(E. MARICOPA)
RWCD FLOODWAY REACH 4
DESIGN COMPUTATIONS #1

1985

CHANDLER, AZ

A121.807

(E. MARICOPA)

RWCD FLOODWAY

REACH 4

- DESIGN COMPUTATIONS

1985

CHANDLER, ARIZONA

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

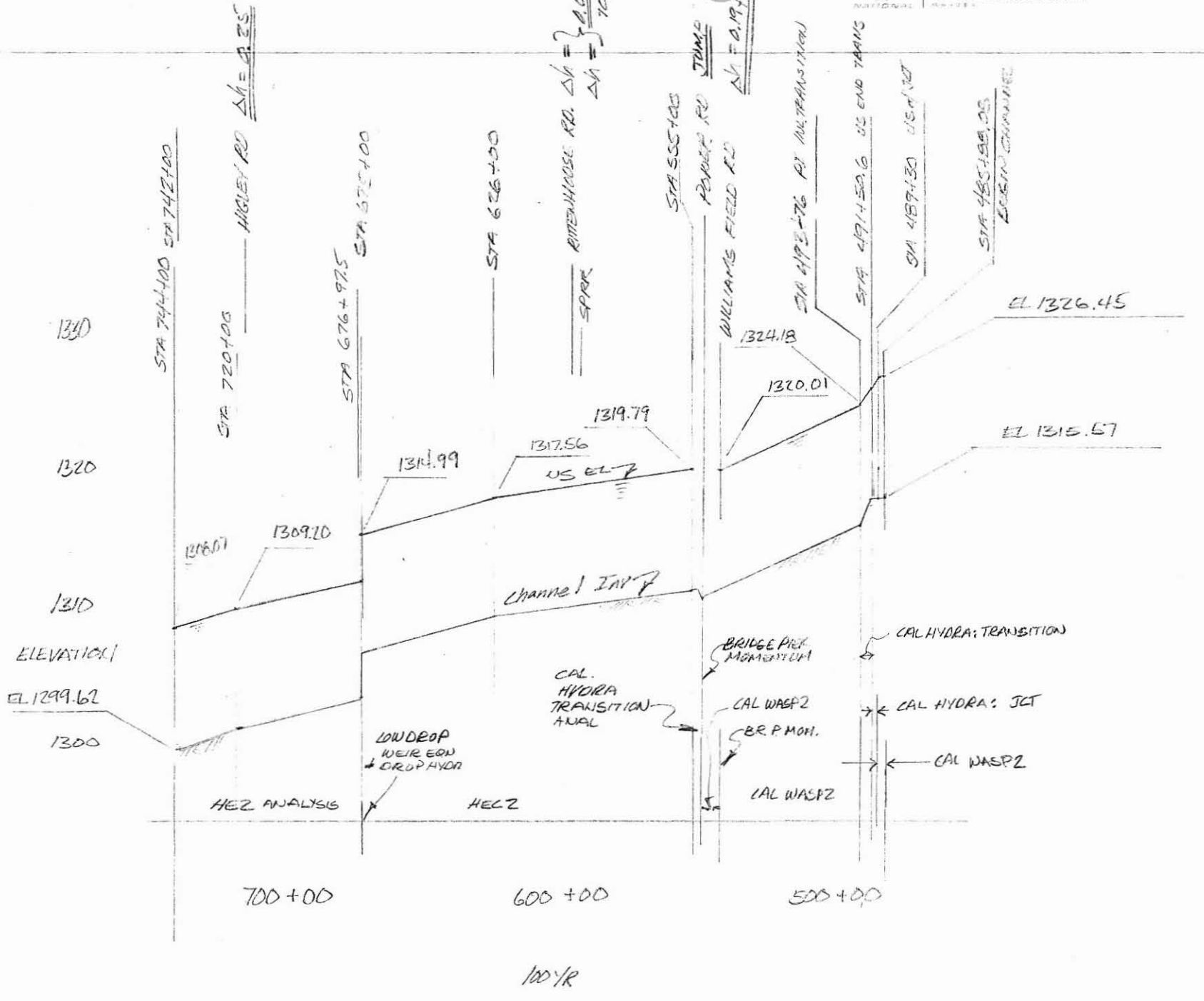
ARIZONA RIVER RD

DT 11/26/85

CHANNEL HYDRAULICS SUMMARY

DESCRIPTION	STATION	INV. EL	S	n	b (ft)	z	Q (c/s)	d (ft) 100yr	WS EL
END TRANSITION	744+00	1299.62	0.0003	0.027	200	2	6900	8.45	1308.07
BEGIN "	742+00	1299.68	0.0006		150			8.32	1308.00
GRADE CH.	720+00	1301.00	0.0005					8.20	1309.20
HIGLEY RD. EF.									
	676+97.5	1302.15						8.48	1311.63
DS DROP	676+22.5	1302.19							
US DROP	675+30	1306.54	0.0005						
	675+00	1306.57						8.42	1314.99
END TRANS	627+00	1308.97						8.47	1317.44
BEG. TRANS: GR. CH.	626+00	1309.02	0.00025		175			8.54	1317.56
	596+00	1309.77					6500		
END ROCK: SILL WARP	555+20					3			
END TRANS: BEG WARP	555+00	1310.80			175	2		8.99	1319.79
END					8:1 flare				
	554+00	1310.83			125				
SSZ ISO END	552+00	1310.85			75				
GROUTED ROCK	552+40	1310.86	(-0.01425)		68.33				
	552+00	1310.29	0.0009		12:1 flare 61.67				
BEG. TRANS; END R/C	551+50	1310.34		0.014	50			8.18	1318.52
U.S. POWER RD	550+50	1310.43						8.70	1319.13
U.S. WMS ELD RD	542+60	1311.14						8.87	1320.01
R/C	496+00	1315.33							
	495+35	1315.39							
	494+15.6	1315.50			50				
R/C TRANSITION D.S. R/C TRANS.	493+75.6	1315.53	0.00831					8.65	1324.18
U.S. R/C TRANS.	491+50.6	1317.40	0.0003		150			8.23	1325.63
U.S. JCT —	489+30	1317.47		.027		3	5900	8.83	1326.30
BEG. CHANN.	485+88.08	1317.57						8.88	1326.45
BEG. TEMP INL.	485+13.08	1320.00						—	

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



ARIZONA RANCH
01 485
HYDRAULIC DESIGN SUMMARY

COMPUTATION SHEET
SCS–ENG–522 REV. 3–69

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
GPO : 1968—O-337-998

STATE		PROJECT		
ARIZ		PIDCO RCH 4		
BY	DATE	CHECKED BY	DATE	JOB NO.
Q. THACKERAY	5/14/84	✓		

SUBJECT

SHEET ____ OF ____

PRELIM DRWGS L. BURTON 12/74 ET. AL

STATION	n	s	b	d	a	V	Q
470+00							
501+00	0.027	0.00025	170	8.5	1661	3.6	5900
502+29	0.027	0.00124	170	8.4	1626	3.6	5900
503+49	0.037	0.00025	170	8.4	1645	4.0	6500
	ROCK TRANS						
495+90 = (506+50	CONC TR 0.014	0.0009	50	8.8	591	11.0	6500
548+55)							

CONC ch

(505+00 ATACH JCT - GILBERT
= 494+40 WILLIAMS - CHANDLER)

548+55	ROCK TRANS						
552+05	0.027	0.000154	200	8.6	1950	3.3	6500
595+00	0.027	0.000154	200	8.1	1825	3.8	6900
635+00	EARTH TRANS						
636+13	0.027	0.00097	150	7.1	1200	5.7	6900
765+00							

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**********************************************************
*  WATER SURFACE PROFILES                                *
*  VERSION OF NOVEMBER 1976                              *
*  UPDATED MARCH 1982                                    *
*                                                        *
*  RUN DATE   120584    TIME   122101                     *
**********************************************************
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**********************************************
*  U.S. ARMY CORPS OF ENGINEERS              *
*  THE HYDROLOGIC ENGINEERING CENTER         *
*  609 SECOND STREET, SUITE D                *
*  DAVIS, CALIFORNIA 95616                   *
*  (916) 440-2105 (FTS) 448-2105             *
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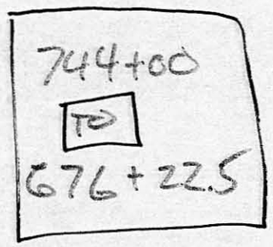
12/5/84 RUN 002

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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                  X     X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
**************************************************

T1      RWCD REACH4 Q=6900
T2      WATER SURFACE PROFILE
T3      RWCD REACH 4 MODIFIED

J1  ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0.       0.        0.        0.   .000000       .00       .2    6900.   308.070      .000

J2  NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1.000      .000      .000      .000      .000      .000      .000      .000      .000      .000

NC      .027      .027      .027      .000      .000      .000      .000      .000      .000      .000
X1  74400.000     4.000      .000   260.000      .000      .000      .000      .000      .000      .000
GR    309.620      .000   299.620    30.000   299.620   230.000   309.620   260.000      .000      .000

X1  74360.000     4.000      .000   250.000    40.000    40.000    40.000      .000      .000      .000
GR    309.630      .000   299.630    30.000   299.630   220.000   309.630   250.000      .000      .000

X1  74320.000     4.000      .000   240.000    40.000    40.000    40.000      .000      .000      .000
GR    309.640      .000   299.640    30.000   299.640   210.000   309.640   240.000      .000      .000

X1  74280.000     4.000      .000   230.000    40.000    40.000    40.000      .000      .000      .000
GR    309.660      .000   299.660    30.000   299.660   200.000   309.660   230.000      .000      .000

X1  74240.000     4.000      .000   220.000    40.000    40.000    40.000      .000      .000      .000
GR    309.670      .000   299.670    30.000   299.670   190.000   309.670   220.000      .000      .000

X1  74200.000     4.000      .000   210.000    40.000    40.000    40.000      .000      .000      .000
GR    309.680      .000   299.680    30.000   299.680   180.000   309.680   210.000      .000      .000

X1  74000.000     4.000      .000   210.000   200.000   200.000   200.000      .000      .000      .000
GR    309.800      .000   299.800    30.000   299.800   180.000   309.800   210.000      .000      .000

X1  73000.000     4.000      .000   210.000  1000.000  1000.000  1000.000      .000      .000      .000
GR    310.400      .000   300.400    30.000   300.400   180.000   310.400   210.000      .000      .000

X1  72000.000     4.000      .000   210.000  1000.000  1000.000  1000.000      .000      .000      .000
GR    311.000      .000   301.000    30.000   301.000   180.000   311.000   210.000      .000      .000
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X1	71810.000	10.000	6.000	372.000	190.000	190.000	190.000	.798	.000	.000
GR	319.230	.000	317.000	6.000	310.000	28.000	310.000	62.000	301.100	95.000
GR	301.100	283.000	310.000	316.000	310.000	350.000	317.000	372.000	319.230	378.000
SB	.900	1.600	2.800	.000	150.000	6.000	2950.000	3.000	301.140	301.100
X1	71730.000	.000	.000	.000	80.000	80.000	80.000	.798	.040	.000
X2	.000	.000	1.000	317.300	319.300	.000	.000	1.330	.798	.000
BT	7.000	.000	319.230	317.230	63.000	319.480	317.480	126.000	319.640	317.640
BT	188.000	319.690	317.690	251.000	319.640	317.640	314.000	319.480	317.480	376.000
BT	319.230	317.230	.000	.000	.000	.000	.000	.000	.000	.000
X1	71500.000	4.000	.000	210.000	230.000	230.000	230.000	.000	.000	.000
GR	311.250	.000	301.250	30.000	301.250	180.000	311.250	210.000	.000	.000
X1	71000.000	.000	.000	.000	500.000	500.000	500.000	.000	.250	.000
X1	70000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.500	.000
X1	69000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.500	.000
X1	68000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.500	.000
X1	67622.000	.000	.000	.000	377.500	377.500	377.500	.000	.190	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*PROF 1									
*SECNO 74400.000									
74400.00	8.45	308.07	.00	308.07	308.27	.20	.00	.00	309.62
6900.	0.	6900.	0.	0.	1904.	0.	0.	0.	309.62
.00	.00	3.62	.00	.027	.027	.027	.000	299.62	4.65
.000295	0.	0.	0.	0	0	0	.00	250.70	255.35
*SECNO 74360.000									
74360.00	8.43	308.06	.00	.00	308.29	.22	.01	.00	309.63
6900.	0.	6900.	0.	0.	1818.	0.	2.	0.	309.63
.00	.00	3.80	.00	.027	.027	.027	.000	299.63	4.68
.000326	40.	40.	40.	1	0	0	.00	240.65	245.32
*SECNO 74320.000									
74320.00	8.41	308.05	.00	.00	308.30	.25	.01	.00	309.64
6900.	0.	6900.	0.	0.	1726.	0.	3.	0.	309.64
.01	.00	4.00	.00	.027	.027	.027	.000	299.64	4.76
.000365	40.	40.	40.	2	0	0	.00	230.47	235.24
*SECNO 74280.000									
74280.00	8.38	308.04	.00	.00	308.32	.28	.02	.00	309.66
6900.	0.	6900.	0.	0.	1635.	0.	5.	1.	309.66
.01	.00	4.22	.00	.027	.027	.027	.000	299.66	4.86
.000413	40.	40.	40.	2	0	0	.00	220.27	225.14
*SECNO 74240.000									
74240.00	8.35	308.02	.00	.00	308.33	.31	.02	.00	309.67
6900.	0.	6900.	0.	0.	1546.	0.	6.	1.	309.67
.01	.00	4.46	.00	.027	.027	.027	.000	299.67	4.94
.000467	40.	40.	40.	2	0	0	.00	210.12	215.06
*SECNO 74200.000									
74200.00	8.32	308.00	.00	.00	308.35	.35	.02	.00	309.68
6900.	0.	6900.	0.	0.	1457.	0.	8.	1.	309.68
.01	.00	4.74	.00	.027	.027	.027	.000	299.68	5.03
.000534	40.	40.	40.	2	0	0	.00	199.95	204.97

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 74000.000									
74000.00	8.31	308.11	.00	.00	308.46	.35	.11	.00	309.80
6900.	0.	6900.	0.	0.	1455.	0.	14.	2.	309.80
.02	.00	4.74	.00	.027	.027	.027	.000	299.80	5.05
.000535	200.	200.	200.	1	0	0	.00	199.91	204.95
*SECNO 73000.000									
73000.00	8.25	308.65	.00	.00	309.00	.36	.54	.00	310.40
6900.	0.	6900.	0.	0.	1441.	0.	48.	7.	310.40
.08	.00	4.79	.00	.027	.027	.027	.000	300.40	5.26
.000551	1000.	1000.	1000.	2	0	0	.00	199.48	204.74
*SECNO 72000.000									
72000.00	8.20	309.20	.00	.00	309.56	.36	.56	.00	311.00
6900.	0.	6900.	0.	0.	1432.	0.	81.	11.	311.00
.14	.00	4.82	.00	.027	.027	.027	.000	301.00	5.40
.000563	1000.	1000.	1000.	2	0	0	.00	199.20	204.60
*SECNO 71810.000									
71810.00	8.21	309.31	.00	.00	309.67	.36	.11	.00	317.00
6900.	0.	6900.	0.	0.	1429.	0.	87.	12.	317.00
.15	.00	4.83	.00	.027	.027	.027	.000	301.10	51.55
.000564	190.	190.	190.	0	0	0	.00	198.55	250.10

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.60	2.80	.00	150.00	6.00	2950.00	3.00	301.14	301.10

*SECNO 71730.000

3301 HV CHANGED MORE THAN HVINS

CLASS A LOW FLOW

3420 BRIDGE W.S.= 309.30 BRIDGE VELOCITY=, 5.01 CALCULATED CHANNEL AREA=, 1374.

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD
.00	309.89	.02	0.	6900.	2950.	3110.	317.30	319.30
71730.00	8.18	309.32	.00	.00	309.89	.57	.23	.00	317.04
6900.	0.	6900.	0.	0.	1138.	0.	89.	12.	317.04
.16	.00	6.07	.00	.027	.027	.027	.000	301.14	41.18
.000901	80.	80.	80.	0	0	0	.00	158.36	199.53

*SECNO 71500.000

1645 INT SEC ADDED BY RAISING SEC 71500.00, -.055FT AND MULTIPLYING BY .898

1.01	8.36	309.55	.00	.00	309.98	.43	.09	.00	311.19
6900.	0.	6900.	0.	0.	1315.	0.	92.	13.	311.19
.16	.00	5.25	.00	.027	.027	.027	.000	301.19	4.42
.000655	115.	115.	115.	2	0	0	.00	179.79	184.22

1645 INT SEC ADDED BY RAISING SEC 1.01, .055FT AND MULTIPLYING BY 1.113

71500.00	8.46	309.71	.00	.00	310.05	.34	.07	.00	311.25
6900.	0.	6900.	0.	0.	1484.	0.	96.	13.	311.25
.17	.00	4.65	.00	.027	.027	.027	.000	301.25	4.62
.000505	115.	115.	115.	2	0	0	.00	200.77	205.38

*SECNO 71000.000

71000.00	8.46	309.96	.00	.00	310.30	.34	.25	.00	311.50
6900.	0.	6900.	0.	0.	1484.	0.	113.	16.	311.50
.20	.00	4.65	.00	.027	.027	.027	.000	301.50	4.62
.000505	500.	500.	500.	0	0	0	.00	200.77	205.38

*SECNO 70000.000

70000.00	8.47	310.47	.00	.00	310.80	.34	.50	.00	312.00
6900.	0.	6900.	0.	0.	1484.	0.	147.	20.	312.00
.26	.00	4.65	.00	.027	.027	.027	.000	302.00	4.61
.000504	1000.	1000.	1000.	0	0	0	.00	200.78	205.39

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 69000.000									
69000.00	8.47	310.97	.00	.00	311.31	.34	.50	.00	312.50
6900.	0.	6900.	0.	0.	1485.	0.	181.	25.	312.50
.32	.00	4.65	.00	.027	.027	.027	.000	302.50	4.60
.000503	1000.	1000.	1000.	0	0	0	.00	200.81	205.40
*SECNO 68000.000									
68000.00	8.48	311.48	.00	.00	311.81	.33	.50	.00	313.00
6900.	0.	6900.	0.	0.	1486.	0.	215.	29.	313.00
.38	.00	4.64	.00	.027	.027	.027	.000	303.00	4.58
.000502	1000.	1000.	1000.	0	0	0	.00	200.83	205.42
*SECNO 67622.000									
67622.00	8.48	311.67	.00	.00	312.00	.33	.19	.00	313.19
6900.	0.	6900.	0.	0.	1487.	0.	228.	31.	313.19
.40	.00	4.64	.00	.027	.027	.027	.000	303.19	4.57
.000502	378.	378.	378.	0	0	0	.00	200.85	205.43

INV 1303.19 OK

PROFILE FOR STREAM RWCD REACH 4 MODIFIED

PLOTTED POINTS (BY PRIORITY)-E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

```
ELEVATION   298.      300.      302.      304.      306.      308.      310.      312.      314.      316.
   SECNO  CUMDIS
 74400.00     0.  C      I .       .         .         .         WE      L .       .         .         .         .
 74360.00    50.  C      I .       .         .         .         WE      L .       .         .         .         .
 74320.00   100.  C      I .       .         .         .         WE      L .       .         .         .         .
 74280.00   150.  C      I .       .         .         .         W E     L .       .         .         .         .
 74240.00   200.  C      I .       .         .         .         W E     L .       .         .         .         .
 74200.00   250.  C      I .       .         .         .         W E     L .       .         .         .         .
            300.  C       I.       .         .         .         W E      L.       .         .         .         .
            350.  C       I.       .         .         .         W E      L.       .         .         .         .
 74000.00   400.  C       I.       .         .         .         .WE      L.       .         .         .         .
            450.  C       I.       .         .         .         .WE      L.       .         .         .         .
            500.  C       I.       .         .         .         .W E     L.       .         .         .         .
            550.  C       I.       .         .         .         .W E     L.       .         .         .         .
            600.  C        I       .         .         .         .W E      L       .         .         .         .
            650.  C        I       .         .         .         .W E      L       .         .         .         .
            700.  C        I       .         .         .         .W E      L       .         .         .         .
            750.  C        I       .         .         .         . WE      L       .         .         .         .
            800.  C        I       .         .         .         . WE      L       .         .         .         .
            850.  C       I        .         .         .         . W E     L       .         .         .         .
            900.  C       I        .         .         .         . W E     L       .         .         .         .
            950.  C      .I        .         .         .         . W E     .L      .         .         .         .
           1000.  C      .I        .         .         .         . W E     .L      .         .         .         .
           1050.  C      .I        .         .         .         . W E     .L      .         .         .         .
           1100.  C      .I        .         .         .         . W E     .L      .         .         .         .
           1150.  C      .I        .         .         .         .  WE     .L      .         .         .         .
           1200.  C      .I        .         .         .         .  WE     .L      .         .         .         .
           1250.  C      . I       .         .         .         .  W E    . L     .         .         .         .
           1300.  C      . I       .         .         .         .  W E    . L     .         .         .         .
           1350.  C      . I       .         .         .         .  W E    . L     .         .         .         .
 73000.00  1400.  C      . I       .         .         .         .  W E    . L     .         .         .         .
           1450.  C      . I       .         .         .         .  W E    . L     .         .         .         .
           1500.  C      . I       .         .         .         .   WE    . L     .         .         .         .
           1550.  C      . I       .         .         .         .   WE    . L     .         .         .         .
           1600.  C      .  I      .         .         .         .   W E   .  L     .         .         .         .
           1650.  C      .  I      .         .         .         .   W E   .  L     .         .         .         .
           1700.  C      .  I      .         .         .         .   W E   .  L     .         .         .         .
           1750.  C      .  I      .         .         .         .   W E   .  L     .         .         .         .
           1800.  C      .  I      .         .         .         .   W E   .  L     .         .         .         .
           1850.  C      .  I      .         .         .         .   W E   .  L     .         .         .         .
           1900.  C      .   I     .         .         .         .    WE   .   L     .         .         .         .
           1950.  C      .   I     .         .         .         .   W E   .   L     .         .         .         .
           2000.  C      .   I     .         .         .         .   W E   .   L     .         .         .         .
           2050.  C      .   I     .         .         .         .   W E   .   L     .         .         .         .
           2100.  C      .   I     .         .         .         .   W E   .   L     .         .         .         .
           2150.  C      .   I     .         .         .         .   W E   .   L     .         .         .         .
           2200.  C      .   I     .         .         .         .   W E   .   L     .         .         .         .
           2250.  C      .    I    .         .         .         .    WE   .    L    .         .         .         .
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HAGLEY RD

	2300.	C	
	2350.	C	
72000.00	2400.	C	
	2450.	C	
	2500.	C	
	2550.	C	
71810.00	2600.	C	
	2650.	C	
* 71730.00	2700.	C	
	2750.	C	
1.01	2800.	C	
	2850.	C	
71500.00	2900.	C	
	2950.	C	
	3000.	C	
	3050.	C	
	3100.	C	
	3150.	C	
	3200.	C	
	3250.	C	
	3300.	C	
	3350.	C	
71000.00	3400.	C	
	3450.	C	
	3500.	C	
	3550.	C	
	3600.	C	
	3650.	C	
	3700.	C	
	3750.	C	
	3800.	C	
	3850.	C	
	3900.	C	
	3950.	C	
	4000.	C	
	4050.	C	
	4100.	C	
	4150.	C	
	4200.	C	
	4250.	C	
	4300.	C	
	4350.	C	
70000.00	4400.	C	
	4450.	C	
	4500.	C	
	4550.	C	
	4600.	C	
	4650.	C	
	4700.	C	
	4750.	C	
	4800.	C	
	4850.	C	
	4900.	C	
	4950.	C	
	5000.	C	
	5050.	C	
	5100.	C	

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                5150.  C        .         .I        .         .         .         .W E    .L        .         .         .
                5200.  C        .         .I        .         .         .         .W E    .L        .         .         .
                5250.  C        .         .I        .         .         .         .W E    .L        .         .         .
                5300.  C        .         .I        .         .         .         . WE    .L        .         .         .
                5350.  C        .         .I        .         .         .         . WE    .L        .         .         .
    69000.00    5400.  C        .         . I       .         .         .         .  W E  .  L      .         .         .
                5450.  C        .         . I       .         .         .         .  W E  .  L      .         .         .
                5500.  C        .         . I       .         .         .         .  W E  .  L      .         .         .
                5550.  C        .         . I       .         .         .         .  W E  .  L      .         .         .
                5600.  C        .         . I       .         .         .         .  W E  .  L      .         .         .
                5650.  C        .         . I       .         .         .         .  W E  .  L      .         .         .
                5700.  C        .         . I       .         .         .         .   WE  .  L      .         .         .
                5750.  C        .         . I       .         .         .         .   WE  .  L      .         .         .
                5800.  C        .         . I       .         .         .         .   W E .  L      .         .         .
                5850.  C        .         .  I      .         .         .         .   W E .   L     .         .         .
                5900.  C        .         .  I      .         .         .         .   W E .   L     .         .         .
                5950.  C        .         .  I      .         .         .         .   W E .   L     .         .         .
                6000.  C        .         .  I      .         .         .         .   W E .   L     .         .         .
                6050.  C        .         .  I      .         .         .         .   W E .   L     .         .         .
                6100.  C        .         .  I      .         .         .         .    WE .   L     .         .         .
                6150.  C        .         .  I      .         .         .         .    WE .   L     .         .         .
                6200.  C        .         .  I      .         .         .         .    W E.   L     .         .         .
                6250.  C        .         .   I     .         .         .         .    W E.    L    .         .         .
                6300.  C        .         .   I     .         .         .         .    W E.    L    .         .         .
                6350.  C        .         .   I     .         .         .         .    W E.    L    .         .         .
    68000.00    6400.  C        .         .   I     .         .         .         .    W E.    L    .         .         .
                6450.  C        .         .  I      .         .         .         .  W E.     L    .         .         .
                6500.  C        .         .  I      .         .         .         .   WE.     L    .         .         .
                6550.  C        .         .  I      .         .         .         .   WE.     L    .         .         .
                6600.  C        .         .   I     .         .         .         .   W E      L   .         .         .
                6650.  C        .         .   I     .         .         .         .   W E      L   .         .         .
                6700.  C        .         .   I     .         .         .         .   W E      L   .         .         .
                6750.  C        .         .   I     .         .         .         .   W E      L   .         .         .
    67622.00    6800.  C        .         .   I     .         .         .         .   W E      L   .         .         .
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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

RWCD REACH 4 MODIFIED

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
	74400.000	.00	.00	.00	299.62	6900.00	308.07	.00	308.27	2.95	3.62	1904.21	4020.58
	74360.000	40.00	.00	.00	299.63	6900.00	308.06	.00	308.29	3.26	3.80	1817.66	3822.42
	74320.000	40.00	.00	.00	299.64	6900.00	308.05	.00	308.30	3.65	4.00	1726.45	3609.55
	74280.000	40.00	.00	.00	299.66	6900.00	308.04	.00	308.32	4.13	4.22	1635.06	3396.62
	74240.000	40.00	.00	.00	299.67	6900.00	308.02	.00	308.33	4.67	4.46	1545.97	3191.47
	74200.000	40.00	.00	.00	299.68	6900.00	308.00	.00	308.35	5.34	4.74	1456.60	2985.97
	74000.000	200.00	.00	.00	299.80	6900.00	308.11	.00	308.46	5.35	4.74	1455.27	2981.86
	73000.000	1000.00	.00	.00	300.40	6900.00	308.65	.00	309.00	5.51	4.79	1441.18	2938.22
	72000.000	1000.00	.00	.00	301.00	6900.00	309.20	.00	309.56	5.63	4.82	1431.67	2908.86
	71810.000	190.00	.00	.00	301.10	6900.00	309.31	.00	309.67	5.64	4.83	1429.10	2906.07
	71730.000	80.00	319.30	317.30	301.14	6900.00	309.32	.00	309.89	9.01	6.07	1137.62	2299.19
*	71500.000	230.00	.00	.00	301.25	6900.00	309.71	.00	310.05	5.05	4.65	1483.98	3071.38
	71000.000	500.00	.00	.00	301.50	6900.00	309.96	.00	310.30	5.05	4.65	1483.96	3071.32
	70000.000	1000.00	.00	.00	302.00	6900.00	310.47	.00	310.80	5.04	4.65	1484.43	3072.79
	69000.000	1000.00	.00	.00	302.50	6900.00	310.97	.00	311.31	5.03	4.65	1485.37	3075.74
	68000.000	1000.00	.00	.00	303.00	6900.00	311.48	.00	311.81	5.02	4.64	1486.21	3078.37
	67622.000	377.50	.00	.00	303.19	6900.00	311.67	.00	312.00	5.02	4.64	1486.85	3080.39

RWCD REACH 4 MODIFIED

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	74400.000	6900.00	308.07	.00	.00	.00	250.70	.00
	74360.000	6900.00	308.06	.00	-.01	.00	240.65	40.00
	74320.000	6900.00	308.05	.00	-.01	.00	230.47	40.00
	74280.000	6900.00	308.04	.00	-.01	.00	220.27	40.00
	74240.000	6900.00	308.02	.00	-.02	.00	210.12	40.00
	74200.000	6900.00	308.00	.00	-.02	.00	199.95	40.00
	74000.000	6900.00	308.11	.00	.11	.00	199.91	200.00
	73000.000	6900.00	308.65	.00	.54	.00	199.48	1000.00
	72000.000	6900.00	309.20	.00	.55	.00	199.20	1000.00
	71810.000	6900.00	309.31	.00	.11	.00	198.55	190.00
	71730.000	6900.00	309.32	.00	.02	.00	158.36	80.00
*	71500.000	6900.00	309.71	.00	.16	.00	200.77	230.00
	71000.000	6900.00	309.96	.00	.25	.00	200.77	500.00
	70000.000	6900.00	310.47	.00	.50	.00	200.78	1000.00
	69000.000	6900.00	310.97	.00	.50	.00	200.81	1000.00
	68000.000	6900.00	311.48	.00	.50	.00	200.83	1000.00
	67622.000	6900.00	311.67	.00	.19	.00	200.85	377.50

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO=71500.000 PROFILE= 1 INTERPOLATED XSECTIONS USED

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MARC 1982
  ERROR CORR -  01,02,03,04,05
  MODIFICATION -  50,51,52,53,54,55
**************************************************

@FIN
```

Henry Pearl

$\frac{2}{12} \frac{50}{50}$ 0.943 =

0.943 $\frac{50(\%)}{50}$ = 0.258

50

20kg

HEC2 Q100 Final 2/26/85

675+00 TO 555+00

THIS RUN EXECUTED 01/01/80 03:36:40

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
  IBM-PC-XT VERSION
**************************************************


T1 RWCD REACH4 Q=6900CFS
T2 WATER SURFACE PROFILE
T3 RWCD REACH 4 MODIFIED

J1   ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

        0.       0.        0.        0.    .000000       .00       .2    6900.   315.020      .000

J2   NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      -1.000      .000      .000      .000      .000      .000      .000      .000      .000      .000


NC        .027      .027      .027      .000      .000      .000      .000      .000      .000      .000
X1   67500.000     4.000      .000    210.000      .000      .000      .000      .000      .000      .000
GR     316.600      .000    306.600     30.000    306.600   180.000   316.600   210.000      .000      .000

X1   67000.000      .000      .000      .000    500.000   500.000   500.000      .000      .250      .000

X1   66000.000      .000      .000      .000   1000.000  1000.000  1000.000      .000      .500      .000

X1   65000.000      .000      .000      .000   1000.000  1000.000  1000.000      .000      .500      .000

X1   64000.000      .000      .000      .000   1000.000  1000.000  1000.000      .000      .500      .000

X1   63000.000      .000      .000      .000   1000.000  1000.000  1000.000      .000      .500      .000

X1   62700.000      .000      .000      .000    300.000   300.000   300.000      .000      .150      .000

X1   62600.000     4.000      .000    235.000    100.000   100.000   100.000      .000      .000      .000
GR     319.050      .000    309.050     30.000    309.050   205.000   319.050   235.000      .000      .000

X1   62000.000      .000      .000      .000    600.000   600.000   600.000      .000      .150      .000

X1   61000.000      .000      .000      .000   1000.000  1000.000  1000.000      .000      .250      .000

X1   60000.000     4.000      .000    235.000   1000.000  1000.000  1000.000      .000      .000      .000
GR     319.700      .000    309.700     30.000    309.700   205.000   319.700   235.000      .000      .000

X1   59860.000     6.000     1.000    240.000    140.000   140.000   140.000      .000      .000      .000
GR     322.700      .000    319.900      1.000    309.740    32.000   309.740   207.000   319.900   240.000
GR     322.700   241.000      .000      .000       .000      .000      .000      .000      .000      .000
1
 01/01/80     03:36:38                                                                          PAGE     2


SB        .900     1.600     2.800      .000    175.000     4.000  2055.000     3.000   309.750   309.740
X1   59800.000      .000      .000      .000     40.000    40.000    40.000      .000      .000      .000
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BT	2.000	7575.000	322.700	319.700	7810.000	322.200	319.700	.000	.000	.000
X1	59680.000	4.000	.000	235.000	120.000	120.000	120.000	.000	.000	.000
GR	319.790	.000	309.790	30.000	309.790	205.000	319.790	235.000	.000	.000
SB	1.050	1.560	2.800	270.000	175.000	15.000	2202.000	3.000	309.800	309.790
X1	59650.000	.000	.000	.000	30.000	30.000	30.000	.000	.010	.000
X2	.000	.000	1.000	319.970	324.000	.000	.000	1.800	.000	.000
X1	59600.000	4.000	.000	235.000	50.000	50.000	50.000	.000	.000	.000
X2	6500.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	319.800	.000	309.800	30.000	309.800	205.000	319.800	235.000	.000	.000
X1	59000.000	.000	.000	.000	600.000	600.000	600.000	.000	.150	.000
X1	58000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.250	.000
X1	57000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.250	.000
X1	56000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.250	.000
X1	55500.000	4.000	.000	235.000	500.000	500.000	500.000	.000	.000	.000
GR	320.820	.000	310.820	30.000	310.820	205.000	320.820	235.000	.000	.000
NC	.035	.035	.035	.000	.000	.000	.000	.000	.000	.000
X1	55450.000	4.000	.000	209.100	50.000	50.000	50.000	.000	.000	.000
GR	320.830	.000	310.830	28.400	310.830	180.800	320.830	209.100	.000	.000
X1	55400.000	4.000	.000	183.400	50.000	50.000	50.000	.000	.000	.000
GR	320.840	.000	310.840	26.700	310.840	156.700	320.840	183.400	.000	.000
X1	55380.000	4.000	.000	174.000	20.000	20.000	20.000	.000	.000	.000
GR	320.850	.000	310.850	26.000	310.850	148.000	320.850	174.000	.000	.000
X1	55340.000	4.000	.000	155.400	40.000	40.000	40.000	.000	.000	.000
GR	320.860	.000	310.860	24.700	310.860	130.700	320.860	155.400	.000	.000
X1	55320.000	4.000	.000	146.000	20.000	20.000	20.000	.000	.000	.000
GR	320.870	.000	310.870	24.000	310.870	122.000	320.870	146.000	.000	.000
X1	55300.000	4.000	.000	136.600	20.000	20.000	20.000	.000	.000	.000
GR	320.870	.000	310.870	23.300	310.870	113.300	320.870	136.600	.000	.000
X1	55280.000	4.000	.000	129.400	20.000	20.000	20.000	.000	.000	.000
GR	320.880	.000	310.880	22.700	310.880	106.700	320.880	129.400	.000	.000

X1	55260.000	4.000	.000	122.000	20.000	20.000	20.000	.000	.000	.000
GR	320.880	.000	310.880	22.000	310.880	100.000	320.880	122.000	.000	.000
X1	55240.000	4.000	.000	114.600	20.000	20.000	20.000	.000	.000	.000
GR	320.880	.000	310.880	21.300	310.880	93.300	320.880	114.600	.000	.000
X1	55220.000	4.000	.000	107.400	20.000	20.000	20.000	.000	.000	.000
GR	320.610	.000	310.610	20.700	310.610	86.700	320.610	107.400	.000	.000
X1	55200.000	4.000	.000	100.000	20.000	20.000	20.000	.000	.000	.000
GR	320.310	.000	310.310	20.000	310.310	80.000	320.310	100.000	.000	.000
X1	55180.000	4.000	.000	98.000	20.000	20.000	20.000	.000	.000	.000
GR	320.330	.000	310.330	20.000	310.330	78.000	320.330	98.000	.000	.000

GR	320.350	.000	310.350	20.000	310.350	76.000	320.350	96.000	.000	.000
X1	55140.000	4.000	.000	126.000	20.000	20.000	20.000	.000	.000	.000
GR	328.360	.000	310.360	36.000	310.360	90.000	328.360	126.000	.000	.000
SB	1.250	1.600	2.800	120.000	54.000	1.300	1560.000	2.000	310.400	310.360
X1	55095.000	4.000	.000	122.000	45.000	45.000	45.000	.000	.000	.000
X2	.000	.000	1.000	329.300	330.500	.000	.000	2.000	.000	.000
GR	328.400	.000	310.400	36.000	310.400	86.000	328.400	122.000	.000	.000
NC	.014	.014	.014	.000	.000	.000	.000	.000	.000	.000
X1	55060.000	4.000	.000	90.000	35.000	35.000	35.000	.000	.000	.000
GR	320.440	.000	310.440	20.000	310.440	70.000	320.440	90.000	.000	.000
X1	55000.000	.000	.000	.000	60.000	60.000	60.000	.000	.050	.000
X1	54340.000	.000	.000	.000	660.000	660.000	660.000	.000	.590	.000
SB	1.250	1.500	2.900	100.000	50.000	1.300	1100.000	2.000	311.400	311.330
X1	54260.000	.000	.000	.000	80.000	80.000	80.000	.000	.070	.000
X2	.000	.000	1.000	325.900	328.900	.000	.000	1.330	.000	.000
X1	54000.000	.000	.000	.000	260.000	260.000	260.000	.000	.230	.000
X1	53000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.900	.000
X1	52000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.900	.000
X1	51000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.900	.000
X1	50000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.900	.000

1

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X1	49590.000	4.000	.000	90.000	410.000	410.000	410.000	.000	.000	.000
GR	325.360	.000	315.360	20.000	315.360	70.000	325.360	90.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

*PROF 1

1

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 67500.000									
67500.00	8.42	315.02	.00	315.02	315.36	.34	.00	.00	316.60
6900.	0.	6900.	0.	0.	1476.	0.	0.	0.	316.60
.00	.00	4.68	.00	.027	.027	.027	.000	306.60	4.74
.000513	0.	0.	0.	0	0	0	.00	200.52	205.26
0									
*SECNO 67000.000									
67000.00	8.43	315.28	.00	.00	315.62	.34	.26	.00	316.85
6900.	0.	6900.	0.	0.	1476.	0.	17.	2.	316.85
.03	.00	4.68	.00	.027	.027	.027	.000	306.85	4.74
.000513	500.	500.	500.	0	0	0	.00	200.52	205.26
0									
*SECNO 66000.000									

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      .09       .00      4.67       .00      .027      .027      .027      .000    307.35      4.70
   .000511     1000.     1000.     1000.         1         0         0       .00    200.60    205.30
0
 *SECNO 65000.000
  65000.00      8.45    316.30       .00       .00    316.64       .34       .51       .00    317.85
     6900.        0.     6900.        0.        0.    1481.        0.       85.       12.     317.85
       .15       .00      4.66       .00      .027      .027      .027      .000    307.85      4.66
   .000508     1000.     1000.     1000.         1         0         0       .00    200.67    205.34
0
 *SECNO 64000.000
  64000.00      8.46    316.81       .00       .00    317.14       .34       .51       .00    318.35
     6900.        0.     6900.        0.        0.    1482.        0.       119.      16.     318.35
       .21       .00      4.66       .00      .027      .027      .027      .000    308.35      4.65
   .000507     1000.     1000.     1000.         0         0         0       .00    200.70    205.35
0
 *SECNO 63000.000
  63000.00      8.47    317.32       .00       .00    317.65       .34       .51       .00    318.85
     6900.        0.     6900.        0.        0.    1483.        0.       153.      21.     318.85
       .27       .00      4.65       .00      .027      .027      .027      .000    308.85      4.63
   .000505     1000.     1000.     1000.         0         0         0       .00    200.75    205.37
0
1
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

 *SECNO 62700.000
  62700.00      8.47    317.47       .00       .00    317.80       .34       .15       .00    319.00
     6900.        0.     6900.        0.        0.    1485.        0.       163.      22.     319.00
       .29       .00      4.65       .00      .027      .027      .027      .000    309.00      4.60
   .000504      300.      300.      300.         0         0         0       .00    200.79    205.40
0
 *SECNO 62600.000
  62600.00      8.54    317.59       .00       .00    317.85       .25       .04       .00    319.05
     6900.        0.     6900.        0.        0.    1714.        0.       167.      23.     319.05
       .29       .00      4.03       .00      .027      .027      .027      .000    309.05      4.37
   .000365      100.      100.      100.         2         0         0       .00    226.26    230.63
0
 *SECNO 62000.000
  62000.00      8.61    317.81       .00       .00    318.06       .25       .22       .00    319.20
     6900.        0.     6900.        0.        0.    1730.        0.       190.      26.     319.20
       .33       .00      3.99       .00      .027      .027      .027      .000    309.20      4.16
   .000355      600.      600.      600.         2         0         0       .00    226.69    230.84
0
 *SECNO 61000.000
  61000.00      8.72    318.17       .00       .00    318.41       .24       .35       .00    319.45
     6900.        0.     6900.        0.        0.    1754.        0.       230.      31.     319.45
       .41       .00      3.93       .00      .027      .027      .027      .000    309.45      3.84
   .000341     1000.     1000.     1000.         2         0         0       .00    227.31    231.16
0
 *SECNO 60000.000
  60000.00      8.81    318.51       .00       .00    318.74       .23       .33       .00    319.70
     6900.        0.     6900.        0.        0.    1774.        0.       271.      36.     319.70
       .48       .00      3.89       .00      .027      .027      .027      .000    309.70      3.57
   .000329     1000.     1000.     1000.         2         0         0       .00    227.85    231.43
0
 *SECNO 59860.000
  59860.00      8.82    318.56       .00       .00    318.79       .23       .05       .00    319.90
     6900.        0.     6900.        0.        0.    1786.        0.       277.      37.     319.90
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.60	2.80	.00	175.00	4.00	2055.00	3.00	309.75	309.74

*SECNO 59800.000
CLASS A LOW FLOW

3420 BRIDGE W.S.= 318.55 BRIDGE VELOCITY=, 3.97 CALCULATED CHANNEL AREA=, 1738.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD
.00	318.79	.00	0.	6900.	2055.	1998.	319.70	322.80

59800.00	8.80	318.56	.00	.00	318.79	.23	.01	.00	319.92
6900.	0.	6900.	0.	0.	1784.	0.	279.	37.	319.92
.49	.00	3.87	.00	.000	.027	.000	.000	309.76	5.14
.000327	60.	60.	60.	0	0	0	.00	230.45	235.59

*SECNO 59680.000

59680.00	8.81	318.60	.00	.00	318.83	.24	.04	.00	319.79
6900.	0.	6900.	0.	0.	1773.	0.	284.	38.	319.79
.50	.00	3.89	.00	.027	.027	.027	.000	309.79	3.59
.000330	120.	120.	120.	0	0	0	.00	227.81	231.41

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.05	1.56	2.80	270.00	175.00	15.00	2202.00	3.00	309.80	309.79

*SECNO 59650.000
CLASS A LOW FLOW

3420 BRIDGE W.S.= 318.56 BRIDGE VELOCITY=, 4.22 CALCULATED CHANNEL AREA=, 1632.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD
.00	318.86	.03	0.	6900.	2202.	1937.	319.97	324.00

59650.00	8.83	318.63	.00	.00	318.86	.23	.03	.00	319.80
6900.	0.	6900.	0.	0.	1778.	0.	285.	38.	319.80
.50	.00	3.88	.00	.000	.027	.000	.000	309.80	3.52
.000327	30.	30.	30.	0	0	0	.00	227.95	231.48

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 59600.000									
59600.00	8.87	318.67	.00	.00	318.87	.21	.02	.00	319.80
6500.	0.	6500.	0.	0.	1788.	0.	287.	38.	319.80
.51	.00	3.64	.00	.027	.027	.027	.000	309.80	3.39
.000285	50.	50.	50.	2	0	0	.00	228.22	231.61
0									
*SECNO 59000.000									
59000.00	8.89	318.84	.00	.00	319.04	.20	.17	.00	319.95
6500.	0.	6500.	0.	0.	1793.	0.	312.	41.	319.95
.55	.00	3.63	.00	.027	.027	.027	.000	309.95	3.33
.000283	600.	600.	600.	2	0	0	.00	228.34	231.67
0									
*SECNO 58000.000									
58000.00	8.92	319.12	.00	.00	319.33	.20	.28	.00	320.20
6500.	0.	6500.	0.	0.	1800.	0.	353.	47.	320.20
.63	.00	3.61	.00	.027	.027	.027	.000	310.20	3.23
.000279	1000.	1000.	1000.	2	0	0	.00	228.54	231.77
0									
*SECNO 57000.000									
57000.00	8.95	319.40	.00	.00	319.60	.20	.28	.00	320.45
6500.	0.	6500.	0.	0.	1807.	0.	395.	52.	320.45
.71	.00	3.60	.00	.027	.027	.027	.000	310.45	3.14
.000276	1000.	1000.	1000.	2	0	0	.00	228.71	231.86
0									
*SECNO 56000.000									
56000.00	8.98	319.68	.00	.00	319.88	.20	.27	.00	320.70
6500.	0.	6500.	0.	0.	1813.	0.	436.	57.	320.70
.78	.00	3.59	.00	.027	.027	.027	.000	310.70	3.07
.000273	1000.	1000.	1000.	2	0	0	.00	228.87	231.93
0									
*SECNO 55500.000									
55500.00	8.99	319.81	.00	.00	320.01	.20	.14	.00	320.82
6500.	0.	6500.	0.	0.	1815.	0.	457.	60.	320.82
.82	.00	3.58	.00	.027	.027	.027	.000	310.82	3.04
.000272	500.	500.	500.	1	0	0	.00	228.92	231.96
0									
1									

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 55450.000									
55450.00	8.94	319.77	.00	.00	320.03	.26	.02	.00	320.83
6500.	0.	6500.	0.	0.	1590.	0.	459.	60.	320.83
.83	.00	4.09	.00	.035	.035	.035	.000	310.83	3.00
.000609	50.	50.	50.	2	0	0	.00	203.11	206.11
0									
*SECNO 55400.000									
55400.00	8.88	319.72	.00	.00	320.07	.35	.04	.00	320.84
6500.	0.	6500.	0.	0.	1364.	0.	461.	60.	320.84
.83	.00	4.76	.00	.035	.035	.035	.000	310.84	3.00
.000849	50.	50.	50.	2	0	0	.00	177.40	180.40
0									
*SECNO 55380.000									
55380.00	8.84	319.69	.00	.00	320.09	.40	.02	.00	320.85
6500.	0.	6500.	0.	0.	1281.	0.	461.	60.	320.85
.83	.00	5.07	.00	.035	.035	.035	.000	310.85	3.00

VOID

0
*SECNO 55340.000
55340.00 8.75 319.61 .00 .00 320.13 .53 .05 .00 320.86
6500. 0. 6500. 0. 0. 1116. 0. 462. 60. 320.86
.83 .00 5.82 .00 .035 .035 .035 .000 310.86 3.10
.001326 40. 40. 40. 2 0 0 .00 149.21 152.30
0
*SECNO 55320.000 VOID
55320.00 8.67 319.54 .00 .00 320.16 .62 .03 .00 320.87
6500. 0. 6500. 0. 0. 1031. 0. 463. 61. 320.87
.83 .00 6.31 .00 .035 .035 .035 .000 310.87 3.18
.001586 20. 20. 20. 2 0 0 .00 139.64 142.82
0
*SECNO 55300.000
55300.00 8.59 319.46 .00 .00 320.20 .73 .03 .00 320.87
6500. 0. 6500. 0. 0. 945. 0. 463. 61. 320.87
.83 .00 6.88 .00 .035 .035 .035 .000 310.87 3.28
.001930 20. 20. 20. 2 0 0 .00 130.04 133.32
0
1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 55280.000
55280.00 8.51 319.39 .00 .00 320.24 .85 .04 .00 320.88
6500. 0. 6500. 0. 0. 879. 0. 464. 61. 320.88
.83 .00 7.39 .00 .035 .035 .035 .000 310.88 3.38
.002279 20. 20. 20. 2 0 0 .00 122.64 126.02
0
*SECNO 55260.000
55260.00 8.41 319.29 .00 .00 320.29 .99 .05 .00 320.88
6500. 0. 6500. 0. 0. 812. 0. 464. 61. 320.88
.83 .00 8.00 .00 .035 .035 .035 .000 310.88 3.49
.002736 20. 20. 20. 2 0 0 .00 115.02 118.51
0
*SECNO 55240.000 VOID
55240.00 8.28 319.16 .00 .00 320.35 1.19 .06 .00 320.88
6500. 0. 6500. 0. 0. 742. 0. 464. 61. 320.88
.84 .00 8.76 .00 .035 .035 .035 .000 310.88 3.67
.003379 20. 20. 20. 2 0 0 .00 107.26 110.93
0
*SECNO 55220.000
55220.00 8.52 319.13 .00 .00 320.42 1.29 .07 .00 320.61
6500. 0. 6500. 0. 0. 713. 0. 465. 61. 320.61
.84 .00 9.12 .00 .035 .035 .035 .000 310.61 3.06
.003600 20. 20. 20. 2 0 0 .00 101.27 104.34
0
*SECNO 55200.000
55200.00 8.76 319.07 .00 .00 320.49 1.42 .07 .00 320.31
6500. 0. 6500. 0. 0. 680. 0. 465. 61. 320.31
.84 .00 9.56 .00 .035 .035 .035 .000 310.31 2.47
.003897 20. 20. 20. 2 0 0 .00 95.07 97.53
0
*SECNO 55180.000
55180.00 8.73 319.06 .00 .00 320.57 1.51 .08 .00 320.33
6500. 0. 6500. 0. 0. 659. 0. 465. 61. 320.33
.84 .00 9.86 .00 .035 .035 .035 .000 310.33 2.53
.004193 20. 20. 20. 2 0 0 .00 92.94 95.47
0

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 55160.000

55160.00	8.70	319.05	.00	.00	320.66	1.61	.09	.00	320.35
6500.	0.	6500.	0.	0.	639.	0.	466.	61.	320.35
.84	.00	10.17	.00	.035	.035	.035	.000	310.35	2.59
.004515	20.	20.	20.	2	0	0	.00	90.82	93.41

0

VOID

*SECNO 55140.000

55140.00	8.70	319.06	.00	.00	320.75	1.70	.09	.00	328.36
6500.	0.	6500.	0.	0.	622.	0.	466.	61.	328.36
.84	.00	10.46	.00	.035	.035	.035	.000	310.36	18.59
.004812	20.	20.	20.	0	0	0	.00	88.82	107.41

0

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.80	120.00	54.00	1.30	1560.00	2.00	310.40	310.36

*SECNO 55095.000
CLASS A LOW FLOW

3420 BRIDGE W.S.= 318.95 BRIDGE VELOCITY=, 10.86 CALCULATED CHANNEL AREA=, 597.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD
.00	321.08	.20	0.	6500.	1560.	1710.	329.30	330.50

55095.00	8.86	319.26	.00	.00	321.00	1.82	.33	.00	328.40
6500.	0.	6500.	0.	0.	600.	0.	467.	61.	328.40
.84	.00	10.84	.00	.000	.035	.000	.000	310.40	18.28
.005164	45.	45.	45.	0	0	0	.00	85.43	103.72

0

*SECNO 55060.000

55060.00	8.90	319.34	.00	.00	321.14	1.80	.06	.00	320.44
6500.	0.	6500.	0.	0.	603.	0.	467.	61.	320.44
.84	.00	10.78	.00	.014	.014	.014	.000	310.44	2.21
.000814	35.	35.	35.	2	0	0	.00	85.58	87.79

0

VOID

*SECNO 55000.000

55000.00	8.89	319.38	.00	.00	321.19	1.80	.05	.00	320.49
6500.	0.	6500.	0.	0.	603.	0.	468.	61.	320.49
.84	.00	10.78	.00	.014	.014	.014	.000	310.49	2.21
.000814	60.	60.	60.	0	0	0	.00	85.58	87.79

0
1

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 54340.000

.86	.00	10.92	.00	.014	.014	.014	.000	311.08	2.39
.000844	660.	660.	660.	2	0	0	.00	85.22	87.61

0

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.90	100.00	50.00	1.30	1100.00	2.00	311.40	311.33

*SECNO 54260.000
CLASS A LOW FLOW

3420 BRIDGE W.S.= 319.70 BRIDGE VELOCITY=, 11.93 CALCULATED CHANNEL AREA=, 542.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD
.00	321.89	.25	0.	6500.	1100.	1127.	325.90	328.90

54260.00	8.99	320.14	.00	.00	321.89	1.76	.16	.00	321.15
6500.	0.	6500.	0.	0.	611.	0.	478.	63.	321.15
.86	.00	10.64	.00	.000	.014	.000	.000	311.15	2.03
.000784	80.	80.	80.	0	0	0	.00	85.95	87.97

0

*SECNO 54000.000

54000.00	8.94	320.32	.00	.00	322.10	1.78	.21	.00	321.38
6500.	0.	6500.	0.	0.	607.	0.	482.	63.	321.38
.87	.00	10.71	.00	.014	.014	.014	.000	311.38	2.12
.000800	260.	260.	260.	2	0	0	.00	85.75	87.88

0

*SECNO 53000.000

53000.00	8.78	321.06	.00	.00	322.93	1.86	.82	.00	322.28
6500.	0.	6500.	0.	0.	594.	0.	496.	65.	322.28
.89	.00	10.95	.00	.014	.014	.014	.000	312.28	2.43
.000851	1000.	1000.	1000.	2	0	0	.00	85.14	87.57

0

*SECNO 52000.000

52000.00	8.71	321.89	.00	.00	323.79	1.90	.87	.00	323.18
6500.	0.	6500.	0.	0.	587.	0.	509.	67.	323.18
.92	.00	11.07	.00	.014	.014	.014	.000	313.18	2.59
.000879	1000.	1000.	1000.	2	0	0	.00	84.83	87.41

0
1

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 51000.000

51000.00	8.67	322.75	.00	.00	324.68	1.92	.89	.00	324.08
6500.	0.	6500.	0.	0.	584.	0.	523.	69.	324.08
.94	.00	11.13	.00	.014	.014	.014	.000	314.08	2.65
.000892	1000.	1000.	1000.	2	0	0	.00	84.69	87.35

0

*SECNO 50000.000

50000.00	8.66	323.64	.00	.00	325.57	1.92	.89	.00	324.98
6500.	0.	6500.	0.	0.	584.	0.	536.	71.	324.98
.97	.00	11.13	.00	.014	.014	.014	.000	314.98	2.65
.000892	1000.	1000.	1000.	0	0	0	.00	84.69	87.35

0

47570.00	8.83	323.77	.00	.00	325.94	1.95	.37	.00	325.36	
6500.	0.	6500.	0.	0.	580.	0.	541.	72.	325.36	
.98	.00	11.20	.00	.014	.014	.014	.000	315.36	2.74	
.000908	410.	410.	410.	2	0	0	.00	84.52	87.26	

0

1

PROFILE FOR STREAM REACH 4 MODIFIED

PLOTTED POINTS (BY PRIORITY)-E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

