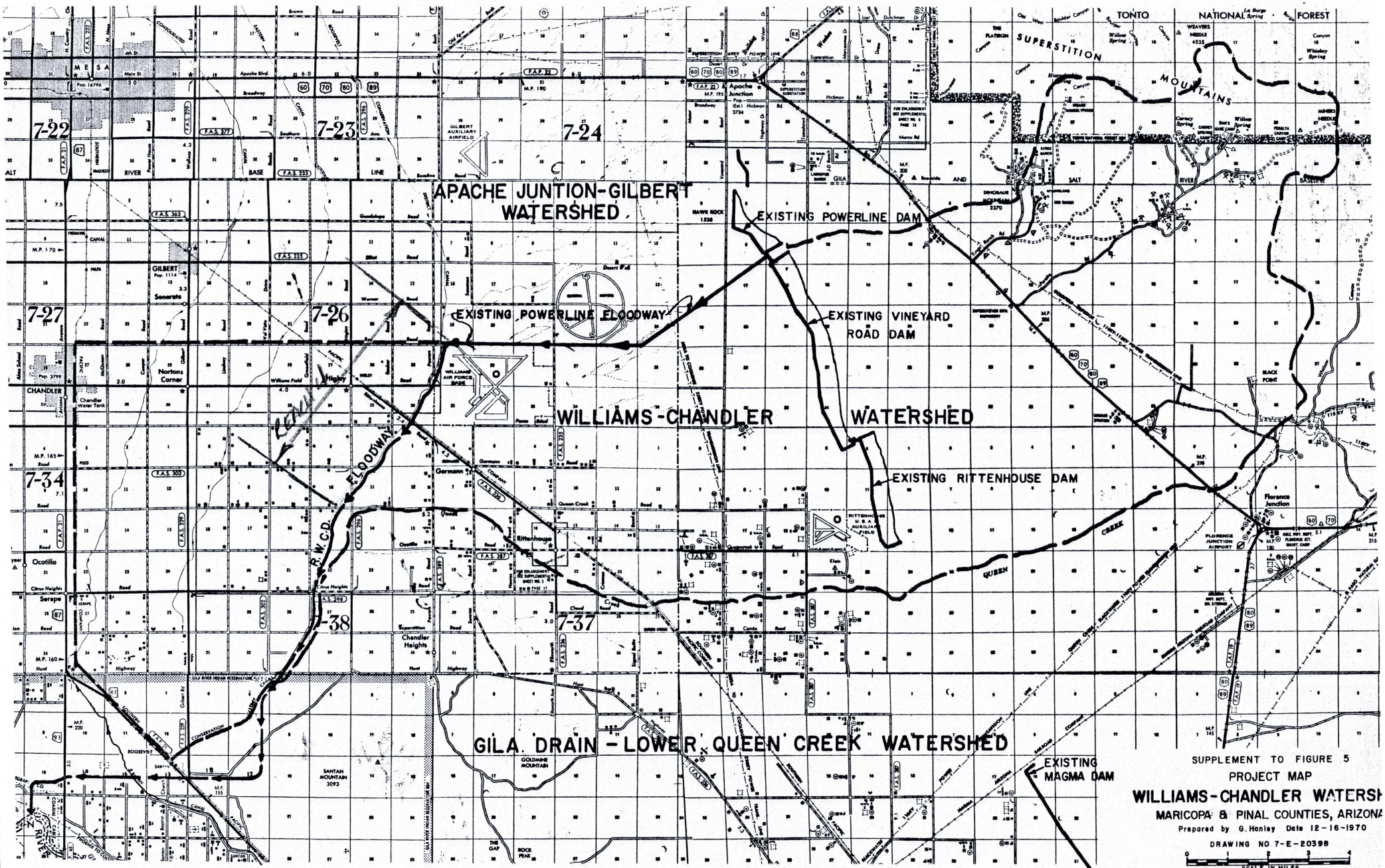
TR 20 RESULTS:

	Q100	Q10	
DS MAX	6846	1672	145
SIDE	584	138	143
US	6343	1619	130

DESIGN:

CASE	Q DS OF JCT	SIDE INL.	Q US OF JCT	
1	6900	600	6300	
2	6900	400	6500	← TR20
3	1675	150	1525	
4	1675	50	1625	


Phoenix and Vicinity
Miles
0 1/2 1 2 3
PHOENIX
SCOTTSDALE
TEMPE
MESA
GLENDALE
PEORIA
PARADISE VALLEY
FOUNTAIN HILLS
CHANDLER
GILBERT
GUADALUPE
LAVEEN
APACHE JCT.
Fort McDowell
McDOWELL MOUNTAIN PARK
NATIONAL FOREST
SALT RIVER INDIAN RES.
PHOENIX SOUTH MOUNTAIN PARK
Firebird Lake
GILA RIVER INDIAN RES.
Deer Valley Airport
Scottsdale Municipal Airport
Glendale Municipal Airport
Sky Harbor International Airport
Mesa Municipal Airport (Falcon Field)
Williams A.F.B.
Chandler Muncipal
Arizona Boys Ranch
Scottsdale Community College
Mesa Community College
Arizona State University
Phoenix Country Club
Desert Botanical Garden
Phoenix Zoo
Heard Museum
Arizona Museum
Phoenix Civic Center
Phoenix Mun. Bldg
State Capitol
State Fair Grounds
Municipal Stadium
Encanto Park
Papago Park
Tempe Beach Park
Mormon Temple
Granite Reef Dam
Cave Creek Dam
Roosevelt Dam
To Payson
To Saguaro Lake
To Globe–Miami
To Roosevelt Dam
MARICOPA COUNTY
PINAL COUNTY
Salt River
Verde River
Aqueduct
Canal
Western Canal
Eastern Canal
Highline Canal
Consolidated Canal
Crosscut Canal
Arizona Canal
Beeline Hwy.
Grand Ave.
Roosevelt
Baseline
Elliot Rd.
Thomas Rd.
McDowell
Van Buren
Buckeye
Lower Buckeye
Southern
Broadway
Apache Blvd.
University Dr.
Mill Ave.
Scottsdale Rd.
Hayden Rd.
Rural Rd.
McClintock
Price
Dobson
Alma School
Country Club Dr.
Center St.
Stapley
Gilbert Rd.
Greenfield
Higley
Power
Recker
Val Vista
Lindsay
Cooper
Kyrene
Priest
Central
Dobbins
Estrella Dr.
Warner
Ray
Williams
Pecos
Germann
Queen Creek
Chandler Blvd.
Ellsworth
Sossaman
Vineyard
Meridian
Crismon
Signal Butte
Hawes
Ironwood
Idaho
Bush Highway
Usery Mountain Park
Reach 4