ELEVATION	306.	308.	310.	312.	314.	316.	318.	320.	322.	324.
SECNO	CUMDIS									
67500.00	0.	C I	.	.	.	W E . L	.	.	.	.
	50.	C I	.	.	.	W E . L	.	.	.	.
	100.	C I	.	.	.	W E . L	.	.	.	.
	150.	C I	.	.	.	W E . L	.	.	.	.
	200.	C I	.	.	.	WE . L	.	.	.	.
	250.	C I	.	.	.	WE . L	.	.	.	.
	300.	C I	.	.	.	W E . L	.	.	.	.
	350.	C I	.	.	.	W E . L	.	.	.	.
	400.	C I	.	.	.	W E . L	.	.	.	.
	450.	C I	.	.	.	W E . L	.	.	.	.
67000.00	500.	C I	.	.	.	W E . L	.	.	.	.
	550.	C I	.	.	.	W E . L	.	.	.	.
	600.	C I	.	.	.	WE . L	.	.	.	.
	650.	C I	.	.	.	WE . L	.	.	.	.
	700.	C I	.	.	.	W E. L	.	.	.	.
	750.	C I	.	.	.	W E. L	.	.	.	.
	800.	C I	.	.	.	W E. L	.	.	.	.
	850.	C I	.	.	.	W E. L	.	.	.	.
	900.	C I	.	.	.	W E. L	.	.	.	.
	950.	C I	.	.	.	W E. L	.	.	.	.
	1000.	C I	.	.	.	WE. L	.	.	.	.
	1050.	C I	.	.	.	W E L	.	.	.	.
	1100.	C I	.	.	.	W E L	.	.	.	.
	1150.	C I	.	.	.	W E L	.	.	.	.
	1200.	C I	.	.	.	W E L	.	.	.	.
	1250.	C I	.	.	.	W E L	.	.	.	.
	1300.	C I	.	.	.	W E L	.	.	.	.
	1350.	C I	.	.	.	WE L	.	.	.	.
	1400.	C I	.	.	.	WE L	.	.	.	.
	1450.	C I	.	.	.	W.E L	.	.	.	.
66000.00	1500.	C I	.	.	.	W.E L	.	.	.	.
	1550.	C I	.	.	.	W.E L	.	.	.	.
	1600.	C I	.	.	.	W.E L	.	.	.	.
	1650.	C I	.	.	.	W.E L	.	.	.	.
	1700.	C I	.	.	.	W.E L	.	.	.	.
	1750.	C I	.	.	.	WE L	.	.	.	.
	1800.	C I	.	.	.	WE L	.	.	.	.
	1850.	C I	.	.	.	W E L	.	.	.	.
	1900.	C I	.	.	.	W E L	.	.	.	.
	1950.	C I	.	.	.	W E L	.	.	.	.
	2000.	C I	.	.	.	W E L	.	.	.	.
	2050.	C I	.	.	.	W E L	.	.	.	.
	2100.	C I	.	.	.	W E L	.	.	.	.
	2150.	C I	.	.	.	.WE L	.	.	.	.
	2200.	C I.	.	.	.	.WE L.	.	.	.	.
	2250.	C I.	.	.	.	.W E L.	.	.	.	.
	2300.	C I.	.	.	.	.W E L.	.	.	.	.
	2350.	C I.	.	.	.	.W E L.	.	.	.	.
	2400.	C I.	.	.	.	W E				

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          2500.   C       I.          .          .         .         .W E     L.          .         .         .          .
          2550.   C       I.          .          .         .         . WE     L.          .         .         .          .
          2600.   C       I.          .          .         .         . WE     L.          .         .         .          .
          2650.   C         I         .          .         .         . W E     L          .         .         .          .
          2700.   C         I         .          .         .         . W E     L          .         .         .          .
          2750.   C         I         .          .         .         . W E     L          .         .         .          .
          2800.   C         I         .          .         .         . W E     L          .         .         .          .
          2850.   C         I         .          .         .         . W E     L          .         .         .          .
          2900.   C         I         .          .         .         .  WE     L          .         .         .          .
          2950.   C         I         .          .         .         .  WE     L          .         .         .          .
          3000.   C         .I        .          .         .         .  WE     .L         .         .         .          .
          3050.   C         .I        .          .         .         .  W E    .L         .         .         .          .
          3100.   C         .I        .          .         .         .  W E    .L         .         .         .          .
          3150.   C         .I        .          .         .         .  W E    .L         .         .         .          .
          3200.   C         .I        .          .         .         .  W E    .L         .         .         .          .
          3250.   C         .I        .          .         .         .  W E    .L         .         .         .          .
          3300.   C         .I        .          .         .         .  W E    .L         .         .         .          .
          3350.   C         .I        .          .         .         .   WE    .L         .         .         .          .
          3400.   C         . I       .          .         .         .   WE    . L        .         .         .          .
          3450.   C         . I       .          .         .         .   W E   . L        .         .         .          .
64000.00  3500.   C         . I       .          .         .         .   W E   . L        .         .         .          .
          3550.   C         . I       .          .         .         .   W E   . L        .         .         .          .
          3600.   C         . I       .          .         .         .   W E   . L        .         .         .          .
          3650.   C         . I       .          .         .         .   W E   . L        .         .         .          .
          3700.   C         . I       .          .         .         .    WE   . L        .         .         .          .
          3750.   C         . I       .          .         .         .    WE   . L        .         .         .          .
          3800.   C         .  I      .          .         .         .    WE   .  L       .         .         .          .
          3850.   C         .  I      .          .         .         .    W E  .  L       .         .         .          .
          3900.   C         .  I      .          .         .         .    W E  .  L       .         .         .          .
          3950.   C         .  I      .          .         .         .    W E  .  L       .         .         .          .
          4000.   C         .  I      .          .         .         .    W E  .  L       .         .         .          .
          4050.   C         .  I      .          .         .         .    W E  .  L       .         .         .          .
          4100.   C         .  I      .          .         .         .     WE  .  L       .         .         .          .
          4150.   C         .  I      .          .         .         .     WE  .  L       .         .         .          .
          4200.   C         .   I     .          .         .         .     WE  .   L      .         .         .          .
          4250.   C         .   I     .          .         .         .     W E .   L      .         .         .          .
          4300.   C         .   I     .          .         .         .     W E .   L      .         .         .          .
          4350.   C         .   I     .          .         .         .     W E .   L      .         .         .          .
          4400.   C         .   I     .          .         .         .     W E .   L      .         .         .          .
          4450.   C         .   I     .          .         .         .     W E .   L      .         .         .          .
63000.00  4500.   C         .   I     .          .         .         .      WE .   L      .         .         .          .
          4550.   C         .   I     .          .         .         .      WE .   L      .         .         .          .
          4600.   C         .   I     .          .         .         .      WE .   L      .         .         .          .
          4650.   C         .    I    .          .         .         .      W E.    L     .         .         .          .
          4700.   C         .    I    .          .         .         .      W E.    L     .         .         .          .
          4750.   C         .    I    .          .         .         .      W E.    L     .         .         .          .
62700.00  4800.   C         .    I    .          .         .         .      W E.    L     .         .         .          .
          4850.   C         .    I    .          .         .         .       WE.    L     .         .         .          .
62600.00  4900.   C         .    I    .          .         .         .       WE.    L     .         .         .          .
          4950.   C         .    I    .          .         .         .       WE.    L     .         .         .          .
          5000.   C         .    I    .          .         .         .       WE.    L     .         .         .          .
          5050.   C         .    I    .          .         .         .       W E    L     .         .         .          .
          5100.   C         .     I   .          .         .         .       W E      L   .         .         .          .
          5150.   C         .     I   .          .         .         .       W E      L   .         .         .          .
          5200.   C         .     I   .          .         .         .        WE      L   .         .         .          .
          5250.   C         .     I   .          .         .         .        WE      L   .         .         .          .
          5300.   C         .     I   .          .         .         .        WE      L   .         .         .          .
          5350.   C         .     I   .          .         .         .        WE      L   .         .         .          .
          5400.   C         .     I   .          .         .         .        WE      L   .         .         .          .
          5450.   C         .     I   .          .         .         .        WE      L   .         .         .          .
62000.00  5500.   C         .     I   .          .         .         .        WE      L   .         .         .          .
          5550.   C         .     I   .          .         .         .        WE      L   .         .         .          .
          5600.   C         .     I   .          .         .         .        WE      L   .         .         .          .
          5650.   C         .     I   .          .         .         .        W.E     L   .         .         .          .
          5700.   C         .     I   .          .         .         .        W.E     L   .         .         .          .
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          5800.  C         .     I   .         .         .         .        WE    L    .         .         .         .
          5850.  C         .     I   .         .         .         .        WE    L    .         .         .         .
          5900.  C         .      I  .         .         .         .        WE      L  .         .         .         .
          5950.  C         .      I  .         .         .         .        WE      L  .         .         .         .
          6000.  C         .      I  .         .         .         .        WE      L  .         .         .         .
          6050.  C         .      I  .         .         .         .        WE      L  .         .         .         .
          6100.  C         .      I  .         .         .         .        WE      L  .         .         .         .
          6150.  C         .      I  .         .         .         .        WE      L  .         .         .         .
          6200.  C         .      I  .         .         .         .        W E     L  .         .         .         .
          6250.  C         .      I  .         .         .         .        W E     L  .         .         .         .
          6300.  C         .      I  .         .         .         .        W E     L  .         .         .         .
          6350.  C         .      I  .         .         .         .        .WE     L  .         .         .         .
          6400.  C         .      I  .         .         .         .        .WE     L  .         .         .         .
          6450.  C         .      I  .         .         .         .        .WE     L  .         .         .         .
61000.00  6500.  C         .      I  .         .         .         .        .WE     L  .         .         .         .
          6550.  C         .      I  .         .         .         .        .WE     L  .         .         .         .
          6600.  C         .      I  .         .         .         .        .WE     L  .         .         .         .
          6650.  C         .      I  .         .         .         .        .WE     L  .         .         .         .
          6700.  C         .       I .         .         .         .        .WE      L .         .         .         .
          6750.  C         .       I .         .         .         .        .WE      L .         .         .         .
          6800.  C         .       I .         .         .         .        .W E     L .         .         .         .
          6850.  C         .       I .         .         .         .        .W E     L .         .         .         .
          6900.  C         .       I .         .         .         .         . WE    L .         .         .         .
          6950.  C         .       I .         .         .         .         . WE    L .         .         .         .
          7000.  C         .       I .         .         .         .         . WE    L .         .         .         .
          7050.  C         .       I .         .         .         .         . WE    L .         .         .         .
          7100.  C         .       I .         .         .         .         . WE    L .         .         .         .
          7150.  C         .       I .         .         .         .         . WE    L .         .         .         .
          7200.  C         .       I .         .         .         .         . WE    L .         .         .         .
          7250.  C         .       I .         .         .         .         . WE    L .         .         .         .
          7300.  C         .       I .         .         .         .         . WE    L .         .         .         .
          7350.  C         .       I .         .         .         .         . WE    L .         .         .         .
          7400.  C         .       I .         .         .         .         . W E   L .         .         .         .
          7450.  C         .       I .         .         .         .         . W E   L .         .         .         .
60000.00  7500.  C         .        I.         .         .         .         .  WE    L.         .         .         .
          7550.  C         .        I.         .         .         .         .  WE    L.   M     .         .         .
          7600.  C         .        I.         .         .         .         .  WE    L.        M.         .         .
59860.00  7650.  C         .        I.         .         .         .         .  WE    L.         .   M     .         .
59800.00  7700.  C         .        I.         .         .         .         .  WE    L          .   M     .         .
          7750.  C         .        I.         .         .         .         .  WE    L.      M  .         .         .
          7800.  C         .        I.         .         .         .         .  WE    L.M        .         .         .
59680.00  7850.  C         .        I.         .         .         .         .  WE    L.         .         .         .
59650.00  7900.  C         .        I.         .         .         .         .  WE    L.         .         .         .
59600.00  7950.  C         .        I.         .         .         .         .  WE    L.         .         .         .
          8000.  C         .        I.         .         .         .         .  WE    L.         .         .         .
          8050.  C         .        I.         .         .         .         .  WE    L.         .         .         .
          8100.  C         .        I.         .         .         .         .   WE   L.         .         .         .
          8150.  C         .        I.         .         .         .         .   WE   L.         .         .         .
          8200.  C         .        I.         .         .         .         .   WE   L.         .         .         .
          8250.  C         .        I.         .         .         .         .   WE   L.         .         .         .
          8300.  C         .        I.         .         .         .         .   WE   L.         .         .         .
          8350.  C         .        I.         .         .         .         .   WE   L.         .         .         .
          8400.  C         .         I         .         .         .         .   WE    L         .         .         .
          8450.  C         .         I         .         .         .         .   WE    L         .         .         .
59000.00  8500.  C         .         I         .         .         .         .   WE    L         .         .         .
          8550.  C         .         I         .         .         .         .   WE    L         .         .         .
          8600.  C         .         I         .         .         .         .   WE    L         .         .         .
          8650.  C         .         I         .         .         .         .   WE    L         .         .         .
          8700.  C         .         I         .         .         .         .   WE    L         .         .         .
          8750.  C         .         I         .         .         .         .    WE   L         .         .         .
          8800.  C         .         I         .         .         .         .    WE   L         .         .         .
          8850.  C         .         I         .         .         .         .    WE   L         .         .         .
          8900.  C         .         I         .         .         .         .    WE   L         .         .         .
          8950.  C         .         I         .         .         .         .    WE   L         .         .         .
          9000.  C         .         I         .         .         .         .    WE   L         .         .
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          9150.  C         .         .I        .         .         .         .   WE   .L         .         .         .
          9200.  C         .         .I        .         .         .         .   WE   .L         .         .         .
          9250.  C         .         .I        .         .         .         .   WE   .L         .         .         .
          9300.  C         .         .I        .         .         .         .   WE   .L         .         .         .
          9350.  C         .         .I        .         .         .         .   WE   .L         .         .         .
          9400.  C         .         .I        .         .         .         .   W E  .L         .         .         .
          9450.  C         .         .I        .         .         .         .    WE  .L         .         .         .
58000.00  9500.  C         .         .I        .         .         .         .    WE  .L         .         .         .
          9550.  C         .         .I        .         .         .         .    WE  .L         .         .         .
          9600.  C         .         .I        .         .         .         .    WE  .L         .         .         .
          9650.  C         .         .I        .         .         .         .    WE  .L         .         .         .
          9700.  C         .         .I        .         .         .         .    WE  .L         .         .         .
          9750.  C         .         .I        .         .         .         .    WE  .L         .         .         .
          9800.  C         .         .I        .         .         .         .    WE  .L         .         .         .
          9850.  C         .         .I        .         .         .         .    WE  .L         .         .         .
          9900.  C         .         . I       .         .         .         .    WE  . L        .         .         .
          9950.  C         .         . I       .         .         .         .    WE  . L        .         .         .
         10000.  C         .         . I       .         .         .         .    WE  . L        .         .         .
         10050.  C         .         . I       .         .         .         .    WE  . L        .         .         .
         10100.  C         .         . I       .         .         .         .    WE  . L        .         .         .
         10150.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10200.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10250.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10300.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10350.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10400.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10450.  C         .         . I       .         .         .         .     WE . L        .         .         .
57000.00 10500.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10550.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10600.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10650.  C         .         . I       .         .         .         .     WE . L        .         .         .
         10700.  C         .         .  I      .         .         .         .     WE .  L       .         .         .
         10750.  C         .         .  I      .         .         .         .     WE .  L       .         .         .
         10800.  C         .         .  I      .         .         .         .     WE .  L       .         .         .
         10850.  C         .         .  I      .         .         .         .     WE .  L       .         .         .
         10900.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         10950.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11000.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11050.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11100.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11150.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11200.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11250.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11300.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11350.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11400.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
         11450.  C         .         .  I      .         .         .         .      WE.  L       .         .         .
56000.00 11500.  C         .         .   I     .         .         .         .      WE.   L      .         .         .
         11550.  C         .         .   I     .         .         .         .      WE.   L      .         .         .
         11600.  C         .         .   I     .         .         .         .       WE   L      .         .         .
         11650.  C         .         .   I     .         .         .         .       WE   L      .         .         .
         11700.  C         .         .   I     .         .         .         .       WE   L      .         .         .
         11750.  C         .         .   I     .         .         .         .       WE   L      .         .         .
         11800.  C         .         .   I     .         .         .         .       WE   L      .         .         .
         11850.  C         .         .   I     .         .         .         .       WE   L      .         .         .
         11900.  C         .         .   I     .         .         .         .       WE   L      .         .         .
         11950.  C         .         .   I     .         .         .         .       WE   L      .         .         .
55500.00 12000.  C         .         .   I     .         .         .         .       WE   L      .         .         .
55450.00 12050.  C         .         .   I     .         .         .         .       WE   L      .         .         .
55400.00 12100.  C         .         .   I     .         .         .         .       WE   L      .         .         .
55380.00 12150.  C         .         .   I     .         .         .         .      W E   L      .         .         .
55340.00 12200.  C         .         .   I     .         .         .         .      W .E  L      .         .         .
55320.00 12250.  C         .         .   I     .         .         .         .      W .E  L      .         .         .
55300.00 12300.  C         .         .   I     .         .         .         .     W  .E  L      .         .         .
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          9100.  C        .          .I        .         .         .         .   WE    .L        .         .         .
          9150.  C        .          .I        .         .         .         .   WE    .L        .         .         .
          9200.  C        .          .I        .         .         .         .   WE    .L        .         .         .
          9250.  C        .          .I        .         .         .         .   WE    .L        .         .         .
          9300.  C        .          .I        .         .         .         .   WE    .L        .         .         .
          9350.  C        .          .I        .         .         .         .   WE    .L        .         .         .
          9400.  C        .          .I        .         .         .         .   W E   .L        .         .         .
          9450.  C        .          .I        .         .         .         .    WE   .L        .         .         .
58000.00  9500.  C        .          .I        .         .         .         .    WE   .L        .         .         .
          9550.  C        .          .I        .         .         .         .    WE   .L        .         .         .
          9600.  C        .          .I        .         .         .         .    WE   .L        .         .         .
          9650.  C        .          .I        .         .         .         .    WE   .L        .         .         .
          9700.  C        .          .I        .         .         .         .    WE   .L        .         .         .
          9750.  C        .          .I        .         .         .         .    WE   .L        .         .         .
          9800.  C        .          .I        .         .         .         .    WE   .L        .         .         .
          9850.  C        .          .I        .         .         .         .    WE   .L        .         .         .
          9900.  C        .          . I       .         .         .         .    WE   . L       .         .         .
          9950.  C        .          . I       .         .         .         .    WE   . L       .         .         .
         10000.  C        .          . I       .         .         .         .    WE   . L       .         .         .
         10050.  C        .          . I       .         .         .         .    WE   . L       .         .         .
         10100.  C        .          . I       .         .         .         .    WE   . L       .         .         .
         10150.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10200.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10250.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10300.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10350.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10400.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10450.  C        .          . I       .         .         .         .     WE . L        .         .         .
57000.00 10500.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10550.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10600.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10650.  C        .          . I       .         .         .         .     WE . L        .         .         .
         10700.  C        .          .  I      .         .         .         .     WE .  L       .         .         .
         10750.  C        .          .  I      .         .         .         .     WE .  L       .         .         .
         10800.  C        .          .  I      .         .         .         .     WE .  L       .         .         .
         10850.  C        .          .  I      .         .         .         .     WE .  L       .         .         .
         10900.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         10950.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11000.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11050.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11100.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11150.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11200.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11250.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11300.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11350.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11400.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
         11450.  C        .          .  I      .         .         .         .      WE.  L       .         .         .
56000.00 11500.  C        .          .   I     .         .         .         .      WE.   L      .         .         .
         11550.  C        .          .   I     .         .         .         .      WE.   L      .         .         .
         11600.  C        .          .   I     .         .         .         .       WE   L      .         .         .
         11650.  C        .          .   I     .         .         .         .       WE   L      .         .         .
         11700.  C        .          .   I     .         .         .         .       WE   L      .         .         .
         11750.  C        .          .   I     .         .         .         .       WE   L      .         .         .
         11800.  C        .          .   I     .         .         .         .       WE   L      .         .         .
         11850.  C        .          .   I     .         .         .         .       WE   L      .         .         .
         11900.  C        .          .   I     .         .         .         .       WE   L      .         .         .
         11950.  C        .          .   I     .         .         .         .       WE   L      .         .         .
55500.00 12000.  C        .          .   I     .         .         .         .       WE   L      .         .         .
55450.00 12050.  C        .          .   I     .         .         .         .       WE   L      .         .         .
55400.00 12100.  C        .          .   I     .         .         .         .       WE   L      .         .         .
55380.00 12150.  C        .          .   I     .         .         .         .      W E   L      .         .         .
55340.00 12200.  C        .          .   I     .         .         .         .      W .E  L      .         .         .
55320.00 12250.  C        .          .   I     .         .         .         .      W .E  L      .         .         .
55300.00 12300.  C        .          .   I     .         .         .         .     W  .E  L      .         .         .
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                  C         .         .   I     .         .         .         .     W   .E  L     .         .         .
55240.00 12450.  C         .         .   I     .         .         .         .     W   . E L     .         .         .
55220.00 12500.  C         .         .  I      .         .         .         .     W   . EL      .         .         .
55200.00 12550.  C         .         . I       .         .         .         .    W    . E       .         .         .
55180.00 12600.  C         .         . I       .         .         .         .    W    . LE      .         .         .
55160.00 12650.  C         .         . I       .         .         .         .    W    . LE      .         .         .
55140.00 12700.  C         .         . I       .         .         .         .    W    .   E     .         .         L
55095.00 12750.  C         .         . I       .         .         .         .     W   .    E    .         .         L
55060.00 12800.  C         .         . I       .         .         .         .      W  . L   E   .         .         .
55000.00 12850.  C         .         . I       .         .         .         .      W  . L   E   .         .         .
         12900.  C         .         .  I      .         .         .         .      W  .  L  E   .         .         .
         12950.  C         .         .  I      .         .         .         .      W  .  L  E   .         .         .
         13000.  C         .         .  I      .         .         .         .       W .  L   E  .         .         .
         13050.  C         .         .  I      .         .         .         .       W .  L   E  .         .         .
         13100.  C         .         .   I     .         .         .         .       W .   L  E  .         .         .
         13150.  C         .         .   I     .         .         .         .       W .   L  E  .         .         .
54340.00 13200.  C         .         .    I    .         .         .         .        W.    L   E.         .         .
54260.00 13250.  C         .         .     I   .         .         .         .         .W    L  E.         .         .
         13300.  C         .         .     I   .         .         .         .         .W    L   E         .         .
         13350.  C         .         .     I   .         .         .         .         .W    L   E         .         .
         13400.  C         .         .     I   .         .         .         .         .W    L   E         .         .
         13450.  C         .         .      I  .         .         .         .         .W     L  E         .         .
54000.00 13500.  C         .         .      I  .         .         .         .         . W    L  .E        .         .
         13550.  C         .         .      I  .         .         .         .         . W    L  .E        .         .
         13600.  C         .         .      I  .         .         .         .         . W    L  .E        .         .
         13650.  C         .         .       I .         .         .         .         . W     L .E        .         .
         13700.  C         .         .       I .         .         .         .         . W     L .E        .         .
         13750.  C         .         .       I .         .         .         .         .  W    L . E       .         .
         13800.  C         .         .       I .         .         .         .         .  W    L . E       .         .
         13850.  C         .         .       I .         .         .         .         .  W    L . E       .         .
         13900.  C         .         .        I.         .         .         .         .  W     L. E       .         .
         13950.  C         .         .        I.         .         .         .         .  W     L. E       .         .
         14000.  C         .         .        I.         .         .         .         .  W     L.  E      .         .
         14050.  C         .         .        I.         .         .         .         .   W    L.  E      .         .
         14100.  C         .         .         I         .         .         .         .   W     L  E      .         .
         14150.  C         .         .         I         .         .         .         .   W     L  E      .         .
         14200.  C         .         .         I         .         .         .         .   W     L  E      .         .
         14250.  C         .         .         I         .         .         .         .   W     L   E     .         .
         14300.  C         .         .         .I        .         .         .         .    W    .L  E     .         .
         14350.  C         .         .         .I        .         .         .         .    W    .L  E     .         .
         14400.  C         .         .         .I        .         .         .         .    W    .L  E     .         .
         14450.  C         .         .         .I        .         .         .         .    W    .L  E     .         .
53000.00 14500.  C         .         .         .I        .         .         .         .    W    .L   E    .         .
         14550.  C         .         .         . I       .         .         .         .     W   . L  E    .         .
         14600.  C         .         .         . I       .         .         .         .     W   . L  E    .         .
         14650.  C         .         .         . I       .         .         .         .     W   . L  E    .         .
         14700.  C         .         .         . I       .         .         .         .     W   . L   E   .         .
         14750.  C         .         .         .  I      .         .         .         .     W   .  L  E   .         .
         14800.  C         .         .         .  I      .         .         .         .      W  .  L  E   .         .
         14850.  C         .         .         .  I      .         .         .         .      W  .  L  E   .         .
         14900.  C         .         .         .  I      .         .         .         .      W  .  L  E   .         .
         14950.  C         .         .         .  I      .         .         .         .      W  .  L   E  .         .
         15000.  C         .         .         .   I     .         .         .         .      W  .   L  E  .         .
         15050.  C         .         .         .   I     .         .         .         .       W .   L  E  .         .
         15100.  C         .         .         .   I     .         .         .         .       W .   L  E  .         .
         15150.  C         .         .         .   I     .         .         .         .       W .   L  E  .         .
         15200.  C         .         .         .    I    .         .         .         .       W .    L  E .         .
         15250.  C         .         .         .    I    .         .         .         .       W .    L  E .         .
         15300.  C         .         .         .    I    .         .         .         .        W.    L  E .         .
         15350.  C         .         .         .    I    .         .         .         .        W.    L  E .         .
         15400.  C         .         .         .    I    .         .         .         .        W.    L   E.         .
         15450.  C         .         .         .     I   .         .         .         .        W.     L  E.         .
52000.00 15500.  C         .         .         .     I   .         .         .         .        W.     L  E.         .
         15550.  C         .         .         .     I   .         .         .         .         W     L  E.         .
         15600.  C         .         .         .     I   .         .         .         .         W     L  E.         .
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            15750.  C      .       .       .  I  .       .       .       .      .W      L  E       .
            15800.  C      .       .       .  I  .       .       .       .      .W      L  E       .
            15850.  C      .       .       .  I  .       .       .       .      .W      L  .E      .
            15900.  C      .       .       .   I .       .       .       .      .W       L .E      .
            15950.  C      .       .       .   I .       .       .       .      .W       L .E      .
            16000.  C      .       .       .   I .       .       .       .      . W      L .E      .
            16050.  C      .       .       .   I .       .       .       .      . W      L .E      .
            16100.  C      .       .       .    I.       .       .       .      . W       L. E     .
            16150.  C      .       .       .    I.       .       .       .      . W       L. E     .
            16200.  C      .       .       .    I.       .       .       .      . W       L. E     .
            16250.  C      .       .       .    I.       .       .       .      .  W      L. E     .
            16300.  C      .       .       .    I.       .       .       .      .  W      L.  E    .
            16350.  C      .       .       .     I       .       .       .      .  W       L  E    .
            16400.  C      .       .       .     I       .       .       .      .  W       L  E    .
            16450.  C      .       .       .     I       .       .       .      .   W      L  E    .
   51000.00 16500.  C      .       .       .     I       .       .       .      .   W      L  E    .
            16550.  C      .       .       .     .I      .       .       .      .   W      .L  E   .
            16600.  C      .       .       .     .I      .       .       .      .   W      .L  E   .
            16650.  C      .       .       .     .I      .       .       .      .   W      .L  E   .
            16700.  C      .       .       .     .I      .       .       .      .    W     .L  E   .
            16750.  C      .       .       .     . I     .       .       .      .    W     . L  E  .
            16800.  C      .       .       .     . I     .       .       .      .    W     . L  E  .
            16850.  C      .       .       .     . I     .       .       .      .    W     . L  E  .
            16900.  C      .       .       .     . I     .       .       .      .     W    . L  E  .
            16950.  C      .       .       .     . I     .       .       .      .     W    . L  E  .
            17000.  C      .       .       .     .  I    .       .       .      .     W    .  L  E .
            17050.  C      .       .       .     .  I    .       .       .      .     W    .  L  E .
            17100.  C      .       .       .     .  I    .       .       .      .     W    .  L  E .
            17150.  C      .       .       .     .  I    .       .       .      .      W   .  L  E .
            17200.  C      .       .       .     .   I   .       .       .      .      W   .   L  E .
            17250.  C      .       .       .     .   I   .       .       .      .      W   .   L  E .
            17300.  C      .       .       .     .   I   .       .       .      .      W   .   L  E .
            17350.  C      .       .       .     .   I   .       .       .      .       W  .   L  E .
            17400.  C      .       .       .     .   I   .       .       .      .       W  .   L  E .
            17450.  C      .       .       .     .    I  .       .       .      .       W  .    L  E.
   50000.00 17500.  C      .       .       .     .    I  .       .       .      .       W  .    L  E.
            17550.  C      .       .       .     .    I  .       .       .      .       W  .    L  E.
            17600.  C      .       .       .     .    I  .       .       .      .        W.    L  E.
            17650.  C      .       .       .     .     I .       .       .      .        W.     L  E.
            17700.  C      .       .       .     .     I .       .       .      .        W.     L  E.
            17750.  C      .       .       .     .     I .       .       .      .        W.     L  E.
            17800.  C      .       .       .     .     I .       .       .      .        W.     L  E.
            17850.  C      .       .       .     .      I.       .       .      .         W      L E.
            17900.  C      .       .       .     .      I.       .       .      .         W      L  E
   49590.00 17950.  C      .       .       .     .      I.       .       .      .         W      L  E
1
 01/01/80    03:36:38                                                                   PAGE   14
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THIS RUN EXECUTED 01/01/80 03:39:36

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  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
  IBM-PC-XT VERSION
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

REACH 4 MODIFIED

SUMMARY PRINTOUT TABLE 130

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
67500.000	.00	.00	.00	306.60	6900.00	315.02	.00	315.36	5.13	4.68	1475.69	3045.43
67000.000	500.00	.00	.00	306.85	6900.00	315.28	.00	315.62	5.13	4.68	1475.69	3045.43
66000.000	1000.00	.00	.00	307.35	6900.00	315.79	.00	316.13	5.11	4.67	1478.35	3053.76
65000.000	1000.00	.00	.00	307.85	6900.00	316.30	.00	316.64	5.08	4.66	1480.71	3061.13
64000.000	1000.00	.00	.00	308.35	6900.00	316.81	.00	317.14	5.07	4.66	1481.74	3064.37
63000.000	1000.00	.00	.00	308.85	6900.00	317.32	.00	317.65	5.05	4.65	1483.35	3069.40
62700.000	300.00	.00	.00	309.00	6900.00	317.47	.00	317.80	5.04	4.65	1484.73	3073.73
62600.000	100.00	.00	.00	309.05	6900.00	317.59	.00	317.85	3.65	4.03	1714.09	3609.72
62000.000	600.00	.00	.00	309.20	6900.00	317.81	.00	318.06	3.55	3.99	1730.12	3661.39
61000.000	1000.00	.00	.00	309.45	6900.00	318.17	.00	318.41	3.41	3.93	1753.82	3738.19
60000.000	1000.00	.00	.00	309.70	6900.00	318.51	.00	318.74	3.29	3.89	1774.35	3805.14
59860.000	140.00	.00	.00	309.74	6900.00	318.56	.00	318.79	3.26	3.86	1785.95	3819.04
59800.000	60.00	322.80	319.70	309.76	6900.00	318.56	.00	318.79	3.27	3.87	1784.48	3814.27
59680.000	120.00	.00	.00	309.79	6900.00	318.60	.00	318.83	3.30	3.89	1772.89	3800.35
59650.000	30.00	324.00	319.97	309.80	6900.00	318.63	.00	318.86	3.27	3.88	1778.10	3817.38
59600.000	50.00	.00	.00	309.80	6500.00	318.67	.00	318.87	2.85	3.64	1788.13	3850.27
59000.000	600.00	.00	.00	309.95	6500.00	318.84	.00	319.04	2.83	3.63	1793.00	3866.26

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SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
58000.000	1000.00	.00	.00	310.20	6500.00	319.12	.00	319.33	2.79	3.61	1800.45	3890.74
57000.000	1000.00	.00	.00	310.45	6500.00	319.40	.00	319.60	2.76	3.60	1807.08	3912.58
56000.000	1000.00	.00	.00	310.70	6500.00	319.68	.00	319.88	2.73	3.59	1812.99	3932.09
55500.000	500.00	.00	.00	310.82	6500.00	319.81	.00	320.01	2.72	3.58	1814.90	3938.41
55450.000	50.00	.00	.00	310.83	6500.00	319.77	.00	320.03	6.09	4.09	1589.89	2634.91
55400.000	50.00	.00	.00	310.84	6500.00	319.72	.00	320.07	8.49	4.76	1364.42	2230.41
55380.000	20.00	.00	.00	310.85	6500.00	319.69	.00	320.09	9.75	5.07	1281.32	2081.32
55340.000	40.00	.00	.00	310.86	6500.00	319.61	.00	320.13	13.26	5.82	1116.04	1785.32
55320.000	20.00	.00	.00	310.87	6500.00	319.54	.00	320.16	15.86	6.31	1030.67	1632.08
55300.000	20.00	.00	.00	310.87	6500.00	319.46	.00	320.20	19.30	6.88	945.39	1479.72

55260.000	20.00	.00	.00	310.88	6500.00	319.29	.00	320.29	27.36	8.00	812.01	1242.69
55240.000	20.00	.00	.00	310.88	6500.00	319.16	.00	320.35	33.79	8.76	741.99	1118.23
55220.000	20.00	.00	.00	310.61	6500.00	319.13	.00	320.42	36.00	9.12	712.55	1083.27
55200.000	20.00	.00	.00	310.31	6500.00	319.07	.00	320.49	38.97	9.56	679.78	1041.27
55180.000	20.00	.00	.00	310.33	6500.00	319.06	.00	320.57	41.93	9.86	659.22	1003.82
55160.000	20.00	.00	.00	310.35	6500.00	319.05	.00	320.66	45.15	10.17	639.03	967.35
55140.000	20.00	.00	.00	310.36	6500.00	319.06	.00	320.75	48.12	10.46	621.61	937.01
55095.000	45.00	330.50	329.30	310.40	6500.00	319.26	.00	321.08	51.64	10.84	599.82	904.55
55060.000	35.00	.00	.00	310.44	6500.00	319.34	.00	321.14	8.14	10.78	603.06	2278.91
55000.000	60.00	.00	.00	310.49	6500.00	319.38	.00	321.19	8.14	10.78	603.07	2278.92
54340.000	660.00	.00	.00	311.08	6500.00	319.88	.00	321.74	8.44	10.92	595.27	2236.82
54260.000	80.00	328.90	325.90	311.15	6500.00	320.14	.00	321.89	7.84	10.64	610.84	2321.10
54000.000	260.00	.00	.00	311.38	6500.00	320.32	.00	322.10	8.00	10.71	606.72	2298.72
53000.000	1000.00	.00	.00	312.28	6500.00	321.06	.00	322.93	8.51	10.95	593.58	2227.70
52000.000	1000.00	.00	.00	313.18	6500.00	321.89	.00	323.79	8.79	11.07	586.93	2192.03

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
51000.000	1000.00	.00	.00	314.08	6500.00	322.75	.00	324.68	8.92	11.13	584.11	2176.90
50000.000	1000.00	.00	.00	314.98	6500.00	323.64	.00	325.57	8.92	11.13	584.11	2176.88
49590.000	410.00	.00	.00	315.36	6500.00	323.99	.00	325.94	9.08	11.20	580.35	2156.83

REACH 4 MODIFIED

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
67500.000	6900.00	315.02	.00	.00	.00	200.52	.00
67000.000	6900.00	315.28	.00	.26	.00	200.52	500.00
66000.000	6900.00	315.79	.00	.51	.00	200.60	1000.00
65000.000	6900.00	316.30	.00	.51	.00	200.67	1000.00
64000.000	6900.00	316.81	.00	.51	.00	200.70	1000.00
63000.000	6900.00	317.32	.00	.51	.00	200.75	1000.00

62700.000	6900.00	317.47	.00	.15	.00	200.79	300.00
62600.000	6900.00	317.59	.00	.13	.00	226.26	100.00
62000.000	6900.00	317.81	.00	.22	.00	226.69	600.00
61000.000	6900.00	318.17	.00	.35	.00	227.31	1000.00
60000.000	6900.00	318.51	.00	.34	.00	227.85	1000.00
59860.000	6900.00	318.56	.00	.05	.00	230.49	140.00
59800.000	6900.00	318.56	.00	.00	.00	230.45	60.00
59680.000	6900.00	318.60	.00	.04	.00	227.81	120.00
59650.000	6900.00	318.63	.00	.03	.00	227.95	30.00
59600.000	6500.00	318.67	.00	.04	.00	228.22	50.00
59000.000	6500.00	318.84	.00	.17	.00	228.34	600.00
58000.000	6500.00	319.12	.00	.28	.00	228.54	1000.00
57000.000	6500.00	319.40	.00	.28	.00	228.71	1000.00
56000.000	6500.00	319.68	.00	.28	.00	228.87	1000.00
55500.000	6500.00	319.81	.00	.14	.00	228.92	500.00
55450.000	6500.00	319.77	.00	-.04	.00	203.11	50.00
55400.000	6500.00	319.72	.00	-.06	.00	177.40	50.00
55380.000	6500.00	319.69	.00	-.03	.00	167.96	20.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
55340.000	6500.00	319.61	.00	-.08	.00	149.21	40.00
55320.000	6500.00	319.54	.00	-.06	.00	139.64	20.00
55300.000	6500.00	319.46	.00	-.08	.00	130.04	20.00
55280.000	6500.00	319.39	.00	-.07	.00	122.64	20.00
55260.000	6500.00	319.29	.00	-.10	.00	115.02	20.00
55240.000	6500.00	319.16	.00	-.14	.00	107.26	20.00
55220.000	6500.00	319.13	.00	-.03	.00	101.27	20.00
55200.000	6500.00	319.07	.00	-.05	.00	95.07	20.00
55180.000	6500.00	319.06	.00	-.01	.00	92.94	20.00
55160.000	6500.00	319.05	.00	-.01	.00	90.82	20.00
55140.000	6500.00	319.06	.00	.00	.00	88.82	20.00
55095.000	6500.00	319.26	.00	.20	.00	85.43	45.00

55000.000	6500.00	319.38	.00	.05	.00	85.58	60.00
54340.000	6500.00	319.88	.00	.50	.00	85.22	660.00
54260.000	6500.00	320.14	.00	.25	.00	85.95	80.00
54000.000	6500.00	320.32	.00	.18	.00	85.75	260.00
53000.000	6500.00	321.06	.00	.75	.00	85.14	1000.00
52000.000	6500.00	321.89	.00	.82	.00	84.83	1000.00
51000.000	6500.00	322.75	.00	.87	.00	84.69	1000.00
50000.000	6500.00	323.64	.00	.89	.00	84.69	1000.00
49590.000	6500.00	323.99	.00	.34	.00	84.52	410.00

SUMMARY OF ERRORS AND SPECIAL NOTES

THIS RUN EXECUTED 01/01/80 03:39:55

```
**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
  IBM-PC-XT VERSION
**************************************************
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ARIZONA RWCD R4

JT 11/19/84 Lmt 2/35

Low DROP 4

CHECK HYDRAULICS

MSLD

Eqn. 11

$$\frac{Y_M}{Y_c} = 0.68\left(\frac{H}{Y_c}\right)^{-0.19}$$

$H = 3.35$

$Y_c = 6.21$

$$Y_M = 6.21(0.68)\left(\frac{3.35}{6.21}\right)^{-0.19}$$

$$Y_M = 4.75 \quad V$$

$$F = V/\sqrt{gh}$$

$$= 17.75/\sqrt{32.16(4.75)}$$

$F = 1.44$

$A \approx 4.75(2.5(4.75)+10)$

$= 388.74$

$V = 6900/388 = 17.75$

PER BEST FIT EQN: (7)

$$Y_2 = Y_M(-0.36 + 1.47F_M)$$

$$= 4.75(-0.36 + 1.47(1.44))$$

$$= 5.32 \text{ ft} \quad \text{OK}$$

ARIZONA RWCD REACH 4

DT 11/19/84 LM4 2/85

LOW DROP 5/

SUMMARY:

SS: 2.5:1

B: 70

* W_{SB}: 140

L_B: 35

L_{SB}: 72.5

X_B: 36.25

Y_c: 6.21

Y_{SB}: 9.56 USE → 9.5

Y_b: 2.00

H_b: 6.21 USE → 6.0

H: 3.35

Depth = 6.65

* W_{SB} MAY BE REDUCED TO = B WITH NO BAD EFFECT ON THE PERFORMANCE. SEE LAYOUT ✓

from "STILLING BASIN DESIGN FOR LOW DROP STRUCTURES"

by W. CAMPBELL LITTLE

ASAE PAPER 83-2115

6/83

ARIZONA RWCD R4

DT 11/19/84 YMK 2/85

LOW DROP 1

PROBLEM: DEVELOP DIMENSIONS FOR DROP STRUCTURE USDA PUBLICATION STREAM CHANNEL STABILITY APPENDIX B "MODEL STUDY OF THE LOW DROP GRADIENT CONTROL STRUCTURES"

ANALYSIS: 1. $Q = 6900$ CFS ✓
$H = 3.35$ FT

2. CRITERIA

WIDTH $W_{SB} = 2B$

LENGTH $X_b/Y_c = 3.54 + 4.26\ (H/Y_c)$

DEPTH $Y_{SB} = 1.0\ Y_c + H$

SS 2.5:1 TO 2.0:1

BAFFLE LENGTH $L_B = B/2$

BAFFLE HEIGHT $H_B = Y_c$

HEIGHT OF BAFF ABOVE WEIR CR. $Y_c/4 \leq Y_b \leq Y_c/3$

ARIZONA RWCD R4

DT 11/19/84 YMK 2/86

LOW DROP 2

1. DETERMINE WEIR CREST LENGTH

Try crest length that will provide H= Normal depth in channel upstream.

D = 8.48

TRAPEZOIDAL WEIR

$$Q = CLH^{3/2} + CZH^{5/2}$$

$$L = \frac{Q - CZH^{5/2}}{CH^{3/2}}$$

$$= \frac{6900 - 3.1(2.5)(8.48)^{5/2}}{3.1(8.48)^{3/2}}$$

$$= 68.94$$

TRY 70 FT WEIR

2. FIND Y_c:

$Y_c = 6.21$ ✓

Check $Q = \left(\frac{gA^3}{T}\right)^{1/2}$

$$= \left(\frac{32.16(531)^3}{101.05}\right)^{1/2}$$

$= 6902$ ✓

$A = bd + zd^2$
$= 70(6.4) + 2.5(6.4)$
$= 531$

$T = b + 2zd$
$= 70 + 2(2.5)(6.4)$
$= 101.05$

$$V_c = \frac{6900}{531} = 13.0 \text{ ft/s}$$

ARIZONA RWCD R4
DT 11/19/84 2M4 2/85
LOW DROP 3

3. WIDTH (1.0 to 2.0) B is OK Alt

$W_{SB} = 2B = 2(70) = 140$

4. LENGTH

$X_b = 3.54 y_c + 4.26 H$

$= 3.54(6.21) + 4.26(3.35)$

$= 21.98 + 14.27$

$X_b = 36.25$ ✓

$L_{SB} = 2X_b = \underline{72.5 FT}$ ✓

5. DEPTH:

$W_{SB} = D = y_c + H = 6.21 + 3.35 = \underline{9.56 FT}$ ✓

6. BAFFLE HEIGHT $H_b = y_c = 6.21$ ✓

7. HEIGHT OF BAFFLE ABOVE WEIR CR: $y_c/4 \leq y_b \leq y_c/3$

$1.55' \; y_b \leq 2.07$ ✓

USE 2.0

8. BAFFLE LENGTH = $B/2 = 70/2 = 35 FT$ ✓

ARIZONA
DT
11/29/84
RWCD RCH 4
=/85
WSP (S OF LOW CROP

WEIR CREST

SUB
STA.=675+00.00
Q=6,900.00 CFS
BW=70.00 FT
Z=2.50:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.150
CB-EL.=1,306.64 FT
WS-EL.=1,312.35 FT
EGL-EL.=1,315.47 FT
D=6.210 FT
V=12.992 F/S
DC=6.205 FT
VC=13.004 F/S
FR=0.999

1306.61

SUB
STA.=674+80.00
Q=6,900.00 CFS
BW=77.00 FT
Z=2.90:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.150
CB-EL.=1,306.65 FT
WS-EL.=1,314.33 FT
EGL-EL.=1,315.73 FT
EGL-S=0.0031115 F/F
D=7.680 FT
V=9.506 F/S
DC=6.014 FT
VC=12.770 F/S
FR=0.670

SUB
STA.=674+90.00
Q=6,900.00 CFS
BW=70.00 FT
Z=2.70:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.150
CB-EL.=1,306.65 FT
WS-EL.=1,313.90 FT
EGL-EL.=1,315.65 FT
EGL-S=0.0049235 F/F
D=7.257 FT
V=10.613 F/S
DC=6.169 FT
VC=12.908 F/S
FR=0.766

SUB
STA.=674+70.00
Q=6,900.00 CFS
BW=100.00 FT
Z=2.90:1
N=0.027
Scb=0.0005 F/F
a=1.000
k=0.150
CB-EL.=1,306.68 FT
WS-EL.=1,315.22 FT
EGL-EL.=1,315.87 FT
EGL-S=0.0010466 F/F
D=8.563 FT
V=6.455 F/S
DC=5.026 FT
VC=11.982 F/S
FR=0.426

ARIZONA
DT 11/29/84 RWCD R4 SMT 2/85

STA.=67+50.00
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=0.150
CB-EL.=1,306.66 FT
WS-EL.=1,315.63 FT
EGL-EL.=1,315.93 FT
EGL-S=0.0007188 F/F
D=8.972 FT
V=4.347 F/S
DC=3.928 FT
VC=10.858 F/S
FR=0.275

WEIR EQN.
D = 8.42 FT
B = 70
Z = 2.5
C = 3.1
Q = 6896

ARIZONA DT

RWCD R4

11/29/04

WSP U.S. 60 NEAR @ 675+08 50

$Q = 6900$

$b = 70$

$z = 2.5$

$d_c = 6.21$

	STA	b	z	d	INV EL
CL	675+08 50	70	2.5	6.21	1306.64
	674+90 40	70	2.7		
	80 30	73	2.8		
	70 20	100	2.9		
	60 10	150	3.0		

ARIZ RWCD R4

DT 11/26/84 LMF 2/85

LOW DROP

PROBLEM: THE LOW DROP CRITERIA WERE REFINED IN THE PAPER

"STILLING BASIN DESIGN FOR LOW DROP STRUCTURES. ASAE P 83-2115"

CHECK BASIN DIMENSIONS

ANALYSIS:

1. THE PAPER PROVIDES FOR A RECTANGULAR BASIN SHAPE TO SIMPLIFY CONSTRUCTION LAYOUT.

2. THE OPTIMUM BAFFLE LOCATION IS PROVIDED BY:

$$\frac{X_b}{Y_c} = 3.65 + 4.04\left(\frac{H}{Y_c}\right)$$

$$X_b = 3.65 Y_c + 4.04 H \quad \checkmark$$

(THE COEFFICIENTS ARE SLIGHTLY DIFFERENT THAN IN THE ORIGINAL PAPER)

3. PERFORMANCE OF THE STRUCTURE REMAINED THE SAME FOR BOTTOM WIDTHS FOR THE RANGE OF $W_B/B = 1.0$ TO 2.0

ARIZ RDXCD R4

JT 11/26/84

LOW DROP

SOLUTION:

1. Use $W_{SB} = 70$ $(W/B = 1.0)$

2. $X_b = 3.65 Y_c + 4.04 H$

$= 3.65(6.21) + 4.04(3.35)$

$X_b = 36.2$ FT

RWCD R-4, Ag. Low Drop STA 675+50

LMS 2/85

Objective: Analyze alternative design to "low drop with baffle" to one based on Calif. Low Drop design.

design criteria: 1. Stable flow condition - Basic hydraulics

design procedure 1. Size weir to minimize upstream drawdown
2. Chute and basin geometry based on WSP and jump basin length per Monograph 25 (Surec).

Weir crest:
Trapezodial $Q = CLH^{3/2} + ZCH^{5/2}$

use $Z = 2$
$C = 3.5$ (Kings)

Upstream channel Hydraulics
$d_n \simeq 3.5$ SS = 3:1
$b = 150$ Q = 6900 cfs
$S = 0.0005$
$n = 0.027$

For $L = 60$
$Q = 6488$ cfs

$L = 65$
$Q = 7112$

RWCD R4
LMS 2/85

Low Drop STA 675+50

Provide transition inlet similar to design by Thackeray 11/84

Chute to diverge no ~~faster greater~~ than 12°

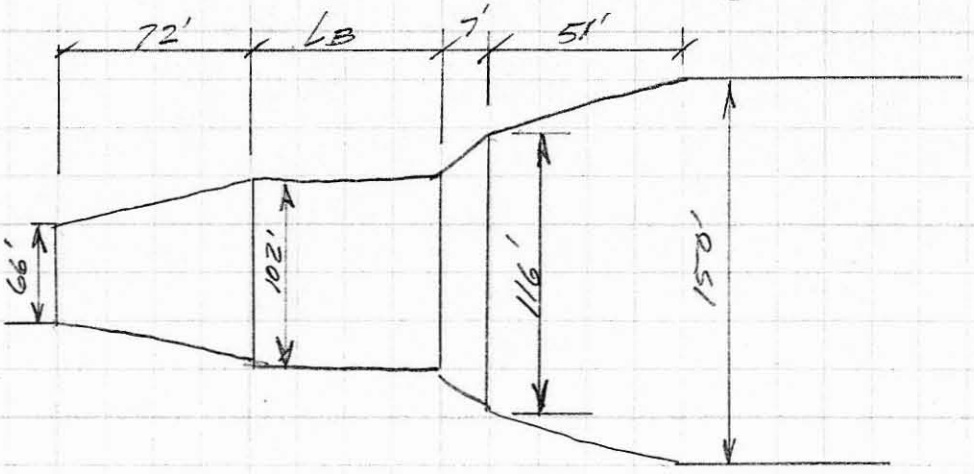
Try Weir crest L=65
Chute slope 10% ± Length 80'
divergence 4:1

WSP (see attached Computer Runs)

d. @ 3.5 feet vert. downslope = 3.3'
∴ Total fall = 3.5 + 3.3 = 6.8
Use F = 7.0'

Length of transition = $\frac{7}{0.1}$ = 70'
4:1 divergence $\frac{70}{4}$ = 17.5'

Try length of transition = 72'
F = 7.0'
b(crest) = 66'
b(invert) = 102'



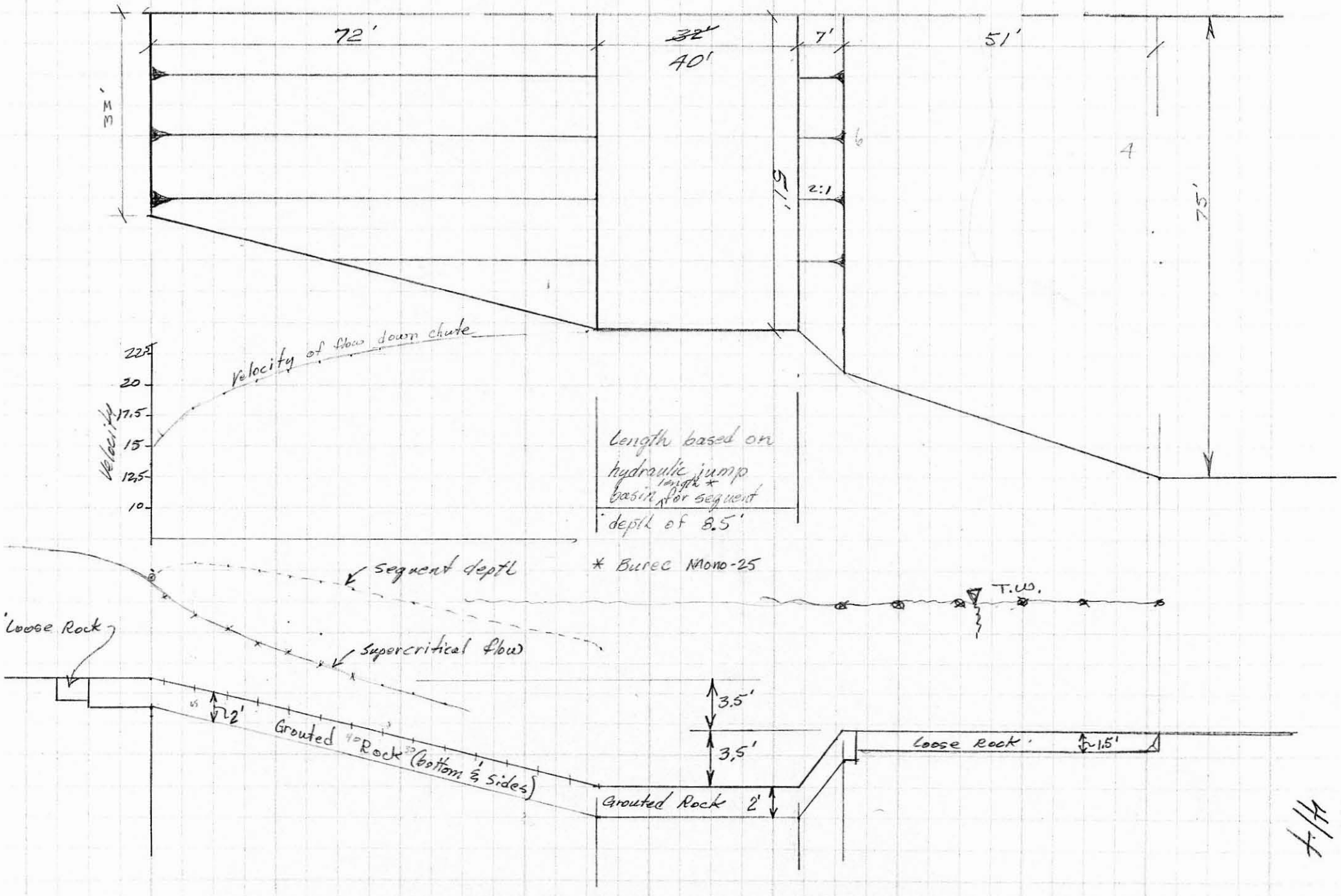
L_B = Basin length

use Mono-25 (Burns)

$F = 2.75$

$L_B = (5)(8.5) = 42.5$

Use $L_B = 40$ End sill will shorten basin length required.


72'
32'
40'
7'
51'
75'
2:1
Velocity of flow down chute
Velocity
22.5
20
17.5
15
12.5
10
Length based on hydraulic jump basin for sequent depth of 8.5'
* Length * Bureau Mono-25
Sequent depth
T.W.
Loose Rock
Supercritical flow
2'
Grouted Rock (bottom & sides)
3.5'
3.5'
Grouted Rock 2'
Loose Rock 1.5'

~~A-2~~ - 1 RWCD R-4 Drop @ STA 675+50

4M5 / 2/85

Cost Analysis & Comparison

"Calif. Drop" versus "low drop with baffle"

Structure layout are similar ∴ following assumptions can be made:

1. Inlet section to crest of weir is identical
2. Outlet ds. of basin are the same
3. Chute length and basin length for Calif. drop is longer). Base cost comparison on only these sections.

Calif. Drop (use 2.5 side slopes)

~~Tan~~ Chute – Grouted Rock

A at crest = (66)(2) + (2)(27)(2) = 240 ft²/ft
A at invert = (102)(2) + (2)(32)(2) = 332 ft²/ft

572 / 2 = 286 ft²/ft

$V_c = (286)(72) \div 27 = 763$ yd³

Basin

A = (102)(2) + (2)(32)(2) = 332

$V = (332)(40) = \frac{13,280}{27} = 492$ yd³

TOTAL 1255 yd³

Low Drop w/ Baffle

A at crest = (70)(2) + (2)(27)(2) = 248
A at invert = (86)(2) + (2)(54)(2) = 388

388 / 2 = 318 ft²/ft

$V = \frac{(318)(36)}{27} = 424$ yd³

A2 - RWCD R-4 Low Drop @ STA 675+50 2/2
LMS 2/85

Basin

$A = 388$

$V = (388)\frac{(\pi 27)}{27} = 388\ yd^3$

TOTAL = 812 yd^3 grouted Rock

Baffle Wall

$V = \frac{(35)}{27}(6.25)\left(\frac{15"}{12}\right) = 10\ yd^3$ concrete

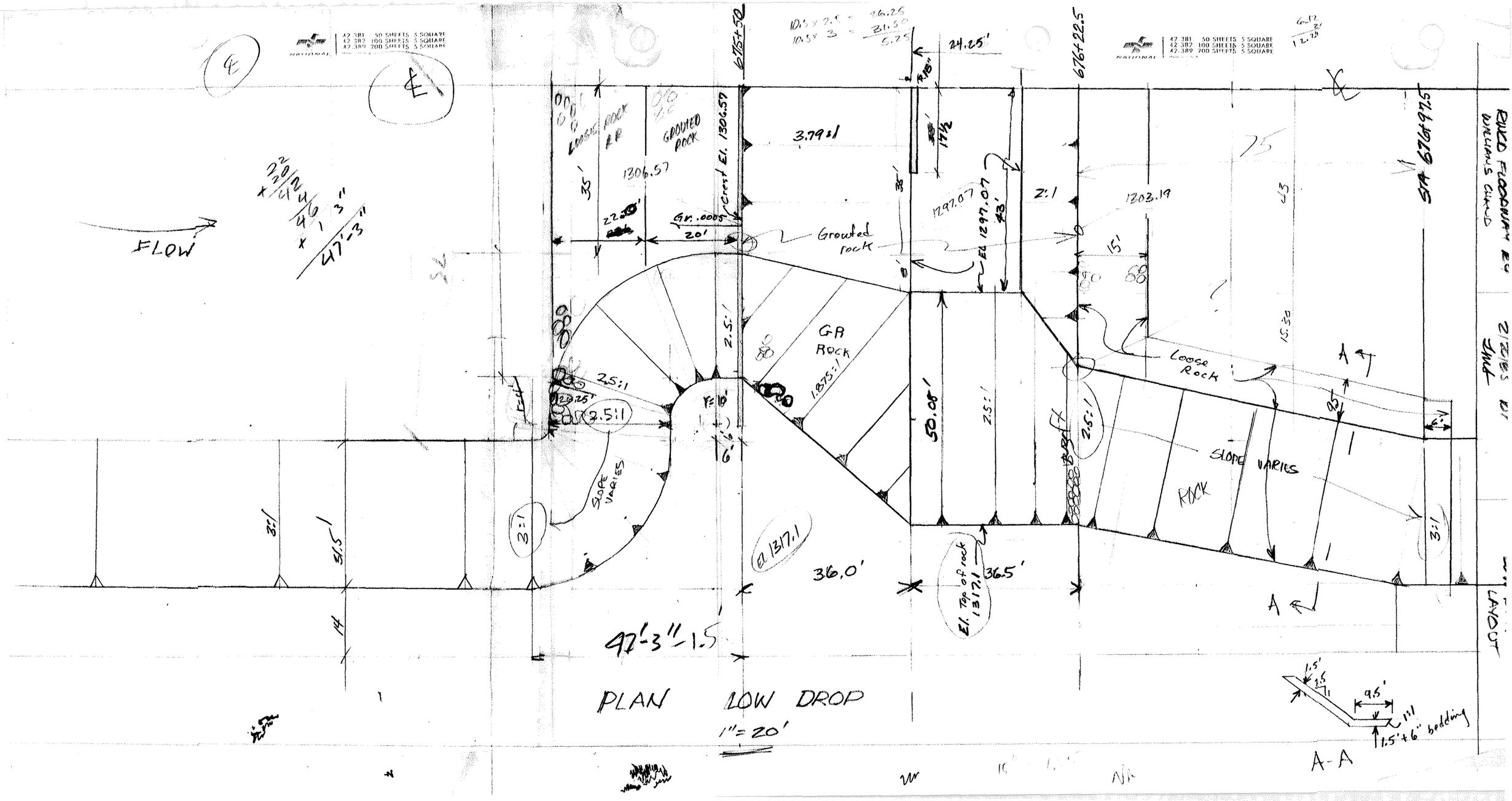
Support Wall on concrete Columns
Assume 20' depth below basin ∴ L = 30'
3 required 1.5' DIA

$V = (3)\frac{\pi(1.5)^2}{4}\frac{(30)}{27} = 5.9$ cu. yd.^{3}

	ITEM	Unit	Quantity	Unit Cost	~~Cost~~
CALIF. Drop	GROUTED Rock	cu yd.	1255	50 *	62,750
Low Drop w/Baffle	Grouted Rock	cu yd	812	50 *	40,600
	R/C Concrete (Baffle - includes Steel)	cu yd	10	350 *	3500
	R/C Concrete Columns - includes drilling	cu yd	6	600	3600
				Total	47,700

* Reference Reach 3 bid prices

⇒ Conclusion: Low Drop with Baffle will be used
1. Apparent lower cost
2. Performance backed up by hydraulic research
3. Baffle provides additional measure of erosion protection


FLOW
47'-3"
Loose Rock
GROUTED ROCK
1306.57
Crest El. 1306.59
3.79:1
35'
22.50'
Gr. .0005
20'
Grouted rock
2.5:1
GR ROCK
1.875:1
2.5:1
2.5:1
2.5:1
2.5:1
2.5:1
SLOPE VARIES
3:1
3:1
3:1
3:1
El 1317.1
36.0'
47'-3"-1.5
PLAN LOW DROP
1"=20'
6775+50
6764+22.5
24.25'
1297.07
El 1297.07
43'
1303.19
50.08'
Loose Rock
SLOPE VARIES
ROCK
36.5'
El. Top of rock 1317.1
A
A
1.5'
9.5'
1:1
1.5'+6" bedding
A-A
RWCD FLOODWAY E
WILLIAMS CHNL
LAYOUT

HEC2 Q10 Final 2/26/05 675+00 to 555+00

THIS RUN EXECUTED 01/01/80 03:58:51

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**************************************************
  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
  IBM-PC-XT VERSION
**************************************************

T1 RWCD REACH4 Q=1670CFS
T2 WATER SURFACE PROFILE
T3 RWCD REACH 4 MODIFIED 10 YEAR DISCHARGE

J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

        0.         0.         0.         0.    .000000        .00        .2     1670.    310.270       .000

J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

      -1.000       .000       .000       .000       .000       .000       .000       .000       .000       .000


NC        .027       .027       .027       .000       .000       .000       .000       .000       .000       .000
X1   67500.000      4.000       .000    210.000       .000       .000       .000       .000       .000       .000
GR     316.600       .000    306.600     30.000    306.600    180.000    316.600    210.000       .000       .000

X1   67000.000       .000       .000       .000    500.000    500.000    500.000       .000       .250       .000

X1   66000.000       .000       .000       .000   1000.000   1000.000   1000.000       .000       .500       .000

X1   65000.000       .000       .000       .000   1000.000   1000.000   1000.000       .000       .500       .000

X1   64000.000       .000       .000       .000   1000.000   1000.000   1000.000       .000       .500       .000

X1   63000.000       .000       .000       .000   1000.000   1000.000   1000.000       .000       .500       .000

X1   62700.000       .000       .000       .000    300.000    300.000    300.000       .000       .150       .000

X1   62600.000      4.000       .000    235.000    100.000    100.000    100.000       .000       .000       .000
GR     319.050       .000    309.050     30.000    309.050    205.000    319.050    235.000       .000       .000

X1   62000.000       .000       .000       .000    600.000    600.000    600.000       .000       .150       .000

X1   61000.000       .000       .000       .000   1000.000   1000.000   1000.000       .000       .250       .000

X1   60000.000      4.000       .000    235.000   1000.000   1000.000   1000.000       .000       .000       .000
GR     319.700       .000    309.700     30.000    309.700    205.000    319.700    235.000       .000       .000

X1   59860.000      6.000      1.000    240.000    140.000    140.000    140.000       .000       .000       .000
GR     322.700       .000    319.900      1.000    309.740     32.000    309.740    207.000    319.900    240.000
GR     322.700    241.000       .000       .000       .000       .000       .000       .000       .000       .000
1
  01/01/80     03:58:50                                                                                PAGE     2


SB        .900      1.600      2.800       .000    175.000      4.000   2055.000      3.000    309.750    309.740
```