SUPPLEMENT TO FIGURE 5

PROJECT MAP

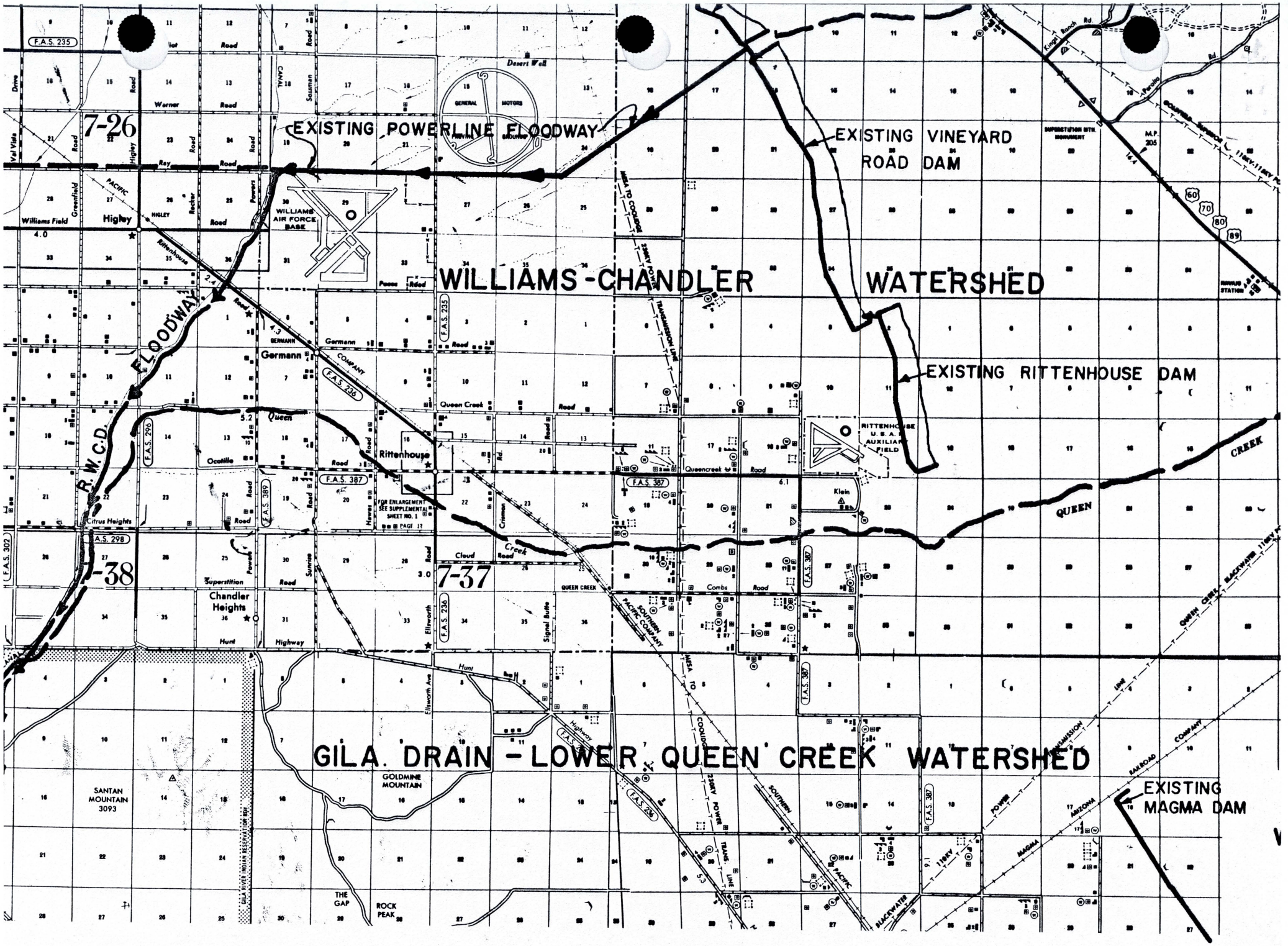
WILLIAMS-CHANDLER WATERSH

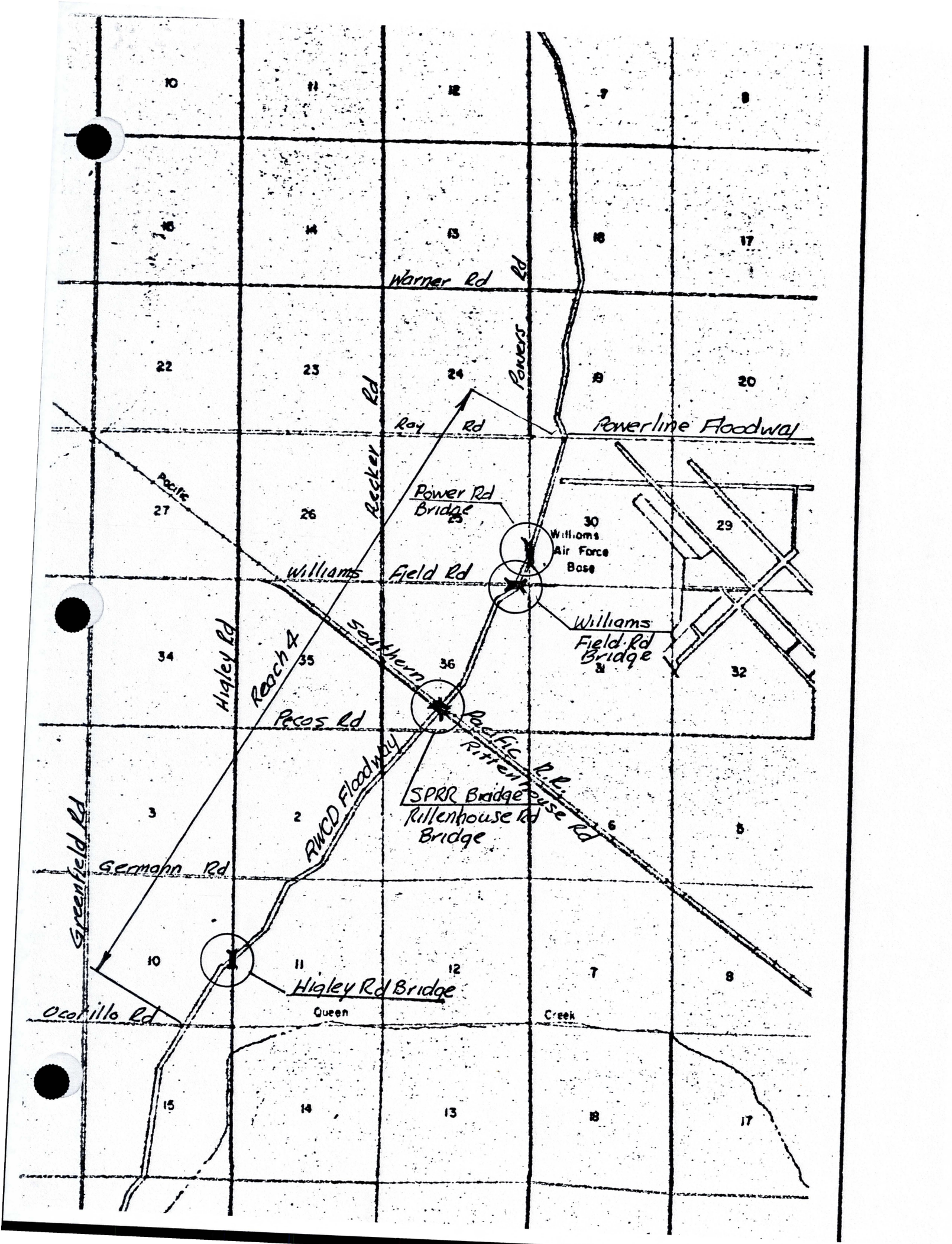
MARICOPA & PINAL COUNTIES, ARIZONA

Prepared by G. Hanley Date 12-16-1970

DRAWING NO. 7-E-20398

SCALE IN MILES


EXISTING POWERLINE FLOODWAY
EXISTING VINEYARD ROAD DAM
EXISTING RITTENHOUSE DAM
EXISTING MAGMA DAM
WILLIAMS-CHANDLER WATERSHED
GILA DRAIN - LOWER QUEEN CREEK WATERSHED
7-26
7-37
7-38
F.L. FLOODWAY
R.W.C.D.
WILLIAMS AIR FORCE BASE
RITTENHOUSE U.S.A. AUXILIARY FIELD
Williams Field
Higley
Germann
Queen Creek
Rittenhouse
Chandler Heights
Citrus Heights
Ocotillo
Klein
Combs
Hunt
Cloud
Queencreek
SANTAN MOUNTAIN 3093
GOLDMINE MOUNTAIN
THE GAP
ROCK PEAK
QUEEN CREEK
SOUTHERN PACIFIC COMPANY
MESA TO COOLIDGE 230KV POWER TRANS. LINE
F.A.S. 235
F.A.S. 236
F.A.S. 296
F.A.S. 298
F.A.S. 302
F.A.S. 387
F.A.S. 389
FOR ENLARGEMENT SEE SUPPLEMENTAL SHEET NO. 1 PAGE 17


Warner Rd
Powers Rd
Ray Rd
Powerline Floodway
Recker Rd
Pacific
Power Rd Bridge
Williams Air Force Base
Williams Field Rd
Williams Field Rd Bridge
Higley Rd
Reach 4
Southern
Pacific Railroad
Pecos Rd
RWCD Floodway
SPRR Bridge
Rittenhouse Rd Bridge
Rittenhouse Rd
Greenfield Rd
Germann Rd
Higley Rd Bridge
Ocotillo Rd
Queen Creek
10
11
12
7
8
15
14
13
18
17
22
23
24
19
20
27
26
25
30
29
34
35
36
31
32
3
2
1
6
5

L WORK

Williams-Chandler Watershed, Arizona

Channel Reach Name and Sta.	Drainage Area sq.mi.	100 Yr. Frequency Design Discharge cfs	Water Surface Elevation Feet msl	Channel Dimensions: Hydraulic Gradient ft./ft.	Bottom Gradient ft./ft.	Bottom Width ft.	Bottom Elevation ft.msl	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged 1/ ft/sec	Velocities As Built 2/ ft/sec	Excavation Volume cu.yds.	3/ Type of Work	4/ Existing Channel Type	5/ Present Flow Condition
RWCD Floodway																
494+40	100.1		1325.5				1316.4									
		6500		-	-	Conc.	Transition	2:1	.014	.014	5.5	3.9	4,800	III.	M	E
495+90	100.1		1324.1				1315.1									
		6500		0.0011	0.0009	50		2:1	.014	.014	11.0	7.0	172,500	III.	M	E
548+55	100.1		1318.5				1310.6									
		6500		-	-	Rock	Transition	2-3:1	.037	.037	12.5	6.3	20,800	III.	M	E
552+05	100.1		1319.2				1310.6									
		6500		0.00028	0.000154	200		3:1	.027	.024	3.3	1.9	435,200	II	M	E
595+00	122.1		1318.0				1309.9									
		6900		0.00040	0.000154	200		3:1	.027	.024	3.8	2.1	310,700	II	M	E
635+00	131.8		1316.4				1309.3									
		6900		-	-	Earth	Transition	3:1	.027	.024	4.3	2.6	7,400	II	M	E
636+13	131.8		1316.2				1309.1									
		6900		0.00088	0.00097	150		3:1	.027	.024	5.7	3.4	843,500	II	M	E
765+00	131.8		1304.8				1296.6									
		6900		-	-	Earth	Transition	3:1	.027	.024	4.9	2.9	25,300	II	M	E
767+25	131.8		1304.9				1296.6									
		6900		0.00022	0.00021	250		3:1	.027	.024	3.0	1.8	973,000	II	M	E
853+80	131.8		1303.0				1294.8									
		6900		-	-	Rock	Transition	3:1	.037	.037	3.6	2.3	9,800	II	M	E
857+00	238.1		1300.2				1294.7									
		8100		-	-	Conc.	Drop Structure		.014	.014	13.4	8.4	30,100	II	M	E
857+55	238.1		1298.9				1290.7									
		8100		-	-	Rock	Transition	3:1	.037	.037	9.0	4.6	31,500	II	M	E
860+75	238.1		1298.8				1290.6									
		8100		0.0003	0.0003	250		3:1	.027	.024	3.6	2.2	1,331,300	II	M	E
996+00	251.9		1294.9				1286.6									
		8700		0.0003	0.0003	250		3:1	.027	.024	3.8	2.2	943,900	I	O	E
1124+97	256.9		1291.2				1282.7									
		8700		-	-	Rock	Transition	3:1	.037	.037	4.4	2.9	400	I	O	E
1125+27	256.9		1290.8				1282.7									
		8700		-	-	Conc.	Transition	3-0:1	.014	.014	9.2	5.6	800	I	O	E
1125+85	256.9		1288.0				1282.7									
		8700		0.0157	0.0458	65		0:1	.014	.014	12.9	8.0	2,100	I	O	E
1127+39	256.9		1282.5				1275.6									
		8700		0.0105	0.0098	65		0:1	.014	.014	27.3	10.2	41,200	I	O	E
1157+80	256.9		1250.7				1245.8									
		8700		-	-	SAF	Basin	0:1	.014	.014	27.3	10.2	2,600	I	O	E
1159+72	256.9		1248.6				1243.9									
		8700		-	-	Conc.	Transition	0-3:1	.014	.014	12.3	7.8	800	I	O	E
1160+29	257.4		1245.4				1239.5									
		8700		0.00155	0.00155	200		3:1	.027	.024	6.8	3.9	1,400,600	I	O	E
1458+23	257.9		1199.3				1193.3									
		8700		-	-	Rock	Transition	3:1	.037	.037	6.7	4.2	3,700	I	O	E
1459+00	257.9		1197.6				1193.2									
		8700		0.0000	0.0000	166		3-0:1	.014	.014	11.9	7.3	600	I	O	E
1459+12	257.9		1197.6				1193.2									
		8700		-	-	Conc.	Baffle Chute	0:1	.014	.014	11.9	7.5	1,800	I	O	E
1459+49	257.9		1194.0				1186.5									
		8700		0.0000	0.00155	Outlet Channel to Gila River			-	-	-	-	21,400	I	O	E
1464+00	257.9		1194.0				1186.0									

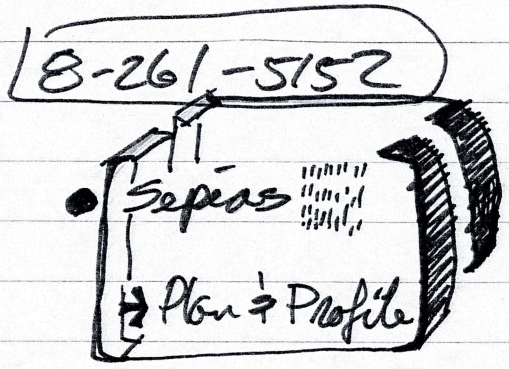
Reach 4

740+00

1/ Velocity associated with design discharge.
2/ Velocity associated with 10-year frequency discharge in unlined channel.
3/ I - Establishment of new channel including necessary stabilization measures.
II - Enlargement or realignment of existing channel.
L - Concrete lined.
4/ M - Man-made ditch or previously modified channel.
O - None or practically no defined channel.
5/ E - Ephemeral - flows only during periods of surface runoff, otherwise dry.

August 1977

8-261-5152



2/26/65 2:45 pm Called ARIZ. STATE OFFICE.

- talked to Suzanne Zedeboard
- told her we would have the drawings to Ariz by Tues Mar 5.
- told her we'll send sepias and 1 set of blueline

(V24/85) ~ 3:00 PM

Bill Payne called back:

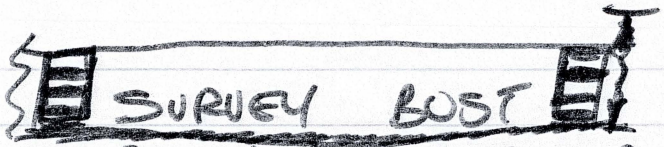
1. Shobe: 122' RW IN VICINITY OF WILLIAMS FLD A.B.
   - WILL SEND DRWGS
2. POWER RD.: WILL BE RECONSTRUCTED.
   - WILL SEND PLANS

— TOLD BILL WE WILL BE HARD PRESSED TO MEET THE 4/1/85 DEADLINE & AND WILL NEED THE ABOVE INFO ASAP.

BUT WE WILL CONTINUE TO SHOOT FOR IT.

BILL & PAYNE

1/10/85
10:17

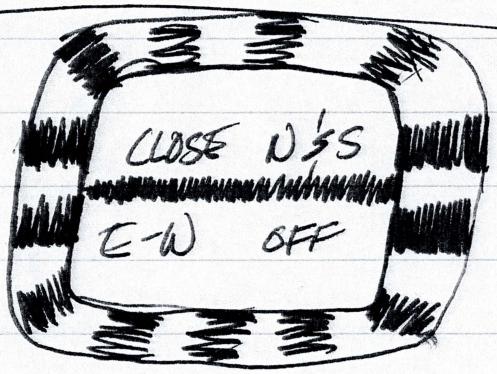


- REACH 4 UPPER END REACH 4
- AERIAL PHOTOS
-
- R.J. Shobe brought up the fact that there apparently is some discrepancy in stationing and elevations between the planning and design surveys.

- I told Bill that we were basically designing to fit the existing topography and Burtges as depicted in the design surveys but would be interested in seeing any specific information Shobe might have.

TALK BERGEN 8/7/84

p. 6	℄ curve yes
p. 10	STA 584+71 yes
p. 13	dist 3504.08
	PI to PC 488+15.84



ARIZONA RWCD REACH 4

O.T. 7/30/84

PRELIM. HYDRAULICS

PROBLEM: DEVELOP ALTERNATES FOR R/C LINED SECTION OF REACH 4 (APPROX. STA 494+40 to 550+00)
WK PLAN 495+90 TO 548+55 (5265 FT)

ANALYSIS: 1. The work plan alternate uses D=50, Z=2 Trapezoidal concrete-lined channel:

100 yr Q = 6500 cfs 10 yr Q = 1650

S = 0.0009
n = 0.014
d = 8.65 ft
V = 11.16 ft/s

(WITH 20% FREEBOARD)
D = 10.4 ft

10 ft =

2. CONSIDER ALTERNATES:

A. RECTANGULAR R/C CHANNEL
B. TRAPEZOIDAL SOIL CEMENT

ARIZONA RWCD REACH 4
D.T. 8/1/84
PRELIM. HYDRAULICS

PROPOSED CHANNEL INVERT FROM PRELIMINARY RWCD FLOODWAY P&P 12/74.