BT	2.000	7575.000	322.700	319.700	7810.000	322.200	319.700	.000	.000	.000
X1	59680.000	4.000	.000	235.000	120.000	120.000	120.000	.000	.000	.000
GR	319.790	.000	309.790	30.000	309.790	205.000	319.790	235.000	.000	.000
SB	1.050	1.560	2.800	270.000	175.000	15.000	2202.000	3.000	309.800	309.790
X1	59650.000	.000	.000	.000	30.000	30.000	30.000	.000	.010	.000
X2	.000	.000	1.000	319.970	324.000	.000	.000	1.800	.000	.000
X1	59600.000	4.000	.000	235.000	50.000	50.000	50.000	.000	.000	.000
X2	1620.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
GR	319.800	.000	309.800	30.000	309.800	205.000	319.800	235.000	.000	.000
X1	59000.000	.000	.000	.000	600.000	600.000	600.000	.000	.150	.000
X1	58000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.250	.000
X1	57000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.250	.000
X1	56000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.250	.000
X1	55500.000	4.000	.000	235.000	500.000	500.000	500.000	.000	.000	.000
GR	320.820	.000	310.820	30.000	310.820	205.000	320.820	235.000	.000	.000
NC	.035	.035	.035	.000	.000	.000	.000	.000	.000	.000
X1	55450.000	4.000	.000	209.100	50.000	50.000	50.000	.000	.000	.000
GR	320.830	.000	310.830	28.400	310.830	180.800	320.830	209.100	.000	.000
X1	55400.000	4.000	.000	183.400	50.000	50.000	50.000	.000	.000	.000
GR	320.840	.000	310.840	26.700	310.840	156.700	320.840	183.400	.000	.000
X1	55380.000	4.000	.000	174.000	20.000	20.000	20.000	.000	.000	.000
GR	320.850	.000	310.850	26.000	310.850	148.000	320.850	174.000	.000	.000
X1	55340.000	4.000	.000	155.400	40.000	40.000	40.000	.000	.000	.000
GR	320.860	.000	310.860	24.700	310.860	130.700	320.860	155.400	.000	.000
X1	55320.000	4.000	.000	146.000	20.000	20.000	20.000	.000	.000	.000
GR	320.870	.000	310.870	24.000	310.870	122.000	320.870	146.000	.000	.000
X1	55300.000	4.000	.000	136.600	20.000	20.000	20.000	.000	.000	.000
GR	320.870	.000	310.870	23.300	310.870	113.300	320.870	136.600	.000	.000
X1	55280.000	4.000	.000	129.400	20.000	20.000	20.000	.000	.000	.000
GR	320.880	.000	310.880	22.700	310.880	106.700	320.880	129.400	.000	.000

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X1	55260.000	4.000	.000	122.000	20.000	20.000	20.000	.000	.000	.000
GR	320.880	.000	310.880	22.000	310.880	100.000	320.880	122.000	.000	.000
X1	55240.000	4.000	.000	114.600	20.000	20.000	20.000	.000	.000	.000
GR	320.880	.000	310.880	21.300	310.880	93.300	320.880	114.600	.000	.000
X1	55220.000	4.000	.000	107.400	20.000	20.000	20.000	.000	.000	.000
GR	320.610	.000	310.610	20.700	310.610	86.700	320.610	107.400	.000	.000
X1	55200.000	4.000	.000	100.000	20.000	20.000	20.000	.000	.000	.000
GR	320.310	.000	310.310	20.000	310.310	80.000	320.310	100.000	.000	.000
X1	55180.000	4.000	.000	98.000	20.000	20.000	20.000	.000	.000	.000
GR	320.330	.000	310.330	20.000	310.330	78.000	320.330	98.000	.000	.000

X1	55140.000	4.000	.000	126.000	20.000	20.000	20.000	.000	.000	.000
GR	328.360	.000	310.360	36.000	310.360	90.000	328.360	126.000	.000	.000
SB	1.250	1.600	2.800	120.000	54.000	1.300	1560.000	2.000	310.400	310.360
X1	55095.000	4.000	.000	122.000	45.000	45.000	45.000	.000	.000	.000
X2	.000	.000	1.000	329.300	330.500	.000	.000	2.000	.000	.000
GR	328.400	.000	310.400	36.000	310.400	86.000	328.400	122.000	.000	.000
NC	.014	.014	.014	.000	.000	.000	.000	.000	.000	.000
X1	55060.000	4.000	.000	90.000	35.000	35.000	35.000	.000	.000	.000
GR	320.440	.000	310.440	20.000	310.440	70.000	320.440	90.000	.000	.000
X1	55000.000	.000	.000	.000	60.000	60.000	60.000	.000	.050	.000
X1	54340.000	.000	.000	.000	660.000	660.000	660.000	.000	.590	.000
SB	1.250	1.500	2.900	100.000	50.000	1.300	1100.000	2.000	311.400	311.330
X1	54260.000	.000	.000	.000	80.000	80.000	80.000	.000	.070	.000
X2	.000	.000	1.000	325.900	328.900	.000	.000	1.330	.000	.000
X1	54000.000	.000	.000	.000	260.000	260.000	260.000	.000	.230	.000
X1	53000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.900	.000
X1	52000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.900	.000
X1	51000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.900	.000
X1	50000.000	.000	.000	.000	1000.000	1000.000	1000.000	.000	.900	.000

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X1	49590.000	4.000	.000	90.000	410.000	410.000	410.000	.000	.000	.000
GR	325.360	.000	315.360	20.000	315.360	70.000	325.360	90.000	.000	.000
EJ	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

*SECNO 67500.000

67500.00	3.67	310.27	.00	310.27	310.39	.12	.00	.00	316.60
1670.	0.	1670.	0.	0.	591.	0.	0.	0.	316.60
.00	.00	2.83	.00	.027	.027	.027	.000	306.60	18.99
.000513	0.	0.	0.	0	0	0	.00	172.02	191.01

0

*SECNO 67000.000

67000.00	3.68	310.53	.00	.00	310.65	.12	.26	.00	316.85
1670.	0.	1670.	0.	0.	591.	0.	7.	2.	316.85
.05	.00	2.83	.00	.027	.027	.027	.000	306.85	18.99
.000513	500.	500.	500.	0	0	0	.00	172.02	191.01

0

*SECNO 66000.000

66000.00	3.69	311.04	.00	.00	311.16	.12	.51	.00	317.35

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      .15       .00      2.82       .00      .027      .027      .027      .000    307.35     18.95
   .000507    1000.     1000.     1000.         1         0         0       .00    172.10    191.05
0
 *SECNO 65000.000
  65000.00      3.69    311.54       .00       .00    311.67       .12       .51       .00    317.85
     1670.         0.    1670.         0.        0.     594.         0.       34.       10.    317.85
       .25       .00      2.81       .00      .027      .027      .027      .000    307.85     18.94
   .000505    1000.     1000.     1000.         0         0         0       .00    172.13    191.06
0
 *SECNO 64000.000
  64000.00      3.70    312.05       .00       .00    312.17       .12       .50       .00    318.35
     1670.         0.    1670.         0.        0.     595.         0.       48.       14.    318.35
       .35       .00      2.81       .00      .027      .027      .027      .000    308.35     18.92
   .000502    1000.     1000.     1000.         0         0         0       .00    172.17    191.08
0
 *SECNO 63000.000
  63000.00      3.70    312.55       .00       .00    312.67       .12       .50       .00    318.85
     1670.         0.    1670.         0.        0.     596.         0.       61.       18.    318.85
       .44       .00      2.80       .00      .027      .027      .027      .000    308.85     18.90
   .000500    1000.     1000.     1000.         0         0         0       .00    172.19    191.10
0
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  01/01/80    03:58:50                                                                  PAGE     6

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

 *SECNO 62700.000
  62700.00      3.70    312.70       .00       .00    312.82       .12       .15       .00    319.00
     1670.         0.    1670.         0.        0.     596.         0.       65.       19.    319.00
       .47       .00      2.80       .00      .027      .027      .027      .000    309.00     18.90
   .000500     300.      300.      300.         0         0         0       .00    172.20    191.10
0
 *SECNO 62600.000
  62600.00      3.72    312.77       .00       .00    312.86       .09       .04       .00    319.05
     1670.         0.    1670.         0.        0.     693.         0.       67.       19.    319.05
       .49       .00      2.41       .00      .027      .027      .027      .000    309.05     18.83
   .000362     100.      100.      100.         2         0         0       .00    197.34    216.17
0
 *SECNO 62000.000
  62000.00      3.79    312.99       .00       .00    313.07       .09       .21       .00    319.20
     1670.         0.    1670.         0.        0.     706.         0.       77.       22.    319.20
       .56       .00      2.37       .00      .027      .027      .027      .000    309.20     18.64
   .000341     600.      600.      600.         2         0         0       .00    197.73    216.36
0
 *SECNO 61000.000
  61000.00      3.87    313.32       .00       .00    313.40       .08       .33       .00    319.45
     1670.         0.    1670.         0.        0.     722.         0.       93.       27.    319.45
       .68       .00      2.31       .00      .027      .027      .027      .000    309.45     18.39
   .000317    1000.     1000.     1000.         2         0         0       .00    198.22    216.61
0
 *SECNO 60000.000
  60000.00      3.93    313.63       .00       .00    313.71       .08       .31       .00    319.70
     1670.         0.    1670.         0.        0.     735.         0.      110.       31.    319.70
       .80       .00      2.27       .00      .027      .027      .027      .000    309.70     18.20
   .000301    1000.     1000.     1000.         2         0         0       .00    198.59    216.80
0
 *SECNO 59860.000
  59860.00      3.93    313.67       .00       .00    313.75       .08       .04       .00    319.90
     1670.         0.    1670.         0.        0.     737.         0.      112.       32.    319.90
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.60	2.80	.00	175.00	4.00	2055.00	3.00	309.75	309.74

*SECNO 59800.000
CLASS A LOW FLOW

3420 BRIDGE W.S.= 313.68 BRIDGE VELOCITY=, 2.32 CALCULATED CHANNEL AREA=, 718.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD
.00	313.76	.00	0.	1670.	2055.	1998.	319.70	322.80

59800.00	3.92	313.68	.00	.00	313.76	.08	.00	.00	319.92
1670.	0.	1670.	0.	0.	734.	0.	113.	32.	319.92
.82	.00	2.28	.00	.000	.027	.000	.000	309.76	20.05
.000304	60.	60.	60.	0	0	0	.00	199.67	219.72

0
*SECNO 59680.000

59680.00	3.92	313.71	.00	.00	313.79	.08	.04	.00	319.79
1670.	0.	1670.	0.	0.	731.	0.	115.	33.	319.79
.84	.00	2.28	.00	.027	.027	.027	.000	309.79	18.25
.000305	120.	120.	120.	0	0	0	.00	198.50	216.75

0

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.05	1.56	2.80	270.00	175.00	15.00	2202.00	3.00	309.80	309.79

*SECNO 59650.000
CLASS A LOW FLOW

3420 BRIDGE W.S.= 313.70 BRIDGE VELOCITY=, 2.49 CALCULATED CHANNEL AREA=, 670.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD
.00	313.80	.01	0.	1670.	2202.	1937.	319.97	324.00

59650.00	3.92	313.72	.00	.00	313.80	.08	.01	.00	319.80
1670.	0.	1670.	0.	0.	732.	0.	116.	33.	319.80
.84	.00	2.28	.00	.000	.027	.000	.000	309.80	18.24
.000304	30.	30.	30.	0	0	0	.00	198.53	216.76

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA

SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 59600.000									
59600.00	3.94	313.74	.00	.00	313.82	.08	.01	.00	319.80
1620.	0.	1620.	0.	0.	736.	0.	116.	33.	319.80
.85	.00	2.20	.00	.027	.027	.027	.000	309.80	18.17
.000281	50.	50.	50.	2	0	0	.00	198.65	216.83
0									
*SECNO 59000.000									
59000.00	3.96	313.91	.00	.00	313.98	.07	.17	.00	319.95
1620.	0.	1620.	0.	0.	738.	0.	127.	36.	319.95
.92	.00	2.19	.00	.027	.027	.027	.000	309.95	18.15
.000279	600.	600.	600.	1	0	0	.00	198.71	216.85
0									
*SECNO 58000.000									
58000.00	3.99	314.19	.00	.00	314.26	.07	.27	.00	320.20
1620.	0.	1620.	0.	0.	745.	0.	144.	40.	320.20
1.05	.00	2.17	.00	.027	.027	.027	.000	310.20	18.04
.000270	1000.	1000.	1000.	2	0	0	.00	198.92	216.96
0									
*SECNO 57000.000									
57000.00	4.01	314.46	.00	.00	314.53	.07	.27	.00	320.45
1620.	0.	1620.	0.	0.	747.	0.	161.	45.	320.45
1.18	.00	2.17	.00	.027	.027	.027	.000	310.45	18.01
.000268	1000.	1000.	1000.	1	0	0	.00	198.98	216.99
0									
*SECNO 56000.000									
56000.00	4.02	314.72	.00	.00	314.79	.07	.27	.00	320.70
1620.	0.	1620.	0.	0.	751.	0.	178.	49.	320.70
1.31	.00	2.16	.00	.027	.027	.027	.000	310.70	17.96
.000264	1000.	1000.	1000.	1	0	0	.00	199.09	217.04
0									
*SECNO 55500.000									
55500.00	4.03	314.85	.00	.00	314.93	.07	.13	.00	320.82
1620.	0.	1620.	0.	0.	754.	0.	187.	52.	320.82
1.37	.00	2.15	.00	.027	.027	.027	.000	310.82	17.92
.000261	500.	500.	500.	1	0	0	.00	199.17	217.08
0									
1									

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 55450.000									
55450.00	4.02	314.85	.00	.00	314.94	.09	.02	.00	320.83
1620.	0.	1620.	0.	0.	660.	0.	187.	52.	320.83
1.38	.00	2.46	.00	.035	.035	.035	.000	310.83	16.96
.000577	50.	50.	50.	1	0	0	.00	175.24	192.20
0									
*SECNO 55400.000									
55400.00	4.01	314.85	.00	.00	314.98	.13	.03	.00	320.84
1620.	0.	1620.	0.	0.	565.	0.	188.	52.	320.84
1.38	.00	2.87	.00	.035	.035	.035	.000	310.84	15.98
.000798	50.	50.	50.	1	0	0	.00	151.44	167.42
0									
*SECNO 55380.000									
55380.00	4.00	314.85	.00	.00	315.00	.14	.02	.00	320.85
1620.	0.	1620.	0.	0.	571.	0.	188.	52.	320.85

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0
 *SECNO 55340.000
  55340.00      3.99    314.85      .00      .00    315.04      .19      .04      .00   320.86
     1620.        0.      1620.       0.       0.      463.       0.      189.      52.    320.86
      1.39       .00       3.50      .00     .035     .035     .035     .000   310.86    14.83
  .001216        40.        40.      40.        1        0        0      .00   125.73   140.57
0
 *SECNO 55320.000
  55320.00      3.97    314.84      .00      .00    315.06      .22      .03      .00   320.87
     1620.        0.      1620.       0.       0.      428.       0.      189.      52.    320.87
      1.39       .00       3.79      .00     .035     .035     .035     .000   310.87    14.45
  .001438        20.        20.      20.        1        0        0      .00   117.10   131.55
0
 *SECNO 55300.000
  55300.00      3.96    314.83      .00      .00    315.09      .26      .03      .00   320.87
     1620.        0.      1620.       0.       0.      394.       0.      189.      52.    320.87
      1.39       .00       4.11      .00     .035     .035     .035     .000   310.87    14.05
  .001712        20.        20.      20.        0        0        0      .00   108.50   122.55
0
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  01/01/80     03:58:50                                                              PAGE    10

     SECNO      DEPTH     CWSEL     CRIWS     WSELK      EG         HV         HL       OLOSS     BANK ELEV
     Q          QLOB      QCH       QROB      ALOB       ACH        AROB       VOL      TWA     LEFT/RIGHT
     TIME       VLOB      VCH       VROB      XNL        XNCH       XNR        WTN      ELMIN       SSTA
     SLOPE      XLOBL     XLCH      XLOBR     ITRIAL     IDC        ICONT      CORAR    TOPWID      ENDST

 *SECNO 55280.000
  55280.00      3.95    314.83      .00      .00    315.13      .30      .04      .00   320.88
     1620.        0.      1620.       0.       0.      368.       0.      189.      53.    320.88
      1.39       .00       4.40      .00     .035     .035     .035     .000   310.88    13.72
  .001986        20.        20.      20.        1        0        0      .00   101.96   115.68
0
 *SECNO 55260.000
  55260.00      3.95    314.83      .00      .00    315.17      .35      .04      .00   320.88
     1620.        0.      1620.       0.       0.      342.       0.      189.      53.    320.88
      1.39       .00       4.73      .00     .035     .035     .035     .000   310.88    13.31
  .002312        20.        20.      20.        0        0        0      .00    95.38   108.69
0
 *SECNO 55240.000
  55240.00      3.94    314.82      .00      .00    315.22      .40      .05      .00   320.88
     1620.        0.      1620.       0.       0.      317.       0.      190.      53.    320.88
      1.39       .00       5.10      .00     .035     .035     .035     .000   310.88    12.89
  .002716        20.        20.      20.        0        0        0      .00    88.81   101.71
0
 *SECNO 55220.000
  55220.00      4.27    314.88      .00      .00    315.28      .40      .05      .00   320.61
     1620.        0.      1620.       0.       0.      320.       0.      190.      53.    320.61
      1.40       .00       5.06      .00     .035     .035     .035     .000   310.61    11.85
  .002456        20.        20.      20.        2        0        0      .00    83.69    95.55
0
 *SECNO 55200.000
  55200.00      4.62    314.93      .00      .00    315.32      .40      .05      .00   320.31
     1620.        0.      1620.       0.       0.      320.       0.      190.      53.    320.31
      1.40       .00       5.06      .00     .035     .035     .035     .000   310.31    10.76
  .002265        20.        20.      20.        2        0        0      .00    78.48    89.24
0
 *SECNO 55180.000
  55180.00      4.62    314.95      .00      .00    315.37      .42      .05      .00   320.33
     1620.        0.      1620.       0.       0.      310.       0.      190.      53.    320.33
      1.40       .00       5.22      .00     .035     .035     .035     .000   310.33    10.77
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 55160.000

55160.00	4.62	314.97	.00	.00	315.42	.45	.05	.00	320.35
1620.	0.	1620.	0.	0.	301.	0.	190.	53.	320.35
1.40	.00	5.38	.00	.035	.035	.035	.000	310.35	10.77
.002589	20.	20.	20.	0	0	0	.00	74.47	85.23

0

VOID

*SECNO 55140.000

55140.00	4.64	315.00	.00	.00	315.47	.48	.05	.00	328.36
1620.	0.	1620.	0.	0.	293.	0.	190.	53.	328.36
1.40	.00	5.53	.00	.035	.035	.035	.000	310.36	26.74
.002748	20.	20.	20.	1	0	0	.00	72.51	99.26

0

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.60	2.80	120.00	54.00	1.30	1560.00	2.00	310.40	310.36

*SECNO 55095.000
CLASS A LOW FLOW

3420 BRIDGE W.S.= 314.99 BRIDGE VELOCITY=, 5.67 CALCULATED CHANNEL AREA=, 284.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD
.00	315.58	.04	0.	1620.	1560.	1710.	329.30	330.50

55095.00	4.64	315.04	.00	.00	315.58	.54	.10	.00	328.40
1620.	0.	1620.	0.	0.	275.	0.	191.	53.	328.40
1.40	.00	5.89	.00	.000	.035	.000	.000	310.40	26.72
.003150	45.	45.	45.	0	0	0	.00	68.56	95.28

0

VOID

*SECNO 55060.000

55060.00	4.63	315.07	.00	.00	315.61	.54	.04	.00	320.44
1620.	0.	1620.	0.	0.	275.	0.	191.	53.	320.44
1.40	.00	5.89	.00	.014	.014	.014	.000	310.44	10.72
.000504	35.	35.	35.	0	0	0	.00	68.56	79.28

0

*SECNO 55000.000

55000.00	4.61	315.10	.00	.00	315.64	.55	.03	.00	320.49
1620.	0.	1620.	0.	0.	273.	0.	191.	53.	320.49
1.41	.00	5.94	.00	.014	.014	.014	.000	310.49	10.79
.000516	60.	60.	60.	2	0	0	.00	68.43	79.21

0
1

01/01/80 03:58:50

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 54340.000

1.44	.00	6.41	.00	.014	.014	.014	.000	311.08	11.38
.000649	660.	660.	660.	2	0	0	.00	67.25	78.62

0

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.90	100.00	50.00	1.30	1100.00	2.00	311.40	311.33

*SECNO 54260.000
CLASS A LOW FLOW

3420 BRIDGE W.S.= 315.36 BRIDGE VELOCITY=, 7.15 CALCULATED CHANNEL AREA=, 224.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD
.00	316.10	.08	0.	1620.	1100.	1127.	325.90	328.90

54260.00	4.32	315.47	.00	.00	316.10	.64	.08	.00	321.15
1620.	0.	1620.	0.	0.	253.	0.	196.	54.	321.15
1.44	.00	6.40	.00	.000	.014	.000	.000	311.15	11.37
.000646	80.	80.	80.	0	0	0	.00	67.27	78.63

0
*SECNO 54000.000

54000.00	4.23	315.61	.00	.00	316.28	.67	.17	.00	321.38
1620.	0.	1620.	0.	0.	247.	0.	197.	55.	321.38
1.45	.00	6.55	.00	.014	.014	.014	.000	311.38	11.54
.000693	260.	260.	260.	2	0	0	.00	66.93	78.46

0
*SECNO 53000.000

VOID

53000.00	4.00	316.28	.00	.00	317.04	.76	.76	.00	322.28
1620.	0.	1620.	0.	0.	232.	0.	203.	56.	322.28
1.49	.00	6.98	.00	.014	.014	.014	.000	312.28	11.99
.000838	1000.	1000.	1000.	2	0	0	.00	66.02	78.01

0
*SECNO 52000.000

52000.00	3.93	317.11	.00	.00	317.90	.79	.86	.00	323.18
1620.	0.	1620.	0.	0.	228.	0.	208.	58.	323.18
1.53	.00	7.12	.00	.014	.014	.014	.000	313.18	12.13
.000890	1000.	1000.	1000.	2	0	0	.00	65.74	77.87

0
1

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

VOID

*SECNO 51000.000

51000.00	3.92	318.00	.00	.00	318.79	.79	.89	.00	324.08
1620.	0.	1620.	0.	0.	227.	0.	213.	59.	324.08
1.57	.00	7.13	.00	.014	.014	.014	.000	314.08	12.14
.000894	1000.	1000.	1000.	1	0	0	.00	65.72	77.86

0
*SECNO 50000.000

50000.00	3.92	318.90	.00	.00	319.69	.79	.90	.00	324.98
1620.	0.	1620.	0.	0.	227.	0.	218.	61.	324.98
1.61	.00	7.14	.00	.014	.014	.014	.000	314.98	12.15
.000898	1000.	1000.	1000.	0	0	0	.00	65.70	77.85

0

1620.	0.	1620.	0.	0.	226.	0.	221.	61.	325.36	
1.62	.00	7.16	.00	.014	.014	.014	.000	315.36	12.18	
.000909	410.	410.	410.	1	0	0	.00	65.64	77.82	

0
1 VOID

PROFILE FOR STREAM REACH 4 MODIFIED 10 YEAR

PLOTTED POINTS (BY PRIORITY)-E-ENERGY,W-WATER SURFACE,I-INVERT,C-CRITICAL W.S.,L-LEFT BANK,R-RIGHT BANK,M-LOWER END STA

ELEVATION	306.	308.	310.	312.	314.	316.	318.	320.	322.	324.
SECNO	CUMDIS									
67500.00	0. C I	.	.	.WE	.	.	. L	.	.	.
	50. C I	.	.	.WE	.	.	. L	.	.	.
	100. C I	.	.	. E	.	.	. L	.	.	.
	150. C I	.	.	. E	.	.	. L	.	.	.
	200. C I	.	.	. E	.	.	. L	.	.	.
	250. C I	.	.	. WE	.	.	. L	.	.	.
	300. C I	.	.	. WE	.	.	. L	.	.	.
	350. C I	.	.	. WE	.	.	. L	.	.	.
	400. C I	.	.	. WE	.	.	. L	.	.	.
	450. C I	.	.	. WE	.	.	. L	.	.	.
67000.00	500. C I	.	.	. E	.	.	. L	.	.	.
	550. C I	.	.	. E	.	.	. L	.	.	.
	600. C I	.	.	. WE	.	.	. L	.	.	.
	650. C I	.	.	. WE	.	.	. L	.	.	.
	700. C I	.	.	. WE	.	.	. L	.	.	.
	750. C I	.	.	. WE	.	.	. L	.	.	.
	800. C I	.	.	. WE	.	.	. L	.	.	.
	850. C I	.	.	. WE	.	.	. L	.	.	.
	900. C I	.	.	. E	.	.	. L	.	.	.
	950. C I	.	.	. E	.	.	. L	.	.	.
	1000. C I	.	.	. WE	.	.	. L	.	.	.
	1050. C I	.	.	. WE	.	.	. L	.	.	.
	1100. C I	.	.	. WE	.	.	. L	.	.	.
	1150. C I	.	.	. WE	.	.	. L	.	.	.
	1200. C I	.	.	. WE	.	.	. L	.	.	.
	1250. C I	.	.	. E	.	.	. L	.	.	.
	1300. C I	.	.	. E	.	.	. L	.	.	.
	1350. C I	.	.	. E	.	.	. L	.	.	.
	1400. C I	.	.	. WE	.	.	. L	.	.	.
	1450. C I	.	.	. WE	.	.	. L	.	.	.
66000.00	1500. C I	.	.	. WE	.	.	. L	.	.	.
	1550. C I	.	.	. WE	.	.	. L	.	.	.
	1600. C I	.	.	. WE	.	.	. L	.	.	.
	1650. C I	.	.	. E	.	.	. L	.	.	.
	1700. C I	.	.	. E	.	.	. L	.	.	.
	1750. C I	.	.	. E	.	.	. L	.	.	.
	1800. C I	.	.	. WE	.	.	. L	.	.	.
	1850. C I	.	.	. WE	.	.	. L	.	.	.
	1900. C I	.	.	. WE	.	.	. L	.	.	.
	1950. C I	.	.	. WE	.	.	. L	.	.	.
	2000. C I	.	.	. WE	.	.	. L	.	.	.
	2050. C I	.	.	. E	.	.	. L	.	.	.
	2100. C I	.	.	. E	.	.	. L	.	.	.
	2150. C I	.	.	. E	.	.	. L	.	.	.
	2200. C I	.	.	. WE	.	.	. L	.	.	.
	2250. C I	.	.	. WE	.	.	. L	.	.	.
	2300. C I	.	.	. WE	.	.	. L	.	.	.
	2350. C I	.	.	. WE	.	.	. L	.	.	.
	2400. C I	.	.	. WE	.	.	. L	.	.	.

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          2550.  C        I.         .       E .         .         .        L.         .         .         .         .
          2600.  C        I.         .       WE.         .         .        L.         .         .         .         .
          2650.  C         I         .       WE.         .         .         L         .         .         .         .
          2700.  C         I         .       WE.         .         .         L         .         .         .         .
          2750.  C         I         .       WE.         .         .         L         .         .         .         .
          2800.  C         I         .       WE.         .         .         L         .         .         .         .
          2850.  C         I         .        E.         .         .         L         .         .         .         .
          2900.  C         I         .        E.         .         .         L         .         .         .         .
          2950.  C         I         .        E.         .         .         L         .         .         .         .
          3000.  C         .I        .        WE         .         .         .L        .         .         .         .
          3050.  C         .I        .        WE         .         .         .L        .         .         .         .
          3100.  C         .I        .        WE         .         .         .L        .         .         .         .
          3150.  C         .I        .        WE         .         .         .L        .         .         .         .
          3200.  C         .I        .        WE         .         .         .L        .         .         .         .
          3250.  C         .I        .         E         .         .         .L        .         .         .         .
          3300.  C         .I        .         E         .         .         .L        .         .         .         .
          3350.  C         .I        .         E         .         .         .L        .         .         .         .
          3400.  C         . I       .         WE        .         .         . L       .         .         .         .
          3450.  C         . I       .         WE        .         .         . L       .         .         .         .
64000.00  3500.  C         . I       .         WE        .         .         . L       .         .         .         .
          3550.  C         . I       .         WE        .         .         . L       .         .         .         .
          3600.  C         . I       .         WE        .         .         . L       .         .         .         .
          3650.  C         . I       .         .E        .         .         . L       .         .         .         .
          3700.  C         . I       .         .E        .         .         . L       .         .         .         .
          3750.  C         . I       .         .E        .         .         . L       .         .         .         .
          3800.  C         .  I      .         .WE       .         .         .  L      .         .         .         .
          3850.  C         .  I      .         .WE       .         .         .  L      .         .         .         .
          3900.  C         .  I      .         .WE       .         .         .  L      .         .         .         .
          3950.  C         .  I      .         .WE       .         .         .  L      .         .         .         .
          4000.  C         .  I      .         .WE       .         .         .  L      .         .         .         .
          4050.  C         .  I      .         . E       .         .         .  L      .         .         .         .
          4100.  C         .  I      .         . E       .         .         .  L      .         .         .         .
          4150.  C         .  I      .         . E       .         .         .  L      .         .         .         .
          4200.  C         .   I     .         . WE      .         .         .   L     .         .         .         .
          4250.  C         .   I     .         . WE      .         .         .   L     .         .         .         .
          4300.  C         .   I     .         . WE      .         .         .   L     .         .         .         .
          4350.  C         .   I     .         . WE      .         .         .   L     .         .         .         .
          4400.  C         .   I     .         . WE      .         .         .   L     .         .         .         .
          4450.  C         .   I     .         .  E      .         .         .   L     .         .         .         .
63000.00  4500.  C         .   I     .         .  E      .         .         .   L     .         .         .         .
          4550.  C         .   I     .         .  E      .         .         .   L     .         .         .         .
          4600.  C         .   I     .         .  WE     .         .         .   L     .         .         .         .
          4650.  C         .    I    .         .  WE     .         .         .    L    .         .         .         .
          4700.  C         .    I    .         .  WE     .         .         .    L    .         .         .         .
          4750.  C         .    I    .         .  WE     .         .         .    L    .         .         .         .
62700.00  4800.  C         .    I    .         .   E     .         .         .    L    .         .         .         .
          4850.  C         .    I    .         .   E     .         .         .    L    .         .         .         .
62600.00  4900.  C         .    I    .         .   E     .         .         .    L    .         .         .         .
          4950.  C         .    I    .         .   E     .         .         .    L    .         .         .         .
          5000.  C         .    I    .         .   E     .         .         .    L    .         .         .         .
          5050.  C         .    I    .         .   WE    .         .         .    L    .         .         .         .
          5100.  C         .     I   .         .   WE    .         .         .     L   .         .         .         .
          5150.  C         .     I   .         .   WE    .         .         .     L   .         .         .         .
          5200.  C         .     I   .         .   WE    .         .         .     L   .         .         .         .
          5250.  C         .     I   .         .   WE    .         .         .     L   .         .         .         .
          5300.  C         .     I   .         .    E    .         .         .     L   .         .         .         .
          5350.  C         .     I   .         .    E    .         .         .     L   .         .         .         .
          5400.  C         .     I   .         .    E    .         .         .     L   .         .         .         .
          5450.  C         .     I   .         .    E    .         .         .     L   .         .         .         .
62000.00  5500.  C         .     I   .         .    E    .         .         .     L   .         .         .         .
          5550.  C         .     I   .         .    E    .         .         .     L   .         .         .         .
          5600.  C         .     I   .         .    WE   .         .         .     L   .         .         .         .
          5650.  C         .     I   .         .    WE   .         .         .     L   .         .         .         .
          5700.  C         .     I   .         .    WE   .         .         .     L   .         .         .         .
          5750.  C               I                  WE                             L
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           5800.  C     .    I    .      .  WE  .      .      .   L  .      .      .      .
           5850.  C     .    I    .      .   E  .      .      .   L  .      .      .      .
           5900.  C     .     I   .      .   E  .      .      .    L .      .      .      .
           5950.  C     .     I   .      .   E  .      .      .    L .      .      .      .
           6000.  C     .     I   .      .   E  .      .      .    L .      .      .      .
           6050.  C     .     I   .      .   E  .      .      .    L .      .      .      .
           6100.  C     .     I   .      .   E  .      .      .    L .      .      .      .
           6150.  C     .     I   .      .   E  .      .      .    L .      .      .      .
           6200.  C     .     I   .      .  WE  .      .      .    L .      .      .      .
           6250.  C     .     I   .      .  WE  .      .      .    L .      .      .      .
           6300.  C     .     I   .      .  WE  .      .      .    L .      .      .      .
           6350.  C     .     I   .      .  WE  .      .      .    L .      .      .      .
           6400.  C     .     I   .      .  WE  .      .      .    L .      .      .      .
           6450.  C     .     I   .      .    E .      .      .    L .      .      .      .
61000.00   6500.  C     .     I   .      .    E .      .      .    L .      .      .      .
           6550.  C     .     I   .      .    E .      .      .    L .      .      .      .
           6600.  C     .     I   .      .    E .      .      .    L .      .      .      .
           6650.  C     .     I   .      .    E .      .      .    L .      .      .      .
           6700.  C     .      I  .      .    E .      .      .     L.      .      .      .
           6750.  C     .      I  .      .    E .      .      .     L.      .      .      .
           6800.  C     .      I  .      .    E .      .      .     L.      .      .      .
           6850.  C     .      I  .      .   WE .      .      .     L.      .      .      .
           6900.  C     .      I  .      .   WE .      .      .     L.      .      .      .
           6950.  C     .      I  .      .   WE .      .      .     L.      .      .      .
           7000.  C     .      I  .      .   WE .      .      .     L.      .      .      .
           7050.  C     .      I  .      .   WE .      .      .     L.      .      .      .
           7100.  C     .      I  .      .     E.      .      .     L.      .      .      .
           7150.  C     .      I  .      .     E.      .      .     L.      .      .      .
           7200.  C     .      I  .      .     E.      .      .     L.      .      .      .
           7250.  C     .      I  .      .     E.      .      .     L.      .      .      .
           7300.  C     .      I  .      .     E.      .      .     L.      .      .      .
           7350.  C     .      I  .      .     E.      .      .     L.      .      .      .
           7400.  C     .      I  .      .     E.      .      .     L.      .      .      .
           7450.  C     .      I  .      .     E.      .      .     L.      .      .      .
60000.00   7500.  C     .       I.      .     WE.      .      .      L.     .      .      .
           7550.  C     .       I.      .     WE.      .      .      L.   M .      .      .
           7600.  C     .       I.      .     WE.      .      .      L.     M.      .      .
59860.00   7650.  C     .       I.      .     WE.      .      .      L.     .   M  .      .
59800.00   7700.  C     .       I.      .     WE.      .      .       L     .   M  .      .
           7750.  C     .       I.      .     WE.      .      .      L.   M .      .      .
           7800.  C     .       I.      .      E.      .      .      L.M    .      .      .
59680.00   7850.  C     .       I.      .      E.      .      .      L.     .      .      .
59650.00   7900.  C     .       I.      .      E.      .      .      L.     .      .      .
59600.00   7950.  C     .       I.      .      E.      .      .      L.     .      .      .
           8000.  C     .       I.      .      E.      .      .      L.     .      .      .
           8050.  C     .       I.      .      E.      .      .      L.     .      .      .
           8100.  C     .       I.      .      E.      .      .      L.     .      .      .
           8150.  C     .       I.      .      E.      .      .      L.     .      .      .
           8200.  C     .       I.      .      E.      .      .      L.     .      .      .
           8250.  C     .       I.      .      WE      .      .      L.     .      .      .
           8300.  C     .       I.      .      WE      .      .      L.     .      .      .
           8350.  C     .       I.      .      WE      .      .      L.     .      .      .
           8400.  C     .        I      .      WE      .      .       L     .      .      .
           8450.  C     .        I      .      WE      .      .       L     .      .      .
59000.00   8500.  C     .        I      .      WE      .      .       L     .      .      .
           8550.  C     .        I      .       E      .      .       L     .      .      .
           8600.  C     .        I      .       E      .      .       L     .      .      .
           8650.  C     .        I      .       E      .      .       L     .      .      .
           8700.  C     .        I      .       E      .      .       L     .      .      .
           8750.  C     .        I      .       E      .      .       L     .      .      .
           8800.  C     .        I      .       E      .      .       L     .      .      .
           8850.  C     .        I      .       E      .      .       L     .      .      .
           8900.  C     .        I      .       E      .      .       L     .      .      .
           8950.  C     .        I      .       WE     .      .       L     .      .      .
```

	9150.	C	I	WE	L
	9200.	C	I	E	L
	9250.	C	I	E	L
	9300.	C	I	E	L
	9350.	C	I	E	L
	9400.	C	I	E	L
	9450.	C	I	E	L
58000.00	9500.	C	I	E	L
	9550.	C	I	E	L
	9600.	C	I	E	L
	9650.	C	I	WE	L
	9700.	C	I	WE	L
	9750.	C	I	WE	L
	9800.	C	I	WE	L
	9850.	C	I	WE	L
	9900.	C	I	WE	L
	9950.	C	I	E	L
	10000.	C	I	E	L
	10050.	C	I	E	L
	10100.	C	I	E	L
	10150.	C	I	E	L
	10200.	C	I	E	L
	10250.	C	I	E	L
	10300.	C	I	E	L
	10350.	C	I	E	L
	10400.	C	I	WE	L
	10450.	C	I	WE	L
57000.00	10500.	C	I	WE	L
	10550.	C	I	WE	L
	10600.	C	I	WE	L
	10650.	C	I	WE	L
	10700.	C	I	E	L
	10750.	C	I	E	L
	10800.	C	I	E	L
	10850.	C	I	E	L
	10900.	C	I	E	L
	10950.	C	I	E	L
	11000.	C	I	E	L
	11050.	C	I	E	L
	11100.	C	I	E	L
	11150.	C	I	E	L
	11200.	C	I	WE	L
	11250.	C	I	WE	L
	11300.	C	I	WE	L
	11350.	C	I	WE	L
	11400.	C	I	WE	L
	11450.	C	I	WE	L
56000.00	11500.	C	I	E	L
	11550.	C	I	E	L
	11600.	C	I	E	L
	11650.	C	I	E	L
	11700.	C	I	E	L
	11750.	C	I	E	L
	11800.	C	I	E	L
	11850.	C	I	E	L
	11900.	C	I	WE	L
	11950.	C	I	WE	L
55500.00	12000.	C	I	WE	L
55450.00	12050.	C	I	WE	L
55400.00	12100.	C	I	WE	L
55380.00	12150.	C	I	WE	L
55340.00	12200.	C	I	WE	L
55320.00	12250.	C	I	WE	L
55300.00	12300.	C	I	WE	L
55280.00	12350.	C	I	W E	L

```
55260.00 12400.  C          .     .   I     .     .  W E   .     .     .   L     .     .     .
55240.00 12450.  C          .     .   I     .     .  W E   .     .     .   L     .     .     .
55220.00 12500.  C          .     .  I      .     .  W E   .     .     .  L      .     .     .
55200.00 12550.  C          .     . I       .     .   W E  .     .     . L       .     .     .
55180.00 12600.  C          .     . I       .     .   W E  .     .     . L       .     .     .
55160.00 12650.  C          .     . I       .     .   W E  .     .     . L       .     .     .
55140.00 12700.  C          .     . I       .     .   W E  .     .     .         .     .     L
55095.00 12750.  C          .     . I       .     .   W  E .     .     .         .     .     L
55060.00 12800.  C          .     . I       .     .   W  E .     .     . L       .     .     .
55000.00 12850.  C          .     . I       .     .    W E .     .     . L       .     .     .
         12900.  C          .     .  I      .     .    W E .     .     .  L      .     .     .
         12950.  C          .     .  I      .     .    W E .     .     .  L      .     .     .
         13000.  C          .     .  I      .     .    W  E.     .     .  L      .     .     .
         13050.  C          .     .  I      .     .    W  E.     .     .  L      .     .     .
         13100.  C          .     .   I     .     .    W  E.     .     .   L     .     .     .
         13150.  C          .     .   I     .     .    W  E.     .     .   L     .     .     .
54340.00 13200.  C          .     .    I    .     .     W  E     .     .    L    .     .     .
54260.00 13250.  C          .     .     I   .     .     W  .E    .     .     L   .     .     .
         13300.  C          .     .     I   .     .     W  .E    .     .     L   .     .     .
         13350.  C          .     .     I   .     .      W .E    .     .     L   .     .     .
         13400.  C          .     .     I   .     .      W .E    .     .     L   .     .     .
         13450.  C          .     .      I  .     .      W .E    .     .      L  .     .     .
54000.00 13500.  C          .     .      I  .     .      W .E    .     .      L  .     .     .
         13550.  C          .     .      I  .     .      W . E   .     .      L  .     .     .
         13600.  C          .     .      I  .     .      W . E   .     .      L  .     .     .
         13650.  C          .     .       I .     .       W. E   .     .       L .     .     .
         13700.  C          .     .       I .     .       W. E   .     .       L .     .     .
         13750.  C          .     .       I .     .       W. E   .     .       L .     .     .
         13800.  C          .     .       I .     .       W.  E  .     .       L .     .     .
         13850.  C          .     .       I .     .       W.  E  .     .       L .     .     .
         13900.  C          .     .        I.     .       W.  E  .     .        L.     .     .
         13850.  C          .     .       I .     .      W.  E   .     .      L .     .     .
         13900.  C          .     .        I.     .      W.  E   .     .       L.     .     .
         13950.  C          .     .        I.     .       W  E   .     .       L.     .     .
         14000.  C          .     .        I.     .       W  E   .     .       L.     .     .
         14050.  C          .     .        I.     .       W  E   .     .       L.     .     .
         14100.  C          .     .         I     .       W   E  .     .        L     .     .
         14150.  C          .     .         I     .       W   E  .     .        L     .     .
         14200.  C          .     .         I     .       W   E  .     .        L     .     .
         14250.  C          .     .         I     .       .W  E  .     .        L     .     .
         14300.  C          .     .         .I    .       .W  E  .     .        .L    .     .
         14350.  C          .     .         .I    .       .W   E .     .        .L    .     .
         14400.  C          .     .         .I    .       .W   E .     .        .L    .     .
         14450.  C          .     .         .I    .       .W   E .     .        .L    .     .
53000.00 14500.  C          .     .         .I    .       .W   E .     .        .L    .     .
         14550.  C          .     .         . I   .       . W  E .     .        . L   .     .
         14600.  C          .     .         . I   .       . W   E.     .        . L   .     .
         14650.  C          .     .         . I   .       . W   E.     .        . L   .     .
         14700.  C          .     .         . I   .       . W   E.     .        . L   .     .
         14750.  C          .     .         .  I  .       . W   E.     .        .  L  .     .
         14800.  C          .     .         .  I  .       .  W  E.     .        .  L  .     .
         14850.  C          .     .         .  I  .       .  W   E     .        .  L  .     .
         14900.  C          .     .         .  I  .       .  W   E     .        .  L  .     .
         14950.  C          .     .         .  I  .       .  W   E     .        .  L  .     .
         15000.  C          .     .         .   I .       .  W   E     .        .   L .     .
         15050.  C          .     .         .   I .       .   W  E     .        .   L .     .
         15100.  C          .     .         .   I .       .   W  E     .        .   L .     .
         15150.  C          .     .         .   I .       .   W  E     .        .   L .     .
         15200.  C          .     .         .    I.       .   W  E     .        .    L.     .
         15250.  C          .     .         .    I.       .    W E     .        .    L.     .
         15300.  C          .     .         .    I.       .    W  E.   .        .    L.     .
         15350.  C          .     .         .    I.       .    W  E.   .        .    L.     .
         15400.  C          .     .         .    I.       .    W  E.   .        .    L.     .
         15450.  C          .     .         .     I       .    W  E.   .        .     L     .
52000.00 15500.  C          .     .         .     I       .     W  E   .        .     L     .
         15550.  C          .     .         .     I       .     W   E  .        .     L     .
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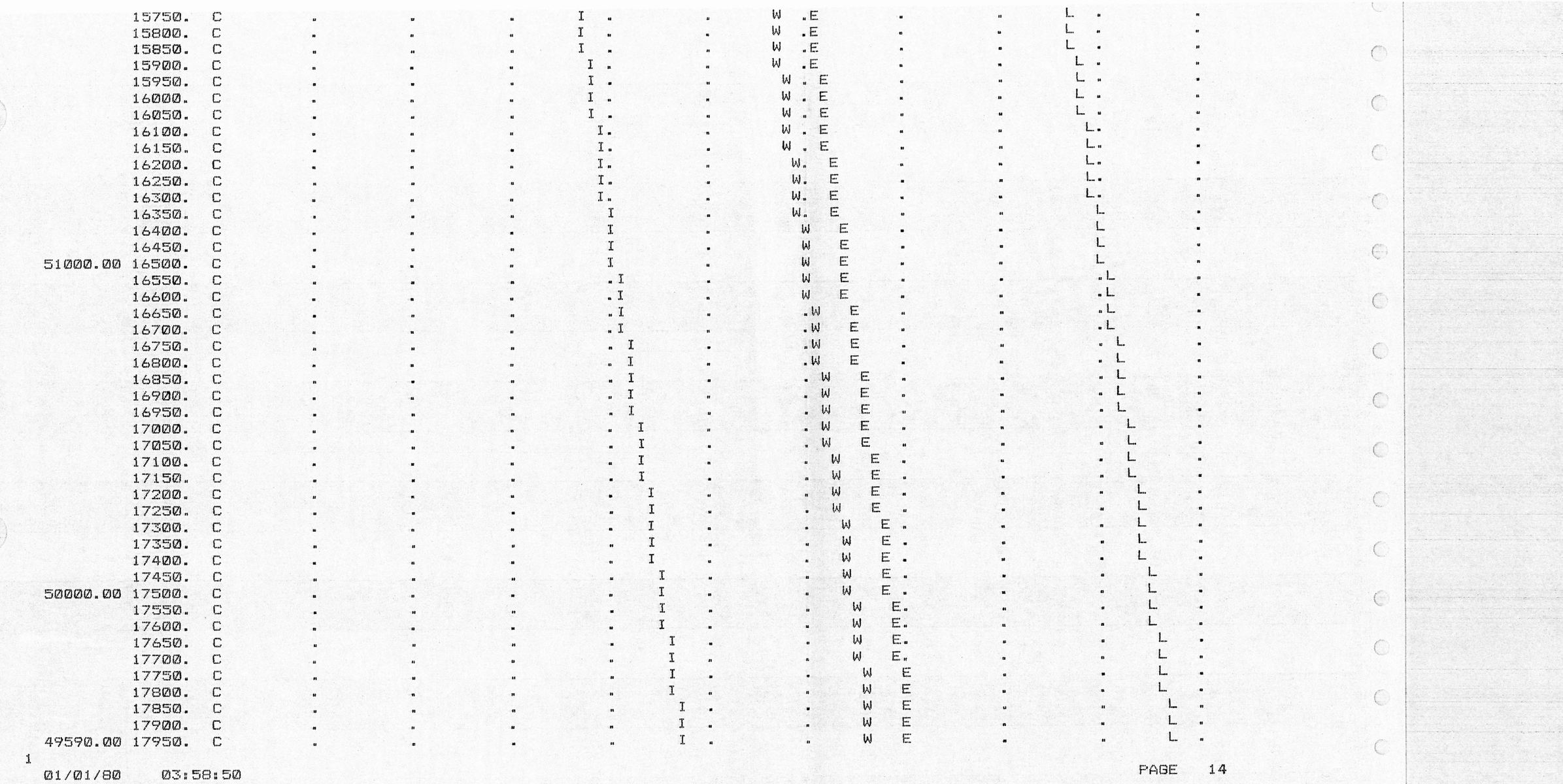

THIS RUN EXECUTED 01/01/80 04:01:46

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  HEC2 RELEASE DATED NOV 76 UPDATED MAY  1984
  ERROR CORR -  01,02,03,04,05,06
  MODIFICATION -  50,51,52,53,54,55,56
  IBM-PC-XT VERSION
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST


REACH 4 MODIFIED 10 YEAR
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SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
67500.000	.00	.00	.00	306.60	1670.00	310.27	.00	310.39	5.13	2.83	590.90	737.03
67000.000	500.00	.00	.00	306.85	1670.00	310.53	.00	310.65	5.13	2.83	590.90	737.03
66000.000	1000.00	.00	.00	307.35	1670.00	311.04	.00	311.16	5.07	2.82	593.12	741.41
65000.000	1000.00	.00	.00	307.85	1670.00	311.54	.00	311.67	5.05	2.81	594.00	743.15
64000.000	1000.00	.00	.00	308.35	1670.00	312.05	.00	312.17	5.02	2.81	595.13	745.38
63000.000	1000.00	.00	.00	308.85	1670.00	312.55	.00	312.67	5.00	2.80	595.80	746.73
62700.000	300.00	.00	.00	309.00	1670.00	312.70	.00	312.82	5.00	2.80	596.04	747.18
62600.000	100.00	.00	.00	309.05	1670.00	312.77	.00	312.86	3.62	2.41	693.29	878.25
62000.000	600.00	.00	.00	309.20	1670.00	312.99	.00	313.07	3.41	2.37	705.92	903.85
61000.000	1000.00	.00	.00	309.45	1670.00	313.32	.00	313.40	3.17	2.31	722.33	937.49
60000.000	1000.00	.00	.00	309.70	1670.00	313.63	.00	313.71	3.01	2.27	734.57	962.85
59860.000	140.00	.00	.00	309.74	1670.00	313.67	.00	313.75	3.00	2.27	736.88	964.30
59800.000	60.00	322.80	319.70	309.76	1670.00	313.68	.00	313.76	3.04	2.28	733.71	957.75
59680.000	120.00	.00	.00	309.79	1670.00	313.71	.00	313.79	3.05	2.28	731.42	956.30
59650.000	30.00	324.00	319.97	309.80	1670.00	313.72	.00	313.80	3.04	2.28	732.41	958.37
59600.000	50.00	.00	.00	309.80	1620.00	313.74	.00	313.82	2.81	2.20	736.43	966.73
59000.000	600.00	.00	.00	309.95	1620.00	313.91	.00	313.98	2.79	2.19	738.27	970.57

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
58000.000	1000.00	.00	.00	310.20	1620.00	314.19	.00	314.26	2.70	2.17	745.18	985.05
57000.000	1000.00	.00	.00	310.45	1620.00	314.46	.00	314.53	2.68	2.17	747.22	989.32
56000.000	1000.00	.00	.00	310.70	1620.00	314.72	.00	314.79	2.64	2.16	750.84	996.94
55500.000	500.00	.00	.00	310.82	1620.00	314.85	.00	314.93	2.61	2.15	753.63	1002.82
55450.000	50.00	.00	.00	310.83	1620.00	314.85	.00	314.94	5.77	2.46	659.80	674.48
55400.000	50.00	.00	.00	310.84	1620.00	314.85	.00	314.98	7.98	2.87	565.13	573.60
55380.000	20.00	.00	.00	310.85	1620.00	314.85	.00	315.00	9.09	3.05	531.11	537.46
55340.000	40.00	.00	.00	310.86	1620.00	314.85	.00	315.04	12.16	3.50	462.77	464.57
55320.000	20.00	.00	.00	310.87	1620.00	314.84	.00	315.06	14.38	3.79	427.97	427.27
55300.000	20.00	.00	.00	310.87	1620.00	314.83	.00	315.09	17.12	4.11	394.12	391.50

55240.000	20.00	.00	.00	310.88	1620.00	314.82	.00	315.22	27.16	5.10	317.36	310.84
55220.000	20.00	.00	.00	310.61	1620.00	314.88	.00	315.28	24.56	5.06	319.87	326.92
55200.000	20.00	.00	.00	310.31	1620.00	314.93	.00	315.32	22.65	5.06	319.95	340.40
55180.000	20.00	.00	.00	310.33	1620.00	314.95	.00	315.37	24.26	5.22	310.27	328.94
55160.000	20.00	.00	.00	310.35	1620.00	314.97	.00	315.42	25.89	5.38	301.16	318.40
55140.000	20.00	.00	.00	310.36	1620.00	315.00	.00	315.47	27.48	5.53	292.79	309.05
55095.000	45.00	330.50	329.30	310.40	1620.00	315.04	.00	315.58	31.50	5.89	274.99	288.64
55060.000	35.00	.00	.00	310.44	1620.00	315.07	.00	315.61	5.04	5.89	274.99	721.60
55000.000	60.00	.00	.00	310.49	1620.00	315.10	.00	315.64	5.16	5.94	272.79	712.99
54340.000	660.00	.00	.00	311.08	1620.00	315.39	.00	316.03	6.49	6.41	252.76	635.84
54260.000	80.00	328.90	325.90	311.15	1620.00	315.47	.00	316.10	6.46	6.40	253.11	637.14
54000.000	260.00	.00	.00	311.38	1620.00	315.61	.00	316.28	6.93	6.55	247.38	615.55
53000.000	1000.00	.00	.00	312.28	1620.00	316.28	.00	317.04	8.38	6.98	232.25	559.63
52000.000	1000.00	.00	.00	313.18	1620.00	317.11	.00	317.90	8.90	7.12	227.67	543.03

SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10K*S	VCH	AREA	.01K
51000.000	1000.00	.00	.00	314.08	1620.00	318.00	.00	318.79	8.94	7.13	227.33	541.80
50000.000	1000.00	.00	.00	314.98	1620.00	318.90	.00	319.69	8.98	7.14	226.98	540.52
49590.000	410.00	.00	.00	315.36	1620.00	319.26	.00	320.06	9.09	7.16	226.12	537.43

REACH 4 MODIFIED 10 YEAR

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
67500.000	1670.00	310.27	.00	.00	.00	172.02	.00
67000.000	1670.00	310.53	.00	.26	.00	172.02	500.00
66000.000	1670.00	311.04	.00	.51	.00	172.10	1000.00
65000.000	1670.00	311.54	.00	.51	.00	172.13	1000.00
64000.000	1670.00	312.05	.00	.50	.00	172.17	1000.00
63000.000	1670.00	312.55	.00	.50	.00	172.19	1000.00

62700.000	1670.00	312.70	.00	.15	.00	172.20	300.00
62600.000	1670.00	312.77	.00	.07	.00	197.34	100.00
62000.000	1670.00	312.99	.00	.21	.00	197.73	600.00
61000.000	1670.00	313.32	.00	.33	.00	198.22	1000.00
60000.000	1670.00	313.63	.00	.31	.00	198.59	1000.00
59860.000	1670.00	313.67	.00	.04	.00	199.77	140.00
59800.000	1670.00	313.68	.00	.00	.00	199.67	60.00
59680.000	1670.00	313.71	.00	.04	.00	198.50	120.00
59650.000	1670.00	313.72	.00	.01	.00	198.53	30.00
59600.000	1620.00	313.74	.00	.02	.00	198.65	50.00
59000.000	1620.00	313.91	.00	.17	.00	198.71	600.00
58000.000	1620.00	314.19	.00	.28	.00	198.92	1000.00
57000.000	1620.00	314.46	.00	.27	.00	198.98	1000.00
56000.000	1620.00	314.72	.00	.27	.00	199.09	1000.00
55500.000	1620.00	314.85	.00	.13	.00	199.17	500.00
55450.000	1620.00	314.85	.00	.00	.00	175.24	50.00
55400.000	1620.00	314.85	.00	.00	.00	151.44	50.00
55380.000	1620.00	314.85	.00	.00	.00	142.86	20.00

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
55340.000	1620.00	314.85	.00	.00	.00	125.73	40.00
55320.000	1620.00	314.84	.00	-.01	.00	117.10	20.00
55300.000	1620.00	314.83	.00	-.01	.00	108.50	20.00
55280.000	1620.00	314.83	.00	.00	.00	101.96	20.00
55260.000	1620.00	314.83	.00	.00	.00	95.38	20.00
55240.000	1620.00	314.82	.00	-.01	.00	88.81	20.00
55220.000	1620.00	314.88	.00	.06	.00	83.69	20.00
55200.000	1620.00	314.93	.00	.05	.00	78.48	20.00
55180.000	1620.00	314.95	.00	.02	.00	76.46	20.00
55160.000	1620.00	314.97	.00	.02	.00	74.47	20.00
55140.000	1620.00	315.00	.00	.03	.00	72.51	20.00

55000.000	1620.00	315.10	.00	.02	.00	68.43	60.00
54340.000	1620.00	315.39	.00	.29	.00	67.25	660.00
54260.000	1620.00	315.47	.00	.08	.00	67.27	80.00
54000.000	1620.00	315.61	.00	.14	.00	66.93	260.00
53000.000	1620.00	316.28	.00	.67	.00	66.02	1000.00
52000.000	1620.00	317.11	.00	.83	.00	65.74	1000.00
51000.000	1620.00	318.00	.00	.89	.00	65.72	1000.00
50000.000	1620.00	318.90	.00	.89	.00	65.70	1000.00
49590.000	1620.00	319.26	.00	.36	.00	65.64	410.00

SUMMARY OF ERRORS AND SPECIAL NOTES

****
HEC2 RELEASE DATED NOV 76 UPDATED MAY 1984
ERROR CORR - 01,02,03,04,05,06
MODIFICATION - 50,51,52,53,54,55,56
IBM-PC-XT VERSION
****

THIS RUN EXECUTED 01/01/80 04:02:05

SUBCRITCAL TRANSITION ANALYSIS CAL HYDRA: MOMENTUM ANALYSIS

OUTLET TRANSITION

COMPUTED BY: DT DATE: 3/25/05 CHECKED BY: _____ DATE: _____

n= 0.030 So= 0.000333

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
855+00 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	172.50	2.83	3.46	8.97	1775.2	3.66	1310.80	1319.77	0.229	0.000	
1+10.00	6500.00	170.00	2.67	3.50	8.95	1734.8	3.75	1310.80	1319.75	0.234	0.000	
1+15.00	6500.00	167.50	2.50	3.54	8.93	1694.5	3.84	1310.81	1319.73	0.239	0.000	
1+20.00	6500.00	165.00	2.33	3.58	8.90	1654.2	3.93	1310.81	1319.71	0.245	0.000	
1+25.00	6500.00	162.50	2.17	3.62	8.88	1614.0	4.03	1310.81	1319.69	0.250	0.000	
554+70 1+30.00	6500.00	160.00	2.00	3.66	8.86	1573.9	4.13	1310.81	1319.67	0.256	0.000	

SUBCRITCAL TRANSITION ANALYSIS

COMPUTED BY: DJ DATE: 7/85 CHECKED BY: _____ DATE: _____

n= 0.030 So= 0.000235

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
554+70 1+30.00	6500.00	160.00	2.00	3.66	8.86	1574.6	4.13	1310.81	1319.67	0.000	0.000	0.000
1+50.00	6500.00	150.00	2.00	3.81	8.83	1480.5	4.39	1310.81	1319.64	0.274	0.000	
1+70.00	6500.00	140.00	2.00	3.98	8.79	1385.9	4.69	1310.82	1319.61	0.294	0.000	
554+10 1+90.00	6500.00	130.00	2.00	4.17	8.75	1290.9	5.04	1310.82	1319.58	0.317	0.000	
553+90 2+10.00	6500.00	120.00	2.00	4.39	8.70	1195.5	5.44	1310.83	1319.53	0.345	0.000	
2+30.00	6500.00	110.00	2.00	4.63	8.64	1099.5	5.91	1310.83	1319.47	0.378	0.000	
553+50 2+50.00	6500.00	100.00	2.00	4.91	8.56	1002.9	6.48	1310.84	1319.40	0.418	0.000	
2+70.00	6500.00	90.00	2.00	5.24	8.47	905.6	7.18	1310.84	1319.31	0.468	0.000	
2+90.00	6500.00	80.00	2.00	5.62	8.35	807.8	8.05	1310.85	1319.20	0.531	0.000	
553+00 3+ 0.00	6500.00	75.00	2.00	5.83	8.29	758.7	8.57	1310.85	1319.14	0.570	0.000	

SUBCRITCAL TRANSITION ANALYSIS

COMPUTED BY: DATE: CHECKED BY: _____ DATE: _____

n= 0.030 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	6500.00	75.00	2.00	5.83	8.29	759.2	8.56	1310.85	1319.14	0.000	0.000	0.000
3+10.00	6500.00	[illegible]	2.00	5.88	8.28	749.0	8.68	1310.85	1319.13	0.578	0.000	
3+20.00	6500.00	[illegible]	2.00	5.93	8.27	738.7	8.80	1310.85	1319.12	0.587	0.000	
3+30.00	6500.00	[illegible]	2.00	5.99	8.26	728.4	8.92	1310.86	1319.12	0.596	0.000	
3+40.00	6500.00	[illegible]	2.00	6.04	8.25	718.1	9.05	1310.86	1319.11	0.606	0.000	
3+50.00	6500.00	[illegible]	2.00	6.09	8.24	707.7	9.18	1310.86	1319.10	0.616	0.000	
3+60.00	6500.00	[illegible]	2.00	6.15	8.22	697.2	9.32	1310.86	1319.08	0.626	0.000	

SUBCRITCAL TRANSITION ANALYSIS

65.00

COMPUTED BY: DATE: CHECKED BY: _____ DATE: _____

n= 0.030 So= -0.014250

CAL HYDRA: MOMENTUM
SUBCRITCAL TRANSITION ANALYSIS

COMPUTED BY: DT DATE: 4/6/25 CHECKED BY:_____ DATE:_____

n= 0.030 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	8.29	759.2	8.56	1310.85	1319.14	0.000	0.000	0.000
552+90 3+10.00	6500.00	73.33	2.00	5.91	8.26	742.1	8.76	1310.85	1319.11	0.584	0.000	
552+80 3+20.00	6500.00	71.67	2.00	5.99	8.23	724.8	8.97	1310.85	1319.08	0.600	0.000	
552+70 3+30.00	6500.00	70.00	2.00	6.07	8.19	707.3	9.19	1310.86	1319.04	0.617	0.000	
552+60 3+40.00	6500.00	68.33	2.00	6.15	8.15	689.5	9.43	1310.86	1319.00	0.636	0.000	
552+50 3+50.00	6500.00	66.67	2.00	6.24	8.10	671.5	9.68	1310.86	1318.96	0.655	0.000	
552+40 3+60.00	6500.00	65.00	2.00	6.33	8.05	653.1	9.95	1310.86	1318.91	0.677	0.000	

CAL HYDRA: MOMENTUM

SUBCRITCAL TRANSITION ANALYSIS

COMPUTED BY: DT DATE: 4/05 CHECKED BY:_____ DATE:_____

n= 0.030 So= -0.014250

	STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
SS2+40	3+60.00	6500.00	65.00	2.00	6.33	8.05	652.9	9.96	1310.86	1318.91	0.000	0.000	0.000
SS2+30	3+70.00	6500.00	63.33	2.00	6.42	8.25	659.0	9.86	1310.72	1318.97	0.665	0.000	
SS2+20	3+80.00	6500.00	61.67	2.00	6.51	8.45	663.9	9.79	1310.58	1319.03	0.654	0.000	
SS2+10	3+90.00	6500.00	60.00	2.00	6.61	8.64	667.8	9.73	1310.43	1319.07	0.645	0.000	
SS2+00	4+ 0.00	6500.00	58.33	2.00	6.71	8.83	670.7	9.69	1310.29	1319.12	0.638	0.000	

CAL HYDRA: MOMENTUM

SUBCRITCAL TRANSITION ANALYSIS

COMPUTED BY: DT DATE: 4/05 CHECKED BY:_____ DATE:_____

n= 0.030 So= 0.001000

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	58.33	2.00	6.71	8.83	671.0	9.69	1310.29	1319.12	0.000	0.000	0.000
4+10.00	6500.00	56.66	2.00	6.82	8.75	648.9	10.02	1310.30	1319.05	0.663	0.000	
4+20.00	6500.00	55.00	2.00	6.93	8.66	626.1	10.38	1310.31	1318.97	0.692	0.000	
4+30.00	6500.00	53.33	2.00	7.04	8.55	602.3	10.79	1310.32	1318.87	0.725	0.000	
4+40.00	6500.00	51.67	2.00	7.16	8.43	577.3	11.26	1310.33	1318.76	0.763	0.000	
4+50.00	6500.00	50.00	2.00	7.28	8.27	550.7	11.80	1310.34	1318.61	0.808	0.000	

''WASP2''SUBCRITICAL WATER SURFACE PROFILE

OUTLET TRANSITION

COMPUTED BY: DT DATE: 3/25/85 DATA FILE: R4MAR CHECKED BY: _____ DATE: _____

555+00

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
1+00.00	6500.00	175.00	3.00	3.430	8.990	1815.7	3.58	1319.99	1310.80	1319.79	0.00	0.22	0.87
	n=0.0300	So=0.000195	Sf=0.000349	Headloss Factor=0.000	Total Headloss=0.003 ft.	Se=0.000351							
1+10.00	6500.00	170.00	2.67	3.501	8.974	1740.3	3.73	1319.99	1310.80	1319.78	10.81	0.23	0.93
	n=0.0300	So=0.000305	Sf=0.000378	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000368							
1+20.00	6500.00	165.00	2.33	3.577	8.955	1664.6	3.90	1320.00	1310.81	1319.76	10.79	0.24	0.99
	n=0.0300	So=0.000195	Sf=0.000412	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000414							
1+30.00	6500.00	160.00	2.00	3.657	8.934	1589.0	4.09	1320.00	1310.81	1319.74	10.77	0.25	1.07
	n=0.0300	So=0.000293	Sf=0.000445	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000428							
1+40.00	6500.00	155.00	2.00	3.732	8.919	1541.5	4.22	1320.00	1310.81	1319.73	10.76	0.26	1.13
	n=0.0300	So=0.000208	Sf=0.000476	Headloss Factor=0.000	Total Headloss=0.005 ft.	Se=0.000474							
1+50.00	6500.00	150.00	2.00	3.811	8.904	1494.1	4.35	1320.01	1310.81	1319.72	10.74	0.27	1.20
	n=0.0300	So=0.000415	Sf=0.000501	Headloss Factor=0.000	Total Headloss=0.003 ft.	Se=0.000491							
1+55.00	6500.00	147.50	2.00	3.852	8.895	1470.2	4.42	1320.01	1310.81	1319.71	10.73	0.27	1.23
	n=0.0300	So=0.000195	Sf=0.000520	Headloss Factor=0.000	Total Headloss=0.003 ft.	Se=0.000491							
1+60.00	6500.00	145.00	2.00	3.895	8.886	1446.4	4.49	1320.01	1310.82	1319.70	10.73	0.28	1.27
	n=0.0300	So=0.000195	Sf=0.000549	Headloss Factor=0.000	Total Headloss=0.005 ft.	Se=0.000546							
1+70.00	6500.00	140.00	2.00	3.982	8.868	1398.8	4.65	1320.02	1310.82	1319.68	10.71	0.29	1.36
	n=0.0300	So=0.000293	Sf=0.000593	Headloss Factor=0.000	Total Headloss=0.006 ft.	Se=0.000596							
1+80.00	6500.00	135.00	2.00	4.075	8.847	1350.9	4.81	1320.03	1310.82	1319.67	10.69	0.30	1.45
	n=0.0300	So=0.000208	Sf=0.000642	Headloss Factor=0.000	Total Headloss=0.006 ft.	Se=0.000640							
1+90.00	6500.00	130.00	2.00	4.173	8.824	1302.9	4.99	1320.03	1310.82	1319.65	10.67	0.31	1.55

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.000305	Sf=0.000697	Headloss Factor=0.000	Total Headloss=0.007 ft.	Se=0.000690							

r4t00

	n=0.0300	So=0.000195	Sf=0.000744	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000726							
2+05.00	6500.00	122.50	2.00	4.332	8.784	1230.4	5.28	1320.04	1310.83	1319.61	10.63	0.33	1.72
	n=0.0300	So=0.000195	Sf=0.000778	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000763							
2+10.00	6500.00	120.00	2.00	4.388	8.769	1206.1	5.39	1320.05	1310.83	1319.60	10.61	0.34	1.78
	n=0.0300	So=0.000293	Sf=0.000833	Headloss Factor=0.000	Total Headloss=0.008 ft.	Se=0.000819							
2+20.00	6500.00	115.00	2.00	4.506	8.736	1157.2	5.62	1320.06	1310.83	1319.57	10.58	0.36	1.92
	n=0.0300	So=0.000208	Sf=0.000918	Headloss Factor=0.000	Total Headloss=0.009 ft.	Se=0.000908							
2+30.00	6500.00	110.00	2.00	4.632	8.699	1108.2	5.87	1320.06	1310.83	1319.53	10.55	0.37	2.07
	n=0.0300	So=0.000305	Sf=0.001017	Headloss Factor=0.000	Total Headloss=0.010 ft.	Se=0.001003							
2+40.00	6500.00	105.00	2.00	4.767	8.654	1058.5	6.14	1320.07	1310.84	1319.49	10.50	0.39	2.25
	n=0.0300	So=0.000195	Sf=0.001133	Headloss Factor=0.000	Total Headloss=0.011 ft.	Se=0.001131							
2+50.00	6500.00	100.00	2.00	4.912	8.604	1008.5	6.45	1320.09	1310.84	1319.44	10.45	0.41	2.44
	n=0.0300	So=0.000415	Sf=0.001235	Headloss Factor=0.000	Total Headloss=0.006 ft.	Se=0.001226							
2+55.00	6500.00	97.50	2.00	4.988	8.575	983.1	6.61	1320.09	1310.84	1319.41	10.43	0.43	2.55
	n=0.0300	So=0.000171	Sf=0.001312	Headloss Factor=0.000	Total Headloss=0.007 ft.	Se=0.001302							
2+60.00	6500.00	95.00	2.00	5.068	8.544	957.6	6.79	1320.10	1310.84	1319.38	10.40	0.44	2.67
	n=0.0300	So=0.000208	Sf=0.001443	Headloss Factor=0.000	Total Headloss=0.014 ft.	Se=0.001432							
2+70.00	6500.00	90.00	2.00	5.236	8.472	906.1	7.17	1320.11	1310.84	1319.31	10.33	0.47	2.92
	n=0.0300	So=0.000305	Sf=0.001654	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.001647							
2+80.00	6500.00	85.00	2.00	5.418	8.384	853.2	7.62	1320.13	1310.85	1319.23	10.24	0.50	3.22
	n=0.0300	So=0.000195	Sf=0.001922	Headloss Factor=0.000	Total Headloss=0.019 ft.	Se=0.001907							
2+90.00	6500.00	80.00	2.00	5.615	8.274	798.8	8.14	1320.15	1310.85	1319.12	10.13	0.54	3.56

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.000293	Sf=0.002275	Headloss Factor=0.000	Total Headloss=0.023 ft.	Se=0.002265							
3+00.00	6500.00	75.00	2.00	5.831	8.130	742.0	8.76	1320.17	1310.85	1318.98	9.99	0.59	3.98
	n=0.0300	So=0.000208	Sf=0.002565	Headloss Factor=0.000	Total Headloss=0.026 ft.	Se=0.002559							
3+10.00	6500.00	73.33	2.00	5.907	8.097	724.9	8.97	1320.20	1310.85	1318.95	9.97	0.60	4.12
	n=0.0300	So=0.000305	Sf=0.002716	Headloss Factor=0.000	Total Headloss=0.027 ft.	Se=0.002705							
3+20.00	6500.00	71.67	2.00	5.985	8.058	707.4	9.19	1320.22	1310.86	1318.91	9.93	0.62	4.27
	n=0.0300	So=0.000195	Sf=0.002884	Headloss Factor=0.000	Total Headloss=0.029 ft.	Se=0.002875							
3+30.00	6500.00	70.00	2.00	6.066	8.017	689.8	9.42	1320.25	1310.86	1318.87	9.90	0.64	4.43

	n=0.0300	So=0.000195	Sf=0.000744	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000726							
2+05.00	6500.00	122.50	2.00	4.332	8.784	1230.4	5.28	1320.04	1310.83	1319.61	10.63	0.33	1.72
	n=0.0300	So=0.000195	Sf=0.000778	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000763							
2+10.00	6500.00	120.00	2.00	4.388	8.769	1206.1	5.39	1320.05	1310.83	1319.60	10.61	0.34	1.78
	n=0.0300	So=0.000293	Sf=0.000833	Headloss Factor=0.000	Total Headloss=0.008 ft.	Se=0.000819							
2+20.00	6500.00	115.00	2.00	4.506	8.736	1157.2	5.62	1320.06	1310.83	1319.57	10.58	0.36	1.92
	n=0.0300	So=0.000208	Sf=0.000918	Headloss Factor=0.000	Total Headloss=0.009 ft.	Se=0.000908							
2+30.00	6500.00	110.00	2.00	4.632	8.699	1108.2	5.87	1320.06	1310.83	1319.53	10.55	0.37	2.07
	n=0.0300	So=0.000305	Sf=0.001017	Headloss Factor=0.000	Total Headloss=0.010 ft.	Se=0.001003							
2+40.00	6500.00	105.00	2.00	4.767	8.654	1058.5	6.14	1320.07	1310.84	1319.49	10.50	0.39	2.25
	n=0.0300	So=0.000195	Sf=0.001133	Headloss Factor=0.000	Total Headloss=0.011 ft.	Se=0.001131							
2+50.00	6500.00	100.00	2.00	4.912	8.604	1008.5	6.45	1320.09	1310.84	1319.44	10.45	0.41	2.44
	n=0.0300	So=0.000415	Sf=0.001235	Headloss Factor=0.000	Total Headloss=0.006 ft.	Se=0.001226							
2+55.00	6500.00	97.50	2.00	4.988	8.575	983.1	6.61	1320.09	1310.84	1319.41	10.43	0.43	2.55
	n=0.0300	So=0.000171	Sf=0.001312	Headloss Factor=0.000	Total Headloss=0.007 ft.	Se=0.001302							
2+60.00	6500.00	95.00	2.00	5.068	8.544	957.6	6.79	1320.10	1310.84	1319.38	10.40	0.44	2.67
	n=0.0300	So=0.000208	Sf=0.001443	Headloss Factor=0.000	Total Headloss=0.014 ft.	Se=0.001432							
2+70.00	6500.00	90.00	2.00	5.236	8.472	906.1	7.17	1320.11	1310.84	1319.31	10.33	0.47	2.92
	n=0.0300	So=0.000305	Sf=0.001654	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.001647							
2+80.00	6500.00	85.00	2.00	5.418	8.384	853.2	7.62	1320.13	1310.85	1319.23	10.24	0.50	3.22
	n=0.0300	So=0.000195	Sf=0.001922	Headloss Factor=0.000	Total Headloss=0.019 ft.	Se=0.001907							
2+90.00	6500.00	80.00	2.00	5.615	8.274	798.8	8.14	1320.15	1310.85	1319.12	10.13	0.54	3.56

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L.	INV EL.	W.S.EL.	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.000293	Sf=0.002275	Headloss Factor=0.000	Total Headloss=0.023 ft.	Se=0.002265							
3+00.00	6500.00	75.00	2.00	5.831	8.130	742.0	8.76	1320.17	1310.85	1318.98	9.99	0.59	3.98
	n=0.0300	So=0.000208	Sf=0.002565	Headloss Factor=0.000	Total Headloss=0.026 ft.	Se=0.002559							
3+10.00	6500.00	73.33	2.00	5.907	8.097	724.9	8.97	1320.20	1310.85	1318.95	9.97	0.60	4.12
	n=0.0300	So=0.000305	Sf=0.002716	Headloss Factor=0.000	Total Headloss=0.027 ft.	Se=0.002705							
3+20.00	6500.00	71.67	2.00	5.985	8.058	707.4	9.19	1320.22	1310.86	1318.91	9.93	0.62	4.27
	n=0.0300	So=0.000195	Sf=0.002884	Headloss Factor=0.000	Total Headloss=0.029 ft.	Se=0.002875							
3+30.00	6500.00	70.00	2.00	6.066	8.017	689.8	9.42	1320.25	1310.86	1318.87	9.90	0.64	4.43

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
3+40.00	6500.00	68.33	2.00	6.150	7.970	671.6	9.68	1320.28	1310.86	1318.83	9.85	0.66	4.61
	n=0.0300	So=0.000208		Sf=0.003282		Headloss Factor=0.000		Total Headloss=0.033 ft.		Se=0.003284			
3+50.00	6500.00	66.67	2.00	6.236	7.917	653.2	9.95	1320.32	1310.86	1318.78	9.81	0.68	4.79
	n=0.0300	So=-.000208		Sf=0.003517		Headloss Factor=0.000		Total Headloss=0.035 ft.		Se=0.003509			
3+60.00	6500.00	65.00	2.00	6.325	7.865	634.9	10.24	1320.35	1310.86	1318.72	9.76	0.70	4.98
	n=0.0300	So=-.014197		Sf=0.003556		Headloss Factor=0.000		Total Headloss=0.036 ft.		Se=0.003549			
3+70.00	6500.00	63.33	2.00	6.417	8.079	642.2	10.12	1320.39	1310.72	1318.80	10.01	0.69	4.98
	n=0.0300	So=-.014294		Sf=0.003402		Headloss Factor=0.000		Total Headloss=0.034 ft.		Se=0.003397			
3+80.00	6500.00	61.67	2.00	6.512	8.285	648.2	10.03	1320.42	1310.58	1318.86	10.25	0.68	4.99
	n=0.0300	So=-.014197		Sf=0.003276		Headloss Factor=0.000		Total Headloss=0.033 ft.		Se=0.003269			
3+90.00	6500.00	60.00	2.00	6.611	8.482	652.8	9.96	1320.45	1310.43	1318.91	10.49	0.67	5.01
	n=0.0300	So=-.014319		Sf=0.003174		Headloss Factor=0.000		Total Headloss=0.032 ft.		Se=0.003166			
552+00													
4+00.00	6500.00	58.33	2.00	6.713	8.674	656.4	9.90	1320.49	1310.29	1318.96	10.71	0.66	5.04
	n=0.0300	So=0.000916		Sf=0.003264		Headloss Factor=0.000		Total Headloss=0.033 ft.		Se=0.003252			
551+90													
4+10.00	6500.00	56.67	2.00	6.818	8.589	634.2	10.25	1320.52	1310.30	1318.89	10.63	0.68	5.28

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.000903		Sf=0.003571		Headloss Factor=0.000		Total Headloss=0.036 ft.		Se=0.003569			
551+80													
4+20.00	6500.00	55.00	2.00	6.927	8.489	611.1	10.64	1320.55	1310.31	1318.80	10.54	0.72	5.55
	n=0.0300	So=0.000891		Sf=0.003945		Headloss Factor=0.000		Total Headloss=0.039 ft.		Se=0.003933			
551+70													
4+30.00	6500.00	53.33	2.00	7.041	8.369	586.5	11.08	1320.59	1310.32	1318.69	10.42	0.75	5.84
	n=0.0300	So=0.000903		Sf=0.004417		Headloss Factor=0.000		Total Headloss=0.044 ft.		Se=0.004415			
551+60													
4+40.00	6500.00	51.67	2.00	7.158	8.217	559.6	11.62	1320.64	1310.33	1318.54	10.28	0.80	6.18
	n=0.0140	So=0.000903		Sf=0.002182		Headloss Factor=0.000		Total Headloss=0.022 ft.		Se=0.002183			
551+50													
4+50.00	6500.00	50.00	2.00	7.280	7.887	518.8	12.53	1320.66	1310.34	1318.22	9.95	0.88	6.70
	n=0.0140	So=0.000891		Sf=0.001250		Headloss Factor=0.000		Total Headloss=0.013 ft.		Se=0.001243			
4+60.00	6500.00	50.00	2.00	7.280	7.902	520.0	12.50	1320.67	1310.34	1318.25	9.97	0.87	6.68
	n=0.0140	So=0.000903		Sf=0.001242		Headloss Factor=0.000		Total Headloss=0.012 ft.		Se=0.001239			
4+70.00	6500.00	50.00	2.00	7.280	7.916	521.1	12.47	1320.68	1310.35	1318.27	9.98	0.87	6.67
	n=0.0140	So=0.000903		Sf=0.001234		Headloss Factor=0.000		Total Headloss=0.012 ft.		Se=0.001231			
4+80.00	6500.00	50.00	2.00	7.280	7.930	522.3	12.45	1320.70	1310.36	1318.29	10.00	0.87	6.66

4+90.00	6500.00	50.00	2.00	7.280	7.943	523.3	12.42	1320.71	1310.37	1318.31	10.01	0.87	6.65

n=0.0140 So=0.000891 Sf=0.001220 Headloss Factor=0.000 Total Headloss=0.012 ft. Se=0.001217

551+00

5+00.00	6500.00	50.00	2.00	7.280	7.956	524.4	12.40	1320.72	1310.38	1318.34	10.02	0.86	6.63

1317.66

Bridge at STA. 550+00 (±) was assumed during design that it would be replaced. This month it was learned that the bridge would not be replaced. This affected the hydraulics because of several piers supporting the exist. bridge. The new hydraulics indicated the flow would pass through critical depth under bridge and cause a hydraulic jump downstream.

It is a weak jump (Froude number less than 2). Two options were looked at: 1. Increased channel roughness downstream to reduce energy and 2. Rock lined reach for channel protection.

Option 2. was selected as best choice

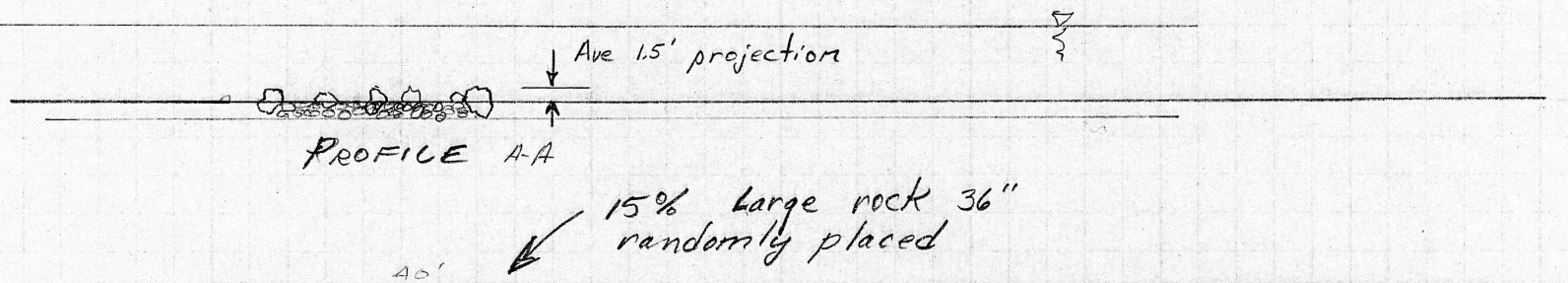
a) less problem with maintenance
b) Rock lining was needed because of high velocity for either option.

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

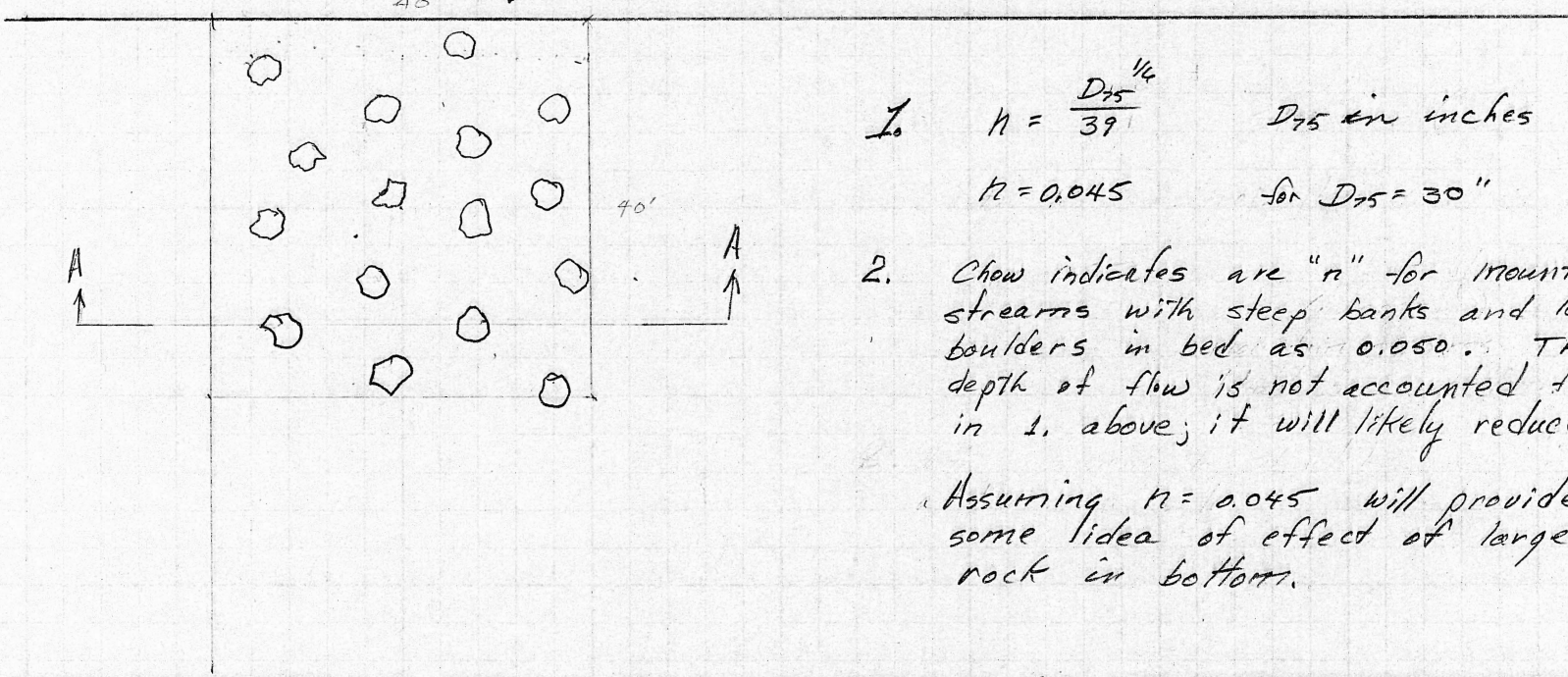
2

RWCD RI AZ. 3/85 Channel Hydraulics

WATER SURFACE PROFILE INDICATES Hydraulic Jump (weak) downstream of bridge near STA. 551+50.



PROFILE A-A



PLAN

1. $n = \frac{D_{75}^{1/4}}{39}$ D_{75} in inches

$n = 0.045$ for $D_{75} = 30"$

2. Chow indicates are "n" for mountain streams with steep banks and large boulders in bed as 0.050. The depth of flow is not accounted for in 1. above; it will likely reduce n.

Assuming n = 0.045 will provide some idea of effect of large rock in bottom.

Option 1.
Place rock boulders downstream of jump. Purpose is to help dissipate energy and surface undulations.

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

Cont. -

Option 2.

Do nothing - Hydraulic calculations indicate that a jump will occur at design flow. Froude number is low meaning a weak jump. Surface undulations can be expected to continue downstream for considerable distance. Grouted rock or rock riprap should be used to prevent erosion from turbulent flow.

Option 2. selected because of maintenance problems associated with Option 1.

Design as shown on Dwgs.

Grouted rock used from STA 551+50 to STA. 552+50

Loose rock used from STA 552+00 to 556+00 ±

42-381 50 SHEETS 5 SQUARE
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Made in U.S.A.
NATIONAL

Bridge Pier Momentum Analysis.

POWER RD. (STA 551+00) EXISTING BRIDGE

$Q = 6500$ cfs bottom width = 50 ft.

Slope = 2:1 Pier width = 1.333 ft. No. Piers = 3

From Far West States:

$$\bar{y} = \frac{d(T+2b)}{3(T+b)}$$ where T = Top width; b = base width

and $M_1 = A_1 \bar{y}$; also $\frac{d}{2} A_0 = M_0$

$A_1 = A_3$ and $M_1 = M_3$

A = Area of trap. channel.

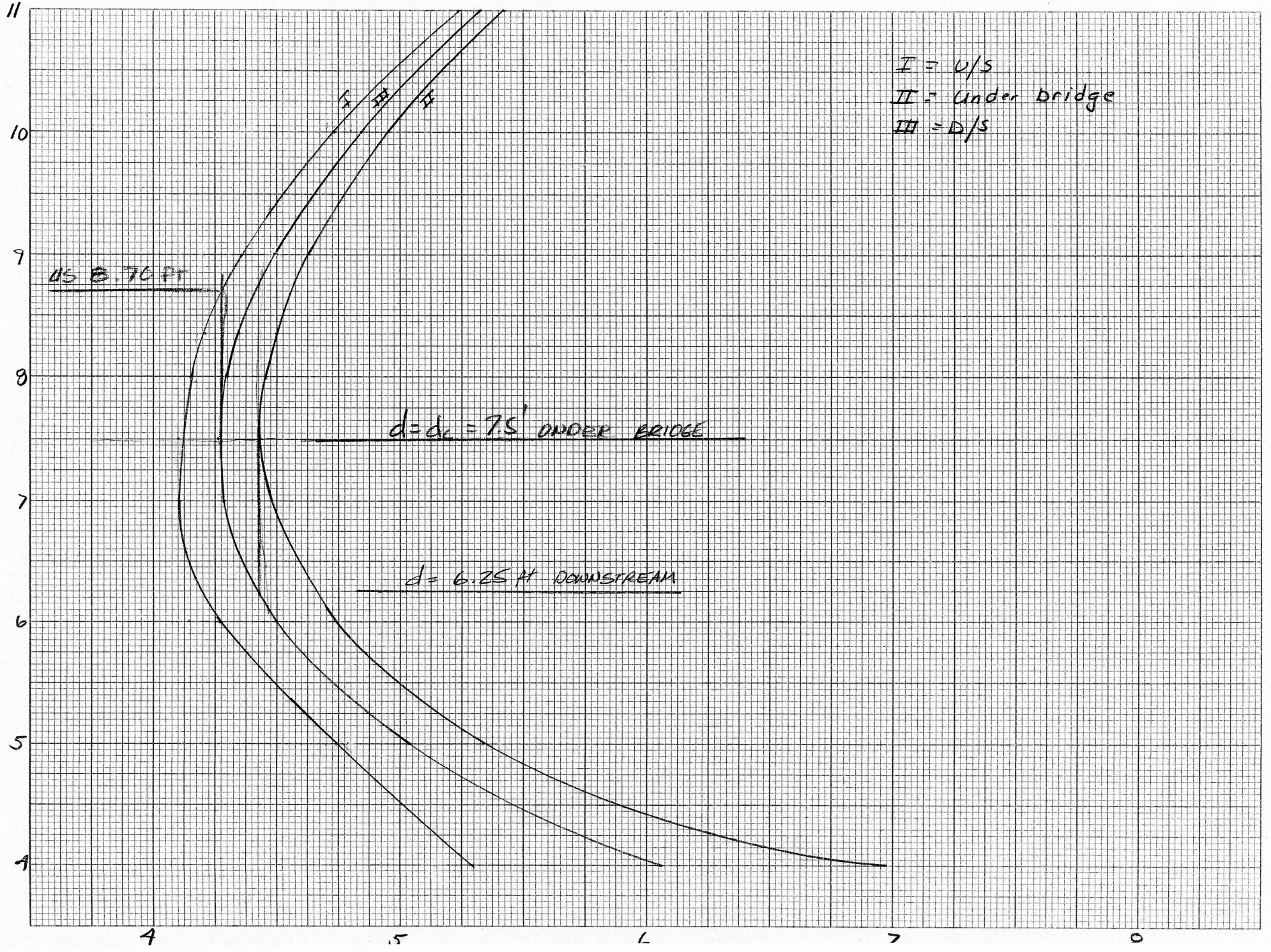
$= (b+2d)d$

d	T (4d+b)	$\bar{y}$
4	66	1.908
5	70	2.361
6	74	2.806
7	78	3.245
8	82	3.677
8.35	83.4	3.827
9.00	86	4.103
10.00	90	4.524
11.00	94	4.940
3	62	1.446

NATIONAL
42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-383 200 SHEETS 5 SQUARE
Made in U.S.A.

d	$A_1 = A_3$	$M_1 = M_3$	A_0	M_0	$A_1 - A_0$	$M_1 - M_0$ (1)	$\frac{Q^2}{g(A_1 - A_0)}$ (2)	$\frac{Q^2}{gA_1^2}$	$\frac{Q^2(A_1 - A_0)}{gA_1^2}$ (3)	$\frac{Q^2}{gA_3}$ (4)	I (1)+(3)	II (1)+(2)	III (1)+(4)
4	232	442.7	16	32	200	410.7	6561	24.4	4876	5652	5287	6972	6067
68 5	300	708.3	20	50	280	658.3	4686	14.6	4082	4374	4740	5344	5032
72 6	372	1043.8	24	72	348	971.8	3770	9.5	3300	3527	4272	4742	4499
76 7	448	1453.8	28	98	420	1355.8	3124	6.5	2746	2929	4102	4480	4285
80 8	528	1941.5	32	128	496	1813.5	2645	4.7	2334	2485	4148	4459	4299
84 8.35	556.9	2131.3	33.4	139.4	523.5	1991.9	2506	4.2	2215	2356	4207	4498	4348
9	612.0	2511.0	36	162.0	576	2349	2278	3.5	2018	2144	4367	4627	4493
88 10	700	3166.8	40	200	660	2966.8	1988	2.7	1767	1874	4734	4955	4841
92 11	792	3912.5	44	242	748	3670.5	1754	2.1	1565	1657	5236	5425	5328
3	168	242.9	12	18	150	224.9							

K+E 10 X 10 TO ½ INCH • 7½ X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.



Bridge Pier Momentum Analysis

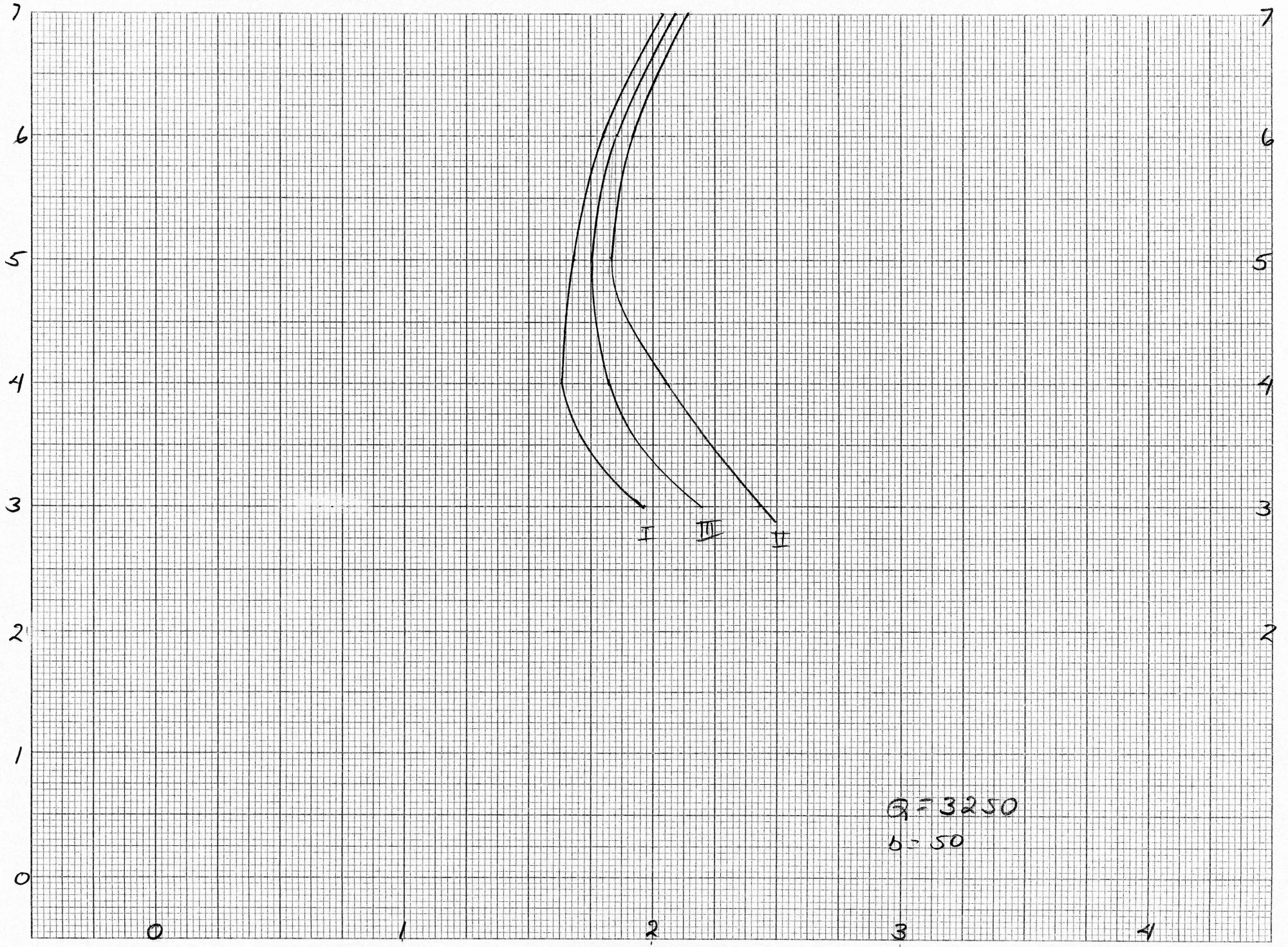
$Q = 3250$ bottom width = 50 ft.

Slope = 2:1 Pier width = 1.333 ft No piers = 3

Trial Run 2.

d	① $M_1 - M_0$	② $\frac{Q^2}{g(A_1 - A_0)}$	$\frac{Q^2}{g A_1^2}$	③ $\frac{Q^2(A_1 - A_0)}{g A_1^2}$	④ $\frac{Q^2}{g A_3}$	I ①+③	II ①+②	III ①+④
4	410.7	1640	6.09	1218.9	1413.9	1630	2051	1825
5	658.3	1172	3.64	1020.5	1093.4	1679	1830	1752
6	971.8	943	2.37	824.9	881.8	1797	1915	1854
7	1355.8	781	1.64	686.4	732.2	2042	2137	2088
8	1813.5	661	1.18	583.6	621.3	2399	2475	2435
9	2349	569	0.88	504.5	536.0	2854	2918	2885
10	2966.8	497	0.67	441.8	468.6	3409	3464	3436
11	3670.5	439	0.52	391.2	414.2	4062	4110	4085
3	242.9	2187	11.62	1743.3	1952.5	1986	2430	2195

K+E 10 X 10 TO ½ INCH • 7½ X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.



Bridge Pier Momentum Analysis.

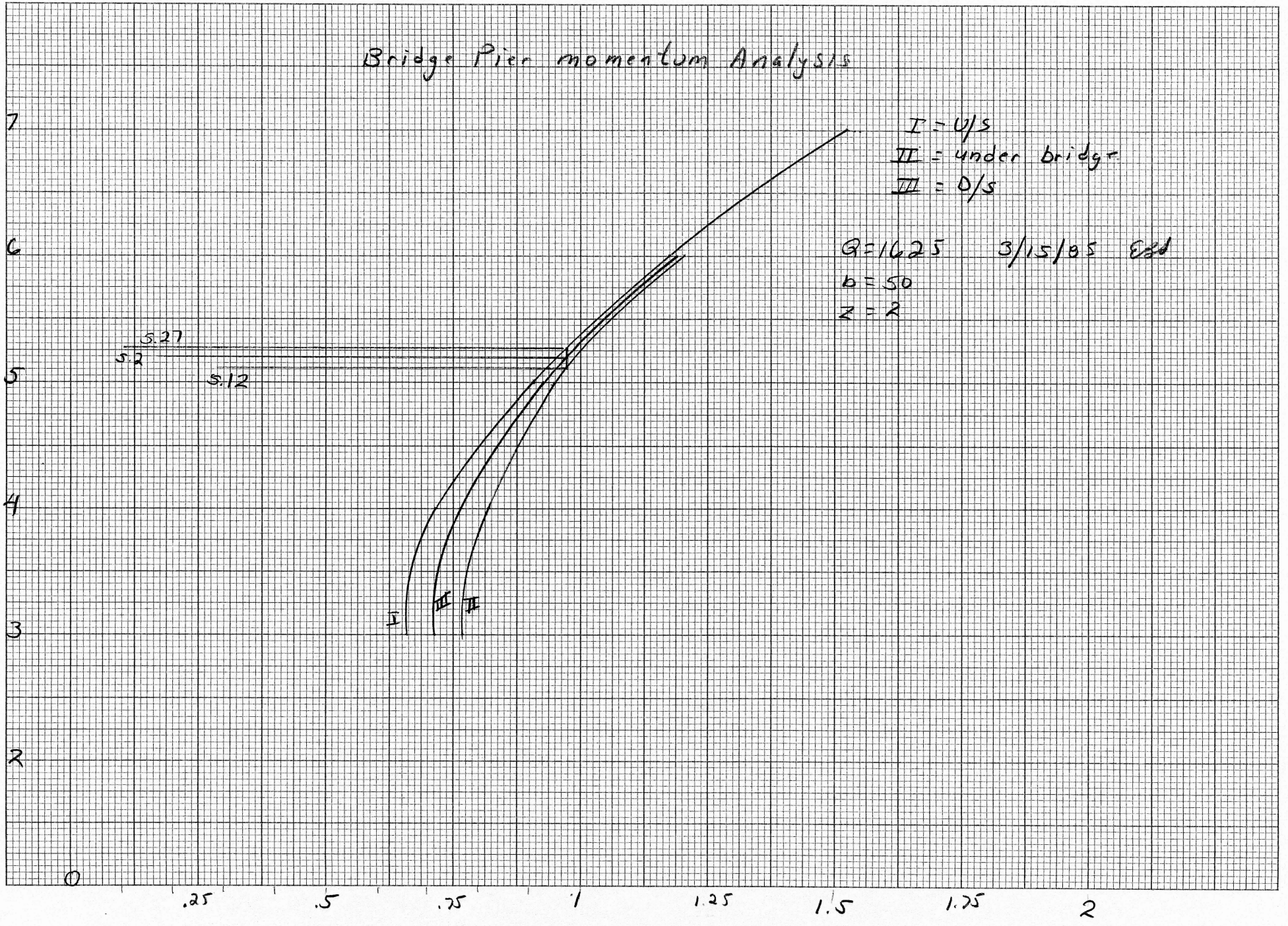
$Q = 1625$ bottom width = 50 ft

Slope = 2.0 Pier width = 1.333 No Piers = 3

Trial Run 3

	①	②		③	④			
d	$M_1 - M_0$	$\frac{Q^2}{g(A_1 - A_0)}$	$\frac{Q^2}{gA_1^2}$	$\frac{Q^2(A_1 - A_0)}{gA_1^2}$	$\frac{Q^2}{gA_3^2}$	I ① + ③	II ① + ②	III ① + ④
3	225	547	2.91	436	488	661	772	713
4	411	410	1.52	305	353	716	821	764
5	658	293	0.91	255	273	913	951	931
6	972	236	0.59	206	220	1178	1208	1192
7	1356	195	0.41	172	183	1528	1551	1539

K+E 10 X 10 TO ½ INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.