APPROX. STATION	ELEVATION
495+90	1315.40
548+55	1310.66

HYDRAULICS

Q=6500 cfs

b	z	n	s	d normal	d crit (X=1)
50	2	0.014	0.0009	8.65	7.28
20	4	0.016	"		8.88
30	4	0.016	"		8.02
50	2	0.018	0.0009	9.36	7.28
35	0	0.014	0.0009	14.62	
40	0	0.014	0.0009	12.92	
50					
60	0	0.014	0.0009	9.24	
65	0	"	"	8.70	
70	0	"	"	8.23	

650
640
630
627

ARIZONA DOT

DESCRIPTION	STATION	INV. EL	S	n	b	z	Q	Given d	HEC2
BEGIN TRANSITION	744+00	1299.62	0.0003	0.027	200	3	6900	8.45	8.45
	742+00	1299.68	0.0006		150				8.32
	720+00	1301.00	0.0005		150				8.20
HIGLEY RD BR									
DS DROP	676+22.5	1303.19			150			8.48	
US DROP	675+50	1306.54	0.0005	0.027	70	3			
DROP ENTRANCE	675+00	1306.57			150		6900	8.42	8.42
BEGIN TRANS	627+00	1308.97			150				8.47
END TRANS	626+00	1309.02	0.0002		175				8.54
D.S OF RITENH									
U.S OF RR	596+00	1309.62					6500		
		1310.44							
BEG TRANS	555+~~00~~	~~1310.43~~		0.035		3			9.01
END TRANS	552+00	1310.50	0.0009		50	2			
				0.014					
POWER RD BR.	551+00								
(new) WILLIAMS FLD RD BR (bridge pier)	543+00								
	497+00								

RWCD NL

ARIZONA DT — 10/29/84 — RWCD FLOODWAY RIGHT

PRELIM. HYDRAULICS

$d_o = 8.45$ ft

DESCRIPTION	STATION	INV. EL	S /	n	b	z	Q_{100}	d HEC2
BEGIN TRANSITION	744+00	1299.62	0.0003	0.027	200	3	6900	(1670) λ=0.024
	742+00	1299.68	0.0006		150	3		
	720+00	1301.00	0.00094					
HIGLEY RD. BR	719+45	–						
	716+00	–						
BEGIN TRANS.	636+00	–			150	3		
END TRANS.	634+00	1309.10	0.00018		200	3		
RITTEN HOUSE RD BR	598+60	–						
	598+10	–						
SPRR RD BR	596+80	–						
	597+10	–						
SIDE INL.	596+00	–					6500	(1620)
BEG. TRANS	555+50	–		0.035 rock	200	3		
END TRANS	552+00	1310.60	0.00085	0.018 soil cl.	50	2		
POWER RD. BR	551+40	–		0.014				
	550+60	–						
WILLIAMS FLD RD	543+40	–						
	542+60	–						
	495+90	1315.30			50	2		

EARTH / ROCK OR SS / R/C

ARIZONA RNCD REACH 4

DT 11/29/84

USP

STA	BW	Z	q	X	K
685+00	150	3	8.354	0	
677+00	150	3			
676+92.5	150	3			0.15
676+67.5	125.375	2.5			"
676+42.5	100.75	2.5			"
676+22.5	100.75	2.5			"

ARIZONA RWCD R4

IT 11/26/84

WSP: Q100 STA 744+00 U.S

1

* * PWSP * *

* * PWSP * *

SUB
STA.=744+00.00
Q=6,900.00 CFS
BW=200.00 FT
Z=3.00:1
N=0.027
Scb=0.0003 F/F
a=1.000
k=0.000
CB-EL.=1,299.62 FT
WS-EL.=1,308.07 FT
EGL-EL.=1,308.27 FT
D=8.450 FT
V=3.624 F/S
DC=3.276 FT
VC=10.030 F/S
FR=0.232

D_0

SUB
STA.=743+00.00
Q=6,900.00 CFS
BW=175.00 FT
Z=3.00:1
N=0.027
Scb=0.0003 F/F
a=1.000
k=0.000
CB-EL.=1,299.65 FT
WS-EL.=1,300.05 FT
EGL-EL.=1,300.31 FT
EGL-S=0.0003413 F/F
D=8.396 FT
V=4.105 F/S
DC=3.566 FT
VC=10.420 F/S
FR=0.265

* * PWSP * *

SUB
STA.=743+00.00
Q=6,900.00 CFS
BW=175.00 FT
Z=3.00:1
N=0.027
Scb=0.0003 F/F
a=1.000
k=0.000
CB-EL.=1,299.65 FT
WS-EL.=1,308.05 FT
EGL-EL.=1,308.31 FT
D=8.396 FT
V=4.105 F/S
DC=3.566 FT
VC=10.420 F/S
FR=0.265

SUB
STA.=742+00.00
Q=6,900.00 CFS
BW=150.00 FT
Z=3.00:1
N=0.027
Scb=0.0006 F/F
a=1.000
k=0.000
CB-EL.=1,299.71 FT
WS-EL.=1,308.00 FT
EGL-EL.=1,308.35 FT
EGL-S=0.0004647 F/F
D=8.293 FT
V=4.758 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.311

ARIZONA
DT

11/26/84

RWCD RL

STA.=[illegible]
CB-EL.=1,299.83 FT
WS-EL.=1,300.11 FT
EGL-EL.=1,308.46 FT
EGL-S=0.0005427 F/F
D=8.280 FT
V=4.766 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.312

SUB
STA.=738+00.00
CB-EL.=1,299.95 FT
WS-EL.=1,300.22 FT
EGL-EL.=1,308.57 FT
EGL-S=0.0005456 F/F
D=8.268 FT
V=4.774 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.313

SUB
STA.=736+00.00
CB-EL.=1,300.07 FT
WS-EL.=1,300.33 FT
EGL-EL.=1,308.68 FT
EGL-S=0.0005482 F/F
D=8.256 FT
V=4.782 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.313