FILE RC1.

''WASP2''SUBCRITICAL WATER SURFACE PROFILE

WSP- POWER RD TO WMS. FIELD RD.

COMPUTED BY: DT DATE: 4/85 DATA FILE: RC1. CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
SSO 1+50.00	6500.00	50.00	2.00	7.280	8.700 (from Momentum Analysis)	586.4	11.08	1321.04	1310.43	1319.13	0.00	0.74	6.00
	n=0.0140	So=0.000903	Sf=0.000882	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000879							
2+00.00	6500.00	50.00	2.00	7.280	8.697	586.2	11.09	1321.08	1310.48	1319.17	10.82	0.74	6.00
	n=0.0140	So=0.000898	Sf=0.000883	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000884							
2+50.00	6500.00	50.00	2.00	7.280	8.696	586.0	11.09	1321.13	1310.52	1319.22	10.82	0.74	6.00
	n=0.0140	So=0.000901	Sf=0.000884	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000882							
3+00.00	6500.00	50.00	2.00	7.280	8.694	585.9	11.09	1321.17	1310.57	1319.26	10.81	0.74	6.01
	n=0.0140	So=0.000898	Sf=0.000884	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000883							
3+50.00	6500.00	50.00	2.00	7.280	8.692	585.7	11.10	1321.21	1310.61	1319.30	10.81	0.74	6.01
	n=0.0140	So=0.000901	Sf=0.000885	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000883							
4+00.00	6500.00	50.00	2.00	7.280	8.690	585.6	11.10	1321.26	1310.66	1319.35	10.81	0.74	6.01
	n=0.0140	So=0.000898	Sf=0.000886	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000885							
4+50.00	6500.00	50.00	2.00	7.280	8.689	585.4	11.10	1321.30	1310.70	1319.39	10.81	0.74	6.01
	n=0.0140	So=0.000903	Sf=0.000886	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000886							
5+00.00	6500.00	50.00	2.00	7.280	8.687	585.3	11.11	1321.35	1310.75	1319.43	10.81	0.74	6.01
	n=0.0140	So=0.000896	Sf=0.000887	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000885							
5+50.00	6500.00	50.00	2.00	7.280	8.686	585.2	11.11	1321.39	1310.79	1319.48	10.81	0.74	6.01
	n=0.0140	So=0.000903	Sf=0.000887	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000885							
6+00.00	6500.00	50.00	2.00	7.280	8.684	585.0	11.11	1321.44	1310.84	1319.52	10.80	0.75	6.01
	n=0.0140	So=0.000898	Sf=0.000888	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000888							
6+50.00	6500.00	50.00	2.00	7.280	8.683	584.9	11.11	1321.48	1310.88	1319.56	10.80	0.75	6.01

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0140	So=0.000901	Sf=0.000888	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000888							

	n=0.0140	So=0.000898	Sf=0.000889	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000887						
7+50.00	6500.00	50.00	2.00	7.280	8.680	584.7	11.12	1321.57	1310.97	1319.65	10.80	0.75	6.02
	n=0.0140	So=0.000901	Sf=0.000889	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000887						
8+00.00	6500.00	50.00	2.00	7.280	8.679	584.6	11.12	1321.61	1311.02	1319.69	10.80	0.75	6.02
	n=0.0140	So=0.000898	Sf=0.000890	Headloss Factor=0.000	Total Headloss=0.044 ft.	Se=0.000888						
8+50.00	6500.00	50.00	2.00	7.280	8.678	584.5	11.12	1321.66	1311.06	1319.74	10.80	0.75	6.02
	n=0.0140	So=0.000903	Sf=0.000890	Headloss Factor=0.000	Total Headloss=0.045 ft.	Se=0.000891						
9+00.00	6500.00	50.00	2.00	7.280	8.677	584.4	11.12	1321.70	1311.11	1319.78	10.80	0.75	6.02

WATER SURFACE PROFILE

- BRIDGE AT WILLIAMS FIELD ROAD
  - FOR PRELIMINARY RUN ΔH AT BRIDGE. (HEC2 VOID COMPS)
  - DEPTH @ 543+40 6.80 ft
    542+60 8.99

ΔH = 0.19ft

42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 383 200 SHEETS 5 SQUARE
NATIONAL

FILE RC2.

''WASP2''SUBCRITICAL WATER SURFACE PROFILE

WSP# WILLIAMS FIELD ROAD TO R/C INLET TRANSITION

COMPUTED BY: DT DATE: 4/8 DATA FILE: RC2 CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
542+60 ~~5+40.00~~	6500.00	50.00	2.00	7.280	8.870	600.9	10.82	1321.83	1311.14	1320.01	0.00	0.72	5.87
	n=0.0140	So=0.000832	Sf=0.000822	Headloss Factor=0.000	Total Headloss=0.049 ft.	Se=0.000823							
542+00 ~~5+00.00~~	6500.00	50.00	2.00	7.280	8.869	600.8	10.82	1321.88	1311.19	1320.06	11.01	0.72	5.87
	n=0.0140	So=0.000901	Sf=0.000825	Headloss Factor=0.000	Total Headloss=0.083 ft.	Se=0.000825							
~~4+80.00~~	6500.00	50.00	2.00	7.280	8.853	599.4	10.84	1321.96	1311.28	1320.13	10.99	0.72	5.88
	n=0.0140	So=0.000900	Sf=0.000830	Headloss Factor=0.000	Total Headloss=0.083 ft.	Se=0.000830							
540 4+00.00	6500.00	50.00	2.00	7.280	8.839	598.2	10.87	1322.04	1311.37	1320.21	10.97	0.72	5.89
	n=0.0140	So=0.000900	Sf=0.000835	Headloss Factor=0.000	Total Headloss=0.084 ft.	Se=0.000834							
4+00.00	6500.00	50.00	2.00	7.280	8.825	597.0	10.89	1322.13	1311.46	1320.28	10.96	0.73	5.90
	n=0.0140	So=0.000900	Sf=0.000840	Headloss Factor=0.000	Total Headloss=0.084 ft.	Se=0.000840							
4+00.00	6500.00	50.00	2.00	7.280	8.812	595.9	10.91	1322.21	1311.55	1320.36	10.94	0.73	5.91
	n=0.0140	So=0.000901	Sf=0.000844	Headloss Factor=0.000	Total Headloss=0.084 ft.	Se=0.000843							
4+00.00	6500.00	50.00	2.00	7.280	8.800	594.9	10.93	1322.29	1311.64	1320.44	10.93	0.73	5.92
	n=0.0140	So=0.000900	Sf=0.000848	Headloss Factor=0.000	Total Headloss=0.085 ft.	Se=0.000848							
4+00.00	6500.00	50.00	2.00	7.280	8.789	594.0	10.94	1322.38	1311.73	1320.52	10.92	0.73	5.93
	n=0.0140	So=0.000900	Sf=0.000852	Headloss Factor=0.000	Total Headloss=0.085 ft.	Se=0.000851							
535 4+00.00	6500.00	50.00	2.00	7.280	8.779	593.1	10.96	1322.46	1311.82	1320.60	10.91	0.73	5.94
	n=0.0140	So=0.000900	Sf=0.000855	Headloss Factor=0.000	Total Headloss=0.086 ft.	Se=0.000855							
4+00.00	6500.00	50.00	2.00	7.280	8.770	592.3	10.97	1322.55	1311.91	1320.68	10.90	0.73	5.94
	n=0.0140	So=0.000901	Sf=0.000858	Headloss Factor=0.000	Total Headloss=0.086 ft.	Se=0.000858							
4+00.00	6500.00	50.00	2.00	7.280	8.760	591.5	10.99	1322.64	1312.00	1320.76	10.89	0.73	5.95

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0140	So=0.000900	Sf=0.000862	Headloss Factor=0.000	Total Headloss=0.086 ft.	Se=0.000861							

	n=0.0140	So=0.000900	Sf=0.000864	Headloss Factor=0.000		Total Headloss=0.086 ft.		Se=0.000864						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.744	590.1	11.01	1322.81	1312.18	1320.92	10.87	0.74	5.96	
	n=0.0140	So=0.000901	Sf=0.000867	Headloss Factor=0.000		Total Headloss=0.087 ft.		Se=0.000866						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.737	589.5	11.03	1322.89	1312.27	1321.01	10.86	0.74	5.97	
	n=0.0140	So=0.000900	Sf=0.000870	Headloss Factor=0.000		Total Headloss=0.087 ft.		Se=0.000869						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.730	588.9	11.04	1322.98	1312.36	1321.09	10.85	0.74	5.98	
	n=0.0140	So=0.000900	Sf=0.000872	Headloss Factor=0.000		Total Headloss=0.087 ft.		Se=0.000871						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.724	588.4	11.05	1323.07	1312.45	1321.17	10.85	0.74	5.98	
	n=0.0140	So=0.000900	Sf=0.000874	Headloss Factor=0.000		Total Headloss=0.087 ft.		Se=0.000874						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.718	587.9	11.06	1323.16	1312.54	1321.26	10.84	0.74	5.99	
	n=0.0140	So=0.000901	Sf=0.000876	Headloss Factor=0.000		Total Headloss=0.088 ft.		Se=0.000876						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.713	587.5	11.06	1323.24	1312.63	1321.34	10.84	0.74	5.99	
	n=0.0140	So=0.000900	Sf=0.000878	Headloss Factor=0.000		Total Headloss=0.088 ft.		Se=0.000878						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.708	587.1	11.07	1323.33	1312.72	1321.43	10.83	0.74	5.99	
	n=0.0140	So=0.000900	Sf=0.000880	Headloss Factor=0.000		Total Headloss=0.088 ft.		Se=0.000879						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.704	586.7	11.08	1323.42	1312.81	1321.51	10.83	0.74	6.00	
	n=0.0140	So=0.000901	Sf=0.000881	Headloss Factor=0.000		Total Headloss=0.088 ft.		Se=0.000881						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.699	586.3	11.09	1323.51	1312.90	1321.60	10.82	0.74	6.00	
	n=0.0140	So=0.000900	Sf=0.000883	Headloss Factor=0.000		Total Headloss=0.088 ft.		Se=0.000882						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.695	586.0	11.09	1323.60	1312.99	1321.69	10.82	0.74	6.00	
	n=0.0140	So=0.000900	Sf=0.000884	Headloss Factor=0.000		Total Headloss=0.088 ft.		Se=0.000883						
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.692	585.7	11.10	1323.68	1313.08	1321.77	10.81	0.74	6.01	

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0140	So=0.000900	Sf=0.000885	Headloss Factor=0.000		Total Headloss=0.089 ft.		Se=0.000885					
520 [illegible]+00.00	6500.00	50.00	2.00	7.280	8.689	585.4	11.10	1323.77	1313.17	1321.86	10.81	0.74	6.01
	n=0.0140	So=0.000901	Sf=0.000887	Headloss Factor=0.000		Total Headloss=0.089 ft.		Se=0.000885					
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.685	585.1	11.11	1323.86	1313.26	1321.95	10.81	0.74	6.01
	n=0.0140	So=0.000900	Sf=0.000888	Headloss Factor=0.000		Total Headloss=0.089 ft.		Se=0.000887					
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.683	584.9	11.11	1323.95	1313.35	1322.03	10.80	0.75	6.01
	n=0.0140	So=0.000900	Sf=0.000889	Headloss Factor=0.000		Total Headloss=0.089 ft.		Se=0.000888					
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.680	584.7	11.12	1324.04	1313.44	1322.12	10.80	0.75	6.02

FREE BOARD	FROUDE NUMBER	SEQUE DEPT
0.80	0.75	6.02
Se=0.000890		
0.79	0.75	6.02
Se=0.000891		
0.79	0.75	6.02
Se=0.000892		
0.79	0.75	6.02
Se=0.000892		
0.79	0.75	6.02
Se=0.000893		
0.79	0.75	6.03
Se=0.000893		
0.79	0.75	6.03
Se=0.000893		
0.78	0.75	6.03
Se=0.000894		
0.78	0.75	6.03
Se=0.000894		
0.78	0.75	6.03
Se=0.000895		
0.78	0.75	6.03
Se=0.000896		
0.78	0.75	6.03
Se=0.000896		
0.78	0.75	6.03
Se=0.000895		
0.78	0.75	6.03
Se=0.000896		
0.78	0.75	6.03
Se=0.000897		

	n=0.0140	So=0.000900	Sf=0.000864	Headloss Factor=0.000	Total Headloss=0.086 ft.	Se=0.000864							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.744	590.1	11.01	1322.81	1312.18	1320.92	10.87	0.74	5.96
	n=0.0140	So=0.000901	Sf=0.000867	Headloss Factor=0.000	Total Headloss=0.087 ft.	Se=0.000866							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.737	589.5	11.03	1322.89	1312.27	1321.01	10.86	0.74	5.97
	n=0.0140	So=0.000900	Sf=0.000870	Headloss Factor=0.000	Total Headloss=0.087 ft.	Se=0.000869							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.730	588.9	11.04	1322.98	1312.36	1321.09	10.85	0.74	5.98
	n=0.0140	So=0.000900	Sf=0.000872	Headloss Factor=0.000	Total Headloss=0.087 ft.	Se=0.000871							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.724	588.4	11.05	1323.07	1312.45	1321.17	10.85	0.74	5.98
	n=0.0140	So=0.000900	Sf=0.000874	Headloss Factor=0.000	Total Headloss=0.087 ft.	Se=0.000874							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.718	587.9	11.06	1323.16	1312.54	1321.26	10.84	0.74	5.99
	n=0.0140	So=0.000901	Sf=0.000876	Headloss Factor=0.000	Total Headloss=0.088 ft.	Se=0.000876							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.713	587.5	11.06	1323.24	1312.63	1321.34	10.84	0.74	5.99
	n=0.0140	So=0.000900	Sf=0.000878	Headloss Factor=0.000	Total Headloss=0.088 ft.	Se=0.000878							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.708	587.1	11.07	1323.33	1312.72	1321.43	10.83	0.74	5.99
	n=0.0140	So=0.000900	Sf=0.000880	Headloss Factor=0.000	Total Headloss=0.088 ft.	Se=0.000879							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.704	586.7	11.08	1323.42	1312.81	1321.51	10.83	0.74	6.00
	n=0.0140	So=0.000901	Sf=0.000881	Headloss Factor=0.000	Total Headloss=0.088 ft.	Se=0.000881							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.699	586.3	11.09	1323.51	1312.90	1321.60	10.82	0.74	6.00
	n=0.0140	So=0.000900	Sf=0.000883	Headloss Factor=0.000	Total Headloss=0.088 ft.	Se=0.000882							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.695	586.0	11.09	1323.60	1312.99	1321.69	10.82	0.74	6.00
	n=0.0140	So=0.000900	Sf=0.000884	Headloss Factor=0.000	Total Headloss=0.088 ft.	Se=0.000883							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.692	585.7	11.10	1323.68	1313.08	1321.77	10.81	0.74	6.01

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0140	So=0.000900	Sf=0.000885	Headloss Factor=0.000	Total Headloss=0.089 ft.	Se=0.000885							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.689	585.4	11.10	1323.77	1313.17	1321.86	10.81	0.74	6.01
	n=0.0140	So=0.000901	Sf=0.000887	Headloss Factor=0.000	Total Headloss=0.089 ft.	Se=0.000885							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.685	585.1	11.11	1323.86	1313.26	1321.95	10.81	0.74	6.01
	n=0.0140	So=0.000900	Sf=0.000888	Headloss Factor=0.000	Total Headloss=0.089 ft.	Se=0.000887							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.683	584.9	11.11	1323.95	1313.35	1322.03	10.80	0.75	6.01
	n=0.0140	So=0.000900	Sf=0.000889	Headloss Factor=0.000	Total Headloss=0.089 ft.	Se=0.000888							
[illegible]+00.00	6500.00	50.00	2.00	7.280	8.680	584.7	11.12	1324.04	1313.44	1322.12	10.80	0.75	6.01

	n=0.0140	So=0.000901	Sf=0.000890		Headloss Factor=0.000			Total Headloss=0.089 ft.		Se=0.000890			
	+00.00	6500.00	50.00	2.00	7.280	8.678	584.5	11.12	1324.13	1313.53	1322.21	10.80	0.75	6.02
	n=0.0140	So=0.000900	Sf=0.000890		Headloss Factor=0.000			Total Headloss=0.089 ft.		Se=0.000890			
	+00.00	6500.00	50.00	2.00	7.280	8.675	584.3	11.12	1324.22	1313.62	1322.30	10.79	0.75	6.02
	n=0.0140	So=0.000900	Sf=0.000891		Headloss Factor=0.000			Total Headloss=0.089 ft.		Se=0.000891			
	+00.00	6500.00	50.00	2.00	7.280	8.674	584.1	11.13	1324.31	1313.71	1322.38	10.79	0.75	6.02
	n=0.0140	So=0.000901	Sf=0.000892		Headloss Factor=0.000			Total Headloss=0.089 ft.		Se=0.000892			
	+00.00	6500.00	50.00	2.00	7.280	8.672	584.0	11.13	1324.40	1313.80	1322.47	10.79	0.75	6.02
	n=0.0140	So=0.000900	Sf=0.000893		Headloss Factor=0.000			Total Headloss=0.089 ft.		Se=0.000892			
	+00.00	6500.00	50.00	2.00	7.280	8.670	583.8	11.13	1324.48	1313.89	1322.56	10.79	0.75	6.02
	n=0.0140	So=0.000900	Sf=0.000893		Headloss Factor=0.000			Total Headloss=0.089 ft.		Se=0.000893			
	+00.00	6500.00	50.00	2.00	7.280	8.669	583.7	11.14	1324.57	1313.98	1322.65	10.79	0.75	6.03
	n=0.0140	So=0.000900	Sf=0.000894		Headloss Factor=0.000			Total Headloss=0.089 ft.		Se=0.000893			
	+00.00	6500.00	50.00	2.00	7.280	8.667	583.6	11.14	1324.66	1314.07	1322.74	10.79	0.75	6.03
	n=0.0140	So=0.000900	Sf=0.000894		Headloss Factor=0.000			Total Headloss=0.089 ft.		Se=0.000893			
	+00.00	6500.00	50.00	2.00	7.280	8.666	583.5	11.14	1324.75	1314.16	1322.83	10.78	0.75	6.03

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0140	So=0.000901	Sf=0.000895		Headloss Factor=0.000			Total Headloss=0.089 ft.		Se=0.000894			
	+00.00	6500.00	50.00	2.00	7.280	8.664	583.4	11.14	1324.84	1314.25	1322.91	10.78	0.75	6.03
	n=0.0140	So=0.000900	Sf=0.000895		Headloss Factor=0.000			Total Headloss=0.090 ft.		Se=0.000894			
	+00.00	6500.00	50.00	2.00	7.280	8.663	583.3	11.14	1324.93	1314.34	1323.00	10.78	0.75	6.03
	n=0.0140	So=0.000900	Sf=0.000895		Headloss Factor=0.000			Total Headloss=0.090 ft.		Se=0.000895			
	+00.00	6500.00	50.00	2.00	7.280	8.662	583.2	11.15	1325.02	1314.43	1323.09	10.78	0.75	6.03
	n=0.0140	So=0.000901	Sf=0.000896		Headloss Factor=0.000			Total Headloss=0.090 ft.		Se=0.000896			
	+00.00	6500.00	50.00	2.00	7.280	8.661	583.1	11.15	1325.11	1314.52	1323.18	10.78	0.75	6.03
	n=0.0140	So=0.000900	Sf=0.000896		Headloss Factor=0.000			Total Headloss=0.090 ft.		Se=0.000896			
	+00.00	6500.00	50.00	2.00	7.280	8.661	583.0	11.15	1325.20	1314.61	1323.27	10.78	0.75	6.03
	n=0.0140	So=0.000900	Sf=0.000897		Headloss Factor=0.000			Total Headloss=0.090 ft.		Se=0.000895			
	+00.00	6500.00	50.00	2.00	7.280	8.660	583.0	11.15	1325.29	1314.70	1323.36	10.78	0.75	6.03
	n=0.0140	So=0.000900	Sf=0.000897		Headloss Factor=0.000			Total Headloss=0.090 ft.		Se=0.000896			
	+00.00	6500.00	50.00	2.00	7.280	8.659	582.9	11.15	1325.38	1314.79	1323.45	10.78	0.75	6.03

	+00.00	6500.00	50.00	2.00	7.280	8.658	582.9	11.15	1325.47	1314.88	1323.54	10.78	0.75	6.03
		n=0.0140		So=0.000900		Sf=0.000897	Headloss Factor=0.000		Total Headloss=0.090 ft.			Se=0.000897		
500	+00.00	6500.00	50.00	2.00	7.280	8.658	582.8	11.15	1325.56	1314.97	1323.63	10.78	0.75	6.03
		n=0.0140		So=0.000900		Sf=0.000898	Headloss Factor=0.000		Total Headloss=0.090 ft.			Se=0.000897		
	+00.00	6500.00	50.00	2.00	7.280	8.657	582.8	11.15	1325.65	1315.06	1323.72	10.78	0.75	6.03
		n=0.0140		So=0.000900		Sf=0.000898	Headloss Factor=0.000		Total Headloss=0.090 ft.			Se=0.000896		
	+00.00	6500.00	50.00	2.00	7.280	8.657	582.7	11.15	1325.74	1315.15	1323.81	10.77	0.75	6.04
		n=0.0140		So=0.000901		Sf=0.000898	Headloss Factor=0.000		Total Headloss=0.090 ft.			Se=0.000898		
	+00.00	6500.00	50.00	2.00	7.280	8.656	582.7	11.16	1325.83	1315.24	1323.90	10.77	0.75	6.04

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0140		So=0.000900		Sf=0.000898	Headloss Factor=0.000			Total Headloss=0.090 ft.			Se=0.000898	
	+00.00	6500.00	50.00	2.00	7.280	8.656	582.6	11.16	1325.92	1315.33	1323.99	10.77	0.75	6.04
		n=0.0140		So=0.000900		Sf=0.000898	Headloss Factor=0.000		Total Headloss=0.090 ft.			Se=0.000898		
495	+00.00	6500.00	50.00	2.00	7.280	8.656	582.6	11.16	1326.01	1315.42	1324.08	10.77	0.75	6.04
		n=0.0140		So=0.000901		Sf=0.000898	Headloss Factor=0.000		Total Headloss=0.090 ft.			Se=0.000898		
	+00.00	6500.00	50.00	2.00	7.280	8.655	582.6	11.16	1326.10	1315.51	1324.16	10.77	0.75	6.04

ARIZONA RWCD #4

DT 2/15/85

INLET TRANSITION HYDRAULICS

PROBLEM: DETERMINE INLET TRANSITION CONFIGURATION

ANALYSIS:

1. LAYOUT: FLARE FROM BW = 50
TO BW = 150 *

WITH 12½° SIDE FLARE
L = ΔBW × 2.25 = 225 FT

2. INV AT DS END:

S = 0.0009
STA = 493+76
@ STA = 552+00

INV EL 1310.31
ΔEL 5.24
1315.55

* 3. WORK PLAN SHOWS DS CHANNEL BW = 170

- USE 150' TO ALLOW BETTER JUNCTION CONFIGURATION. AN EXPANSION TO 170 FT MAY BE PROVIDED IN RCH 5 UPSTREAM IF SO DESIRED IN DESIGN OF REACH 5.

- WORK PLAN SHOWS ΔH = 2.1 FT IN TRANSITION:

US EL = 1317.4
DS EL = 1315.3
ΔH = 2.1

- TRY USING U.S. EL = 1317.4 @STA 491+51
1315.55
1.85

S = 1.85/225

ARIZONA RIVCO R4

O.T. 2/15/85 LMK 3/85

R/C CHANNEL INLET TRANSITION

• UNTIL WSP RUNS ARE COMPLETED MAKE TRIAL RUNS W/ $D = D_n$ AT D.S. END OF TRANSITION:

$Q = 6500$ FT^3

$b = 50$

$z = 2$

$n = 0.014$

$S = 0.0009$

$d_n = 8.65$

$A = 582$ FT^2

$V = 11.16$ FT/S

2/15/85 DT

''WASP2''SUBCRITICAL WATER SURFACE PROFILE

REACH 4 TRANSITION R/C CHANNEL INLET

COMPUTED BY: DATE: DATA FILE: R4TRA CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
5+00.00	6500.00	50.00	2.00	7.280	8.650	582.1	11.17	1326.14	1315.55	1324.20	0.00	0.75	6.04
	n=0.0140	So=0.008215	Sf=0.000784	Headloss Factor=0.000	Total Headloss=0.008 ft.	Se=0.000787							
5+10.00	6500.00	54.44	2.00	6.965	8.944	647.0	10.05	1326.14	1315.63	1324.58	11.05	0.66	5.27
	n=0.0140	So=0.008203	Sf=0.000621	Headloss Factor=0.000	Total Headloss=0.006 ft.	Se=0.000616							
5+20.00	6500.00	58.89	2.00	6.678	9.104	701.9	9.26	1326.15	1315.71	1324.82	11.19	0.60	4.69
	n=0.0140	So=0.008301	Sf=0.000518	Headloss Factor=0.000	Total Headloss=0.005 ft.	Se=0.000512							
5+30.00	6500.00	63.33	2.00	6.417	9.197	751.6	8.65	1326.16	1315.80	1324.99	11.27	0.56	4.22
	n=0.0140	So=0.008191	Sf=0.000445	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000437							
5+40.00	6500.00	67.78	2.00	6.178	9.251	798.1	8.14	1326.16	1315.88	1325.13	11.31	0.52	3.83
	n=0.0140	So=0.008203	Sf=0.000389	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000386							
5+50.00	6500.00	72.22	2.00	5.959	9.277	842.2	7.72	1326.16	1315.96	1325.24	11.32	0.49	3.50
	n=0.0140	So=0.008203	Sf=0.000346	Headloss Factor=0.000	Total Headloss=0.003 ft.	Se=0.000339							
5+60.00	6500.00	76.67	2.00	5.757	9.285	884.2	7.35	1326.17	1316.04	1325.33	11.31	0.46	3.22
	n=0.0140	So=0.008301	Sf=0.000312	Headloss Factor=0.000	Total Headloss=0.003 ft.	Se=0.000313							
5+70.00	6500.00	81.11	2.00	5.570	9.276	924.5	7.03	1326.17	1316.13	1325.40	11.29	0.44	2.98
	n=0.0140	So=0.008191	Sf=0.000283	Headloss Factor=0.000	Total Headloss=0.003 ft.	Se=0.000277							
5+80.00	6500.00	85.56	2.00	5.397	9.258	963.5	6.75	1326.17	1316.21	1325.47	11.25	0.42	2.76
	n=0.0140	So=0.008191	Sf=0.000260	Headloss Factor=0.000	Total Headloss=0.003 ft.	Se=0.000248							
5+90.00	6500.00	90.00	2.00	5.236	9.231	1001.2	6.49	1326.18	1316.29	1325.52	11.21	0.41	2.57
	n=0.0140	So=0.008215	Sf=0.000240	Headloss Factor=0.000	Total Headloss=0.002 ft.	Se=0.000234							
6+00.00	6500.00	94.44	2.00	5.086	9.196	1037.7	6.26	1326.18	1316.37	1325.57	11.16	0.39	2.41

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0140	So=0.008203	Sf=0.000223	Headloss Factor=0.000	Total Headloss=0.002 ft.	Se=0.000215							
6+10.00	6500.00	98.89	2.00	4.946	9.154	1073.1	6.06	1326.18	1316.45	1325.61	11.13	0.38	2.26

	n=0.0140	So=0.008301	Sf=0.000208	Headloss Factor=0.000	Total Headloss=0.002 ft.	Se=0.000202							
6+20.00	6500.00	103.33	2.00	4.814	9.110	1107.3	5.87	1326.18	1316.54	1325.65	11.04	0.37	2.12
	n=0.0140	So=0.008191	Sf=0.000196	Headloss Factor=0.000	Total Headloss=0.002 ft.	Se=0.000190							
6+30.00	6500.00	107.78	2.00	4.691	9.061	1140.8	5.70	1326.18	1316.62	1325.68	10.97	0.36	2.01
	n=0.0140	So=0.008203	Sf=0.000184	Headloss Factor=0.000	Total Headloss=0.002 ft.	Se=0.000178							
6+40.00	6500.00	112.22	2.00	4.575	9.008	1173.2	5.54	1326.19	1316.70	1325.71	10.91	0.35	1.90
	n=0.0140	So=0.008203	Sf=0.000175	Headloss Factor=0.000	Total Headloss=0.002 ft.	Se=0.000170							
6+50.00	6500.00	116.67	2.00	4.466	8.952	1204.7	5.40	1326.19	1316.78	1325.74	10.83	0.34	1.80
	n=0.0140	So=0.008301	Sf=0.000166	Headloss Factor=0.000	Total Headloss=0.002 ft.	Se=0.000167							
6+60.00	6500.00	121.11	2.00	4.363	8.893	1235.3	5.26	1326.19	1316.87	1325.76	10.76	0.33	1.71
	n=0.0140	So=0.008191	Sf=0.000159	Headloss Factor=0.000	Total Headloss=0.002 ft.	Se=0.000150							
6+70.00	6500.00	125.56	2.00	4.266	8.833	1265.1	5.14	1326.19	1316.95	1325.78	10.68	0.32	1.64
	n=0.0140	So=0.008203	Sf=0.000152	Headloss Factor=0.000	Total Headloss=0.002 ft.	Se=0.000139							
6+80.00	6500.00	130.00	2.00	4.173	8.770	1294.0	5.02	1326.19	1317.03	1325.80	10.60	0.32	1.56
	n=0.0140	So=0.008203	Sf=0.000146	Headloss Factor=0.000	Total Headloss=0.001 ft.	Se=0.000145							
6+90.00	6500.00	134.44	2.00	4.086	8.706	1322.1	4.92	1326.19	1317.11	1325.82	10.52	0.31	1.50
	n=0.0140	So=0.008203	Sf=0.000140	Headloss Factor=0.000	Total Headloss=0.001 ft.	Se=0.000134							
7+00.00	6500.00	138.89	2.00	4.003	8.641	1349.4	4.82	1326.20	1317.19	1325.83	10.44	0.30	1.44
	n=0.0140	So=0.008301	Sf=0.000135	Headloss Factor=0.000	Total Headloss=0.001 ft.	Se=0.000125							
7+10.00	6500.00	143.33	2.00	3.923	8.573	1375.7	4.72	1326.20	1317.28	1325.85	10.36	0.30	1.38
	n=0.0140	So=0.008191	Sf=0.000131	Headloss Factor=0.000	Total Headloss=0.001 ft.	Se=0.000133							
7+20.00	6500.00	147.78	2.00	3.848	8.505	1401.5	4.64	1326.20	1317.36	1325.86	10.27	0.29	1.33

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0140	So=0.008203	Sf=0.000128	Headloss Factor=0.000	Total Headloss=0.001 ft.	Se=0.000106							
7+25.00	6500.00	150.00	2.00	3.811	8.470	1414.0	4.60	1326.20	1317.40	1325.87	10.23	0.29	1.31

1.67

SUBCRITCAL TRANSITION ANALYSIS

RWCD @ POWERLINE R/C WL "HYDRA" MOMENTUM

COMPUTED BY: DT DATE: 2/15/85 CHECKED BY: _____ DATE: _____

n= 0.014 So= 0.008222

	STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
DS	5+ 0.00	6500.00	50.00	2.00	7.28	8.65	582.1	11.17	1315.55	1324.20	0.000	0.000	0.000
	5+10.00	6500.00	54.44	2.00	6.96	8.94	646.8	10.05	1315.63	1324.57	0.661	0.000	
	5+20.00	6500.00	58.89	2.00	6.68	9.10	701.3	9.27	1315.71	1324.81	0.602	0.000	
	5+30.00	6500.00	63.33	2.00	6.42	9.18	750.3	8.66	1315.80	1324.98	0.558	0.000	
	5+40.00	6500.00	67.78	2.00	6.18	9.23	795.7	8.17	1315.88	1325.11	0.522	0.000	
	5+50.00	6500.00	72.22	2.00	5.96	9.24	838.5	7.75	1315.96	1325.20	0.493	0.000	
	5+60.00	6500.00	76.67	2.00	5.76	9.24	879.1	7.39	1316.04	1325.28	0.468	0.000	
	5+70.00	6500.00	81.11	2.00	5.57	9.22	917.8	7.08	1316.13	1325.35	0.447	0.000	
	5+80.00	6500.00	85.56	2.00	5.40	9.19	955.0	6.81	1316.21	1325.40	0.429	0.000	
	5+90.00	6500.00	90.00	2.00	5.24	9.15	990.8	6.56	1316.29	1325.44	0.413	0.000	
	6+ 0.00	6500.00	94.44	2.00	5.09	9.10	1025.3	6.34	1316.37	1325.47	0.399	0.000	
	6+10.00	6500.00	98.89	2.00	4.95	9.05	1058.6	6.14	1316.45	1325.50	0.387	0.000	
	6+20.00	6500.00	103.33	2.00	4.81	8.99	1090.8	5.96	1316.54	1325.53	0.375	0.000	
	6+30.00	6500.00	107.78	2.00	4.69	8.93	1121.9	5.79	1316.62	1325.55	0.365	0.000	
	6+40.00	6500.00	112.22	2.00	4.58	8.86	1151.9	5.64	1316.70	1325.57	0.356	0.000	
	6+50.00	6500.00	116.67	2.00	4.47	8.80	1181.0	5.50	1316.78	1325.58	0.348	0.000	
	6+60.00	6500.00	121.11	2.00	4.36	8.73	1209.2	5.38	1316.87	1325.59	0.340	0.000	
	6+70.00	6500.00	125.56	2.00	4.27	8.65	1236.5	5.26	1316.95	1325.60	0.333	0.000	
	6+80.00	6500.00	130.00	2.00	4.17	8.58	1262.8	5.15	1317.03	1325.61	0.327	0.000	
	6+90.00	6500.00	134.44	2.00	4.09	8.51	1288.3	5.05	1317.11	1325.62	0.322	0.000	
	7+ 0.00	6500.00	138.89	2.00	4.00	8.43	1312.9	4.95	1317.19	1325.62	0.316	0.000	
	7+10.00	6500.00	143.33	2.00	3.92	8.35	1336.6	4.86	1317.28	1325.63	0.312	0.000	
	7+20.00	6500.00	147.78	2.00	3.85	8.27	1359.6	4.78	1317.36	1325.63	0.307	0.000	
DS	7+25.00	6500.00	150.00	2.00	3.81	8.23	1370.7	4.74	1317.40	1325.63	0.305	0.000	

SUBCRITCAL TRANSITION ANALYSIS

RWCA R4 INLET TRANSITION

COMPUTED BY: DATE: CHECKED BY: _____ DATE: _____

n= 0.014 So= 0.008222

STATION	Q	B	Z	Dc	DEPTH	AREA	VEL.	INV.EL.	W.S. EL.	FROUDE NUMBER	SEQUENT DEPTH	MAX C/L OFFSET
4934 5+ 0.00	3140.00	50.00	2.00	4.65	5.74	352.9	8.90	1315.55	1321.29	0.000	0.000	0.000
5+10.00	3140.00	54.44	2.00	4.43	5.89	389.9	8.05	1315.63	1321.52	0.635	0.000	
5+20.00	3140.00	58.89	2.00	4.24	5.96	421.7	7.45	1315.71	1321.67	0.581	0.000	
5+30.00	3140.00	63.33	2.00	4.06	5.98	450.5	6.97	1315.80	1321.78	0.541	0.000	
5+40.00	3140.00	67.78	2.00	3.90	5.98	477.1	6.58	1315.88	1321.86	0.508	0.000	
5+50.00	3140.00	72.22	2.00	3.75	5.97	502.0	6.25	1315.96	1321.93	0.482	0.000	
5+60.00	3140.00	76.67	2.00	3.62	5.93	525.4	5.98	1316.04	1321.98	0.460	0.000	
5+70.00	3140.00	81.11	2.00	3.49	5.89	547.6	5.73	1316.13	1322.02	0.442	0.000	
5+80.00	3140.00	85.56	2.00	3.38	5.85	568.5	5.52	1316.21	1322.05	0.426	0.000	
5+90.00	3140.00	90.00	2.00	3.27	5.79	588.4	5.34	1316.29	1322.08	0.412	0.000	
6+ 0.00	3140.00	94.44	2.00	3.18	5.73	607.2	5.17	1316.37	1322.11	0.401	0.000	
6+10.00	3140.00	98.89	2.00	3.09	5.67	625.1	5.02	1316.45	1322.13	0.390	0.000	
6+20.00	3140.00	103.33	2.00	3.00	5.61	642.1	4.89	1316.54	1322.14	0.381	0.000	
6+30.00	3140.00	107.78	2.00	2.92	5.54	658.2	4.77	1316.62	1322.16	0.374	0.000	
6+40.00	3140.00	112.22	2.00	2.85	5.47	673.4	4.66	1316.70	1322.17	0.367	0.000	
6+50.00	3140.00	116.67	2.00	2.78	5.40	687.8	4.57	1316.78	1322.18	0.361	0.000	
6+60.00	3140.00	121.11	2.00	2.71	5.32	701.3	4.48	1316.87	1322.19	0.356	0.000	
6+70.00	3140.00	125.56	2.00	2.65	5.25	714.0	4.40	1316.95	1322.20	0.351	0.000	
6+80.00	3140.00	130.00	2.00	2.59	5.17	725.9	4.33	1317.03	1322.20	0.347	0.000	
6+90.00	3140.00	134.44	2.00	2.54	5.10	737.0	4.26	1317.11	1322.21	0.344	0.000	
7+ 0.00	3140.00	138.89	2.00	2.48	5.02	747.2	4.20	1317.19	1322.21	0.342	0.000	
7+10.00	3140.00	143.33	2.00	2.43	4.94	756.7	4.15	1317.28	1322.22	0.339	0.000	
7+20.00	3140.00	147.78	2.00	2.39	4.86	765.4	4.10	1317.36	1322.22	0.338	0.000	
4915 7+25.00	3140.00	150.00	2.00	2.36	4.82	769.5	4.08	1317.40	1322.22	0.337	0.000	

ARIZONA
RWCD RCH 4
WILLIAMS - CHANDLER

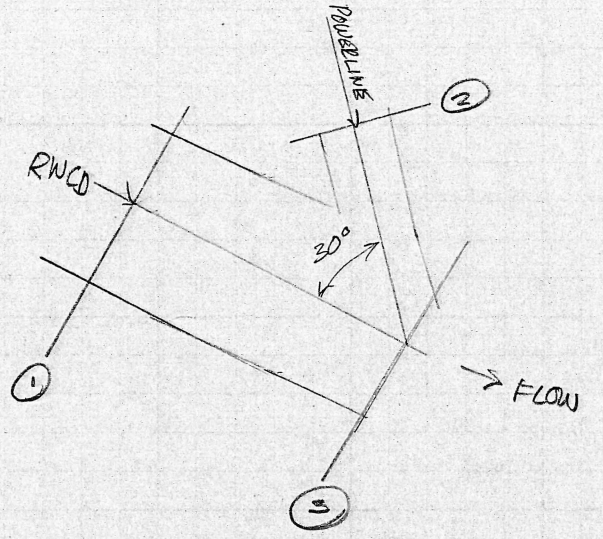
RT 2/21/85
3/85

POWERLINE JCT

PROBLEM: FIND W.S. EL UPSTREAM OF JCT. BY MOMENTUM METHODS.

ANALYSIS:

1.



LAYOUT

2. SECTION DATA

	B	Z
①	150	3
②	80	3
③	150	3

3. CASES

CASE	Q_1	Q_2	Q_3	d_3
I	3360	3140	6500	8.65
II	4100	2400	6500	8.65
III	5900	600	6500	8.65

SOLUTION:

SUMMARY

CASE	d_3 L=150	L=200
I	8.95	— (≈8.96) ←
II	8.93	8.94
III	8.81	8.83 ←

42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-380 200 SHEETS 5 SQUARE
Made in U.S.A.
NATIONAL

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

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Az. PROJECT RWCD Channel Rch 4
BY CSS DATE 2/27/05 CHECKED BY DATE JOB NO.
SUBJECT Junction Analysis SHEET 1 OF

Situation: Channel with side inlet at 30° to main channel.

1. Main channel D/s = 150 ft
2. Main Channel U/s = 150 ft
3. Side channel = 80 ft

Q D/s = 6500 cfs
Q U/s = 3360 cfs
Q side = 3140 cfs

depth D/s = 8.65 ft. ℓ = 150 ft
n = 0.027

Channel Slopes = 3:1
Invert slope = 0.0

Determine:

1. Depths of flow for U/s main channel and side channel.

2. Using Momentum Analysis

Exp 3 2/27/95 RWCO Channel Rch 4

Junction Analysis 2

	$A=(b+Zd)d$			$\frac{d_1+d_3}{2}$	$(b_a+Zd_a)d_a$	$b_a=b_1=b_3$
$d_1=d_2$	A_1	A_2	A_3	d_a	A_a	
6	1008	588	1521.97	7.33	1260.58	
7	1197	707	"	7.83	1358.31	
8	1392	832	"	8.33	1457.54	
8.92	1576.7	952.3	"	8.79	1550.16	
9	1593.0	963	"	8.83	1558.27	
10	1800	1100	"	9.33	1660.51	

	$b_a+2d_a\sqrt{Z^2+1}$	$\frac{A_a}{P_a}$		$\frac{Q_3}{A_a}$	
$d_1=d_2$	P_a	R_a	$R_a^{2/3}$	V_a	V_a^2
6	196.33	6.42	1.86	5.16	26.63
7	199.49	6.81	1.89	4.79	22.94
8	202.65	7.19	1.93	4.46	19.89
8.92	205.59	7.54	1.96	4.19	17.58
9	205.81	7.57	1.96	4.17	17.39
10.	208.97	7.95	1.99	3.91	15.32

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

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE | PROJECT

BY AJ ESSD | DATE 2/27/85 | CHECKED BY | DATE | JOB NO.

SUBJECT RWCD Channel Rch 4. Junction Analysis | SHEET 3 OF

Downstream Pressure & Momentum:

$$\frac{Q_3^2}{gA_3} + \left(\frac{b_3}{2} + \frac{z d_3}{3}\right)\left(d_3^2\right) = M_3 + P_3$$

$$\frac{(6500)^2}{(32.2)(1521.97)} + \left(\frac{150}{2} + \frac{(3)8.65}{3}\right)\left[8.65\right]^2 = 7121.02$$

Summary of U/s Pressure & Momentum:

$$\frac{Q_1^2}{gA_1} + \frac{Q_2^2}{gA_2}\cos\theta + \left(\frac{b_1}{2} + \frac{z d_1}{3}\right)\left(d_1^2\right) - \frac{P_a l n^2 V_a^2}{2.21 R_a^{1/3}}$$

d	$\frac{Q_1^2}{gA_1}$	$\frac{Q_2^2}{gA_2}\cos\theta$	$\frac{b_1 d_1^2}{2}$	$\frac{z d_1^3}{3}$	$\frac{P_a l n^2 V_a^2}{2.21 R_a^{1/3}}$	Total
6	347.83	450.98	2700	216.0	139.08	3575.23
7	292.91	375.07	3675	343.0	119.81	4566.17
8	251.87	318.72	4800	512.0	103.34	5779.25
8.92	222.37	278.46	5967.5	709.7	91.24	7086.79
9	220.09	275.36	6075	729.0	90.35	7209.10
10	194.78	241.07	7500	1000.0	79.60	8856.25

• WSP POWER ROAD BRIDGE TO WILLIAMS FIELD ROAD BRIDGE:

$Q = 6500$, $b = 50$, $Z = 2$, $n = 0.014$, $S = 0.0009$

RC1	STA	INV. EL	d	V
150	550+50	1310.43	*8.70	
200	550	1310.47		
300	549	1310.56		
400	548	1310.65		
500	547	1310.74		
600	546	1310.83		
700	545	1310.92		
800	544	1311.01		
860	543+40	1311.06	8.67	
RC2	455	$\Delta h = 0.20$ FT		
140	542+60	1311.14	8,87	
200	542	1311.19		
400	540	1311.37		
900	535	1311.82		
1400	530	1312.27		
2400	520	1313.17		
~~1400~~	500	1314.97		
~~584.40~~	494+15.60	1315.50	8.65	11.16
	584.40			

Momentum of moving mass of water in upstream channel = 13,785.3 lbs.

Momentum of moving mass of water in downstream channel = 53,796.0 lbs.

Axial component of moving mass of water in side channel = 17,252.7 lbs.

JUNCTION ANALYSIS

COMPUTED BY: DATE: CHECKED BY:_____ DATE:_____

SUBCRITCAL

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 150.00 ft. Manning's 'n' = 0.035

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	3,360 cfs.	6,500 cfs.	3,140 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	2.46 ft.	3.78 ft.	3.47 ft.
DEPTH =	8.95 ft.	8.65 ft.	8.95 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel = 419,494.0 lbs.

Hydrostatic pressure on downstream channel = 390,555.5 lbs.

Horizontal component of pressure on invert = 0.0 lbs.

Axial component of pressure on walls = 0.0 lbs.

Retardation pressure of friction = 6,268.6 lbs.

Momentum of moving mass of water in upstream channel = 13,824.4 lbs.

Momentum of moving mass of water in downstream channel = 53,796.0 lbs.

Axial component of moving mass of water in side channel = 17,306.0 lbs.

JUNCTION ANALYSIS

COMPUTED BY: DATE: CHECKED BY:_____ DATE:_____

SUBCRITCAL

#1

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 200.00 ft. Manning's 'n' = 0.027

RT SECTION

50 141 X-SEC : STA 523+ .00 ELEV .00 1327.2/500.0 1327.2/482.2 1325.0/476.8 1324.9/370.5 1324.3/174.0
1323.8/ 97.0 1327.8/ 84.6 1323.6/ 75.9 1323.6/ 38.2 1319.6/ 3.0
1318.8/ .0 1317.6/ 9.0 1317.6/ 21.0 1319.7/ 48.1 1331.4/ 74.1
1332.0/ 96.5 1323.0/114.6 1323.0/131.7 1325.7/135.3 1324.6/151.2
1321.2/169.4 1320.8/321.5 1321.5/327.2 1318.7/339.0 1319.9/354.4
1319.9/377.2 1318.6/391.3 1320.2/408.1 1321.1/428.7 1321.2/437.7
1320.1/448.0 1319.5/500.0

50 142 X-SEC : STA 523+92.50 ELEV .00 1324.8/500.0 1324.8/456.9 1325.8/440.6 1327.2/427.5 1327.2/395.3
1324.8/371.0 1324.0/166.1 1323.2/ 86.6 1326.4/ 71.9 1323.3/ 64.6
1323.0/ 36.2 1319.4/ .5 1319.4/ .0 1317.8/ 9.4 1317.8/ 19.0
1318.2/ 40.5 1331.0/ 75.6 1331.9/100.2 1322.4/115.5 1322.4/131.4
1324.5/137.2 1324.5/152.1 1321.2/171.3 1321.1/294.7 1321.6/300.3
1319.0/313.2 1319.8/329.1 1320.6/352.8 1318.7/368.8 1320.2/381.3
1321.2/401.8 1321.7/412.7 1320.1/422.4 1320.1/433.4 1321.0/445.1
1319.6/454.4 1319.6/500.0

50 143 X-SEC : STA 524+ .00 ELEV .00 1324.9/500.0 1325.2/457.8 1327.7/443.4 1327.2/392.3 1324.9/371.2
1324.2/250.6 1323.4/ 86.7 1326.8/ 74.5 1323.4/ 66.3 1322.7/ 39.3
1319.2/ .0 1317.6/ 9.1 1317.6/ 18.3 1319.5/ 43.5 1331.3/ 73.4
1331.6/ 94.6 1322.2/114.5 1322.2/130.4 1324.8/137.9 1324.8/148.6
1321.3/169.5 1321.0/289.8 1321.7/296.5 1318.9/309.1 1320.7/322.3
1320.6/348.3 1318.6/365.0 1320.6/382.0 1321.4/396.3 1321.4/408.4
1320.0/415.2 1319.9/446.6 1321.0/458.0 1319.6/467.5 1319.6/500.0

50 144 X-SEC : STA 525+ .00 ELEV .00 1325.9/500.0 1324.3/438.7 1323.8/328.5 1323.3/178.3 1323.9/120.6
1322.4/ 34.8 1318.9/ 10.5 1318.9/ .0 1317.1/ 6.8 1317.1/ 15.7
1318.3/ 19.8 1318.8/ 49.2 1330.2/ 75.1 1331.5/ 97.8 1321.2/114.2
1321.2/133.7 1324.6/135.8 1324.5/157.4 1320.9/177.5 1320.7/225.4
1321.3/272.7 1319.0/282.2 1321.2/300.6 1320.7/327.1 1318.1/338.0
1320.1/349.2 1321.5/376.5 1320.5/381.9 1321.5/384.9 1319.5/389.2
1320.3/392.9 1320.1/471.2 1320.2/500.0

FLOW =	3,360 cfs.	6,500 cfs.	3,140 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	2.46 ft.	3.78 ft.	3.47 ft.
DEPTH =	8.94 ft.	8.65 ft.	8.94 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel	=	418,142.1 lbs.
Hydrostatic pressure on downstream channel	=	390,555.5 lbs.
Horizontal component of pressure on invert	=	0.0 lbs.
Axial component of pressure on walls	=	0.0 lbs.
Retardation pressure of friction	=	4,974.6 lbs.
Momentum of moving mass of water in upstream channel	=	13,848.9 lbs.
Momentum of moving mass of water in downstream channel	=	53,796.0 lbs.
Axial component of moving mass of water in side channel	=	17,339.2 lbs.

JUNCTION ANALYSIS

COMPUTED BY: DATE: CHECKED BY:_____ DATE:_____

#13

SUBCRITCAL

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 150.00 ft. Manning's 'n' = 0.027

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	4,100 cfs.	6,500 cfs.	2,400 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	2.80 ft.	3.78 ft.	2.92 ft.
DEPTH =	8.93 ft.	8.65 ft.	8.93 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel	=	417,660.2 lbs.
Hydrostatic pressure on downstream channel	=	390,555.5 lbs.
Horizontal component of pressure on invert	=	0.0 lbs.

RT SECTION

50 145 X-SEC : STA 525+92.30 ELEV .00 1324.7/500.0 1324.3/398.1 1323.5/263.4 1323.3/129.5 1322.6/ 91.8
1326.7/ 78.2 1322.6/ 67.3 1322.4/ 39.6 1318.8/ 12.4 1317.9/ 5.5
1317.3/ .0 1317.1/ 12.7 1318.7/ 26.1 1319.3/ 47.7 1330.4/ 69.1
1331.6/ 96.3 1321.9/108.6 1321.7/125.1 1325.4/131.8 1324.1/156.6
1320.4/179.4 1319.9/227.5 1321.1/244.7 1319.1/254.4 1320.5/271.1
1320.2/299.4 1318.3/312.8 1320.0/331.8 1321.7/350.4 1320.9/353.7
1321.5/360.5 1320.3/370.0 1321.3/387.0 1320.2/394.1 1320.0/500.0

50 146 X-SEC : STA 526+ .00 ELEV .00 1324.8/500.0 1323.9/348.9 1323.4/186.8 1323.2/127.4 1322.5/ 90.8
1326.3/ 74.8 1322.7/ 65.7 1322.3/ 37.7 1319.0/ 15.0 1317.4/ 1.5
1317.4/ .0 1316.9/ 10.1 1318.9/ 25.9 1319.1/ 46.0 1330.4/ 70.9
1331.7/ 92.9 1321.7/109.6 1321.7/126.5 1325.3/130.8 1324.5/154.5
1321.0/170.0 1320.1/221.4 1320.9/240.7 1319.1/251.7 1321.0/269.5
1320.1/299.4 1318.3/311.9 1320.5/329.7 1322.1/348.5 1320.9/354.0
1321.9/355.9 1320.4/366.0 1320.4/395.5 1321.0/408.2 1320.0/418.6
1319.9/500.0

50 147 X-SEC : STA 527+ .00 ELEV .00 1324.7/500.0 1323.7/321.3 1323.7/243.7 1322.9/123.8 1322.7/ 91.9
1325.1/ 82.6 1322.3/ 72.7 1322.0/ 47.5 1318.5/ 22.9 1317.6/ 9.7
1317.4/ .0 1319.3/ 30.4 1320.0/ 42.1 1330.0/ 64.9 1331.2/ 88.0
1321.3/104.4 1321.3/121.0 1325.0/126.9 1325.0/148.0 1321.4/165.4
1320.9/220.5 1319.7/226.2 1321.1/242.4 1320.5/267.2 1318.6/282.3
1321.5/317.1 1320.7/321.9 1321.1/328.6 1320.1/330.5 1320.1/348.2
1321.1/370.7 1320.2/378.3 1319.9/495.1 1320.5/500.0

50 148 X-SEC : STA 528+ .00 ELEV .00 1324.5/500.0 1324.1/408.2 1323.1/282.8 1323.0/162.8 1322.4/ 94.4
1321.7/ 82.4 1321.7/ 46.9 1318.2/ 22.7 1317.0/ 12.0 1317.0/ .0
1318.4/ 7.6 1319.1/ 35.0 1330.4/ 60.2 1331.0/ 85.8 1321.9/102.4
1321.9/120.1 1324.7/124.4 1322.8/148.1 1321.0/159.3 1319.4/208.6
1321.1/223.3 1320.8/249.7 1320.2/258.9 1321.0/291.3 1321.6/307.1
1321.3/326.9 1320.3/338.3 1319.8/455.9 1320.7/462.5 1319.7/471.8
1319.5/500.0

Axial component of pressure on walls = -0.0 lbs.

Retardation pressure of friction = 4,083.3 lbs.

Momentum of moving mass of water in upstream channel = 20,633.7 lbs.

Momentum of moving mass of water in downstream channel = 53,796.0 lbs.

Axial component of moving mass of water in side channel = 10,136.5 lbs.

JUNCTION ANALYSIS

COMPUTED BY: DATE: CHECKED BY:_____ DATE:_____

SUBCRITCAL

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 150.00 ft. Manning's 'n' = 0.027

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	5,900 cfs.	6,500 cfs.	2,400 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	3.55 ft.	3.78 ft.	2.92 ft.
DEPTH =	8.70 ft.	8.65 ft.	8.70 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel = 395,197.0 lbs.

Hydrostatic pressure on downstream channel = 390,555.5 lbs.

Horizontal component of pressure on invert = 0.0 lbs.

Axial component of pressure on walls = 0.0 lbs.

Retardation pressure of friction = 5,361.2 lbs.

Momentum of moving mass of water in upstream channel = 44,038.0 lbs.

Momentum of moving mass of water in downstream channel = 53,796.0 lbs.

Axial component of moving mass of water in side channel = 10,474.4 lbs.

JUNCTION ANALYSIS

COMPUTED BY: DATE: CHECKED BY:_____ DATE:_____

SUBCRITCAL

RT SECTION

50 149 X-SEC : STA 529+ .00 ELEV .00 1324.3/500.0 1323.6/367.3 1323.2/221.7 1322.9/121.6 1325.5/113.3
1326.2/ 82.6 1322.7/ 70.4 1322.0/ 49.2 1318.5/ 27.3 1317.8/ 16.7
1316.6/ 10.0 1316.6/ .0 1318.4/ 15.2 1319.1/ 40.3 1329.6/ 62.3
1330.7/ 87.0 1321.3/104.5 1321.3/122.2 1324.3/128.3 1323.3/146.8
1319.9/175.2 1318.7/178.2 1319.4/195.9 1321.8/202.5 1321.2/228.3
1319.1/241.4 1320.8/260.3 1320.1/267.7 1320.9/274.2 1320.9/280.5
1319.9/293.1 1319.9/373.5 1319.5/500.0

50 150 X-SEC : STA 530+ .00 ELEV .00 1324.1/500.0 1323.6/350.1 1322.9/215.9 1323.1/135.1 1322.7/ 95.7
1323.7/ 88.6 1322.5/ 75.0 1322.4/ 48.1 1318.1/ 25.7 1317.5/ 17.2
1316.5/ 12.1 1316.0/ 1.1 1317.5/ .0 1319.5/ 37.9 1329.1/ 61.6
1330.0/ 88.3 1321.5/103.0 1321.5/118.9 1324.5/124.7 1324.3/146.0
1320.0/168.9 1318.7/177.4 1321.7/198.6 1321.5/222.5 1319.3/238.2
1321.1/259.3 1321.1/288.8 1319.3/405.4 1318.9/438.7 1319.5/500.0

50 151 X-SEC : STA 531+ .00 ELEV .00 1324.1/500.0 1323.9/380.2 1324.5/367.8 1323.2/324.1 1323.1/229.6
1323.4/137.5 1322.6/ 58.9 1317.8/ 25.9 1317.0/ 13.1 1316.1/ 9.4
1316.2/ .0 1318.4/ 8.9 1319.4/ 37.3 1329.4/ 64.8 1330.4/ 87.8
1321.5/106.6 1321.5/122.3 1324.8/126.1 1323.7/144.7 1320.1/166.5
1319.0/183.0 1321.7/203.0 1321.7/226.2 1319.1/239.7 1320.7/264.2
1320.1/370.0 1319.5/420.5 1319.5/500.0

50 152 X-SEC : STA 532+ .00 ELEV .00 1324.3/500.0 1323.9/374.1 1323.3/282.5 1322.7/ 58.0 1317.9/ 25.6
1317.4/ 13.2 1316.2/ 8.9 1316.2/ 2.1 1317.1/ .0 1317.7/ 9.2
1319.1/ 39.6 1329.8/ 65.5 1330.6/ 90.4 1321.2/103.4 1321.2/121.5
1324.1/128.3 1323.2/146.5 1319.2/181.4 1321.6/200.6 1321.6/227.1
1319.1/240.7 1320.7/264.7 1319.8/372.7 1319.2/491.4 1319.9/500.0

50 153 X-SEC : STA 532+41.00 ELEV .00 1324.0/500.0 1323.1/310.0 1322.8/ 99.8 1326.3/ 62.7 1322.3/ 51.8
1317.9/ 22.7 1317.5/ 15.4 1316.2/ 8.2 1316.2/ .0 1316.2/ 5.3
1318.4/ 10.8 1318.9/ 38.3 1329.4/ 65.8 1330.6/ 86.9 1321.7/105.0
1321.7/123.6 1324.5/125.7 1323.4/144.9 1320.2/172.2 1319.2/183.1
1322.1/200.4 1321.9/226.4 1319.7/239.4 1320.5/276.7 1320.5/346.2
1319.7/360.6 1319.5/445.4 1319.0/500.0

JUNCTION ANALYSIS

COMPUTED BY: DATE: CHECKED BY:_____ DATE:_____

SUBCRITCAL

#4

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 150.00 ft. Manning's 'n' = 0.027

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	3,360 cfs.	6,500 cfs.	3,140 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	2.46 ft.	3.78 ft.	3.47 ft.
DEPTH =	8.92 ft.	8.65 ft.	8.92 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel	=	416,834.5 lbs.
Hydrostatic pressure on downstream channel	=	390,555.5 lbs.
Horizontal component of pressure on invert	=	0.0 lbs.
Axial component of pressure on walls	=	0.0 lbs.
Retardation pressure of friction	=	3,731.4 lbs.
Momentum of moving mass of water in upstream channel	=	13,872.6 lbs.
Momentum of moving mass of water in downstream channel	=	53,796.0 lbs.
Axial component of moving mass of water in side channel	=	17,371.4 lbs.

RT SECTION

50 163 X-SEC : STA 540+ .00 ELEV .00 1322.8/500.0 1322.9/373.7 1322.9/262.6 1325.2/248.9 1325.1/237.2
1322.1/222.8 1322.2/167.0 1319.8/138.8 1319.9/104.3 1321.8/ 84.2
1321.8/ 46.8 1316.9/ 31.4 1316.9/ .0 1316.8/ 27.3 1316.1/ 38.7
1321.7/ 50.4 1322.3/120.3 1329.1/141.7 1329.8/163.0 1321.7/178.3
1321.9/196.3 1324.9/203.3 1322.3/232.0 1319.6/257.3 1323.0/272.0
1322.7/332.6 1321.3/344.5 1321.7/354.6 1320.9/363.1 1320.2/455.0
1319.6/500.0

50 164 X-SEC : STA 540+34.40 ELEV .00 1325.2/500.0 1325.2/359.4 1325.4/250.4 1324.9/240.0 1322.4/226.6
1322.1/175.0 1318.5/153.3 1318.1/ 92.5 1321.7/ 68.4 1321.9/ 46.3
1316.7/ 30.0 1316.7/ .0 1316.7/ 24.7 1316.7/ 40.4 1321.6/ 57.2
1322.4/132.7 1329.2/149.6 1330.1/171.4 1321.8/188.9 1321.8/206.6
1324.6/214.1 1323.9/227.8 1319.9/271.0 1322.8/286.0 1322.5/349.7
1320.8/382.1 1320.7/491.2 1320.5/500.0

50 165 X-SEC : STA 541+ .00 ELEV .00 1323.9/500.0 1323.1/253.1 1322.4/181.2 1317.2/141.6 1317.1/ 73.8
1322.1/ 54.7 1322.1/ 43.8 1317.3/ 28.0 1316.5/ .0 1316.5/ 33.0
1322.3/ 58.8 1322.3/146.1 1329.3/163.9 1329.9/184.9 1321.9/197.9
1321.9/215.5 1325.8/221.9 1323.1/243.0 1320.5/278.2 1319.4/286.3
1323.1/316.6 1322.3/383.7 1321.2/403.7 1321.3/449.6 1321.3/500.0

50 166 X-SEC : STA 541+52.00 ELEV .00 1324.1/500.0 1323.6/285.9 1323.1/225.8 1322.7/166.7 1315.6/141.1
1315.2/ 89.4 1316.3/ 74.4 1322.5/ 50.4 1322.1/ 39.3 1317.1/ 25.2
1316.3/ .0 1316.3/ 14.1 1317.1/ 37.8 1322.3/ 58.0 1322.7/151.5
1329.2/167.4 1330.3/187.4 1321.7/202.3 1321.7/219.5 1324.9/224.3
1322.7/250.3 1320.3/286.3 1320.5/309.5 1323.5/335.0 1322.3/404.6
1321.0/424.7 1320.6/500.0

50 167 X-SEC : STA 541+63.00 ELEV .00 1324.1/500.0 1323.8/315.9 1322.9/164.6 1322.5/150.6 1316.5/130.0
1316.8/ 72.6 1322.3/ 50.4 1322.3/ 38.5 1316.7/ 26.2 1316.7/ .0
1316.3/ 12.2 1317.2/ 37.9 1322.1/ 56.0 1322.5/155.2 1328.9/167.7
1329.8/184.6 1321.9/200.7 1321.9/218.7 1324.9/223.4 1323.5/249.8
1320.7/292.8 1320.6/312.6 1323.3/336.8 1322.5/392.1 1320.9/419.1
1320.7/500.0

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	5,900 cfs.	6,500 cfs.	600 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	3.55 ft.	3.78 ft.	1.19 ft.
DEPTH =	8.81 ft.	8.65 ft.	8.81 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel = 405,582.3 lbs.

Hydrostatic pressure on downstream channel = 390,555.5 lbs.

Horizontal component of pressure on invert = 0.0 lbs.

Axial component of pressure on walls = -0.0 lbs.

Retardation pressure of friction = 5,298.5 lbs.

Momentum of moving mass of water in upstream channel = 43,418.8 lbs.

Momentum of moving mass of water in downstream channel = 53,796.0 lbs.

Axial component of moving mass of water in side channel = 644.7 lbs.

JUNCTION ANALYSIS

COMPUTED BY: DATE: CHECKED BY:_____ DATE:_____

SUBCRITCAL

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 200.00 ft. Manning's 'n' = 0.027

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	5,900 cfs.	6,500 cfs.	600 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	3.55 ft.	3.78 ft.	1.19 ft.
DEPTH =	8.83 ft.	8.65 ft.	8.83 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel = 407,444.7 lbs.

RT SECTION

50 154 X-SEC : STA 533+ .00 ELEV .00
1324.7/500.0 1323.6/416.8 1323.5/256.1 1329.8/237.7 1330.6/203.6
1323.5/143.9 1323.5/ 87.6 1329.9/ 77.9 1330.1/ 63.8 1322.7/ 50.3
1318.2/ 28.4 1316.0/ 7.0 1316.0/ .0 1316.0/ 4.6 1317.7/ 14.2
1318.9/ 41.3 1329.6/ 62.7 1330.8/ 89.6 1321.5/103.8 1321.5/121.1
1325.3/128.4 1323.6/151.2 1319.6/175.2 1319.1/186.1 1321.7/207.4
1321.7/226.2 1319.2/240.8 1320.5/261.0 1320.5/384.7 1319.5/398.5
1319.5/442.3 1319.7/500.0

50 155 X-SEC : STA 534+ .00 ELEV .00
1324.1/500.0 1326.7/474.7 1324.7/408.8 1323.6/393.8 1323.8/333.3
1323.4/270.7 1325.2/242.6 1329.8/212.0 1329.6/198.5 1324.0/183.7
1322.9/ 99.3 1330.0/ 81.2 1330.0/ 64.5 1322.6/ 51.5 1321.5/ 42.4
1318.3/ 26.7 1316.3/ 1.2 1316.3/ .0 1316.3/ 10.4 1318.8/ 39.6
1330.2/ 64.6 1330.8/ 86.7 1321.2/106.0 1321.2/121.4 1324.5/127.2
1322.7/149.9 1319.8/171.1 1319.8/185.4 1322.4/200.4 1321.9/224.7
1321.7/265.1 1321.1/329.3 1319.3/423.1 1318.9/500.0

50 156 X-SEC : STA 534+55.00 ELEV .00
1324.4/500.0 1323.9/431.0 1323.8/362.8 1323.5/312.9 1324.7/294.6
1322.5/262.1 1322.5/212.2 1329.5/198.1 1330.0/168.3 1330.2/124.1
1324.9/ 73.6 1322.2/ 53.7 1321.5/ 44.6 1318.7/ 25.3 1317.1/ 14.6
1316.5/ .0 1316.5/ 13.1 1319.2/ 39.3 1329.7/ 65.9 1330.5/ 87.7
1321.1/103.5 1321.1/122.4 1324.3/128.9 1323.1/143.3 1319.5/174.8
1319.5/183.5 1322.3/202.2 1322.1/228.9 1319.2/244.6 1320.8/257.4
1320.1/280.5 1318.9/329.7 1321.8/356.6 1318.8/382.9 1319.4/445.8
1320.1/500.0

50 157 X-SEC : STA 535+ .00 ELEV .00
1324.3/500.0 1324.1/425.8 1324.0/380.3 1325.4/360.7 1323.2/339.1
1323.2/280.4 1324.7/259.9 1322.5/236.8 1321.9/158.1 1321.7/ 55.3
1317.9/ 20.0 1317.0/ 5.2 1315.7/ .0 1315.7/ 11.3 1318.9/ 43.3
1330.4/ 67.0 1330.5/ 90.2 1321.3/105.8 1321.3/121.6 1324.8/126.3
1323.5/144.1 1319.2/177.5 1319.2/183.0 1321.9/202.2 1321.9/232.1
1318.8/240.2 1320.5/258.9 1320.5/281.1 1320.4/304.4 1321.9/343.5
1321.7/369.5 1319.1/392.2 1319.6/468.6 1319.5/500.0

Horizontal component of pressure on invert = 0.0 lbs.

Axial component of pressure on walls = 0.0 lbs.

Retardation pressure of friction = 7,050.4 lbs.

Momentum of moving mass of water in upstream channel = 43,310.2 lbs.

Momentum of moving mass of water in downstream channel = 53,796.0 lbs.

Axial component of moving mass of water in side channel = 642.9 lbs.

JUNCTION ANALYSIS

COMPUTED BY: DATE: CHECKED BY:_____ DATE:_____

SUBCRITCAL

#2

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 200.00 ft. Manning's 'n' = 0.027

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	4,100 cfs.	6,500 cfs.	2,400 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	2.80 ft.	3.78 ft.	2.92 ft.
DEPTH =	8.94 ft.	8.65 ft.	8.94 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel = 419,086.0 lbs.

Hydrostatic pressure on downstream channel = 390,555.5 lbs.

Horizontal component of pressure on invert = 0.0 lbs.

Axial component of pressure on walls = -0.0 lbs.

Retardation pressure of friction = 5,441.6 lbs.

Momentum of moving mass of water in upstream channel = 20,595.3 lbs.

Momentum of moving mass of water in downstream channel = 53,796.0 lbs.

Axial component of moving mass of water in side channel = 10,116.0 lbs.

RT SECTION

50 158 X-SEC : STA 536+ .00 ELEV .00 1326.0/500.0 1322.9/463.1 1322.9/389.4 1323.3/285.8 1322.7/209.0
1324.7/193.7 1322.1/160.7 1321.8/ 76.8 1321.5/ 50.3 1317.7/ 24.6
1316.9/ 10.3 1315.7/ 1.4 1315.7/ .0 1315.7/ 4.2 1319.4/ 38.6
1330.0/ 66.6 1330.8/ 89.5 1321.6/104.7 1321.6/122.2 1324.3/127.6
1323.3/144.7 1320.0/167.9 1319.0/182.7 1322.7/202.4 1322.3/227.0
1319.3/240.7 1320.7/258.6 1320.1/287.9 1318.3/335.1 1319.5/374.2
1319.3/446.5 1319.0/500.0

50 159 X-SEC : STA 536+39.90 ELEV .00 1323.4/500.0 1322.7/468.4 1323.3/409.0 1322.9/262.4 1323.4/257.7
1323.0/197.2 1324.5/184.5 1323.9/170.4 1321.8/151.5 1321.9/ 49.4
1318.2/ 20.7 1317.3/ 10.2 1316.1/ 5.6 1316.1/ .0 1316.1/ 4.5
1319.2/ 46.9 1330.0/ 66.6 1330.6/ 89.6 1321.9/104.0 1321.9/121.7
1325.5/124.9 1324.0/142.2 1319.5/170.2 1319.3/187.5 1322.6/200.5
1322.4/226.3 1319.9/243.7 1320.7/256.9 1318.5/323.8 1319.4/364.2
1319.3/431.1 1318.9/500.0

50 160 X-SEC : STA 537+ .00 ELEV .00 1322.9/500.0 1323.1/412.7 1323.0/246.2 1322.9/212.2 1324.6/199.0
1324.4/189.7 1321.9/167.0 1321.9/110.6 1321.8/ 55.9 1317.7/ 27.8
1316.6/ 10.3 1315.7/ .0 1316.3/ 8.3 1319.3/ 46.7 1330.0/ 68.0
1330.7/ 92.2 1321.7/106.7 1321.7/125.5 1324.7/128.9 1323.4/147.2
1319.3/183.1 1322.2/207.2 1322.2/228.9 1320.3/248.4 1320.7/271.3
1319.7/281.4 1319.0/321.8 1319.1/424.9 1318.6/500.0

50 161 X-SEC : STA 538+ .00 ELEV .00 1322.7/500.0 1323.3/379.9 1323.1/301.9 1323.1/235.7 1325.0/225.9
1324.9/213.9 1322.3/192.9 1321.7/ 85.8 1321.2/ 43.5 1317.6/ 29.0
1316.7/ 10.8 1316.3/ .0 1316.4/ 16.6 1317.5/ 36.5 1321.4/ 49.9
1321.8/ 61.5 1329.9/ 82.4 1330.9/102.0 1321.7/118.9 1321.7/135.6
1324.9/143.1 1323.7/163.1 1319.7/195.1 1322.1/215.8 1322.5/243.1
1319.1/254.7 1319.1/270.3 1320.5/276.9 1320.5/287.8 1319.7/300.4
1319.5/450.8 1318.9/500.0

50 162 X-SEC : STA 539+ .00 ELEV .00 1322.9/500.0 1322.6/421.0 1322.8/255.4 1324.9/239.9 1324.7/230.7
1321.9/213.7 1322.2/178.6 1324.0/137.3 1322.5/118.6 1322.0/ 45.1
1321.3/ 36.4 1317.1/ 25.0 1317.6/ .0 1316.7/ 21.7 1316.0/ 42.1

ANTELOPE RWCD REACH 4	DT 4/85	HYDRAULICS SUMMARY

• WATER SURFACE PROFILE •

UPSTREAM OF JCT AT STA 489+30 :

$Q = 5900$ cfs, $b = 150$, $Z = 3$, $n = 0.027$

	STA	INV EL.	d (ft)	V (ft/s)
70	489+30	1317.47	8.83	3.79
100	489+00	1317.48		
200	488+00	1317.51		
300	487+00	1317.54		
400	486+00	1317.57		
511.92	485+88.08	1317.57	8.89	3.76

* from JCT. ANAL. WITH $Q_{DS} = 5900$

$d_{DS} = 8.83$

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

FILE RC3

''WASP2''SUBCRITICAL WATER SURFACE PROFILE

WSP = UPSTREAM OF POWERLINE FLOODWAY JCT. TO U.S. END OF PROJECT

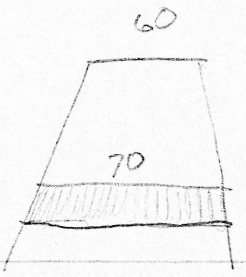
COMPUTED BY: DT DATE: 4/85 DATA FILE: RC3. CHECKED BY: MF 4/85 DATE: _____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
489+30	5900.00	150.00	3.00	3.548	8.830 (from JCT analysis)	1558.4	3.79	1326.52	1317.47	1326.30	0.00	0.24	0.99
	n=0.0270	So=0.000334	Sf=0.000330	Headloss Factor=0.000	Total Headloss=0.010 ft.	Se=0.000327							
490+00	5900.00	150.00	2.00	3.577	8.804	1475.7	4.00	1326.53	1317.48	1326.28	10.61	0.25	1.03
	n=0.0270	So=0.000303	Sf=0.000341	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.000340							
	5900.00	150.00	2.00	3.577	8.806	1476.1	4.00	1326.55	1317.50	1326.30	10.62	0.25	1.03
	n=0.0270	So=0.000298	Sf=0.000341	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.000340							
488+00	5900.00	150.00	2.00	3.577	8.809	1476.5	4.00	1326.57	1317.51	1326.32	10.62	0.25	1.03
	n=0.0270	So=0.000300	Sf=0.000341	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.000340							
	5900.00	150.00	2.00	3.577	8.811	1476.9	3.99	1326.58	1317.53	1326.34	10.62	0.25	1.03
	n=0.0270	So=0.000298	Sf=0.000341	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.000340							
488+00	5900.00	150.00	2.00	3.577	8.813	1477.3	3.99	1326.60	1317.54	1326.35	10.63	0.25	1.03
	n=0.0270	So=0.000303	Sf=0.000340	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.000339							
	5900.00	150.00	2.00	3.577	8.815	1477.7	3.99	1326.62	1317.56	1326.37	10.63	0.25	1.02
	n=0.0270	So=0.000298	Sf=0.000340	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.000338							
487+00	5900.00	150.00	2.00	3.577	8.817	1478.1	3.99	1326.63	1317.57	1326.39	10.63	0.25	1.02
	n=0.0270	So=0.000303	Sf=0.000340	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.000339							
	5900.00	150.00	2.00	3.577	8.819	1478.5	3.99	1326.65	1317.59	1326.40	10.63	0.25	1.02
486+00	n=0.0270	So=0.000298	Sf=0.000339	Headloss Factor=0.000	Total Headloss=0.017 ft.	Se=0.000339							
	5900.00	150.00	2.00	3.577	8.821	1478.9	3.99	1326.67	1317.60	1326.42	10.64	0.25	1.02
	n=0.0270	So=-.002519	Sf=0.000325	Headloss Factor=0.000	Total Headloss=0.004 ft.	Se=0.000326							
485+88.03	5900.00	150.00	3.00	3.548	8.883	1569.2	3.76	1326.67	1317.57	1326.45	10.70	0.24	0.98

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH

DT 2/19/25
RINCO RH
POWERLINE JCT

OK by Alderman
See attached



ANALYSES: 1. TRANSITION: MOMENT. Q=3140
6500
1625

* FOR ALTERNATE CONFIG. IF NECESSARY

2. JUNCTION:

CASE	$Q_{RINCO\,DS}$	Q_{POW}	ΣQ
1	3360	3140	6500
2	5900	600	6500
3	4100	2400	6500
4			

3. JCT:

BACKWATER:

(1) Q=3140 TO DS OF XDROP
b=60 z=2 n=0.027
=70
=80

SPILLWAY

RH POW

(2)

	L	b	z	S	ANV SL
TOP		45	2	0.11667	24.7
	60	60	3		17.7
	40	70	3	0.0000	
	22.5	80	3	0.0008	

JUNCTION ANALYSIS

RWCD RCH4

COMPUTED BY: ALDERMAN DATE: 2/27/85 CHECKED BY:_____ DATE:_____

SUBCRITCAL

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 150.00 ft. Manning's 'n' = 0.027

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	3,360 cfs.	6,500 cfs.	3,140 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	2.46 ft.	3.78 ft.	3.47 ft.
DEPTH =	8.54 ft.	8.23 ft.	8.54 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel	=	379,962.6 lbs.
Hydrostatic pressure on downstream channel	=	351,774.3 lbs.
Horizontal component of pressure on invert	=	0.0 lbs.
Axial component of pressure on walls	=	-0.0 lbs.
Retardation pressure of friction	=	4,186.1 lbs.
Momentum of moving mass of water in upstream channel	=	14,592.0 lbs.
Momentum of moving mass of water in downstream channel	=	56,949.2 lbs.
Axial component of moving mass of water in side channel	=	18,351.2 lbs.

JUNCTION ANALYSIS

RWCD RCH4

COMPUTED BY: ALDERMAN DATE: 2/27/85 CHECKED BY:_____ DATE:_____

SUBCRITCAL

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 150.00 ft. Manning's 'n' = 0.027

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	4,100 cfs.	6,500 cfs.	2,400 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	2.80 ft.	3.78 ft.	2.92 ft.
DEPTH =	8.55 ft.	8.23 ft.	8.55 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel =	380,890.4 lbs.
Hydrostatic pressure on downstream channel =	351,774.3 lbs.
Horizontal component of pressure on invert =	0.0 lbs.
Axial component of pressure on walls =	0.0 lbs.
Retardation pressure of friction =	4,574.3 lbs.
Momentum of moving mass of water in upstream channel =	21,698.3 lbs.
Momentum of moving mass of water in downstream channel =	56,949.2 lbs.
Axial component of moving mass of water in side channel =	10,705.4 lbs.

JUNCTION ANALYSIS

RWCD RCH4

COMPUTED BY: ALDERMAN DATE: 2/27/85 CHECKED BY:_____ DATE:_____

SUBCRITCAL

JUNCTION ANGLE = 30.00 deg. JUNCTION LENGTH = 150.00 ft. Manning's 'n' = 0.027

	UPSTREAM CHANNEL	DOWNSTREAM CHANNEL	SIDE CHANNEL
FLOW =	5,900 cfs.	6,500 cfs.	600 cfs.
BOTTOM WIDTH =	150.00 ft.	150.00 ft.	80.00 ft.
SIDE SLOPE =	3.00	3.00	3.00
INVERT ELEV. =	100.00 ft.	100.00 ft.	100.00 ft.
CRITICAL DEPTH =	3.55 ft.	3.78 ft.	1.19 ft.
DEPTH =	8.41 ft.	8.23 ft.	8.41 ft.

JUNCTION ANALYSIS - PRESSURE AND MOMENTUM VALUES

Hydrostatic pressure on upstream channel =	368,193.2 lbs.
Hydrostatic pressure on downstream channel =	351,774.3 lbs.
Horizontal component of pressure on invert =	0.0 lbs.
Axial component of pressure on walls =	0.0 lbs.
Retardation pressure of friction =	5,926.4 lbs.
Momentum of moving mass of water in upstream channel =	45,770.3 lbs.
Momentum of moving mass of water in downstream channel =	56,949.2 lbs.
Axial component of moving mass of water in side channel =	682.6 lbs.

ARIZONA
RWCO REACH 4 | DT 2/26/85 LMA 3/85 | JCT

- VELOCITY U.S. OF JCT w/ POWERLINE

FROM MOMENTUM ANALYSIS DEPTH UPSTREAM OF JCT ≃ 8.4 ft

w/ $Q_{DS} = 5900$ cfs

$$A = 3(8.4)^2 + 150(8.4) = 1472$$

$$V = Q/A = 5900/1472 = 4.01 \text{ ft/s}$$

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

ARIZONA RWCO REACH 4 | DT 2/26/85 INK 3/85 | TEMP INLET

- Construction of Reach 5 is expected to follow Reach 4 by 1 yr.
- A temporary inlet is required at the upstream end of Reach 4.
- check approx depth of flow for $Q_{10} = \frac{3000}{4}$

$Q_{10} = 1500$ c/s

- Try a ramp inlet as follows:

$b = 40$
$z = 2$
$S = 0.03$

- INITIAL DEPTH:

TRAP WEIR EQN.

$Q = CLH^{3/2} + CzH^{5/2}$

FIND FOR $C = 3.1$
$Q = 1500$

$H = 4.6$ FT

USE ROCK DEPTH = 5 FT ✓

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

Record#	LAB	FLD	STA	D	USC	LL	PI	SUN	QU	D75	UND	REM	COMP	SAMP
1	740052	S2405.1	708+75	2-2.7	SC	34	16		1108					
2	740053	S2450A.1	708+75	2-2.7	CL-1	27	8	28	0.0					
3	740054	S2451.1	695+00	3-6	CL-1	100	29	30						
4	740055	S2451.2	695+00	7.5-9	ML	NP		30						
5	740056	2451.3	695+00	11.5-13	GM	NP								
6	740057	S2454A.1	651+00	2-3	CL-2	26	9	29		.074				
7	740058	S2456A.1	723+00	3.5-3.7	CL-1	46	21	29	1584					
8	740059	S2456.2	623+00	5-5.7	CL-2	46	21	27						
9	740060	S2457.1	609+00	5-5.2	ML	28	5	31	316					
10	740061	S2457.2	609+00	7.5-7.7	CL-1	29	11	31	260	.105				
11	740062	S2458.1	584+25	2-2.7	SM-1	29	3	27						
12	740063	S2460.1	560+25	1-2	CL-1	26	10	31						
13	740064	S2460.2	560+25	6-7	ML	NP		32						
14	740065	S2460.3	560+25	7-10	SM-1	NP		32						
15	740066	S2461.1	547+00	13-17	SP-SM	NP								
16	740067	S2462.1	534+50	5-5.7	CL-1	28	10	32						
17	740068	S2463.1	520+00	6-9	CL-2	35	17	33	1642					
18	84W2380	2401.1	493+25	4-5	CL	37	17	31			X			
19	84W2381	2401.2	493+25	7-8	SC	29	12	32						
20	84W2382	2402.1	520+40	3-4	CL	41	19	31			X			
21	84W2383	2402.2	520+40	8-9	SM	NP		32						
22	84W2384	2403.1	486+50	8-9	CL	37	17				X			
23	84W2385	2404.1	541+70	3.5-4.5	SM	NP		33			X		X	
24	84W2386	2404.2	541+70	9-10	SM	NP		33			X			
25	84W2387	2405.1	547+75	8-9	CL	29	8	33			X			
26	84W2388	2405.2	547+75	12-13	ML	36	5	33						
27	84W2389	2406.1	557+75	4-5	ML	NP		32			X			
28	84W2390	2406.2	557+75	11-12	SC	30	11	33			X			
29	84W2391	2407.1	562+50	6-7	CL	34	15	32					X	
30	84W2392	2408.1	574+45	6-7	CL	24	8	31						BAG
31	84W2393	2408.2	574+45	12-13	CL-ML	22	4	32						BAG
32	84W2394	2409.1	584+00	2.5-3.5	CL	32	11	31						
33	84W2395	2409.2	584+00	6-7	SM	NP		31			X			
34	84W2396	2409.3	584+00	8-14	SM	NP		22						BAG
35	84W2397	2410.1	596+00	1-6	ML	NP		27						BAG
36	84W2398	2410.2	596+00	1-6	CL	34	13	31						BAG
37	84W2399	2411.1	607+00	3-4	SM	NP		29					X	
38	84W2400	2411.2	607+00	8-9	CL	40	23	27			X		X	
39	84W2401	2412.1	632+00	1.5-2.5	CL-ML	27	6	29						
40	84W2402	2412.2	632+00	12-13	SC	28	14	27			X			
41	84W2403	2413.1	643+50	1-4.5	CL-ML	26	5	29					X	BAG
42	84W2404	2413.2	643+50	4.5-16	CL-ML	20	4	23						BAG
43	84W2405	2414.1	658+00	2.5-3.5	SM	NP		29						
44	84W2406	2414.2	658+00	6.5-9.0	SM	NP		23						BAG
45	84W2407	2415.1	669+00	5-6	CL-ML	28	6	29					X	
46	84W2408	2415.2	669+00	12-13	CL	36	18	27			X		X	
47	84W2409	2416.1	678+00	9-10	ML	22	2	27			X			
48	84W2410	2417.1	690+00	3-4	CL-ML	25	6	28					X	
49	84W2411	2417.2	690+00	5-6	CL	29	11	29					X	
50	84W2412	2417.3	690+00	11-12	CL	27	10	27			X		X	
51	84W2413	2418.1	702+00	3-4	CL	33	12	28						
52	84W2414	2418.2	702+00	8-9	CL	28	9	27						
53	84W2415	2418.3	702+00	10-10.9	SM	NP		27			X			
54	84W2416	2419.1	715+00	5-6	CL	23	8	26						
55	84W2417	2419.2	715+00	10-11	SC-SM	22	7	28						
56	84W2418	2420.1	723+00	3-4	CL	33	12	29						
57	84W2419	2420.2	723+00	6-7	SM	NP		27			X			
58	84W2420	2421.1	723+00	6.5-16	SM	NP		30						BAG
59	84W2421	2422.1	732+00	4.5-5.5	SM	20	2	28						
60	84W2422	2424.1	743+00	8-9	SM	NP		26			X			
61	84W2423	2425.1	744+25	7.5-8.5	SM	NP		27						

										DHS
64	84W2426	2440.1	638+00	15-16	ML	29	2	31	X	
65	84W2427	2451.1	574+45	5-6	ML	NP		32	X	
66	84W2428	2454.1	547+75	7-8	ML	NP		32	X	
67	84W2429	2461.1	498+00	7-8	SC-SM	27	7	32	X	

Record#	LAB	FLD	STA	D	USC	LL	PI	SUN	QU	D75	UND	REM	COMP	SAMP
1	740052	S2405.1	708+75	2-2.7	SC	34	16		1108					
2	740053	S2450A.1	708+75	2-2.7	CL-1	27	8	28	0.0					
3	740054	S2451.1	695+00	3-6	CL-1	100	29	30						
4	740055	S2451.2	695+00	7.5-9	ML	NP		30						
5	740056	2451.3	695+00	11.5-13	GM	NP								
6	740057	S2454A.1	651+00	2-3	CL-2	26	9	29		.074				
7	740058	S2456A.1	723+00	3.5-3.7	CL-1	46	21	29	1584					
8	740059	S2456.2	623+00	5-5.7	CL-2	46	21	27						
9	740060	S2457.1	609+00	5-5.2	ML	28	5	31	316					
10	740061	S2457.2	609+00	7.5-7.7	CL-1	29	11	31	260	.105				
11	740062	S2458.1	584+25	2-2.7	SM-1	29	3	27						
12	740063	S2460.1	560+25	1-2	CL-1	26	10	31						
13	740064	S2460.2	560+25	6-7	ML	NP		32						
14	740065	S2460.3	560+25	7-10	SM-1	NP		32						
15	740066	S2461.1	547+00	13-17	SP-SM	NP								
16	740067	S2462.1	534+50	5-5.7	CL-1	28	10	32						
17	740068	S2463.1	520+00	6-9	CL-2	35	17	33	1642					
18	84W2380	2401.1	493+25	4-5	CL	37	17	31			X			
19	84W2381	2401.2	493+25	7-8	SC	29	12	32						
20	84W2382	2402.1	520+40	3-4	CL	41	19	31			X			
21	84W2383	2402.2	520+40	8-9	SM	NP		32						
22	84W2384	2403.1	486+50	8-9	CL	37	17				X			
23	84W2385	2404.1	541+70	3.5-4.5	SM	NP		33			X		X	
24	84W2386	2404.2	541+70	9-10	SM	NP		33			X			
25	84W2387	2405.1	547+75	8-9	CL	29	8	33			X			
26	84W2388	2405.2	547+75	12-13	ML	36	5	33						
27	84W2389	2406.1	557+75	4-5	ML	NP		32			X			
28	84W2390	2406.2	557+75	11-12	SC	30	11	33			X			
29	84W2391	2407.1	562+50	6-7	CL	34	15	32					X	
30	84W2392	2408.1	574+45	6-7	CL	24	8	31						BAG
31	84W2393	2408.2	574+45	12-13	CL-ML	22	4	32						BAG
32	84W2394	2409.1	584+00	2.5-3.5	CL	32	11	31						
33	84W2395	2409.2	584+00	6-7	SM	NP		31			X			
34	84W2396	2409.3	584+00	8-14	SM	NP		22						BAG
35	84W2397	2410.1	596+00	1-6	ML	NP		27						BAG
36	84W2398	2410.2	596+00	1-6	CL	34	13	31						BAG
37	84W2399	2411.1	607+00	3-4	SM	NP		29					X	
38	84W2400	2411.2	607+00	8-9	CL	40	23	27			X		X	
39	84W2401	2412.1	632+00	1.5-2.5	CL-ML	27	6	29						
40	84W2402	2412.2	632+00	12-13	SC	28	14	27			X			
41	84W2403	2413.1	643+50	1-4.5	CL-ML	26	5	29					X	BAG
42	84W2404	2413.2	643+50	4.5-16	CL-ML	20	4	23						BAG
43	84W2405	2414.1	658+00	2.5-3.5	SM	NP		29						
44	84W2406	2414.2	658+00	6.5-9.0	SM	NP		23						BAG
45	84W2407	2415.1	669+00	5-6	CL-ML	28	6	29					X	
46	84W2408	2415.2	669+00	12-13	CL	36	18	27			X		X	
47	84W2409	2416.1	678+00	9-10	ML	22	2	27			X			
48	84W2410	2417.1	690+00	3-4	CL-ML	25	6	28					X	
49	84W2411	2417.2	690+00	5-6	CL	29	11	29					X	
50	84W2412	2417.3	690+00	11-12	CL	27	10	27			X		X	
51	84W2413	2418.1	702+00	3-4	CL	33	12	28						
52	84W2414	2418.2	702+00	8-9	CL	28	9	27						
53	84W2415	2418.3	702+00	10-10.9	SM	NP		27			X			
54	84W2416	2419.1	715+00	5-6	CL	23	8	26						
55	84W2417	2419.2	715+00	10-11	SC-SM	22	7	28						
56	84W2418	2420.1	723+00	3-4	CL	33	12	29						
57	84W2419	2420.2	723+00	6-7	SM	NP		27			X			
58	84W2420	2421.1	723+00	6.5-16	SM	NP		30						BAG
59	84W2421	2422.1	732+00	4.5-5.5	SM	20	2	28						
60	84W2422	2424.1	743+00	8-9	SM	NP		26			X			
61	84W2423	2425.1	744+25	7.5-8.5	SM	NP		27						

NS NS NS NS NS NS US

QUD | QURD | QUR1/4 | QUR2D | MAXD | OPTM | 1GS-4

1108

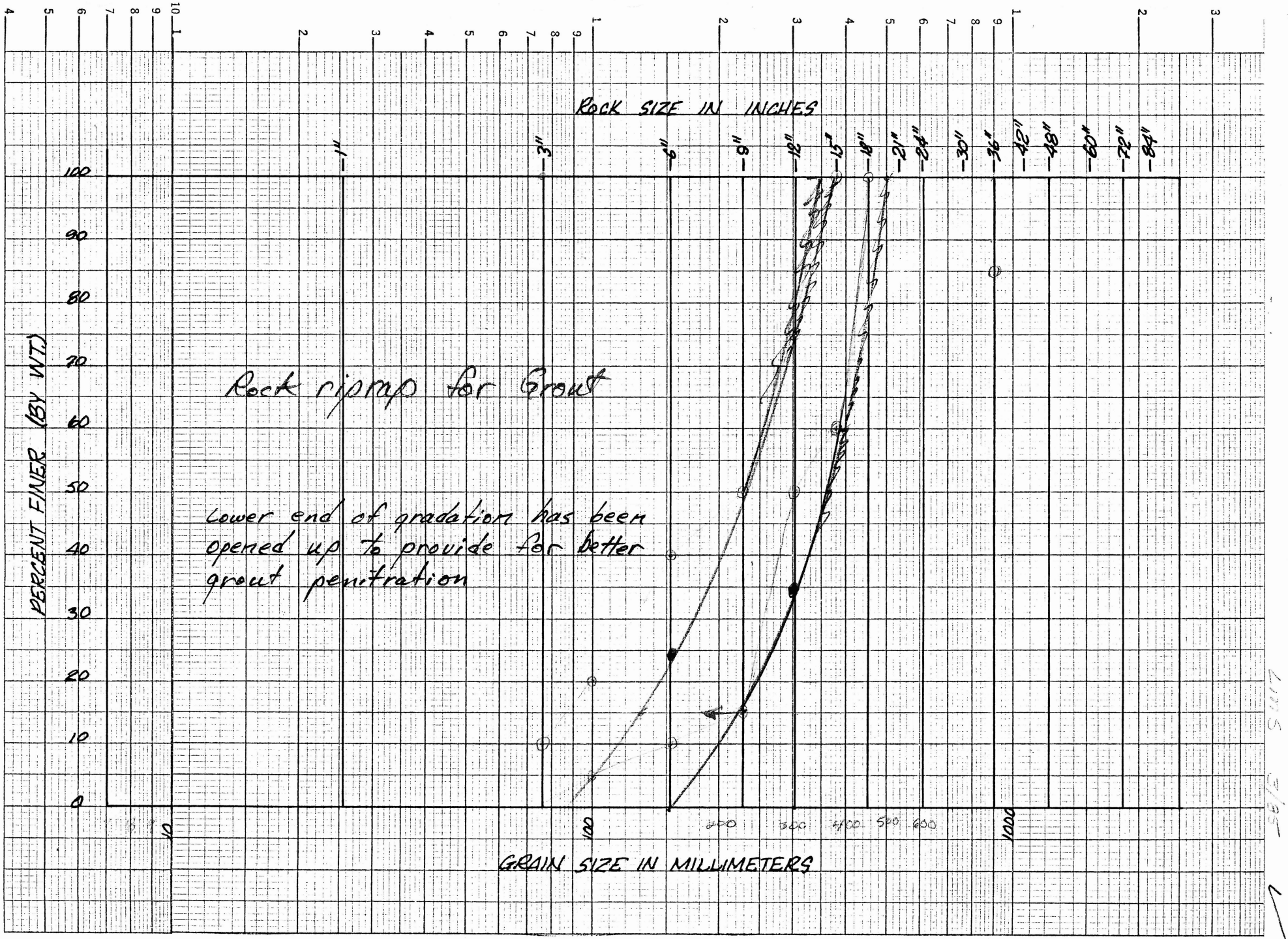
1584

316
260

1642

64	84W2426	2440.1	638+00	15-16	ML	29	2	31		X
65	84W2427	2451.1	574+45	5-6	ML	NP		32		X
66	84W2428	2454.1	547+75	7-8	ML	NP		32		X
67	84W2429	2461.1	498+00	7-8	SC-SM	27	7	32		X

SEMI-LOGARITHMI
3 CYCLES X 140 DIV
KEUFFEL & ESSE
46 5813
MADE IN U. S. A.



REMARKS

DESIGNED AT

BY

DATE

PROJECT and STATE

MATERIALS TESTING REPORT

U.S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE

DRAIN MATERIALS

Form SCS 130
5-65

ARIZONA RWCD R4

DT 2/13/85 SMS 3/85

R/C/GR OUTLET TRANSITION

PROBLEM: IN DESIGN OF THE TRANSITION DOWNSTREAM OF POWER RD WSP CALCULATIONS SHOW THAT AN $n = 0.035$ IS REQUIRED FOR SATISFACTORY PERFORMANCE.

NEED D_{50} REQ'D TO OBTAIN VARIOUS n

ANALYSIS: (. TR59: EQN (2) p7

$$n = C_n (D_{50})^{EXPN} \qquad EXPN = 1/6, \quad C_n = 0.0395$$

D_{50} = SIZE 50% FINER (FT)

$$D_{50} = (n/C_n)^{1/EXPN}$$

$$D_{50} = (25.32\, n)^6$$

n	D_{50} (in)
0.015	0.04
0.020	0.2
0.025	0.8
0.030	2.3
0.035	5.8
0.040	13
0.045	26
0.026	1.0
0.027	1.2
0.028	1.5
0.029	1.9
0.031	2.8
0.032	3.4
0.033	4.1
0.034	4.9

ARIZONA

DT 11/8/84 REVISED RL YMA 3/85

FIELD	LAB	MAX WT	OPT. MOIST	$\frac{g}{cm^3}$
2402.1	84W 2382 "B"	106.0	18.0	2.68
2404.1	84W 2385 B	120.5	11.0	2.64
2406.1	84W 2389 B	110.0	14.5	2.68
2407.1	84W 2391 B	104.0	14.5	2.67
2409.1	84W 2395 B	102.5	19.5	2.70
2411.1	84W 2399 B	120.5	10.0	2.70
2411.2	84W 2400 B	111.5	15.5	2.68
2412.2	84W 2402 B	112.5	12.5	2.64
2413.1	84W 2403 B	108.5	17	2.72
2413.2	84W 2404 B	120.5	11	2.67
2415.1	84W 2407 B	100.5	22	2.69
2415.2	84W 2408 B	112.5	15.5	2.67
2416.1	84W 2409 B	105.5	18	2.69
2417.1	84W 2410 B	107.0	18.5	2.69
2417.2	84W 2411 B	107.0	18	2.69
2417.3	84W 2412 B	113.0	15	2.68
2419.1	84W 2416 B	122.0	12	2.71
2419.2	84W 2417 B	119.5	13	2.69
2420.2	84W 2419 B	125.5	10.5	2.70
2454.1	84W 2428 B	112.5	14	2.65
2461.1	84W 2429 B	119.5	12.5	2.67

ARIZONA RNCD

DT 12/18/84

POWERLINE JCT - DESIGN Q 2

PER 12/11/84 LETTER FROM RALPH ARRINGTON

100 yr PEAK PER 1984 STUDIES	2400 cfs
POWERLINE FLOODWAY DESIGN PEAK	3140
RNCD PLANNING HYDROLOGY	1600

EXISTING

HYDRAULICS - POWERLINE:

Q = 3140
S = 0.00296
~~B = 60~~
Z = 2
n = 0.027

n = 0.030

d = 5.40
A = 382
V = 8.21

n = 0.035

d = 5.74
A = 40
V = 7.66

d = 6.27
A = 455
V = 6.90

d = 4.19 FT

S_c, n = 0.027 S_c = 0.005598
n = 0.024 = 0.007085

ARIZONA RWCD R4

DT 1/15/85

EXISTING POWERLINE FLOODWAY

CHECK VEL WITH FLOW AT TOP OF RR.

Q = 3140

S = 0.00296

b = ~~50~~ [illegible] OK

z = 2

d = 6 ft

$A = bd + zd^2 = 50(6) + 2(6)^2 = 372\ ft^2$

$V = 3140/372 = 8.44\ ft/s$

$P = b + 2d\sqrt{5} = 76.83$

Back figure n

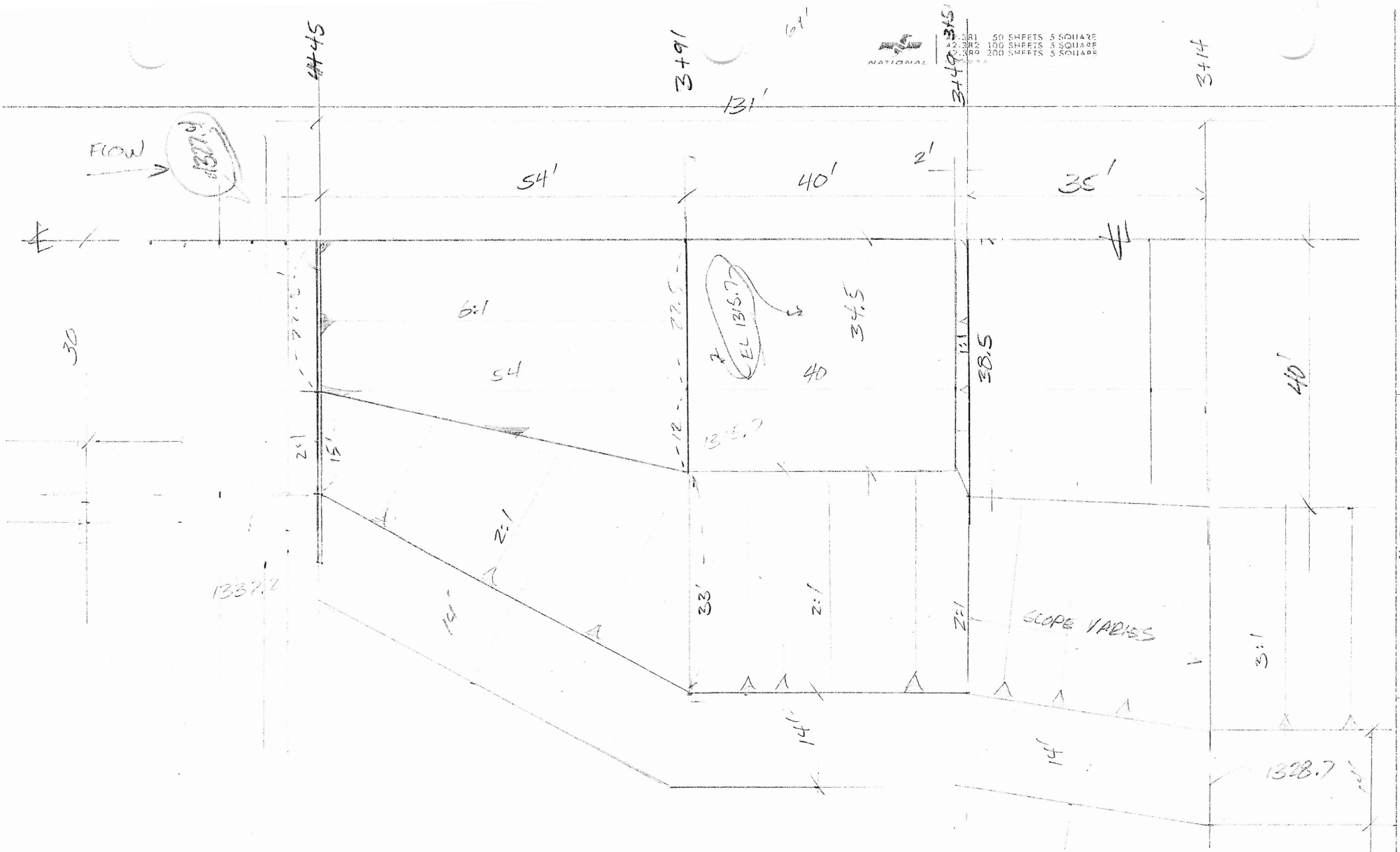
$V = \frac{1.486 R^{2/3} S^{1/2}}{n}$ OK

$n = \frac{1.486 R^{2/3} S^{1/2}}{V}$

$= \frac{1.486 (372/76.83)^{2/3} (0.00296)^{1/2}}{8.44}$

$n = 0.027$

$d_c = 4.19\ ft$



POWERLINE FLUDY GROUTED ROCK DROP

1in = 20ft

R4POWX

''WASP2''SUPERCRITICAL WATER SURFACE PROFILE

COMPUTED BY: DATE: DATA FILE: R4POWX CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
4+45.00	3140.00	45.00	2.00	4.933	4.900	268.5	11.69	1328.12	1321.10	1326.00	0.00	1.01	4.99
	n=0.0300	So=0.100006		Sf=0.012527	Headloss Factor=0.000		Total Headloss=0.050 ft.		Se=0.012489				
4+41.00	3140.00	46.78	2.00	4.829	3.811	207.3	15.15	1328.07	1320.70	1324.51	4.76	1.46	6.00
	n=0.0300	So=0.100000		Sf=0.023084	Headloss Factor=0.000		Total Headloss=0.115 ft.		Se=0.023032				
4+36.00	3140.00	49.00	2.00	4.706	3.344	186.2	16.86	1327.96	1320.20	1323.54	4.18	1.72	6.36
	n=0.0300	So=0.100000		Sf=0.031407	Headloss Factor=0.000		Total Headloss=0.157 ft.		Se=0.031393				
4+31.00	3140.00	51.22	2.00	4.590	3.034	173.8	18.06	1327.80	1319.70	1322.73	3.79	1.92	6.56
	n=0.0300	So=0.100000		Sf=0.039191	Headloss Factor=0.000		Total Headloss=0.196 ft.		Se=0.039156				
4+26.00	3140.00	53.44	2.00	4.480	2.799	165.2	19.00	1327.61	1319.20	1322.00	3.50	2.09	6.68
	n=0.0300	So=0.100000		Sf=0.046725	Headloss Factor=0.000		Total Headloss=0.234 ft.		Se=0.046703				
4+21.00	3140.00	55.67	2.00	4.376	2.610	158.9	19.76	1327.37	1318.70	1321.31	3.26	2.25	6.75
	n=0.0300	So=0.100000		Sf=0.054051	Headloss Factor=0.000		Total Headloss=0.270 ft.		Se=0.054027				
4+16.00	3140.00	57.89	2.00	4.278	2.454	154.1	20.38	1327.10	1318.20	1320.65	3.07	2.38	6.78
	n=0.0300	So=0.100000		Sf=0.061154	Headloss Factor=0.000		Total Headloss=0.306 ft.		Se=0.061118				
4+11.00	3140.00	60.11	2.00	4.185	2.322	150.3	20.89	1326.80	1317.70	1320.02	2.90	2.50	6.79
	n=0.0300	So=0.100000		Sf=0.067993	Headloss Factor=0.000		Total Headloss=0.340 ft.		Se=0.067974				
4+06.00	3140.00	62.33	2.00	4.096	2.208	147.4	21.31	1326.46	1317.20	1319.41	2.76	2.61	6.78
	n=0.0300	So=0.100000		Sf=0.074524	Headloss Factor=0.000		Total Headloss=0.373 ft.		Se=0.074508				
4+01.00	3140.00	64.56	2.00	4.012	2.109	145.1	21.64	1326.08	1316.70	1318.81	2.64	2.71	6.76
	n=0.0300	So=0.100000		Sf=0.080705	Headloss Factor=0.000		Total Headloss=0.404 ft.		Se=0.080670				
3+96.00	3140.00	66.78	2.00	3.931	2.023	143.3	21.91	1325.68	1316.20	1318.22	2.53	2.79	6.72

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.100000		Sf=0.086503	Headloss Factor=0.000		Total Headloss=0.433 ft.		Se=0.086454				

	n=0.0300	So=0.000000	Sf=0.084724	Headloss Factor=0.000	Total Headloss=0.424 ft.	Se=0.084686						
3+86.00	3140.00	69.00	2.00	3.854	2.009	146.7	21.41	1324.82	1315.70	1317.71	2.51	2.73	6.54
	n=0.0300	So=0.000000	Sf=0.076363	Headloss Factor=0.000	Total Headloss=0.382 ft.	Se=0.076333						
3+81.00	3140.00	69.00	2.00	3.854	2.071	151.5	20.73	1324.44	1315.70	1317.77	2.59	2.61	6.41
	n=0.0300	So=0.000000	Sf=0.068998	Headloss Factor=0.000	Total Headloss=0.345 ft.	Se=0.068963						
3+76.00	3140.00	69.00	2.00	3.854	2.134	156.3	20.08	1324.10	1315.70	1317.83	2.67	2.49	6.28
	n=0.0300	So=0.000000	Sf=0.062480	Headloss Factor=0.000	Total Headloss=0.312 ft.	Se=0.062446						
3+71.00	3140.00	69.00	2.00	3.854	2.197	161.2	19.47	1323.79	1315.70	1317.90	2.75	2.38	6.15
	n=0.0300	So=0.000000	Sf=0.056687	Headloss Factor=0.000	Total Headloss=0.283 ft.	Se=0.056652						
3+66.00	3140.00	69.00	2.00	3.854	2.261	166.2	18.89	1323.50	1315.70	1317.96	2.83	2.28	6.03
	n=0.0300	So=0.000000	Sf=0.051515	Headloss Factor=0.000	Total Headloss=0.258 ft.	Se=0.051495						
3+61.00	3140.00	69.00	2.00	3.854	2.325	171.3	18.33	1323.24	1315.70	1318.03	2.91	2.18	5.91
	n=0.0300	So=0.000000	Sf=0.046879	Headloss Factor=0.000	Total Headloss=0.234 ft.	Se=0.046839						
3+56.00	3140.00	69.00	2.00	3.854	2.391	176.4	17.80	1323.01	1315.70	1318.09	2.99	2.09	5.79
	n=0.0300	So=0.000000	Sf=0.042707	Headloss Factor=0.000	Total Headloss=0.214 ft.	Se=0.042693						
3+51.00	3140.00	69.00	2.00	3.854	2.458	181.7	17.29	1322.80	1315.70	1318.16	3.07	2.01	5.67

2/15/85
POWERLINE GROUP
OT

493+60 13

626 +00
555 +00
552 +00
492 +60

1309.05
1310.82
1310.31
1315.36

1200.