SUB
STA.=734+00.00
CB-EL.=1,300.19 FT
WS-EL.=1,300.44 FT
EGL-EL.=1,308.79 FT
EGL-S=0.0005508 F/F
D=8.245 FT
V=4.789 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.314

SUB
STA.=730+00.00
CB-EL.=1,300.43 FT
WS-EL.=1,300.65 FT
EGL-EL.=1,309.01 FT
EGL-S=0.0005545 F/F
D=8.225 FT
V=4.803 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.315

SUB
STA.=726+00.00
CB-EL.=1,300.67 FT
WS-EL.=1,300.88 FT
EGL-EL.=1,309.24 FT
EGL-S=0.0005591 F/F
D=8.206 FT
V=4.815 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.316

SUB
STA.=723+00.00
CB-EL.=1,300.85 FT
WS-EL.=1,309.04 FT
EGL-EL.=1,309.40 FT
EGL-S=0.0005628 F/F
D=8.194 FT
V=4.824 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.317

SUB
STA.=720+00.00
CB-EL.=1,301.03 FT
WS-EL.=1,301.21 FT
EGL-EL.=1,309.57 FT
EGL-S=0.0005657 F/F
D=8.182 FT
V=4.831 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.317

ARIZONA RWCD R4
DT 11/26/84

3

SUB
STA.=720+00.00
Q=6,900.00 CFS
BW=150.00 FT
Z=3.00:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.000
CB-EL.=1,301.03 FT
WS-EL.=1,309.21 FT
EGL-EL.=1,309.57 FT
EGL-S=0.0005670 F/F
D=8.182 FT
V=4.831 F/S
DC=7.928 FT
VC=10.858 F/S
FR=0.318

SUB
STA.=715+00.00
CB-EL.=1,301.28 FT
WS-EL.=1,309.50 FT
EGL-EL.=1,309.86 FT
EGL-S=0.0005629 F/F
D=8.217 FT
V=4.808 F/S
DC=7.928 FT
VC=10.858 F/S
FR=0.316

SUB
STA.=710+00.00
CB-EL.=1,301.53 FT
WS-EL.=1,309.78 FT
EGL-EL.=1,310.13 FT
EGL-S=0.0005552 F/F
D=8.248 FT
V=4.788 F/S
DC=7.928 FT
VC=10.858 F/S
FR=0.314

STA.=705+00.00
CB-EL.=1,301.78 FT
WS-EL.=1,310.05 FT
EGL-EL.=1,310.41 FT
EGL-S=0.0005485 F/F
D=8.274 FT
V=4.770 F/S
DC=7.928 FT
VC=10.858 F/S
FR=0.312

SUB
STA.=700+00.00
CB-EL.=1,302.03 FT
WS-EL.=1,310.33 FT
EGL-EL.=1,310.68 FT
EGL-S=0.0005428 F/F
D=8.298 FT
V=4.754 F/S
DC=7.928 FT
VC=10.858 F/S
FR=0.311

SUB
STA.=695+00.00
CB-EL.=1,302.28 FT
WS-EL.=1,310.60 FT
EGL-EL.=1,310.95 FT
EGL-S=0.0005377 F/F
D=8.319 FT
V=4.741 F/S
DC=7.928 FT
VC=10.858 F/S
FR=0.310

SUB
STA.=690+00.00
CB-EL.=1,302.53 FT
WS-EL.=1,310.87 FT
EGL-EL.=1,311.21 FT
EGL-S=0.0005334 F/F
D=8.337 FT
V=4.729 F/S
DC=7.928 FT

ARIZONA D.T.

11/26/84

RWCD R4

4

SUB
STA.=685+00.00
CB-EL.=1,302.78 FT
WS-EL.=1,311.13 FT
EGL-EL.=1,311.48 FT
EGL-S=0.0005295 F/F
D=8.354 FT
V=4.718 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.308

SUB
STA.=685+00.00
Q=6,900.00 CFS
BW=150.00 FT
Z=3.00:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.000
CB-EL.=1,302.78 FT
WS-EL.=1,311.13 FT
EGL-EL.=1,311.48 FT
D=8.354 FT
V=4.718 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.308

SUB
STA.=677+00.00
CB-EL.=1,303.18 FT
WS-EL.=1,311.56 FT
EGL-EL.=1,311.90 FT
EGL-S=0.0005227 F/F
D=8.377 FT
V=4.703 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.306

SUB
STA.=676+92.50
Q=6,900.00 CFS
BW=150.00 FT
Z=3.00:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.150
CB-EL.=1,303.18 FT
WS-EL.=1,311.56 FT
EGL-EL.=1,311.90 FT
EGL-S=0.0005227 F/F
D=8.377 FT
V=4.703 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.306

SUB
STA.=676+67.50
Q=6,900.00 CFS
BW=125.38 FT
Z=2.50:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.150
CB-EL.=1,303.20 FT
WS-EL.=1,311.43 FT
EGL-EL.=1,311.95 FT
EGL-S=0.0006607 F/F
D=8.239 FT
V=5.738 F/S
DC=4.412 FT
VC=11.465 F/S
FR=0.376

ARIZONA
DT 11/29/84 RWCD REACH 4

5

SUB
STA.=676+42.50
Q=6,900.00 CFS
BW=100.75 FT
Z=2.50:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.150
CB-EL.=1,303.21 FT
WS-EL.=1,311.23 FT
ECL-EL.=1,312.01 FT
ECL-S=0.0010592 F/F
D=8.017 FT
V=7.125 F/S
DC=5.038 FT
VC=12.083 F/S
FR=0.479

ARIZONA
DT

12/3/84

RWCD R4

SUB
STA.=675+00.00
Q=6,900.00 CFS
BW=150.00 FT
Z=3.00:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.000
CB-EL.=1,306.57 FT
WS-EL.=1,314.99 FT
EGL-EL.=1,315.33 FT
D=8.420 FT
V=4.676 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.304

SUB
STA.=674+00.00
CB-EL.=1,306.62 FT
WS-EL.=1,315.04 FT
EGL-EL.=1,315.38 FT
EGL-S=0.0005133 F/F
D=8.421 FT
V=4.675 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.304