11

R=

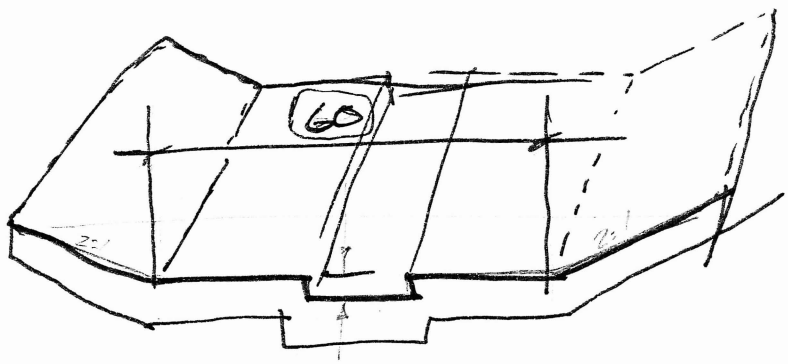
A= ~~(6.16(2)+50)6.16~~
= ~~384~~

(5.91(2)+50)5.91
= 365

P= ~~B+ 2015~~
= 76.43
R= 4.7756
$R^{2/3}$ = 2.83259

= 3291

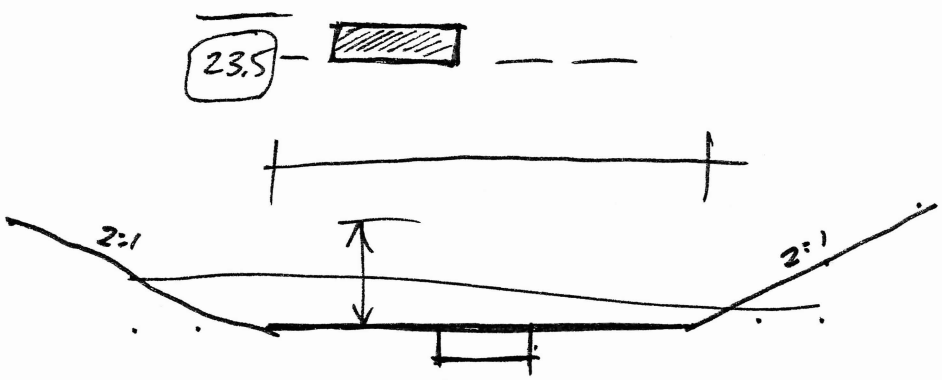
3140



2/15
POWERLINE
DROP
D.T.

H = 5.9

30



$\frac{3140}{51}$ → 62 cfs/ft

$\frac{2400}{51}$ → 47 cfs/ft

$\frac{1600}{51}$ → 31 cfs/ft

$Q_{10} \simeq \frac{600}{51}$ → 12 cfs/ft

ARIZONA RWCD Rd
D. Thackeray 2/14/05
JCT AT POWERLINE

Approx T_W:

- FB FLOW IN RDOF 3300 CFS
- ASSUME NO FLOW FROM U.S. IN RWCD
- USE NORMAL DEPTH

D_N: $S = 0.0009$
$n = 0.014$
$b = 50$
$z = 2$

$D = 5.91$ FT
$A = 365$
$V = 9.0349$

$H_e = 5.91 + 1.27$ ft
$H_e = 7.18$ ft

~~USE~~ $T_W = 5.9 \times 0.9 = 5.31$

$Q = 3140$
$n = 0.014$
$b = 50$
$z = 2$
$S = 0.0009$

$D_N = 5.74$

ARIZONA
DT 2/15/85 RWD FY
YMS 3/85

PROBLEM: DESIGN DROP IN POWERLINE FLOODWAY

ANALYSIS: 1. USE GROUTED ROCK DROP. ✓

2. USE TRAP R/C WEIR CREST. ✓

3. MAINTAIN CAPACITY IN POWERLINE FLY. W/O EXCESSIVE DRAWDOWN. ✓

4. PROVIDE RECESSED BASIN AT BASE OF DROP TO ASSURE HYDRAULIC JUMP OCCURS AT MINIMUM TW LEVELS. ✓

ARIZONA RWCD REACH 4

DT 2/11/85 YMH 3/85

PROBLEM: CHECK WEIR DIMENSIONS AT CREST OF DROP IN POWERLINE ENV AT RWCD ENV.

ANALYSIS:

1. Check USING TRAP. WEIR EQN:

$$Q = CLH^{3/2} + CzH^{5/2}$$

CHECK:

1/15/85 COMPS.

$n_{ch} = 0.027$
$d = 6.0$
$Q = 3140\ cfs$ ✓ (1.11)
$V = 8.44$

$$H = 6.0 + \frac{8.4^2}{64.4} = 7.11\ ft$$

SOLUTION:

FOR $C = 3.1$, $z = 2$, $Q = 3140$

FIND

L	H
60	5.85
50	6.39
45	6.70
40	7.05

L=45, z=2
Q=3140
$d_c = 4.93$
$V_c = 8.53\ ft/s$
$V^2/2g = 1.13$
$A = 368\ ft^2$
$P_{cr} = 6.96$

TRY WEIR L = 45 ft ✓

H_w	Q
4.8	1780
5.0	1906
5.5	2239
6.0	2597
6.5	2980
7.0	3387 ✓

ARIZONA RMCD R4

DT 2/15/85 LMS 3/85

- TRY RECESSING BASIN 2.0 FT

FROM WSP COMPS:

D = 45
Z = 2
S = 0.10
n = 0.035

AT BASE OF JDMP

F_r = 2.80

EGL = 1325.4
INV = 1313.7

H_e = 11.7

LOSS ≈ (FIG VI-20) 0.22
HEC 14

$\Delta H_e \approx 11.7(0.22) = 2.57$ FT

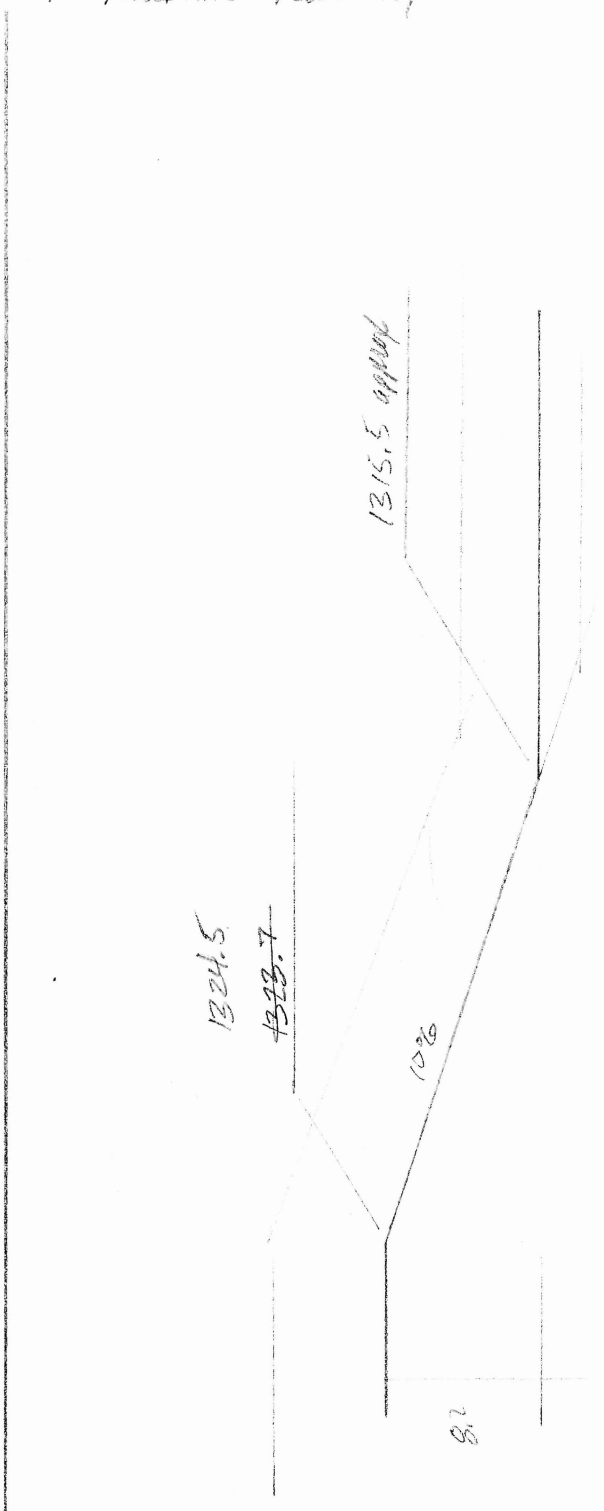
DS DEPTH ≈ 11.7 − 2.6 − 2.0 = 7.10 FT

TW AVAIL ≈ 5.9

ARIZONA
D. Thackeray 2/13/85

RUKO R4

JCT AT POWERLINE FLOODWAY



2/15/85 AT

''WASP2''SUPERCRITICAL WATER SURFACE PROFILE

POWERLINE DROP

COMPUTED BY: DATE: DATA FILE: R4POWC CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
10+00.00	3140.00	45.00	2.00	4.933	4.900	268.5	11.69	1330.72	1323.70	1328.60	0.00	1.01	4.99
	n=0.0350	So=0.100000		Sf=0.016610		Headloss Factor=0.000		Total Headloss=0.083 ft.		Se=0.016607			
9+95.00	3140.00	45.00	2.00	4.933	3.966	209.9	14.96	1330.64	1323.20	1327.17	4.96	1.42	6.03
	n=0.0350	So=0.100000		Sf=0.028072		Headloss Factor=0.000		Total Headloss=0.140 ft.		Se=0.028037			
9+90.00	3140.00	45.00	2.00	4.933	3.682	192.8	16.28	1330.50	1322.70	1326.38	4.60	1.60	6.41
	n=0.0350	So=0.100000		Sf=0.034922		Headloss Factor=0.000		Total Headloss=0.175 ft.		Se=0.034876			
9+85.00	3140.00	45.00	2.00	4.933	3.498	181.9	17.26	1330.33	1322.20	1325.70	4.37	1.73	6.68
	n=0.0350	So=0.100000		Sf=0.040841		Headloss Factor=0.000		Total Headloss=0.204 ft.		Se=0.040804			
9+80.00	3140.00	45.00	2.00	4.933	3.363	174.0	18.05	1330.12	1321.70	1325.06	4.20	1.84	6.88
	n=0.0350	So=0.100000		Sf=0.046147		Headloss Factor=0.000		Total Headloss=0.231 ft.		Se=0.046111			
9+75.00	3140.00	45.00	2.00	4.933	3.259	167.9	18.70	1329.89	1321.20	1324.46	4.07	1.94	7.05
	n=0.0350	So=0.100000		Sf=0.050965		Headloss Factor=0.000		Total Headloss=0.255 ft.		Se=0.050935			
9+70.00	3140.00	45.00	2.00	4.933	3.175	163.0	19.26	1329.64	1320.70	1323.87	3.97	2.02	7.19
	n=0.0350	So=0.100000		Sf=0.055363		Headloss Factor=0.000		Total Headloss=0.277 ft.		Se=0.055339			
9+65.00	3140.00	45.00	2.00	4.933	3.105	159.0	19.75	1329.36	1320.20	1323.31	3.88	2.09	7.30
	n=0.0350	So=0.100000		Sf=0.059385		Headloss Factor=0.000		Total Headloss=0.297 ft.		Se=0.059337			
9+60.00	3140.00	45.00	2.00	4.933	3.047	155.7	20.17	1329.06	1319.70	1322.75	3.81	2.15	7.40
	n=0.0350	So=0.100000		Sf=0.063067		Headloss Factor=0.000		Total Headloss=0.315 ft.		Se=0.063041			
9+55.00	3140.00	45.00	2.00	4.933	2.998	152.9	20.54	1328.75	1319.20	1322.20	3.75	2.21	7.49
	n=0.0350	So=0.100000		Sf=0.066433		Headloss Factor=0.000		Total Headloss=0.332 ft.		Se=0.066397			
9+50.00	3140.00	45.00	2.00	4.933	2.956	150.5	20.86	1328.42	1318.70	1321.66	3.70	2.26	7.56

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0350	So=0.100000		Sf=0.069511		Headloss Factor=0.000		Total Headloss=0.348 ft.		Se=0.069480			
9+45.00	3140.00	45.00	2.00	4.933	2.920	148.4	21.15	1328.07	1318.20	1321.12	3.68	2.31	7.63

R4POWX POWERLINE DROP

''WASP2''SUPERCRITICAL WATER SURFACE PROFILE

CHUTE
n=0.035
Q= 3140

COMPUTED BY: DATE: DATA FILE: R4POWX CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
4+45.00	3140.00	45.00	2.00	4.933	4.900	268.5	11.69	1331.72	1324.70	1329.60	0.00	1.01	4.99
	n=0.0350	So=0.166667		Sf=0.021383	Headloss Factor=0.000	Total Headloss=0.192 ft.		Se=0.021379					
4+36.00	3140.00	49.00	2.00	4.706	3.099	171.1	18.36	1331.53	1323.20	1326.30	3.87	1.94	6.74
	n=0.0350	So=0.166577		Sf=0.056092	Headloss Factor=0.000	Total Headloss=0.280 ft.		Se=0.056069					
4+31.00	3140.00	51.22	2.00	4.590	2.791	158.5	19.81	1331.25	1322.37	1325.16	3.49	2.19	6.98
	n=0.0350	So=0.166602		Sf=0.071405	Headloss Factor=0.000	Total Headloss=0.357 ft.		Se=0.071379					
4+26.00	3140.00	53.44	2.00	4.480	2.562	150.1	20.92	1330.89	1321.53	1324.10	3.20	2.40	7.11
	n=0.0350	So=0.166821		Sf=0.086136	Headloss Factor=0.000	Total Headloss=0.431 ft.		Se=0.086102					
4+21.00	3140.00	55.67	2.00	4.376	2.383	144.0	21.80	1330.46	1320.70	1323.08	2.98	2.58	7.19
	n=0.0350	So=0.166577		Sf=0.100214	Headloss Factor=0.000	Total Headloss=0.501 ft.		Se=0.100186					
4+16.00	3140.00	57.89	2.00	4.278	2.238	139.6	22.49	1329.96	1319.87	1322.11	2.80	2.74	7.22
	n=0.0350	So=0.166797		Sf=0.113509	Headloss Factor=0.000	Total Headloss=0.568 ft.		Se=0.113489					
4+11.00	3140.00	60.11	2.00	4.185	2.118	136.3	23.04	1329.39	1319.03	1321.15	2.65	2.88	7.23
	n=0.0350	So=0.166626		Sf=0.125907	Headloss Factor=0.000	Total Headloss=0.630 ft.		Se=0.125867					
4+06.00	3140.00	62.33	2.00	4.096	2.016	133.8	23.46	1328.77	1318.20	1320.22	2.52	3.00	7.21
	n=0.0350	So=0.166577		Sf=0.137289	Headloss Factor=0.000	Total Headloss=0.686 ft.		Se=0.137244					
4+01.00	3140.00	64.56	2.00	4.012	1.930	132.0	23.78	1328.08	1317.37	1319.30	2.41	3.10	7.17
	n=0.0350	So=0.166797		Sf=0.147613	Headloss Factor=0.000	Total Headloss=0.738 ft.		Se=0.147577					
3+96.00	3140.00	66.78	2.00	3.931	1.855	130.8	24.01	1327.34	1316.53	1318.39	2.32	3.19	7.12
	n=0.0350	So=0.166626		Sf=0.156834	Headloss Factor=0.000	Total Headloss=0.784 ft.		Se=0.156815					
3+91.00	3140.00	69.00	2.00	3.854	1.790	129.9	24.16	1326.56	1315.70	1317.49	2.24	3.26	7.05

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0350	So=0.000000		Sf=0.156256	Headloss Factor=0.000	Total Headloss=0.313 ft.		Se=0.156180					
3+89.00	3140.00	69.00	2.00	3.854	1.824	132.5	23.70	1326.24	1315.70	1317.52	2.28	3.17	6.97

R4POWX POWERLINE DROP

''WASP2''SUPERCRITICAL WATER SURFACE PROFILE

CHUTE
n=0.035
Q=3140

COMPUTED BY: DATE: DATA FILE: R4POWX CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
4+45.00	3140.00	45.00	2.00	4.933	4.900	268.5	11.69	1331.72	1324.70	1329.60	0.00	1.01	4.99
	n=0.0350	So=0.166667		Sf=0.021383	Headloss Factor=0.000	Total Headloss=0.192 ft.		Se=0.021379					
4+36.00	3140.00	49.00	2.00	4.706	3.099	171.1	18.36	1331.53	1323.20	1326.30	3.87	1.94	6.74
	n=0.0350	So=0.166577		Sf=0.056092	Headloss Factor=0.000	Total Headloss=0.280 ft.		Se=0.056069					
4+31.00	3140.00	51.22	2.00	4.590	2.791	158.5	19.81	1331.25	1322.37	1325.16	3.49	2.19	6.98
	n=0.0350	So=0.166602		Sf=0.071405	Headloss Factor=0.000	Total Headloss=0.357 ft.		Se=0.071379					
4+26.00	3140.00	53.44	2.00	4.480	2.562	150.1	20.92	1330.89	1321.53	1324.10	3.20	2.40	7.11
	n=0.0350	So=0.166821		Sf=0.086136	Headloss Factor=0.000	Total Headloss=0.431 ft.		Se=0.086102					
4+21.00	3140.00	55.67	2.00	4.376	2.383	144.0	21.80	1330.46	1320.70	1323.08	2.98	2.58	7.19
	n=0.0350	So=0.166577		Sf=0.100214	Headloss Factor=0.000	Total Headloss=0.501 ft.		Se=0.100186					
4+16.00	3140.00	57.89	2.00	4.278	2.238	139.6	22.49	1329.96	1319.87	1322.11	2.80	2.74	7.22
	n=0.0350	So=0.166797		Sf=0.113509	Headloss Factor=0.000	Total Headloss=0.568 ft.		Se=0.113489					
4+11.00	3140.00	60.11	2.00	4.185	2.118	136.3	23.04	1329.39	1319.03	1321.15	2.65	2.88	7.23
	n=0.0350	So=0.166626		Sf=0.125907	Headloss Factor=0.000	Total Headloss=0.630 ft.		Se=0.125867					
4+06.00	3140.00	62.33	2.00	4.096	2.016	133.8	23.46	1328.77	1318.20	1320.22	2.52	3.00	7.21
	n=0.0350	So=0.166577		Sf=0.137289	Headloss Factor=0.000	Total Headloss=0.686 ft.		Se=0.137244					
4+01.00	3140.00	64.56	2.00	4.012	1.930	132.0	23.78	1328.08	1317.37	1319.30	2.41	3.10	7.17
	n=0.0350	So=0.166797		Sf=0.147613	Headloss Factor=0.000	Total Headloss=0.738 ft.		Se=0.147577					
3+96.00	3140.00	66.78	2.00	3.931	1.855	130.8	24.01	1327.34	1316.53	1318.39	2.32	3.19	7.12
	n=0.0350	So=0.166626		Sf=0.156834	Headloss Factor=0.000	Total Headloss=0.784 ft.		Se=0.156815					
3+91.00	3140.00	69.00	2.00	3.854	1.790	129.9	24.16	1326.56	1315.70	1317.49	2.24	3.26	7.05

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0350	So=0.000000		Sf=0.156256	Headloss Factor=0.000	Total Headloss=0.313 ft.		Se=0.156180					
3+89.00	3140.00	69.00	2.00	3.854	1.824	132.5	23.70	1326.24	1315.70	1317.52	2.28	3.17	6.97

	n=0.0350	So=0.000000	Sf=0.140303	Headloss Factor=0.000	Total Headloss=0.702 ft.	Se=0.140287						
3+84.00	3140.00	69.00	2.00	3.854	1.908	138.9	22.61	1325.54	1315.70	1317.61	2.38	2.96	6.77
	n=0.0350	So=0.000000	Sf=0.115830	Headloss Factor=0.000	Total Headloss=0.927 ft.	Se=0.115804						
3+76.00	3140.00	69.00	2.00	3.854	2.042	149.2	21.04	1324.62	1315.70	1317.74	2.55	2.67	6.47
	n=0.0350	So=0.000000	Sf=0.096653	Headloss Factor=0.000	Total Headloss=0.483 ft.	Se=0.096636						
3+71.00	3140.00	69.00	2.00	3.854	2.127	155.8	20.15	1324.13	1315.70	1317.83	2.66	2.50	6.29
	n=0.0350	So=0.000000	Sf=0.084420	Headloss Factor=0.000	Total Headloss=0.422 ft.	Se=0.084393						
3+66.00	3140.00	69.00	2.00	3.854	2.213	162.5	19.32	1323.71	1315.70	1317.91	2.77	2.36	6.12
	n=0.0350	So=0.000000	Sf=0.076996	Headloss Factor=0.000	Total Headloss=0.154 ft.	Se=0.076948						
3+64.00	3140.00	69.00	2.00	3.854	2.248	165.2	19.01	1323.56	1315.70	1317.95	2.81	2.30	6.05
	n=0.0350	So=0.000000	Sf=0.070246	Headloss Factor=0.000	Total Headloss=0.351 ft.	Se=0.070228						
3+59.00	3140.00	69.00	2.00	3.854	2.336	172.1	18.25	1323.21	1315.70	1318.04	2.92	2.17	5.89
	n=0.0350	So=0.000000	Sf=0.061804	Headloss Factor=0.000	Total Headloss=0.309 ft.	Se=0.061756						
3+54.00	3140.00	69.00	2.00	3.854	2.425	179.1	17.53	1322.90	1315.70	1318.13	3.03	2.05	5.73

WSP POWERLINE LOOP : DRAWDOWN U.S. FROM NEIC DT 2/2/05

''WASP2''SUBCRITICAL WATER SURFACE PROFILE

COMPUTED BY: DATE: DATA FILE: POWZ CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
4+45.00	3140.00	45.00	2.00	4.933	4.950	271.8	11.55	1331.72	1324.70	1329.65	0.00	0.99	4.90
	n=0.0300	So=0.003027		Sf=0.006919	Headloss Factor=0.000	Total Headloss=0.035 ft.		Se=0.006905					
4+50.00	3140.00	46.00	2.00	4.874	5.452	310.2	10.12	1331.76	1324.72	1330.17	6.86	0.83	4.33
	n=0.0300	So=0.002979		Sf=0.005698	Headloss Factor=0.000	Total Headloss=0.028 ft.		Se=0.005679					
4+55.00	3140.00	46.00	2.00	4.874	5.495	313.1	10.03	1331.79	1324.73	1330.22	6.91	0.82	4.29
	n=0.0300	So=0.002808		Sf=0.004515	Headloss Factor=0.000	Total Headloss=0.023 ft.		Se=0.004509					
4+60.00	3140.00	50.00	2.00	4.653	5.924	366.4	8.57	1331.81	1324.74	1330.67	7.34	0.68	3.56
	n=0.0300	So=0.003003		Sf=0.002726	Headloss Factor=0.000	Total Headloss=0.014 ft.		Se=0.002725					
4+65.00	3140.00	60.00	2.00	4.189	6.343	461.1	6.81	1331.82	1324.76	1331.10	7.76	0.52	2.56
	n=0.0300	So=0.002197		Sf=0.002089	Headloss Factor=0.000	Total Headloss=0.010 ft.		Se=0.002087					
4+70.00	3140.00	60.00	2.00	4.189	6.342	461.0	6.81	1331.83	1324.77	1331.11	7.75	0.52	2.56
	n=0.0300	So=0.002961		Sf=0.002123	Headloss Factor=0.000	Total Headloss=0.106 ft.		Se=0.002124					
5+20.00	3140.00	60.00	2.00	4.189	6.285	456.1	6.88	1331.94	1324.92	1331.20	7.69	0.52	2.59
	n=0.0300	So=0.002959		Sf=0.002189	Headloss Factor=0.000	Total Headloss=0.109 ft.		Se=0.002189					
5+70.00	3140.00	60.00	2.00	4.189	6.232	451.6	6.95	1332.05	1325.07	1331.30	7.63	0.53	2.63
	n=0.0300	So=0.002961		Sf=0.002253	Headloss Factor=0.000	Total Headloss=0.113 ft.		Se=0.002253					
6+20.00	3140.00	60.00	2.00	4.189	6.182	447.4	7.02	1332.16	1325.21	1331.40	7.57	0.54	2.65
	n=0.0300	So=0.002959		Sf=0.002314	Headloss Factor=0.000	Total Headloss=0.116 ft.		Se=0.002314					
6+70.00	3140.00	60.00	2.00	4.189	6.137	443.5	7.08	1332.28	1325.36	1331.50	7.52	0.54	2.68
	n=0.0300	So=0.002966		Sf=0.002362	Headloss Factor=0.000	Total Headloss=0.071 ft.		Se=0.002357					
7+00.00	3140.00	60.00	2.00	4.189	6.111	441.3	7.12	1332.35	1325.45	1331.56	7.49	0.55	2.70

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH

POWERLINE DROP (CHUTE)

''WASP2''SUPERCRITICAL WATER SURFACE PROFILE

R4POWX DT 2/22/85

COMPUTED BY: DATE: DATA FILE: R4POWX CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
4+45.00	3140.00	45.00	2.00	4.933	4.900	268.5	11.69	1331.72	1324.70	1329.60	0.00	1.01	4.99
	n=0.0300	So=0.166473		Sf=0.013460	Headloss Factor=0.000	Total Headloss=0.054 ft.		Se=0.013435					
4+41.00	3140.00	46.78	2.00	4.829	3.612	195.1	16.10	1331.67	1324.03	1327.65	4.52	1.59	6.27
	n=0.0300	So=0.166821		Sf=0.028693	Headloss Factor=0.000	Total Headloss=0.143 ft.		Se=0.028664					
4+36.00	3140.00	49.00	2.00	4.706	3.101	171.2	18.34	1331.53	1323.20	1326.30	3.88	1.94	6.74
	n=0.0300	So=0.166577		Sf=0.041585	Headloss Factor=0.000	Total Headloss=0.208 ft.		Se=0.041540					
4+31.00	3140.00	51.22	2.00	4.590	2.773	157.4	19.95	1331.32	1322.37	1325.14	3.47	2.21	7.01
	n=0.0300	So=0.166602		Sf=0.054129	Headloss Factor=0.000	Total Headloss=0.271 ft.		Se=0.054094					
4+26.00	3140.00	53.44	2.00	4.480	2.531	148.1	21.21	1331.05	1321.53	1324.07	3.16	2.45	7.17
	n=0.0300	So=0.166821		Sf=0.066617	Headloss Factor=0.000	Total Headloss=0.333 ft.		Se=0.066591					
4+21.00	3140.00	55.67	2.00	4.376	2.340	141.2	22.23	1330.72	1320.70	1323.04	2.93	2.66	7.28
	n=0.0300	So=0.166577		Sf=0.079006	Headloss Factor=0.000	Total Headloss=0.395 ft.		Se=0.078982					
4+16.00	3140.00	57.89	2.00	4.278	2.186	136.1	23.07	1330.32	1319.87	1322.05	2.73	2.85	7.34
	n=0.0300	So=0.166797		Sf=0.091178	Headloss Factor=0.000	Total Headloss=0.456 ft.		Se=0.091175					
4+11.00	3140.00	60.11	2.00	4.185	2.057	132.1	23.77	1329.86	1319.03	1321.09	2.57	3.01	7.37
	n=0.0300	So=0.166626		Sf=0.103010	Headloss Factor=0.000	Total Headloss=0.515 ft.		Se=0.103001					
4+06.00	3140.00	62.33	2.00	4.096	1.948	129.0	24.34	1329.35	1318.20	1320.15	2.43	3.16	7.37
	n=0.0300	So=0.166577		Sf=0.114362	Headloss Factor=0.000	Total Headloss=0.572 ft.		Se=0.114330					
4+01.00	3140.00	64.56	2.00	4.012	1.854	126.6	24.81	1328.78	1317.37	1319.22	2.32	3.30	7.35
	n=0.0300	So=0.166797		Sf=0.125138	Headloss Factor=0.000	Total Headloss=0.626 ft.		Se=0.125124					
3+96.00	3140.00	66.78	2.00	3.931	1.773	124.7	25.18	1328.15	1316.53	1318.31	2.22	3.42	7.32

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.166626	Sf=0.135240	Headloss Factor=0.000	Total Headloss=0.676 ft.	Se=0.135213							
3+91.00	3140.00	69.00	2.00	3.854	1.703	123.3	25.47	1327.48	1315.70	1317.40	2.13	3.52	7.28
	n=0.0300	So=0.000000	Sf=0.131999	Headloss Factor=0.000	Total Headloss=0.660 ft.	Se=0.131987							
3+86.00	3140.00	69.00	2.00	3.854	1.764	127.9	24.54	1326.82	1315.70	1317.46	2.21	3.33	7.12
	n=0.0300	So=0.000000	Sf=0.117427	Headloss Factor=0.000	Total Headloss=0.587 ft.	Se=0.117398							
3+81.00	3140.00	69.00	2.00	3.854	1.826	132.6	23.68	1326.23	1315.70	1317.53	2.28	3.16	6.97
	n=0.0300	So=0.000000	Sf=0.104865	Headloss Factor=0.000	Total Headloss=0.524 ft.	Se=0.104839							
3+76.00	3140.00	69.00	2.00	3.854	1.887	137.3	22.86	1325.70	1315.70	1317.59	2.36	3.01	6.82
	n=0.0300	So=0.000000	Sf=0.093972	Headloss Factor=0.000	Total Headloss=0.470 ft.	Se=0.093938							
3+71.00	3140.00	69.00	2.00	3.854	1.949	142.1	22.10	1325.24	1315.70	1317.65	2.44	2.86	6.68
	n=0.0300	So=0.000000	Sf=0.084471	Headloss Factor=0.000	Total Headloss=0.422 ft.	Se=0.084456							
3+66.00	3140.00	69.00	2.00	3.854	2.011	146.8	21.39	1324.81	1315.70	1317.71	2.51	2.73	6.54
	n=0.0300	So=0.000000	Sf=0.076141	Headloss Factor=0.000	Total Headloss=0.381 ft.	Se=0.076134							
3+61.00	3140.00	69.00	2.00	3.854	2.073	151.6	20.71	1324.43	1315.70	1317.77	2.59	2.61	6.40
	n=0.0300	So=0.000000	Sf=0.068800	Headloss Factor=0.000	Total Headloss=0.344 ft.	Se=0.068780							
3+56.00	3140.00	69.00	2.00	3.854	2.136	156.5	20.07	1324.09	1315.70	1317.84	2.67	2.49	6.27
	n=0.0300	So=0.000000	Sf=0.062304	Headloss Factor=0.000	Total Headloss=0.312 ft.	Se=0.062271							
3+51.00	3140.00	69.00	2.00	3.854	2.199	161.4	19.46	1323.78	1315.70	1317.90	2.75	2.38	6.15

	n=0.0350	So=0.100000	Sf=0.072323	Headloss Factor=0.000	Total Headloss=0.362 ft.	Se=0.072302							
9+40.00	3140.00	45.00	2.00	4.933	2.888	146.7	21.41	1327.71	1317.70	1320.59	3.61	2.34	7.69
	n=0.0350	So=0.100000	Sf=0.074889	Headloss Factor=0.000	Total Headloss=0.374 ft.	Se=0.074849							
9+35.00	3140.00	45.00	2.00	4.933	2.861	145.1	21.64	1327.33	1317.20	1320.06	3.58	2.38	7.74
	n=0.0350	So=0.100000	Sf=0.077230	Headloss Factor=0.000	Total Headloss=0.386 ft.	Se=0.077188							
9+30.00	3140.00	45.00	2.00	4.933	2.837	143.7	21.84	1326.95	1316.70	1319.54	3.55	2.41	7.78
	n=0.0350	So=0.100000	Sf=0.079362	Headloss Factor=0.000	Total Headloss=0.397 ft.	Se=0.079344							
9+25.00	3140.00	45.00	2.00	4.933	2.816	142.6	22.03	1326.55	1316.20	1319.02	3.52	2.44	7.82
	n=0.0350	So=0.100000	Sf=0.081302	Headloss Factor=0.000	Total Headloss=0.407 ft.	Se=0.081269							
9+20.00	3140.00	45.00	2.00	4.933	2.797	141.5	22.19	1326.14	1315.70	1318.50	3.50	2.46	7.86
	n=0.0350	So=0.100000	Sf=0.083068	Headloss Factor=0.000	Total Headloss=0.415 ft.	Se=0.083017							
9+15.00	3140.00	45.00	2.00	4.933	2.780	140.6	22.34	1325.73	1315.20	1317.98	3.48	2.49	7.89
	n=0.0350	So=0.100000	Sf=0.084674	Headloss Factor=0.000	Total Headloss=0.423 ft.	Se=0.084647							
9+10.00	3140.00	45.00	2.00	4.933	2.766	139.8	22.47	1325.30	1314.70	1317.47	3.46	2.51	7.92
	n=0.0350	So=0.100000	Sf=0.086132	Headloss Factor=0.000	Total Headloss=0.431 ft.	Se=0.086102							
9+05.00	3140.00	45.00	2.00	4.933	2.753	139.0	22.59	1324.87	1314.20	1316.95	3.44	2.53	7.95
	n=0.0350	So=0.100000	Sf=0.087454	Headloss Factor=0.000	Total Headloss=0.437 ft.	Se=0.087435							
9+00.00	3140.00	45.00	2.00	4.933	2.741	138.4	22.69	1324.44	1313.70	1316.44	3.43	2.54	7.97
	n=0.0350	So=0.000000	Sf=0.083774	Headloss Factor=0.000	Total Headloss=0.419 ft.	Se=0.083754							
8+95.00	3140.00	45.00	2.00	4.933	2.822	142.9	21.97	1324.02	1313.70	1316.52	3.53	2.43	7.81
	n=0.0350	So=0.000000	Sf=0.075934	Headloss Factor=0.000	Total Headloss=0.380 ft.	Se=0.075893							
8+90.00	3140.00	45.00	2.00	4.933	2.904	147.5	21.29	1323.64	1313.70	1316.60	3.63	2.32	7.66

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0350	So=0.000000	Sf=0.068938	Headloss Factor=0.000	Total Headloss=0.345 ft.	Se=0.068909							
8+85.00	3140.00	45.00	2.00	4.933	2.986	152.2	20.63	1323.29	1313.70	1316.69	3.73	2.22	7.51
	n=0.0350	So=0.000000	Sf=0.062669	Headloss Factor=0.000	Total Headloss=0.313 ft.	Se=0.062640							
8+80.00	3140.00	45.00	2.00	4.933	3.070	157.0	20.00	1322.98	1313.70	1316.77	3.84	2.13	7.36
	n=0.0350	So=0.000000	Sf=0.057030	Headloss Factor=0.000	Total Headloss=0.285 ft.	Se=0.057005							
8+75.00	3140.00	45.00	2.00	4.933	3.155	161.9	19.39	1322.70	1313.70	1316.86	3.94	2.04	7.22
	n=0.0350	So=0.000000	Sf=0.051938	Headloss Factor=0.000	Total Headloss=0.260 ft.	Se=0.051924							
8+70.00	3140.00	45.00	2.00	4.933	3.242	166.9	18.81	1322.44	1313.70	1316.94	4.05	1.95	7.07

8+65.00	3140.00	45.00	2.00	4.933	3.332	172.1	18.24	1322.20	1313.70	1317.03	4.16	1.87	6.93
	n=0.0350	So=0.000000	Sf=0.043121	Headloss Factor=0.000	Total Headloss=0.216 ft.	Se=0.043083							
8+60.00	3140.00	45.00	2.00	4.933	3.423	177.5	17.69	1321.98	1313.70	1317.12	4.28	1.79	6.79

2/15/05 DT

''WASP2''SUPERCRITICAL WATER SURFACE PROFILE

POWERLINE DROP

COMPUTED BY: DATE: DATA FILE: R4POWC CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
10+00.00	3140.00	45.00	2.00	4.933	4.900	268.5	11.69	1330.72	1323.70	1328.60	3.82	1.01	4.99
	n=0.0300	So=0.100000		Sf=0.012295		Headloss Factor=0.000		Total Headloss=0.061 ft.		Se=0.012286			
9+95.00	3140.00	45.00	2.00	4.933	3.945	208.6	15.05	1330.66	1323.20	1327.14	4.93	1.43	6.06
	n=0.0300	So=0.100000		Sf=0.021153		Headloss Factor=0.000		Total Headloss=0.106 ft.		Se=0.021110			
9+90.00	3140.00	45.00	2.00	4.933	3.647	190.7	16.46	1330.56	1322.70	1326.35	4.56	1.62	6.46
	n=0.0300	So=0.100000		Sf=0.026695		Headloss Factor=0.000		Total Headloss=0.133 ft.		Se=0.026650			
9+85.00	3140.00	45.00	2.00	4.933	3.451	179.1	17.53	1330.42	1322.20	1325.65	4.31	1.77	6.75
	n=0.0300	So=0.100000		Sf=0.031629		Headloss Factor=0.000		Total Headloss=0.158 ft.		Se=0.031615			
9+80.00	3140.00	45.00	2.00	4.933	3.306	170.6	18.40	1330.26	1321.70	1325.01	4.13	1.89	6.97
	n=0.0300	So=0.100000		Sf=0.036184		Headloss Factor=0.000		Total Headloss=0.181 ft.		Se=0.036142			
9+75.00	3140.00	45.00	2.00	4.933	3.192	164.0	19.15	1330.08	1321.20	1324.39	3.99	2.00	7.16
	n=0.0300	So=0.100000		Sf=0.040440		Headloss Factor=0.000		Total Headloss=0.202 ft.		Se=0.040424			
9+70.00	3140.00	45.00	2.00	4.933	3.099	158.6	19.79	1329.88	1320.70	1323.80	3.87	2.10	7.31
	n=0.0300	So=0.100000		Sf=0.044435		Headloss Factor=0.000		Total Headloss=0.222 ft.		Se=0.044405			
9+65.00	3140.00	45.00	2.00	4.933	3.021	154.2	20.36	1329.66	1320.20	1323.22	3.78	2.18	7.45
	n=0.0300	So=0.100000		Sf=0.048192		Headloss Factor=0.000		Total Headloss=0.241 ft.		Se=0.048164			
9+60.00	3140.00	45.00	2.00	4.933	2.955	150.4	20.87	1329.42	1319.70	1322.66	3.69	2.26	7.56
	n=0.0300	So=0.100000		Sf=0.051727		Headloss Factor=0.000		Total Headloss=0.259 ft.		Se=0.051697			
9+55.00	3140.00	45.00	2.00	4.933	2.899	147.2	21.33	1329.16	1319.20	1322.10	3.62	2.33	7.67
	n=0.0300	So=0.100000		Sf=0.055051		Headloss Factor=0.000		Total Headloss=0.275 ft.		Se=0.055027			
9+50.00	3140.00	45.00	2.00	4.933	2.849	144.5	21.74	1328.89	1318.70	1321.55	3.56	2.39	7.76

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.100000		Sf=0.058173		Headloss Factor=0.000		Total Headloss=0.291 ft.		Se=0.058141			
9+45.00	3140.00	45.00	2.00	4.933	2.804	142.2	22.11	1328.58	1318.20	1321.01	3.51	2.45	7.84

	n=0.0300	So=0.100000	Sf=0.061105	Headloss Factor=0.000	Total Headloss=0.306 ft.	Se=0.061063							
9+40.00	3140.00	45.00	2.00	4.933	2.769	139.9	22.44	1328.29	1317.70	1320.47	3.46	2.50	7.91
	n=0.0300	So=0.100000	Sf=0.063855	Headloss Factor=0.000	Total Headloss=0.319 ft.	Se=0.063818							
9+35.00	3140.00	45.00	2.00	4.933	2.735	138.0	22.75	1327.97	1317.20	1319.93	3.42	2.55	7.98
	n=0.0300	So=0.100000	Sf=0.066429	Headloss Factor=0.000	Total Headloss=0.332 ft.	Se=0.066400							
9+30.00	3140.00	45.00	2.00	4.933	2.705	136.4	23.03	1327.64	1316.70	1319.41	3.38	2.60	8.04
	n=0.0300	So=0.100000	Sf=0.068837	Headloss Factor=0.000	Total Headloss=0.344 ft.	Se=0.068807							
9+25.00	3140.00	45.00	2.00	4.933	2.678	134.9	23.28	1327.29	1316.20	1318.88	3.35	2.64	8.09
	n=0.0300	So=0.100000	Sf=0.071088	Headloss Factor=0.000	Total Headloss=0.355 ft.	Se=0.071067							
9+20.00	3140.00	45.00	2.00	4.933	2.655	133.5	23.51	1326.94	1315.70	1318.35	3.32	2.67	8.14
	n=0.0300	So=0.100000	Sf=0.073190	Headloss Factor=0.000	Total Headloss=0.366 ft.	Se=0.073169							
9+15.00	3140.00	45.00	2.00	4.933	2.633	132.4	23.72	1326.57	1315.20	1317.83	3.29	2.71	8.19
	n=0.0300	So=0.100000	Sf=0.075151	Headloss Factor=0.000	Total Headloss=0.376 ft.	Se=0.075118							
9+10.00	3140.00	45.00	2.00	4.933	2.614	131.3	23.92	1326.20	1314.70	1317.31	3.27	2.74	8.23
	n=0.0300	So=0.100000	Sf=0.076978	Headloss Factor=0.000	Total Headloss=0.385 ft.	Se=0.076965							
9+05.00	3140.00	45.00	2.00	4.933	2.596	130.3	24.10	1325.81	1314.20	1316.80	3.25	2.77	8.26
	n=0.0300	So=0.100000	Sf=0.078679	Headloss Factor=0.000	Total Headloss=0.393 ft.	Se=0.078658							
9+00.00	3140.00	45.00	2.00	4.933	2.580	129.4	24.26	1325.42	1313.70	1316.28	3.23	2.80	8.30
	n=0.0300	So=0.000000	Sf=0.076502	Headloss Factor=0.000	Total Headloss=0.383 ft.	Se=0.076493							
8+95.00	3140.00	45.00	2.00	4.933	2.639	132.7	23.67	1325.04	1313.70	1316.34	3.30	2.70	8.18
	n=0.0300	So=0.000000	Sf=0.070930	Headloss Factor=0.000	Total Headloss=0.355 ft.	Se=0.070916							
8+90.00	3140.00	45.00	2.00	4.933	2.698	135.9	23.10	1324.68	1313.70	1316.40	3.37	2.61	8.06

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.000000	Sf=0.065845	Headloss Factor=0.000	Total Headloss=0.329 ft.	Se=0.065819							
8+85.00	3140.00	45.00	2.00	4.933	2.757	139.2	22.55	1324.35	1313.70	1316.46	3.45	2.52	7.94
	n=0.0300	So=0.000000	Sf=0.061191	Headloss Factor=0.000	Total Headloss=0.306 ft.	Se=0.061174							
8+80.00	3140.00	45.00	2.00	4.933	2.816	142.6	22.02	1324.05	1313.70	1316.52	3.52	2.44	7.82
	n=0.0300	So=0.000000	Sf=0.056922	Headloss Factor=0.000	Total Headloss=0.285 ft.	Se=0.056898							
8+75.00	3140.00	45.00	2.00	4.933	2.876	146.0	21.51	1323.76	1313.70	1316.58	3.59	2.36	7.71
	n=0.0300	So=0.000000	Sf=0.053000	Headloss Factor=0.000	Total Headloss=0.265 ft.	Se=0.052959							
8+70.00	3140.00	45.00	2.00	4.933	2.936	149.4	21.02	1323.50	1313.70	1316.64	3.67	2.28	7.60

8+65.00	3140.00	45.00	2.00	4.933	2.997	152.8	20.54	1323.25	1313.70	1316.70	3.75	2.21	7.49

n=0.0300 So=0.000000 Sf=0.046050 Headloss Factor=0.000 Total Headloss=0.230 ft. Se=0.046013

8+60.00	3140.00	45.00	2.00	4.933	3.059	156.4	20.08	1323.02	1313.70	1316.76	3.82	2.14	7.38

2/15/85 DT
POWERLINE DROP

''WASP2''SUPERCRITICAL WATER SURFACE PROFILE

COMPUTED BY: DATE: DATA FILE: R4POWC CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
10+00.00	2400.00	45.00	2.00	4.173	4.150	221.2	10.85	1329.68	1323.70	1327.85	3.82	1.01	4.21
	n=0.0300	So=0.100000		Sf=0.013124		Headloss Factor=0.000		Total Headloss=0.066 ft.		Se=0.013113			
9+95.00	2400.00	45.00	2.00	4.173	3.276	168.9	14.21	1329.61	1323.20	1326.48	4.09	1.47	5.21
	n=0.0300	So=0.100000		Sf=0.023585		Headloss Factor=0.000		Total Headloss=0.118 ft.		Se=0.023552			
9+90.00	2400.00	45.00	2.00	4.173	3.014	153.8	15.60	1329.49	1322.70	1325.71	3.77	1.67	5.57
	n=0.0300	So=0.100000		Sf=0.030083		Headloss Factor=0.000		Total Headloss=0.150 ft.		Se=0.030036			
9+85.00	2400.00	45.00	2.00	4.173	2.846	144.2	16.64	1329.34	1322.20	1325.05	3.56	1.83	5.83
	n=0.0300	So=0.100000		Sf=0.035836		Headloss Factor=0.000		Total Headloss=0.179 ft.		Se=0.035798			
9+80.00	2400.00	45.00	2.00	4.173	2.722	137.3	17.48	1329.17	1321.70	1324.42	3.40	1.96	6.02
	n=0.0300	So=0.100000		Sf=0.041095		Headloss Factor=0.000		Total Headloss=0.205 ft.		Se=0.041075			
9+75.00	2400.00	45.00	2.00	4.173	2.627	132.0	18.18	1328.96	1321.20	1323.83	3.28	2.08	6.19
	n=0.0300	So=0.100000		Sf=0.045949		Headloss Factor=0.000		Total Headloss=0.230 ft.		Se=0.045914			
9+70.00	2400.00	45.00	2.00	4.173	2.550	127.8	18.79	1328.73	1320.70	1323.25	3.19	2.18	6.32
	n=0.0300	So=0.100000		Sf=0.050444		Headloss Factor=0.000		Total Headloss=0.252 ft.		Se=0.050409			
9+65.00	2400.00	45.00	2.00	4.173	2.487	124.3	19.31	1328.48	1320.20	1322.69	3.11	2.26	6.43
	n=0.0300	So=0.100000		Sf=0.054607		Headloss Factor=0.000		Total Headloss=0.273 ft.		Se=0.054575			
9+60.00	2400.00	45.00	2.00	4.173	2.434	121.4	19.77	1328.21	1319.70	1322.13	3.04	2.34	6.53
	n=0.0300	So=0.100000		Sf=0.058460		Headloss Factor=0.000		Total Headloss=0.292 ft.		Se=0.058439			
9+55.00	2400.00	45.00	2.00	4.173	2.389	118.9	20.18	1327.91	1319.20	1321.59	2.99	2.41	6.62
	n=0.0300	So=0.100000		Sf=0.062021		Headloss Factor=0.000		Total Headloss=0.310 ft.		Se=0.061996			
9+50.00	2400.00	45.00	2.00	4.173	2.351	116.8	20.54	1327.60	1318.70	1321.05	2.94	2.47	6.69

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.100000		Sf=0.065309		Headloss Factor=0.000		Total Headloss=0.327 ft.		Se=0.065289			

	n=0.0300	So=0.100000	Sf=0.068339	Headloss Factor=0.000	Total Headloss=0.342 ft.	Se=0.068309							
9+40.00	2400.00	45.00	2.00	4.173	2.289	113.5	21.15	1326.93	1317.70	1319.99	2.86	2.57	6.81
	n=0.0300	So=0.100000	Sf=0.071128	Headloss Factor=0.000	Total Headloss=0.356 ft.	Se=0.071086							
9+35.00	2400.00	45.00	2.00	4.173	2.264	112.1	21.41	1326.58	1317.20	1319.46	2.83	2.62	6.86
	n=0.0300	So=0.100000	Sf=0.073690	Headloss Factor=0.000	Total Headloss=0.368 ft.	Se=0.073677							
9+30.00	2400.00	45.00	2.00	4.173	2.242	110.9	21.64	1326.21	1316.70	1318.94	2.80	2.66	6.91
	n=0.0300	So=0.100000	Sf=0.076039	Headloss Factor=0.000	Total Headloss=0.380 ft.	Se=0.076029							
9+25.00	2400.00	45.00	2.00	4.173	2.222	109.9	21.84	1325.83	1316.20	1318.42	2.78	2.70	6.95
	n=0.0300	So=0.100000	Sf=0.078193	Headloss Factor=0.000	Total Headloss=0.391 ft.	Se=0.078166							
9+20.00	2400.00	45.00	2.00	4.173	2.205	108.9	22.03	1325.44	1315.70	1317.90	2.76	2.73	6.99
	n=0.0300	So=0.100000	Sf=0.080164	Headloss Factor=0.000	Total Headloss=0.401 ft.	Se=0.080154							
9+15.00	2400.00	45.00	2.00	4.173	2.190	108.1	22.20	1325.04	1315.20	1317.39	2.74	2.76	7.02
	n=0.0300	So=0.100000	Sf=0.081966	Headloss Factor=0.000	Total Headloss=0.410 ft.	Se=0.081949							
9+10.00	2400.00	45.00	2.00	4.173	2.176	107.4	22.35	1324.63	1314.70	1316.88	2.72	2.78	7.05
	n=0.0300	So=0.100000	Sf=0.083612	Headloss Factor=0.000	Total Headloss=0.418 ft.	Se=0.083590							
9+05.00	2400.00	45.00	2.00	4.173	2.164	106.8	22.48	1324.21	1314.20	1316.36	2.71	2.81	7.07
	n=0.0300	So=0.100000	Sf=0.085114	Headloss Factor=0.000	Total Headloss=0.426 ft.	Se=0.085095							
9+00.00	2400.00	45.00	2.00	4.173	2.154	106.2	22.60	1323.79	1313.70	1315.85	2.69	2.83	7.10
	n=0.0300	So=0.000000	Sf=0.081800	Headloss Factor=0.000	Total Headloss=0.409 ft.	Se=0.081782							
8+95.00	2400.00	45.00	2.00	4.173	2.215	109.5	21.92	1323.38	1313.70	1315.91	2.77	2.71	6.96
	n=0.0300	So=0.000000	Sf=0.074451	Headloss Factor=0.000	Total Headloss=0.372 ft.	Se=0.074432							
8+90.00	2400.00	45.00	2.00	4.173	2.277	112.8	21.28	1323.00	1313.70	1315.98	2.85	2.60	6.84

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.000000	Sf=0.067892	Headloss Factor=0.000	Total Headloss=0.339 ft.	Se=0.067874							
8+85.00	2400.00	45.00	2.00	4.173	2.339	116.2	20.66	1322.67	1313.70	1316.04	2.92	2.49	6.71
	n=0.0300	So=0.000000	Sf=0.062017	Headloss Factor=0.000	Total Headloss=0.310 ft.	Se=0.061976							
8+80.00	2400.00	45.00	2.00	4.173	2.401	119.6	20.07	1322.36	1313.70	1316.10	3.00	2.39	6.59
	n=0.0300	So=0.000000	Sf=0.056736	Headloss Factor=0.000	Total Headloss=0.284 ft.	Se=0.056701							
8+75.00	2400.00	45.00	2.00	4.173	2.464	123.0	19.51	1322.07	1313.70	1316.16	3.08	2.30	6.47
	n=0.0300	So=0.000000	Sf=0.051972	Headloss Factor=0.000	Total Headloss=0.260 ft.	Se=0.051952							
8+70.00	2400.00	45.00	2.00	4.173	2.528	126.6	18.96	1321.81	1313.70	1316.23	3.16	2.21	6.36

8+65.00	2400.00	45.00	2.00	4.173	2.593	130.1	18.44	1321.57	1313.70	1316.29	3.24	2.12	6.24

n=0.0300 So=0.000000 Sf=0.043743 Headloss Factor=0.000 Total Headloss=0.219 ft. Se=0.043724

8+60.00	2400.00	45.00	2.00	4.173	2.659	133.8	17.94	1321.36	1313.70	1316.36	3.32	2.04	6.13

2/15/85 DT

''WASP2''SUPERCRITICAL WATER SURFACE PROFILE

POWERLINE DROP

COMPUTED BY: DATE: DATA FILE: R4POWC CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
10+00.00	600.00	45.00	2.00	1.722	1.700	82.3	7.29	1326.23	1323.70	1325.40	3.32	1.02	1.76
	n=0.0300	So=0.100000		Sf=0.019705	Headloss Factor=0.000	Total Headloss=0.099 ft.		Se=0.019693					
9+95.00	600.00	45.00	2.00	1.722	1.200	56.9	10.55	1326.13	1323.20	1324.40	1.50	1.74	2.37
	n=0.0300	So=0.100000		Sf=0.044977	Headloss Factor=0.000	Total Headloss=0.225 ft.		Se=0.044937					
9+90.00	600.00	45.00	2.00	1.722	1.090	51.4	11.66	1325.90	1322.70	1323.79	1.36	2.01	2.55
	n=0.0300	So=0.100000		Sf=0.058427	Headloss Factor=0.000	Total Headloss=0.292 ft.		Se=0.058385					
9+85.00	600.00	45.00	2.00	1.722	1.030	48.5	12.38	1325.61	1322.20	1323.23	1.29	2.20	2.66
	n=0.0300	So=0.100000		Sf=0.068624	Headloss Factor=0.000	Total Headloss=0.343 ft.		Se=0.068601					
9+80.00	600.00	45.00	2.00	1.722	0.992	46.6	12.88	1325.27	1321.70	1322.69	1.24	2.33	2.73
	n=0.0300	So=0.100000		Sf=0.076412	Headloss Factor=0.000	Total Headloss=0.382 ft.		Se=0.076397					
9+75.00	600.00	45.00	2.00	1.722	0.966	45.3	13.23	1324.89	1321.20	1322.17	1.21	2.42	2.78
	n=0.0300	So=0.100000		Sf=0.082337	Headloss Factor=0.000	Total Headloss=0.412 ft.		Se=0.082288					
9+70.00	600.00	45.00	2.00	1.722	0.948	44.5	13.49	1324.47	1320.70	1321.65	1.19	2.49	2.82
	n=0.0300	So=0.100000		Sf=0.086821	Headloss Factor=0.000	Total Headloss=0.434 ft.		Se=0.086780					
9+65.00	600.00	45.00	2.00	1.722	0.936	43.9	13.68	1324.04	1320.20	1321.14	1.17	2.54	2.85
	n=0.0300	So=0.100000		Sf=0.090195	Headloss Factor=0.000	Total Headloss=0.451 ft.		Se=0.090157					
9+60.00	600.00	45.00	2.00	1.722	0.927	43.4	13.81	1323.59	1319.70	1320.63	1.16	2.58	2.86
	n=0.0300	So=0.100000		Sf=0.092717	Headloss Factor=0.000	Total Headloss=0.464 ft.		Se=0.092709					
9+55.00	600.00	45.00	2.00	1.722	0.921	43.1	13.91	1323.13	1319.20	1320.12	1.15	2.60	2.88
	n=0.0300	So=0.100000		Sf=0.094596	Headloss Factor=0.000	Total Headloss=0.473 ft.		Se=0.094579					
9+50.00	600.00	45.00	2.00	1.722	0.916	42.9	13.98	1322.65	1318.70	1319.62	1.15	2.62	2.89