SUB
STA.=670+00.00
CB-EL.=1,306.82 FT
WS-EL.=1,315.25 FT
EGL-EL.=1,315.59 FT
EGL-S=0.0005126 F/F
D=8.426 FT
V=4.672 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.303

SUB
STA.=670+00.00
Q=6,900.00 CFS
BW=150.00 FT
Z=3.00:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.000
CB-EL.=1,306.82 FT
WS-EL.=1,315.25 FT
EGL-EL.=1,315.59 FT
EGL-S=0.0005121 F/F
D=8.426 FT
V=4.672 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.303

SUB
STA.=660+00.00
CB-EL.=1,307.32 FT
WS-EL.=1,315.76 FT
EGL-EL.=1,316.10 FT
EGL-S=0.0005109 F/F
D=8.438 FT
V=4.664 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.303

SUB
STA.=650+00.00
CB-EL.=1,307.82 FT
WS-EL.=1,316.27 FT
EGL-EL.=1,316.60 FT
EGL-S=0.0005086 F/F
D=8.448 FT
V=4.658 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.302

ARIZONA RWCD R4

DT 12/3/84

SUB
STA.=650+00.00
Q=6,900.00 CFS
BW=150.00 FT
Z=3.00:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.000
CB-EL.=1,307.82 FT
WS-EL.=1,316.27 FT
EGL-EL.=1,316.60 FT
D=8.448 FT
V=4.658 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.302

SUB
STA.=640+00.00
CB-EL.=1,308.32 FT
WS-EL.=1,316.78 FT
EGL-EL.=1,317.11 FT
EGL-S=0.0005068 F/F
D=8.456 FT
V=4.653 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.302

SUB
STA.=630+00.00
CB-EL.=1,308.82 FT
WS-EL.=1,317.28 FT
EGL-EL.=1,317.62 FT
EGL-S=0.0005054 F/F
D=8.461 FT
V=4,650 F/S
DC=3.928 FT
VC=10.858 F/S

STA.=627+00.00
CB-EL.=1,308.97 FT
WS-EL.=1,317.43 FT
EGL-EL.=1,317.77 FT
EGL-S=0.0005046 F/F
D=0.463 FT
V=4,649 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.301

SUB
STA.=626+50.00
Q=6,900.00 CFS
BW=162.50 FT
Z=3.00:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.000
CB-EL.=1,309.00 FT
WS-EL.=1,317.50 FT
EGL-EL.=1,317.79 FT
EGL-S=0.0004654 F/F
D=8.508 FT
V=4,313 F/S
DC=3.736 FT
VC=10.631 F/S
FR=0.278

SUB
STA.=626+00.00
Q=6,900.00 CFS
BW=175.00 FT
Z=3.00:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.000
CB-EL.=1,309.02 FT
WS-EL.=1,317.56 FT
EGL-EL.=1,317.81 FT
EGL-S=0.0003962 F/F
D=8.540 FT
V=4.037 F/S

ARIZONA RWCD R4

DT 12/3/04

SUB
STA.=626+00.00
Q=6,900.00 CFS
BW=175.00 FT
Z=3.00:1
N=0.027
Scb=0.0002 F/F
a=1.000
k=0.000
CB-EL.=1,309.02 FT
WS-EL.=1,317.56 FT
EGL-EL.=1,317.81 FT
EGL-S=0.0003660 F/F
D=8.540 FT
V=4.027 F/S
DC=3.566 FT
VC=10.420 F/S
FR=0.258

SUB
STA.=625+00.00
CB-EL.=1,309.04 FT
WS-EL.=1,317.60 FT
EGL-EL.=1,317.85 FT
EGL-S=0.0003647 F/F
D=8.557 FT
V=4.018 F/S
DC=3.566 FT
VC=10.420 F/S
FR=0.257

* * PWSP * *

SUB
STA.=625+00.00
Q=6,900.00 CFS
BW=175.00 FT
Z=3.00:1
N=0.027
Scb=0.0002 F/F
a=1.000
k=0.000
CB-EL.=1,309.04 FT
WS-EL.=1,317.60 FT
EGL-EL.=1,317.85 FT
D=8.557 FT
V=4.018 F/S
DC=3.566 FT
VC=10.420 F/S
FR=0.257

SUB
STA.=620+00.00
CB-EL.=1,309.14 FT
WS-EL.=1,317.78 FT
EGL-EL.=1,318.03 FT
EGL-S=0.0003575 F/F
D=8.641 FT
V=3.974 F/S
DC=3.566 FT
VC=10.420 F/S
FR=0.253

SUB
STA.=610+00.00
CB-EL.=1,309.34 FT
WS-EL.=1,318.13 FT
EGL-EL.=1,318.37 FT
EGL-S=0.0003412 F/F
D=8.793 FT
V=3.897 F/S
DC=3.566 FT
VC=10.420 F/S

ARIZONA RWCD R4

DT 12/3/84

SUB
STA.=600+00.00
CB-EL.=1,309.54 FT
WS-EL.=1,318.46 FT
EGL-EL.=1,318.69 FT
EGL-S=0.0003228 F/F
D=8.924 FT
V=3.832 F/S
DC=3.566 FT
VC=10.420 F/S
FR=0.211

STA.=596+00.00
Q=6,500.00 CFS
BW=175.00 FT
Z=3.00:1
N=0.027
Scb=0.0002 F/F
a=1.000
k=0.000
CB-EL.=1,309.62 FT
WS-EL.=1,318.59 FT
EGL-EL.=1,318.79 FT
D=8.971 FT
V=3.598 F/S
DC=3.430 FT
VC=10.229 F/S
FR=0.225

SUB
STA.=590+00.00
CB-EL.=1,309.74 FT
WS-EL.=1,318.76 FT
EGL-EL.=1,318.95 FT
EGL-S=0.0002717 F/F
D=9.016 FT
V=3.568 F/S
DC=3.430 FT
VC=10.229 F/S
FR=0.223

STA.=580+00.00
CB-EL.=1,309.94 FT
WS-EL.=1,319.03 FT
EGL-EL.=1,319.22 FT
EGL-S=0.0002658 F/F
D=9.086 FT
V=3.537 F/S
DC=3.430 FT
VC=10.229 F/S
FR=0.220

SUB
STA.=570+00.00
CB-EL.=1,310.14 FT
WS-EL.=1,319.29 FT
EGL-EL.=1,319.48 FT
EGL-S=0.0002592 F/F
D=9.149 FT
V=3.509 F/S
DC=3.430 FT
VC=10.229 F/S
FR=0.218

SUB
STA.=555+50.00
CB-EL.=1,310.43 FT
WS-EL.=1,319.66 FT
EGL-EL.=1,319.85 FT
EGL-S=0.0002524 F/F
D=9.228 FT
V=3.475 F/S
DC=3.430 FT
VC=10.229 F/S
FR=0.215

ARIZONA DT

INV EL

3/25/85

RWCD REACH 4

VOID

DESCRIPTION		STATION	INV. EL	S	n	b	z	Q
BEGIN TRANSITION		744+00	1299.62	0.0003		200	3	6900
	EARTH	742+00	1299.68	0.0006		150		
		720+00	1301.00	0.0005		150		
HIGLEY RD BR						↓		
		676+97.5	1303.15			150		
DS DROP		676+22.5	1303.19					
US DROP		675+50	1306.54	0.0005				
		675+00				150		
BEGIN TRANS		627+00	1308.97					
END TRANS	EARTH	626+00	1309.02	0.00025		175		
		596+00						6500
BEG TRANSITION		555+00	1310.80			175	3	
FLARE		554+00				130		
FLARE	G.R.	553+00				90		
GR CH		552+40	1310.86	~~-0.0095~~		72	2	
FLARE		552+00	1310.29	0.0009		60		
END TRANS		551+00	1310.38			50	2	
						↓		
	R/C	496+00	1315.33					
TRANSITION PT		495+35	1315.39					
TRANSITION PC		494+15.6	1315.50			50		
		493+75.6	1315.53	0.00831		—		
		491+50.6	1317.40	0.0003				
		485+88.08	1317.57					

uniform warp

AR12, RINCP R4

DT 2/25/85

INV EZ

VOID

745 +28.57
744
725
705
DROP 685
665
645
625
605
585
565
545
525
505

ELEV
1299.58
1299.62

STA=745.28570
EL=1,299.58143

STA=742.00000
EL=1,299.68000

STA=725.00
EL=1,300.70

STA=720.00
EL=1,301.00

STA=720.00
EL=1,301.00

STA=705.00
EL=1,301.75

STA=685.00
EL=1,302.75

STA=676.98
EL=1,303.15

STA=676.23
EL=1,303.19

STA=675.50
EL=1,306.54

STA=675.00
EL=1,306.57

STA=645.00
EL=1,308.07

STA=627.00
EL=1,308.97

STA=626.00
EL=1,309.02

STA=626.00
EL=2.50E-4

STA=626.00
EL=1,309.02

STA=605.00
EL=1,309.55

STA=585.00
EL=1,310.05

STA=565.00
EL=1,310.55

STA=552.00000
EL=1,310.29000

STA=545.00000
EL=1,310.92000

STA=525.00000
EL=1,312.72000

STA=505.00000
EL=1,314.52000

WMS CHANDLER WPP RWCD REACH 4 | DT 2/26/85 | K/C CHANNEL & BERM ELEVATIONS

VOID

[redacted]

STA=500.00
EL=1,314.97
1,326.47 ***

STA=505.00
EL=1,314.52
1,326.02 ***

STA=510.00
EL=1,314.07
1,325.57 ***

STA=515.00
EL=1,313.62
1,325.12 ***

STA=520.00
EL=1,313.17
1,324.67 ***

STA=525.00
EL=1,312.72
1,324.22 ***

STA=530.00
EL=1,312.27
1,323.77 ***

STA=535.00
EL=1,311.82
1,323.32 ***

STA=540.00
EL=1,311.37
1,322.87 ***

STA=545.00
EL=1,310.92
1,322.42 ***

STA=550.00
EL=1,310.47
1,321.97 ***

STA=555.00
EL=1,310.02

[redacted]

42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
Made in U.S.A.
NATIONAL

AR12,

DT 2/2sles

NW EZ

RWCP R4

VOID

ELEV

1299.58

1299.62

745 +28.57
744
725
705
685
665
645
625
605
585
565
545
525
505

DROP

STA=744.00000
EL=1,299.62

STA=745.28570
EL=1,299.58

STA=742.00000
EL=1,299.68

STA=725.00
EL=1,300.70

STA=720.00
EL=1,301.00

STA=720.00
EL=1,301.00

STA=725.00
EL=1,300.75

STA=705.00
EL=1,301.75

STA=685.00
EL=1,302.75

STA=676.98
EL=1,303.15

STA=676.23
EL=1,303.19

STA=675.50
EL=1,306.54

STA=675.00
EL=1,306.57

STA=627.00
EL=1,306.9

STA=665.00
EL=1,307.07

STA=645.00
EL=1,308.07

STA=627.00
EL=1,308.97

STA=626.00
EL=1,309.02

STA=626.00
EL=1,309.02

STA=605.00
EL=1,309.55

STA=585.00
EL=1,310.05

STA=565.00
EL=1,310.55

STA=545.00
EL=1,311.05

STA=552.00000
EL=1,310.29000

STA=545.00000
EL=1,310.92000

STA=525.00000
EL=1,312.72000

STA=505.00000
EL=1,314.52000

ARIZONA DT
RUNG REACH 4
ADJ EL 1325.83

DESCRIPTION	STATION	INV. EL	S	n	D	Z	Q
BEGIN TRANSITION	744+00	1299.62	0.0003		200	3	6900
	742+00	1299.68	0.0006		150		
	720+00	1301.00	0.0005		150		
HIGLEY RD BR					↓		
	676+97.5	1303.15			150		
DS DROP	676+22.5	1303.19					
US DROP	675+50	1306.54	0.0005				
	675+00				150		
BEGIN TRANS	627+00	1308.97					
END TRANS	626+00	1309.02	0.00025		175		
	596+00						6500
BEG TRANSITION	• 555+00	1310.80			175	3	
FLARE	554+00				130		
FLARE	553+00				90		
GR CH	• 552+40	1310.86	(-0.0095)		72		
FLARE	• 552+00	1310.39	0.0009		60	2	
END TRANS	551+00	1310.38			50	2	
					↓		
	496+00	1315.33					
DT	495+35	1315.39					
PC	494+15.6	1315.50			50		
	493+75.6	1315.53	0.00831		—		
	491+50.6	1317.40					

uniform warp