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.100000		Sf=0.095998	Headloss Factor=0.000	Total Headloss=0.480 ft.		Se=0.095966					
9+45.00	600.00	45.00	2.00	1.722	0.913	42.7	14.04	1322.17	1318.20	1319.11	1.14	2.64	2.90

	n=0.0300	So=0.100000	Sf=0.097040	Headloss Factor=0.000	Total Headloss=0.485 ft.	Se=0.097017							
9+40.00	600.00	45.00	2.00	1.722	0.910	42.6	14.08	1321.69	1317.70	1318.61	1.14	2.65	2.90
	n=0.0300	So=0.100000	Sf=0.097811	Headloss Factor=0.000	Total Headloss=0.489 ft.	Se=0.097795							
9+35.00	600.00	45.00	2.00	1.722	0.908	42.5	14.11	1321.20	1317.20	1318.11	1.14	2.66	2.91
	n=0.0300	So=0.100000	Sf=0.098383	Headloss Factor=0.000	Total Headloss=0.492 ft.	Se=0.098360							
9+30.00	600.00	45.00	2.00	1.722	0.907	42.5	14.13	1320.71	1316.70	1317.61	1.13	2.66	2.91
	n=0.0300	So=0.100000	Sf=0.098809	Headloss Factor=0.000	Total Headloss=0.494 ft.	Se=0.098770							
9+25.00	600.00	45.00	2.00	1.722	0.906	42.4	14.15	1320.21	1316.20	1317.11	1.13	2.67	2.91
	n=0.0300	So=0.100000	Sf=0.099128	Headloss Factor=0.000	Total Headloss=0.496 ft.	Se=0.099089							
9+20.00	600.00	45.00	2.00	1.722	0.905	42.4	14.16	1319.72	1315.70	1316.61	1.13	2.67	2.91
	n=0.0300	So=0.100000	Sf=0.099363	Headloss Factor=0.000	Total Headloss=0.497 ft.	Se=0.099337							
9+15.00	600.00	45.00	2.00	1.722	0.905	42.4	14.17	1319.22	1315.20	1316.10	1.13	2.67	2.91
	n=0.0300	So=0.100000	Sf=0.099534	Headloss Factor=0.000	Total Headloss=0.498 ft.	Se=0.099513							
9+10.00	600.00	45.00	2.00	1.722	0.904	42.3	14.17	1318.72	1314.70	1315.60	1.13	2.68	2.91
	n=0.0300	So=0.100000	Sf=0.099660	Headloss Factor=0.000	Total Headloss=0.498 ft.	Se=0.099627							
9+05.00	600.00	45.00	2.00	1.722	0.904	42.3	14.18	1318.23	1314.20	1315.10	1.13	2.68	2.91
	n=0.0300	So=0.100000	Sf=0.099754	Headloss Factor=0.000	Total Headloss=0.499 ft.	Se=0.099716							
9+00.00	600.00	45.00	2.00	1.722	0.904	42.3	14.18	1317.73	1313.70	1314.60	1.13	2.68	2.92
	n=0.0300	So=0.000000	Sf=0.085969	Headloss Factor=0.000	Total Headloss=0.430 ft.	Se=0.085950							
8+95.00	600.00	45.00	2.00	1.722	0.985	46.3	12.97	1317.30	1313.70	1314.68	1.23	2.35	2.75
	n=0.0300	So=0.000000	Sf=0.064968	Headloss Factor=0.000	Total Headloss=0.325 ft.	Se=0.064935							
8+90.00	600.00	45.00	2.00	1.722	1.069	50.4	11.91	1316.97	1313.70	1314.77	1.34	2.08	2.59

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0300	So=0.000000	Sf=0.049646	Headloss Factor=0.000	Total Headloss=0.248 ft.	Se=0.049615							
8+85.00	600.00	45.00	2.00	1.722	1.156	54.7	10.97	1316.72	1313.70	1314.86	1.45	1.84	2.44
	n=0.0300	So=0.000000	Sf=0.038084	Headloss Factor=0.000	Total Headloss=0.190 ft.	Se=0.038063							
8+80.00	600.00	45.00	2.00	1.722	1.251	59.4	10.09	1316.53	1313.70	1314.95	1.56	1.63	2.29
	n=0.0300	So=0.000000	Sf=0.029029	Headloss Factor=0.000	Total Headloss=0.145 ft.	Se=0.028984							
8+75.00	600.00	45.00	2.00	1.722	1.359	64.8	9.25	1316.39	1313.70	1315.06	1.70	1.44	2.14
	n=0.0300	So=0.000000	Sf=0.021491	Headloss Factor=0.000	Total Headloss=0.107 ft.	Se=0.021474							
8+70.00	600.00	45.00	2.00	1.722	1.495	71.7	8.36	1316.28	1313.70	1315.19	1.87	1.24	1.97

2/15/05 DT

''WASP2'' SUBCRITICAL WATER SURFACE PROFILE

REACH 4 TRANSITION R/C CHANNEL INLET

COMPUTED BY: DATE: DATA FILE: R4TRA CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
5+00.00	6500.00	50.00	2.00	7.280	8.650	582.1	11.17	1326.14	1315.55	1324.20	10.23	0.75	6.04
	n=0.0140	So=0.008215		Sf=0.000772	Headloss Factor=0.100		Total Headloss=0.048 ft.		Se=0.004766				
5+10.00	6500.00	54.44	2.00	6.965	9.014	653.3	9.95	1326.18	1315.63	1324.65	11.12	0.65	5.22
	n=0.0140	So=0.008203		Sf=0.000601	Headloss Factor=0.100		Total Headloss=0.030 ft.		Se=0.002993				
5+20.00	6500.00	58.89	2.00	6.678	9.203	711.3	9.14	1326.21	1315.71	1324.92	11.30	0.59	4.63
	n=0.0140	So=0.008301		Sf=0.000497	Headloss Factor=0.100		Total Headloss=0.022 ft.		Se=0.002188				
5+30.00	6500.00	63.33	2.00	6.417	9.312	763.2	8.52	1326.24	1315.80	1325.11	11.40	0.54	4.15
	n=0.0140	So=0.008191		Sf=0.000425	Headloss Factor=0.100		Total Headloss=0.017 ft.		Se=0.001715				
5+40.00	6500.00	67.78	2.00	6.178	9.377	811.4	8.01	1326.25	1315.88	1325.26	11.45	0.51	3.76
	n=0.0140	So=0.008203		Sf=0.000371	Headloss Factor=0.100		Total Headloss=0.014 ft.		Se=0.001396				
5+50.00	6500.00	72.22	2.00	5.959	9.412	857.0	7.58	1326.27	1315.96	1325.37	11.47	0.48	3.43
	n=0.0140	So=0.008203		Sf=0.000329	Headloss Factor=0.100		Total Headloss=0.012 ft.		Se=0.001165				
5+60.00	6500.00	76.67	2.00	5.757	9.426	900.4	7.22	1326.28	1316.04	1325.47	11.47	0.45	3.15
	n=0.0140	So=0.008301		Sf=0.000295	Headloss Factor=0.100		Total Headloss=0.010 ft.		Se=0.000988				
5+70.00	6500.00	81.11	2.00	5.570	9.423	941.9	6.90	1326.29	1316.13	1325.55	11.46	0.43	2.91
	n=0.0140	So=0.008191		Sf=0.000268	Headloss Factor=0.100		Total Headloss=0.009 ft.		Se=0.000846				
5+80.00	6500.00	85.56	2.00	5.397	9.409	982.0	6.62	1326.30	1316.21	1325.62	11.43	0.41	2.69
	n=0.0140	So=0.008191		Sf=0.000245	Headloss Factor=0.100		Total Headloss=0.008 ft.		Se=0.000749				
5+90.00	6500.00	90.00	2.00	5.236	9.385	1020.8	6.37	1326.30	1316.29	1325.67	11.39	0.40	2.51
	n=0.0140	So=0.008215		Sf=0.000226	Headloss Factor=0.100		Total Headloss=0.007 ft.		Se=0.000658				
6+00.00	6500.00	94.44	2.00	5.086	9.353	1058.3	6.14	1326.31	1316.37	1325.73	11.34	0.38	2.34

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
	n=0.0140	So=0.008203		Sf=0.000210	Headloss Factor=0.100		Total Headloss=0.006 ft.		Se=0.000590				
6+10.00	6500.00	98.89	2.00	4.944	9.314	1094.9	5.94	1326.32	1316.45	1325.77	11.32	0.37	2.17

n=0.0140 So=0.008301 Sf=0.000196 Headloss Factor=0.100 Total Headloss=0.005 ft. Se=0.000529

6+20.00	6500.00	103.33	2.00	4.814	9.272	1130.0	5.75	1326.32	1316.54	1325.81	11.23	0.36	2.06

n=0.0140 So=0.008191 Sf=0.000184 Headloss Factor=0.100 Total Headloss=0.005 ft. Se=0.000482

6+30.00	6500.00	107.78	2.00	4.691	9.224	1164.4	5.58	1326.33	1316.62	1325.84	11.17	0.35	1.95

n=0.0140 So=0.008203 Sf=0.000173 Headloss Factor=0.100 Total Headloss=0.004 ft. Se=0.000432

6+40.00	6500.00	112.22	2.00	4.575	9.173	1197.8	5.43	1326.33	1316.70	1325.87	11.10	0.34	1.84

n=0.0140 So=0.008203 Sf=0.000164 Headloss Factor=0.100 Total Headloss=0.004 ft. Se=0.000395

6+50.00	6500.00	116.67	2.00	4.466	9.119	1230.2	5.28	1326.34	1316.78	1325.90	11.03	0.33	1.75

n=0.0140 So=0.008301 Sf=0.000156 Headloss Factor=0.100 Total Headloss=0.004 ft. Se=0.000360

6+60.00	6500.00	121.11	2.00	4.363	9.061	1261.6	5.15	1326.34	1316.87	1325.93	10.96	0.32	1.66

n=0.0140 So=0.008191 Sf=0.000149 Headloss Factor=0.100 Total Headloss=0.003 ft. Se=0.000341

6+70.00	6500.00	125.56	2.00	4.266	9.002	1292.3	5.03	1326.34	1316.95	1325.95	10.88	0.31	1.58

n=0.0140 So=0.008203 Sf=0.000142 Headloss Factor=0.100 Total Headloss=0.003 ft. Se=0.000312

6+80.00	6500.00	130.00	2.00	4.173	8.941	1322.2	4.92	1326.35	1317.03	1325.97	10.80	0.31	1.51

n=0.0140 So=0.008203 Sf=0.000136 Headloss Factor=0.100 Total Headloss=0.003 ft. Se=0.000283

6+90.00	6500.00	134.44	2.00	4.086	8.877	1351.2	4.81	1326.35	1317.11	1325.99	10.72	0.30	1.45

n=0.0140 So=0.008203 Sf=0.000131 Headloss Factor=0.100 Total Headloss=0.003 ft. Se=0.000277

7+00.00	6500.00	138.89	2.00	4.003	8.813	1379.3	4.71	1326.35	1317.19	1326.01	10.64	0.30	1.39

n=0.0140 So=0.008301 Sf=0.000127 Headloss Factor=0.100 Total Headloss=0.003 ft. Se=0.000252

7+10.00	6500.00	143.33	2.00	3.923	8.746	1406.5	4.62	1326.35	1317.28	1326.02	10.56	0.29	1.33

n=0.0140 So=0.008191 Sf=0.000122 Headloss Factor=0.100 Total Headloss=0.002 ft. Se=0.000241

7+20.00	6500.00	147.78	2.00	3.848	8.678	1433.1	4.54	1326.36	1317.36	1326.04	10.48	0.29	1.28

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH

n=0.0140 So=0.008203 Sf=0.000120 Headloss Factor=0.100 Total Headloss=0.001 ft. Se=0.000236

7+25.00	6500.00	150.00	2.00	3.811	8.644	1446.1	4.49	1326.36	1317.40	1326.04	10.44	0.28	1.26

• POWERLINE DROP
2/21/85 MIN TAILWATER

''WASP2''SUBCRITICAL WATER SURFACE PROFILE

approx depth
of RWCD
w/ Q=3140

COMPUTED BY: DATE: DATA FILE: R4POWUS CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
1+74.00	3140.00	80.00	3.00	3.470	5.700	553.5	5.67	1323.60	1317.40	1323.10	10.54	0.45	1.89
	n=0.0300	So=0.001724	Sf=0.001635	Headloss Factor=0.000	Total Headloss=0.041 ft.	Se=0.001633							
1+99.00	3140.00	80.00	3.00	3.470	5.697	553.2	5.68	1323.64	1317.44	1323.14	6.94	0.45	1.89
	n=0.0300	So=0.001680	Sf=0.001638	Headloss Factor=0.000	Total Headloss=0.041 ft.	Se=0.001634							
2+24.00	3140.00	80.00	3.00	3.470	5.696	553.0	5.68	1323.68	1317.49	1323.18	6.94	0.45	1.90
	n=0.0300	So=0.001719	Sf=0.001639	Headloss Factor=0.000	Total Headloss=0.041 ft.	Se=0.001637							
2+49.00	3140.00	80.00	3.00	3.470	5.693	552.7	5.68	1323.72	1317.53	1323.22	6.93	0.45	1.90
	n=0.0300	So=0.001675	Sf=0.001641	Headloss Factor=0.000	Total Headloss=0.041 ft.	Se=0.001636							
2+74.00	3140.00	80.00	3.00	3.470	5.692	552.6	5.68	1323.76	1317.57	1323.26	6.93	0.46	1.90
	n=0.0300	So=0.001724	Sf=0.001643	Headloss Factor=0.000	Total Headloss=0.041 ft.	Se=0.001642							
2+99.00	3140.00	80.00	3.00	3.470	5.690	552.3	5.69	1323.80	1317.61	1323.30	6.93	0.46	1.90
	n=0.0300	So=0.001668	Sf=0.001645	Headloss Factor=0.000	Total Headloss=0.025 ft.	Se=0.001643							
3+14.00	3140.00	80.00	3.00	3.470	5.689	552.3	5.69	1323.83	1317.64	1323.33	6.93	0.46	1.90

Rock RR full side inlet

• POWERLINE DROP
2/21/05 MAX TAILWATER

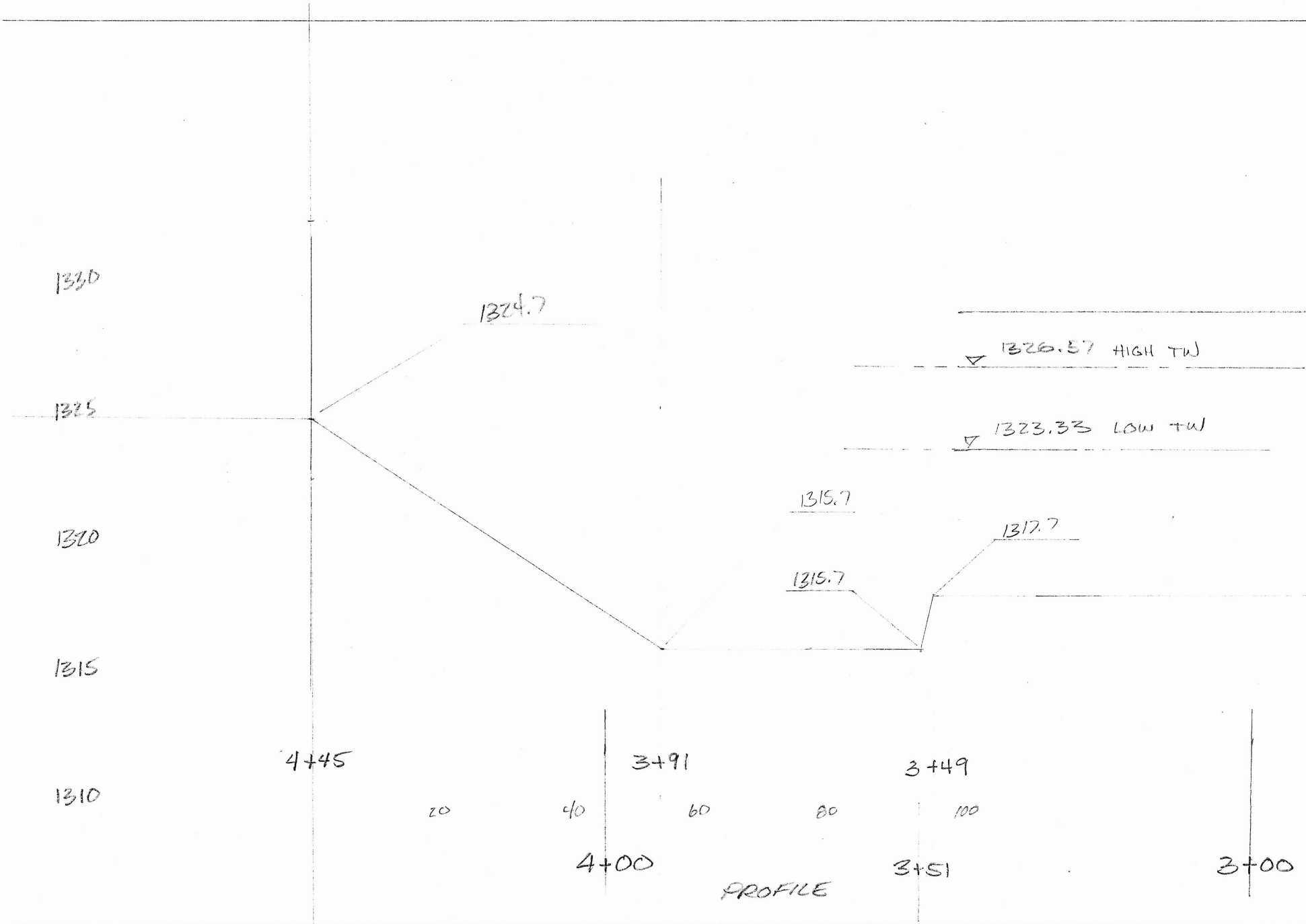
''WASP2''SUBCRITICAL WATER SURFACE PROFILE

Depth & EGL from JET analysis

COMPUTED BY: DATE: DATA FILE: R4POWUS CHECKED BY:_____ DATE:_____

STATION	Q	B	Z	Dc	DEPTH	AREA	VELOC	E.G.L	INV EL	W.S.EL	FREE BOARD	FROUDE NUMBER	SEQUENT DEPTH
1+74.00	3140.00	80.00	3.00	3.470	8.950	956.3	3.28	1326.52	1317.40	1326.35	0.00	0.22	0.88
	n=0.0300	So=0.001724	Sf=0.000331	Headloss Factor=0.000	Total Headloss=0.008 ft.	Se=0.000328							
1+99.00	3140.00	80.00	3.00	3.470	8.913	951.4	3.30	1326.53	1317.44	1326.36	10.73	0.22	0.89
	n=0.0300	So=0.001680	Sf=0.000335	Headloss Factor=0.000	Total Headloss=0.008 ft.	Se=0.000337							
2+24.00	3140.00	80.00	3.00	3.470	8.878	946.7	3.32	1326.53	1317.49	1326.36	10.69	0.22	0.89
	n=0.0300	So=0.001719	Sf=0.000340	Headloss Factor=0.000	Total Headloss=0.009 ft.	Se=0.000338							
2+49.00	3140.00	80.00	3.00	3.470	8.842	941.9	3.33	1326.54	1317.53	1326.37	10.64	0.22	0.90
	n=0.0300	So=0.001675	Sf=0.000345	Headloss Factor=0.000	Total Headloss=0.009 ft.	Se=0.000346							
2+74.00	3140.00	80.00	3.00	3.470	8.807	937.3	3.35	1326.55	1317.57	1326.38	10.60	0.22	0.91
	n=0.0300	So=0.001724	Sf=0.000350	Headloss Factor=0.000	Total Headloss=0.009 ft.	Se=0.000351							
2+99.00	3140.00	80.00	3.00	3.470	8.771	932.5	3.37	1326.56	1317.61	1326.38	10.56	0.22	0.91
	n=0.0300	So=0.001668	Sf=0.000354	Headloss Factor=0.000	Total Headloss=0.005 ft.	Se=0.000351							
3+14.00	3140.00	80.00	3.00	3.470	8.750	929.7	3.38	1326.57	1317.64	1326.39	10.54	0.22	0.92

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



ARIZONA
WILLIAMS - CURRENT

UT 2/21/85

POWERLINE DRIVE

RUCB REACH 4	2/21/85	POWERLINE AREA

WSP VS FROM CREST

STA	WSL EL	S	b	z	d	V
4+45	1324.7	0.00296	45	2	4.95	11.6
50			46		5.45	10.1
55			46		5.50	10.0
60			50			8.6
65			60			6.8
70	1324.77	0.00296	60	2	6.34	6.8
700	1326.45	"	60	2	6.11	7.12

42-381 50 SHEETS 5 SQUARE
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42-383 200 SHEETS 5 SQUARE
NATIONAL

BASIN LENGTH

FROUDE # = 3.0

FROM CHOW p 398 FIG 15-4

$\frac{L}{y_2} \approx 5.3$

$y_2 \approx 7.0$

THUS $L \approx 7.0 \times 5.3 = 37 ft$

USE $L = 40 ft$

BASIN DEPTH

- SOME DROPS HAVE PERFORMED WELL WITH BASIN RECESSED = D_1
- ALSO CHECK THAT $T_w \geq$ SEQUENT DEPTH FOR WORST CASE.

= $D_1 \approx 2.0 FT$ $y_2 = 7 ft$

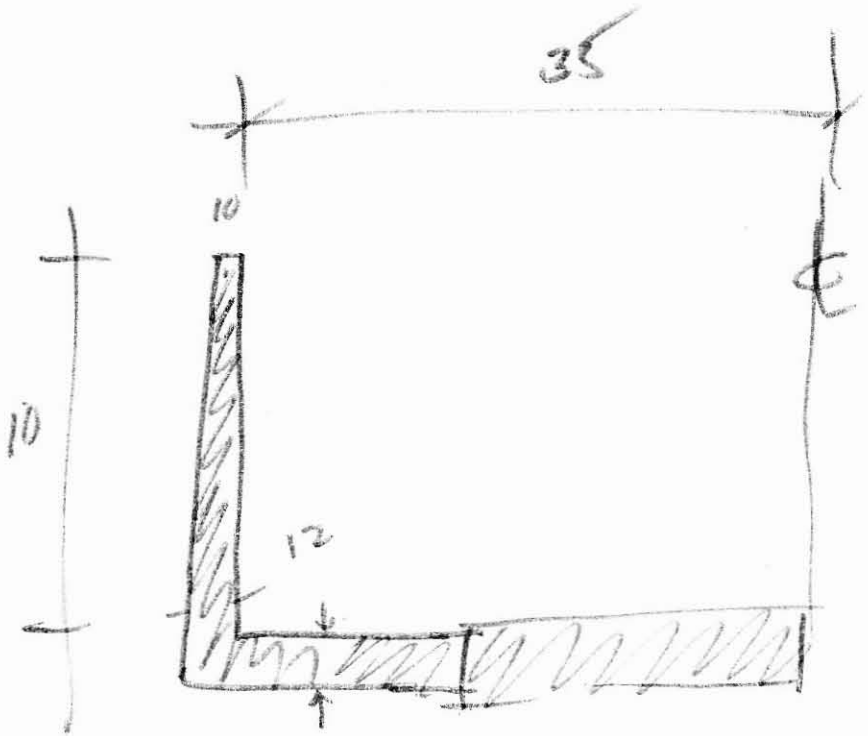
= MIN $T_w \approx 5.9 ft$

→ USE 2.0 FT RECESS

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

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

$ 3,405,000
$ 665,000



$V/ft = \frac{2(46)}{27} = 3.407$

cost/yd = 200

≈ $681/ft

FOR RECTANGULAR LINING

6°57'52"

TRAP LINING

$V = \frac{2(\frac{1}{2}(10.5+25)}{27} = .802$ cy

x 200

$165/ft

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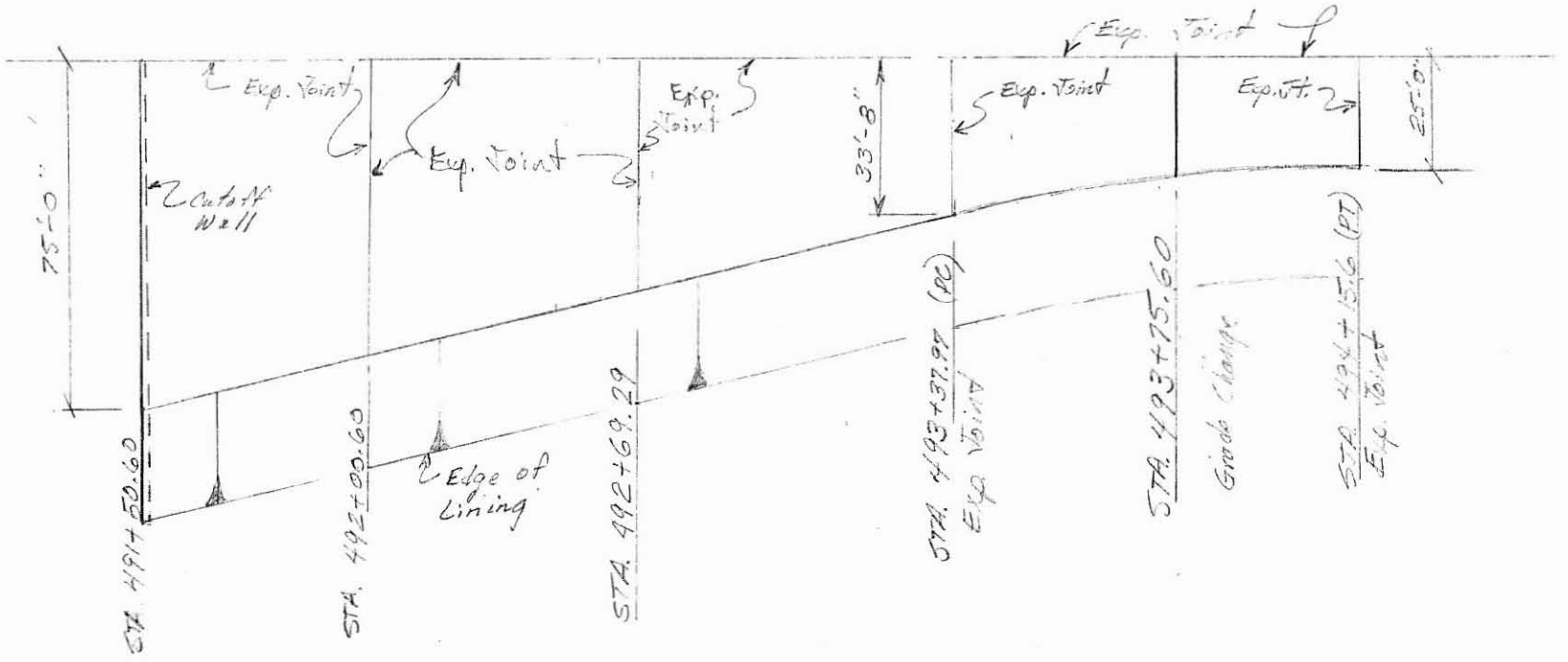
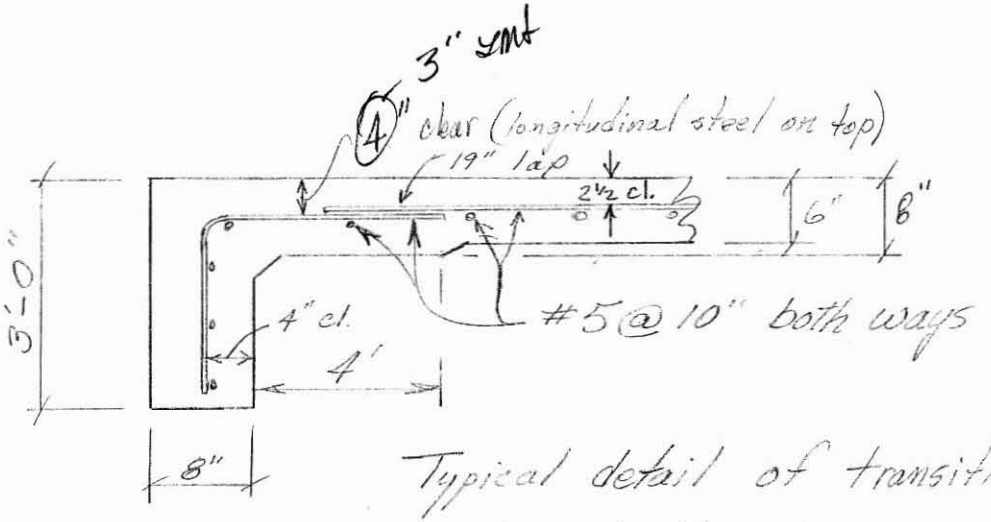
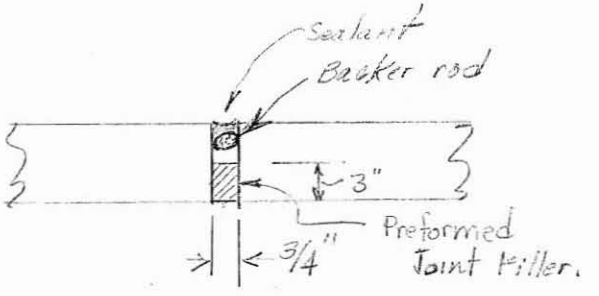
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE







Typical detail of transition reinforcement at cutoff —— STA. 491+50.60

SECT A-A
SEE SHT. 5

RWCD P-4 LMS 3/18/85 Typical PC Lining 4

R/C Lining (cont. from design comps by D.T.)

STRUCTURAL DESIGN:

1. Minimum section thickness per FHWA = 6 inches
2. Subgrade soils:

   @ STA. 491+00 to @ STA 552+00 Logs indicate CL, SC, SM & SP (mostly CL & SC).

   Conclusion: Slab on strong foundation, no significant structural loading due to found. conditions.

3. Structural loading on channel lining will be limited to effects of expansion and contraction from temperature change.
4. Evaluate design for continuous lining and for independent sections.

ACI Journal June 1972

Continuous lining

Measurements of highway pavements (continuous) with 0.6% ~~long~~itudinal reinforcement showed crack widths up to 0.031 inches.

$A_s = (0.006)(6)(12) = 0.43 \text{ in}^2/\text{ft}$ for 6" Thick.

$W_c = (0.031)(25.4 \text{ mm/in}) = 0.79 \text{ mm}$

Crack width is sufficient to allow deposition of sand size particles. This could lead to eventual buckling of concrete. Not recommended!

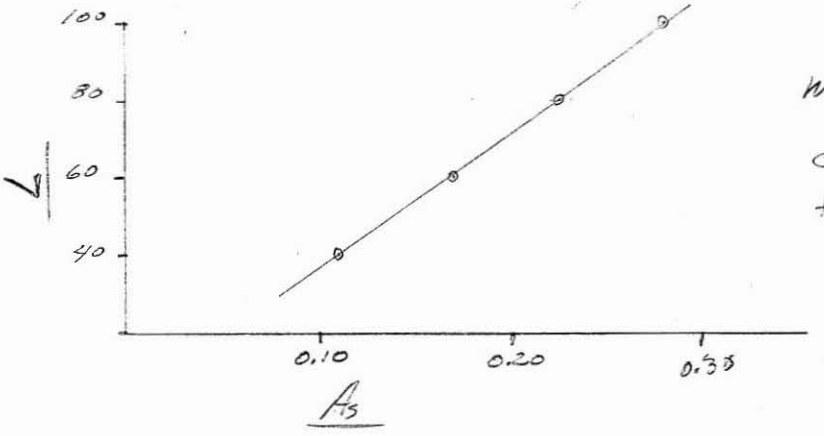
Reduced crack width will require increased concrete to steel ratio. Since 0.6% is equivalent to #6 bars at 12 inches it does not appear practical for added reinforcement and an alternate method of design should be investigated.

R/C Curing non-continuous

FWS 1. Determine reinforcement required by subgrade drag theory for ~~temp~~ & shrinkage

$$A_s = \frac{W\,c\,L}{2\,f_s}$$

L = effective length between joints
c = coefficient of friction slab & sub-grade
W = Unit weight of concrete
f_s = Allowable steel stress



$W = \frac{(6)(12)}{144}(150) = 75$

$c = 1.5$

$f_s = 20{,}000$

Transverse length = $50 + (24.9)(2) \approx 100'$

A_s (for transverse reinforcement) = 0.281 "

2. Determine reinforcement required by T&S criteria
T&S Single grid of reinforcement
$L > 30'$
TR-67 steel-concrete ratio $P_t = 0.005$

$A_s = (6)(12)(.005) = 0.36$ "

3. Use #5 @ 12" single grid, both directions. This will provide $A_s = 0.31$ " which exceeds area required by subgrade drag theory.
Provide transverse expansion joints @ 100'

There are no structural loads anticipated on the channel lining. It will be important however to minimize temp. and shrinkage cracking. This channel is in the same location as the powerline canal which experienced structural problems because of cracking.

The engineering investigation for powerline concludes probable cause as fine grained soils in cracks resulting in high compressive forces during temperature expansion.

SCS criteria for T&S requires a steel to concrete ratio as follows:

TR-67 p-41

Reinforcement in both dirs		P_t ($L<30'$)	P_t ($L>30'$)
	Exposed	0.002	0.003
	Unexposed	0.001	0.002
Single grid reinforcement		0.003	0.005

Spacing Maximum $3t = (3)(6) = 18"$

EDS-FW5 Area of reinforcement by Subgrade drage

$$A_s f_s = W \frac{L}{2} F$$

$F = 1.5$ coefficient subgrade friction
L = length between joints
W = weight of slab (unit)

For $L = 100'$ (both long. & Transverse)

$$A_s f_s = (75)\left(\frac{100}{2}\right)(1.5) = \underline{5625} \text{ lbs/ft}$$

Check thickness of concrete needed to limit tensile stress of concrete (f_c) to 200 psi. $[f_c \leq 0.05 f_c']$

Reference FCA – "Circular Conc. Tanks"

$f_c = \frac{CE_s A_s + T}{A_c + nA_s}$ = concrete tensile stress

$A_c = (12)(t)$ t = thickness

T = Tension load = $A_s f_s$ from subgrade drag = 5625

$E_s = 30 \times 10^6$ $C = 0.0011$ 0% R.H.
$f_s = 20{,}000$ $C = 0.0005$ 85% R.H.
$n = 10$

$$t = \frac{C E_s + f_s - n f_c}{12 f_c f_s}(T)$$

Use $C = 0.001$ long term, dry

$$t = \left[\frac{(0.001)(30 \times 10^6) + 20{,}000 - 10(200)}{(12)(200)(20{,}000)}\right][5625]$$

$t = (0.0010)(5625) = 5.63$ inches

$5.63 < 6''$ ∴ Slab thickness OK

$A_s = \frac{5625}{20{,}000} = 0.28 \text{ in}^2$

T & S criteria $\rho = .005$ $A_s = 0.36 \text{ in}^2$

Therefore Use $A_s = \underline{0.36 \text{ in}^2}$
for $L = 100$ ft between joints

Reinforcement layout

$A_s = 0.36$ " Single grid, Both directions

Important factors to control shrinkage cracks of concrete.

1. Minimize water content (low slump)
   a) larger aggregate
   b) Keep temp down during placement
2. Steel placement close to surface
3. Provide curing compound & retard surface with loss.
4. Close spac reinforcement

Size	Spacing	A_s
#4	6"	0.39
#4	7½	0.31
#5	10	0.37
#5	12	0.31

Use → Appears that #5 @ 10" will provide the most favorable layout for ease of construction and crack control.

Placement temp – < 90°F Covered under Std. SCS spec's.

Use low water-cement ratio

Check with John Sullivan for 8-3 mix.

Place longitudinal bar closest to top face (2½" clear±)

* Compromise between flexural strength and cracking control.

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

Joint design:

Butt joints at 100 foot intervals

Check thermal expansion:

$C_t \approx 6 \times 10^{-6}$ / in/in/°F

Temp. variation

Concrete ⇒ Low) 25° F
High 135° F

$\Delta t = 110°\ F$

$\Delta l_j = (\ell)(\Delta t)(C_t)$

$= (100)(12)(110)(6 \times 10^{-6})$

$\Delta l_j = 0.792$ inches / 100 foot length

Provide minimum joint opening 0.75 in

Joint seal:

Requirements

1. Must remain flexible
2. Withstand high temp. = 135° F
3. Water proof
4. Service life ≈ 20 years (?)

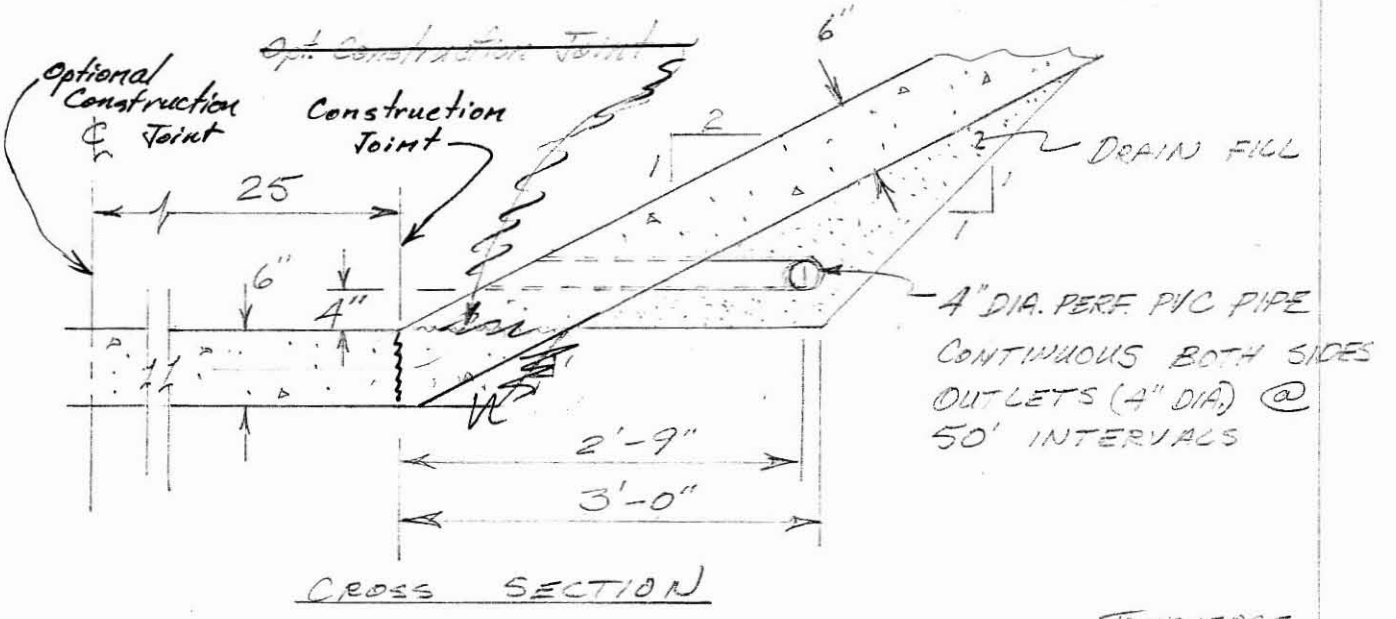
Maintenance ⟹

Design

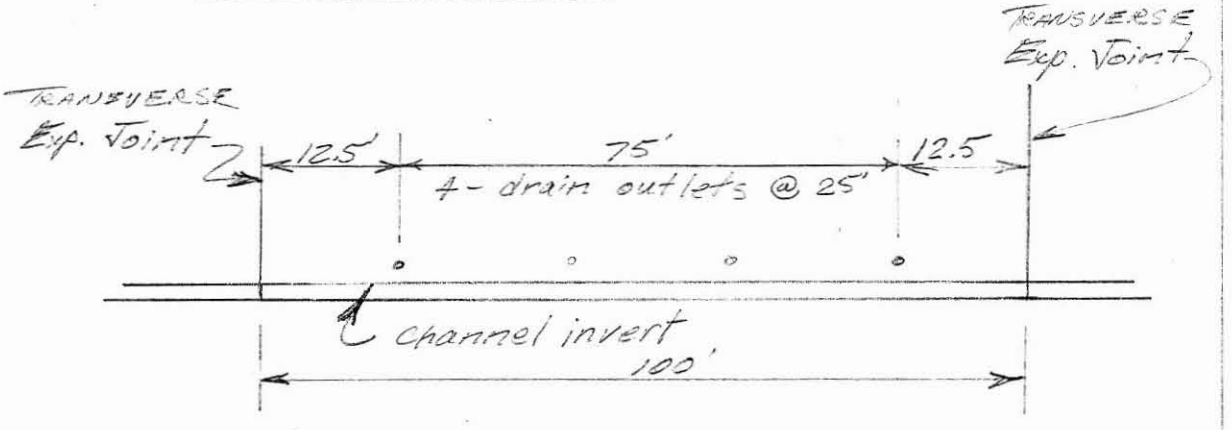
Specifications

1. Placement (temp. of concrete) 50° F low
90° F high
2. Joint movement
Concrete @ 50°
$\Delta t = 135 - 50 = 85°$
$\Delta l_j = (85)(100)(12)(6 \times 10^{-6}) = 0.612$ in

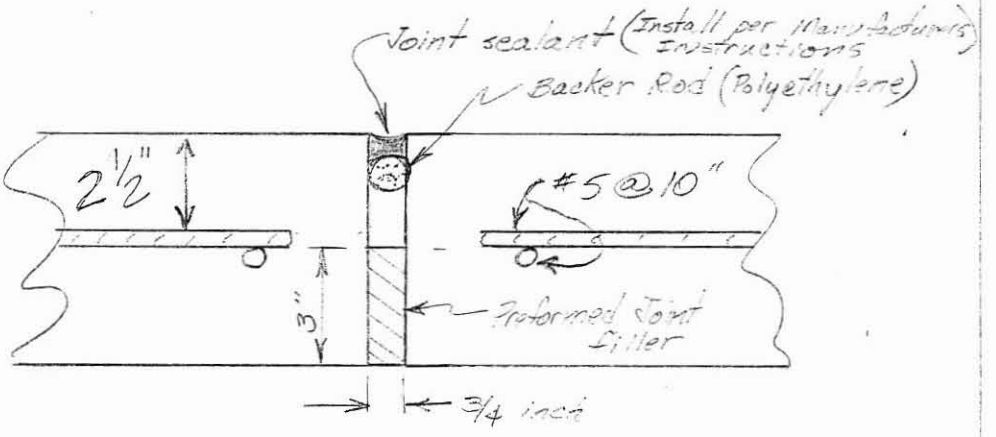
DETAIL OF R/C LINING DRAIN SYSTEM



CROSS SECTION



PROFILE (NTS)



TRANSVERSE EXPANSION - CONTRACTION JOINT

SUMMARY: DESIGN DEPTH OF R/C LINED CHANNEL.

- A DESIGN DEPTH, INCLUDING FREEBOARD, OF 11 FT WAS ARRIVED AT THROUGH VARIOUS EVOLUTIONS OF THE DESIGN.
  IT WAS DESIRED TO USE A UNIFORM LINING DEPTH IF POSSIBLE. ✓

- MAX FLOW DEPTH IS 8.87 ft AT THE UPSTREAM SIDE OF WILLIAMS FIELD ROAD. ✓

- **SUPERELEVATION:**

  (A) — CURVE #4 (US OF NMS FLD RD) R = 961.12 , d = 8.87
  FIND SUPER PER TR25 S = 0.16 ft ✓

  (B) — CURVE #5 (DS OF NMS FLDRD) R = 480.53 d = 8.70
  FIND SUPER PER TR25 S = 0.34 ft ✓

  (C) — CURVE #2 D.S. OF JCT R = 488.66 d = 8.65
  SUPER S = 0.35 ✓

- FREEBOARD:

LOCATION	d (ft)	S (ft)	$\frac{FBD}{(11-(d+S))}100$	$\frac{V^2}{2g}$ (ft)	$d+S+\frac{V^2}{2g}$	$\frac{FBD}{(11-(d+S+\frac{V^2}{2g}))}100$
A	8.87	0.16	22%	1.91	10.94	0.5%
B	8.70	0.34	22	1.82	10.86	1.3%
C	8.65	0.35	22	1.94	10.94	0.5%

- **CONCLUSION:**

  - THE FREEBOARD PROVIDED BY THE 11 FT DEEP TRAPEZOIDAL CHANNEL IS GREATER THAN 20% FOR ALL CRITICAL LOCATIONS. YMA

  - THE 11 FT DEPTH IS GREATER THAN DEPTH PLUS SUPERELEVATION PLUS VELOCITY HEAD AT ALL LOCATIONS. YMA

ARIZONA
DT

11/15/85

RWCD REACH 4

SUPERELEVATION

Summary:

Q = 6500
D = 50
Z = 2

n = 0.012

Rc	Slope	TR25	CHOW 16-13
480.53	0.0009	0.43	0.34
	0.0010	0.45	0.35
	0.0011	0.48	0.38

S = 0.0009

APPROX. DEPTH 7.94
0.40
8.42
1.20
10.10

Revised

USE 10.0'

SEE 11/24 Comps ALSO FOR n = 0.014

ARIZ.
DT 1/9/84 ROCK FLOODWAY RCH 4
SUPERELEVATION - 3/85

SUPERELEVATION

TR25
P5-4

$$S = \frac{V^2(b+2zd)}{2(gR-2zV^2)}$$

May 1ft

$b = 50$
$z = 2$
$g = 32.16$

$A = bd + zd^2$

R = Radius of curvature
$V = Q/A$

BASIC PROGRAM

- ENTER Q, b, z
- FOR VARIOUS d
- FIND V AND S
- PRINT ALL

```
DTSUPER
10  REM ** TR 25 SUPERELEVATION
15  G=32.16
20  CLS
30  INPUT "ENTER Q, b, z"; Q, b, z
40  INPUT "ENTER DEPTH"
50  REM
60  A = B*D + Z*D*D

90  V = Q/A
100 S = V*V*(B+2*Z*D)/(2*(G*R-2*Z*V*V))

45  LPRINT TAB(5) "Q" TAB(15) "B" TAB(25) "Z" TAB(35) "d"
      TAB(45) "V" TAB(55) "S"

110 LPRINT Q, B, Z, D, V, S

120 GOTO 40
```

ARIZONA
DT 11/14/85 RWCD FLOODWAY REACH
SUPERELEVATION

SUPERELEVATION

→ CHECK BY CHOW EQN 16-13

$$\Delta h = \frac{V_{max}^2}{g}\left[\frac{20}{3}\frac{r_c}{b} - 16\frac{r_c^3}{b^3} + \left(4\frac{r_c^2}{b^2} - 1\right)^2 \ln\frac{2r_c + b}{2r_c - b}\right]$$

FOR TRAP. CHANNEL

USE $b' = b + zd$

EXAMPLE: $B = 50$ $D = 8.51$
$z = 2$
$R = 480.53$
$B' = 50 + 2(8.51)$
$= 67.02$

$V = 11.397$

$$\Delta h = \frac{(11.397)^2}{32.16}\left(\frac{20}{3}\left(\frac{480.53}{67.02}\right) - 16\left(\frac{480.53}{67.02}\right)^3 + \left(4\left(\frac{480.53}{67.02}\right)^2 - 1\right)^2 \ln\left(\frac{2(480.53) + 67.02}{2(480.53) - 67.02}\right)\right.$$

$$= 4.0389\left(47.80 - 5897.5 + (41,875)(0.1397)\right)$$

$$= 4.0389(47.80 - 5897.50 + 5849.84)$$

$$= 4.0389(0.07445)$$

$$\Delta h = 0.30068$$

ARIZ

DT 11/4/84 RWCD FLOODWAY REACH 4

SUPERELEVATION Linx 3/85

SUPERELEVATION

$$\Delta h = \frac{V_z^2 b}{g r_c}$$ (Chow 16-11)

Use $b' = 67.02$

$V_z = 11.3967$

$r_c = 480.53$

$$= \frac{(11.3967)^2 (67.02)}{32.16 (480.53)}$$

$$= 0.56$$

Try $d = 7.16$

$V = 14.11$

$b' = 50 + 2(7.16) = 64.32$

$$\Delta h = \frac{(14.11)^2 (64.32)}{32.16 (480.53)} = 0.83'$$

ARIZ. RNCD FLOOD WAY R4

DT 11/10/85 YM

SUPERELEVATION

TR 25

EXAMPLE:

$Q = 6500$ $V = 11.40$

$B = 50$

$Z = 2$

$D = 8.51$

$R_c = 961.12$

$$S = \frac{V^2(b+2zd)}{2(gR - 2zV^2)} * = \frac{11.40^2(50+2(2)8.51)}{2(32.16(961.12) - 2(2)(11.40)^2)}$$

$= 0.180$

* TR25 & FAR WEST STATES DES. STDS p6-8

* 5/6/85

$Q = 6500$, $b = 30$, $z = 2$

CURVE	R	d	V	S	$V^2/2g$
2	488.60	8.65	11.17	0.35	1.94
# ~~3~~	~~1615.13~~				
4	961.12	8.87	10.82	0.16	1.82
5	480.53	8.70	11.08	0.34	1.91
~~3~~	~~4920~~			~~0.03~~	NA

DRAIN FILL, floodway R/C Lining

BASE MATERIALS (See gradations sheet 2)

d_{85} ⇒ .08 mm. to 8.0 mm

USCS classification

CL d_{85} ⇒ 0.08 to 0.105 mm

SM d_{85} ⇒ 0.5 mm to > 1/4"

SM material without cementation is probably more erodiable than CL's under the sudden wetting that will occur in this floodway. The F2 filter from Az. MAG. spec's appears to be a good choice for meeting general criteria for filtering of the finer CL material and providing a permeability greater than all base materials sampled.

MAG – F2

GRADATION

Sieve Size	% PASSING
3/4	100
3/8	80 – 100
No 4	60 – 85
No 8	45 – 70
No 16	30 – 55
" 30	15 – 40
" 50	5 – 20
" 100	0 – 10
" 200	0 – 5

This gradation satisfactory for perforated pipe with 1/4" holes.

Form SCS 130
5-65

U.S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

MATERIALS TESTING REPORT

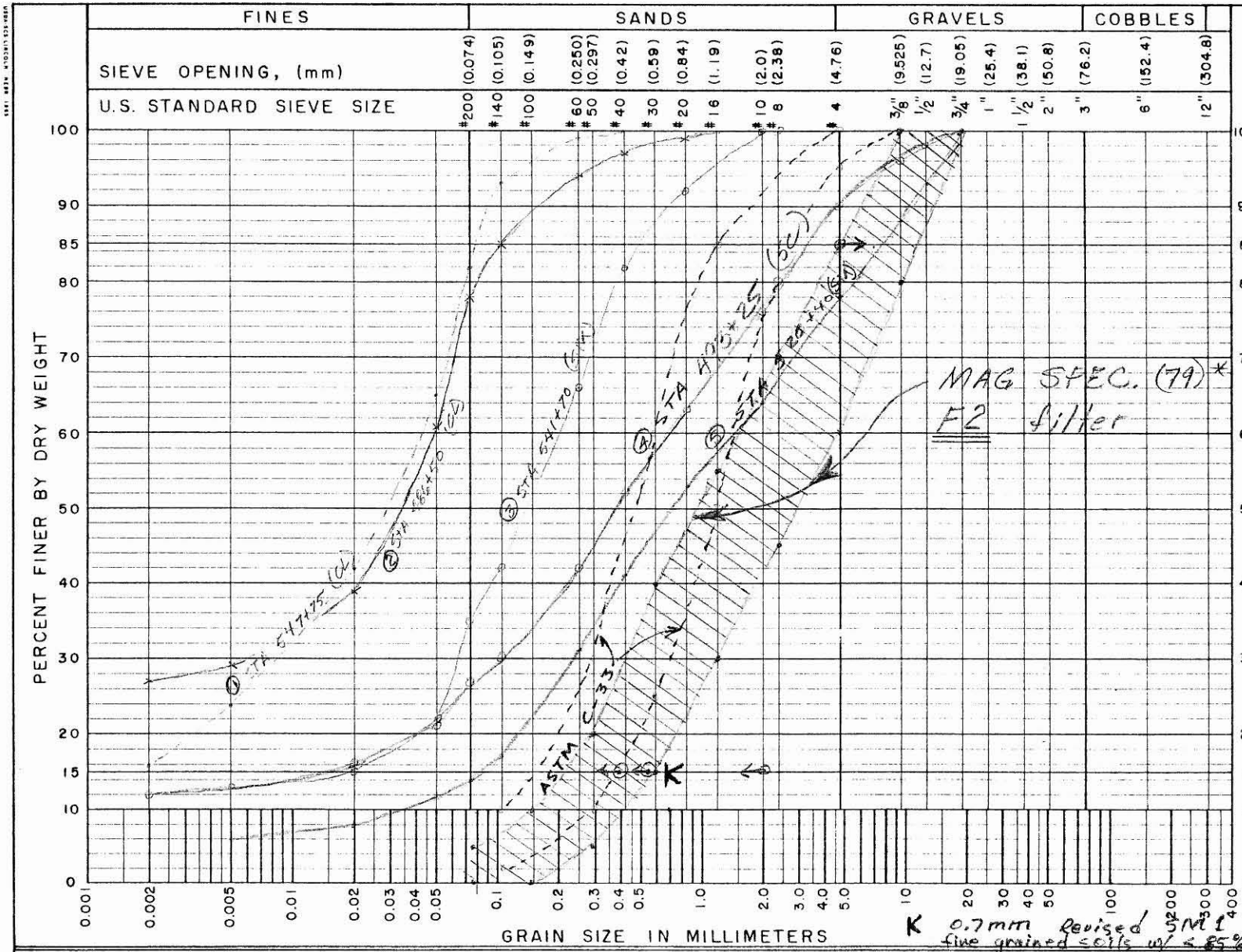
DRAIN MATERIALS

PROJECT and STATE RWCD R-2 AZ.

DESIGNED AT

BY

DATE 3/22/65



REMARKS

S/C Lining STA. 1/95+00± To 550+00 ±

Perforated drain pipe — 1/4" dia. holes

Min. d_{85} = 0.08 mm (Sample ①) ∴ D_{15} = (5)(.08) = 0.4 mm

d_{85} = 0.11 (Sample ②) D_{15} = (5)(.11) = 0.55 mm

$C_u = \frac{D_{60}}{D_{10}} = \frac{4.76}{1.5} = 31$

Sht. 12

Begin R/C Lining Transition — STA. 494+52.60
b = 150'
EI = 1317.40

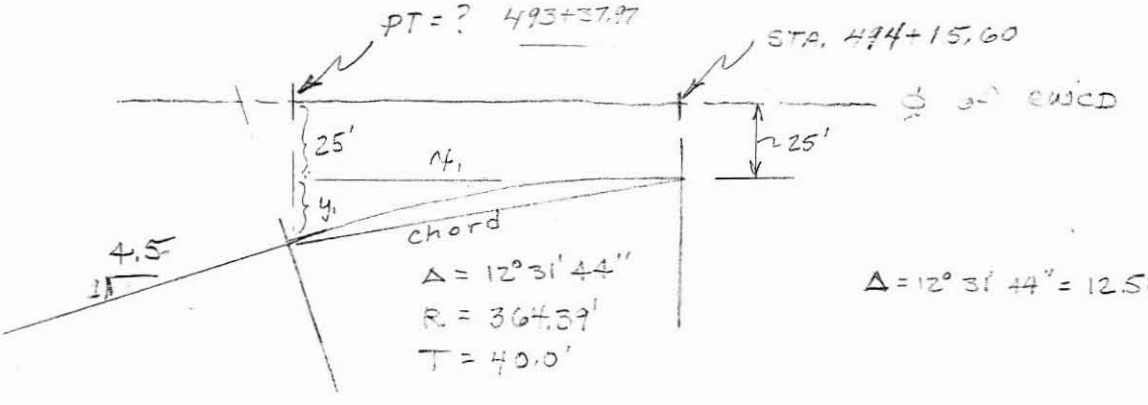
End Transition — STA. 494+15.60
b = 50'
EI = 1315.53

Begin transition — STA. 551+00
b = 50'
EI =

End R/C Lining — STA 552+00
b = 60'
EI =

Determine point of Tangency for curve upstream of STA. 493+25.6

length of Chord = $2r \sin\frac{\Delta}{2}$ = 79.523



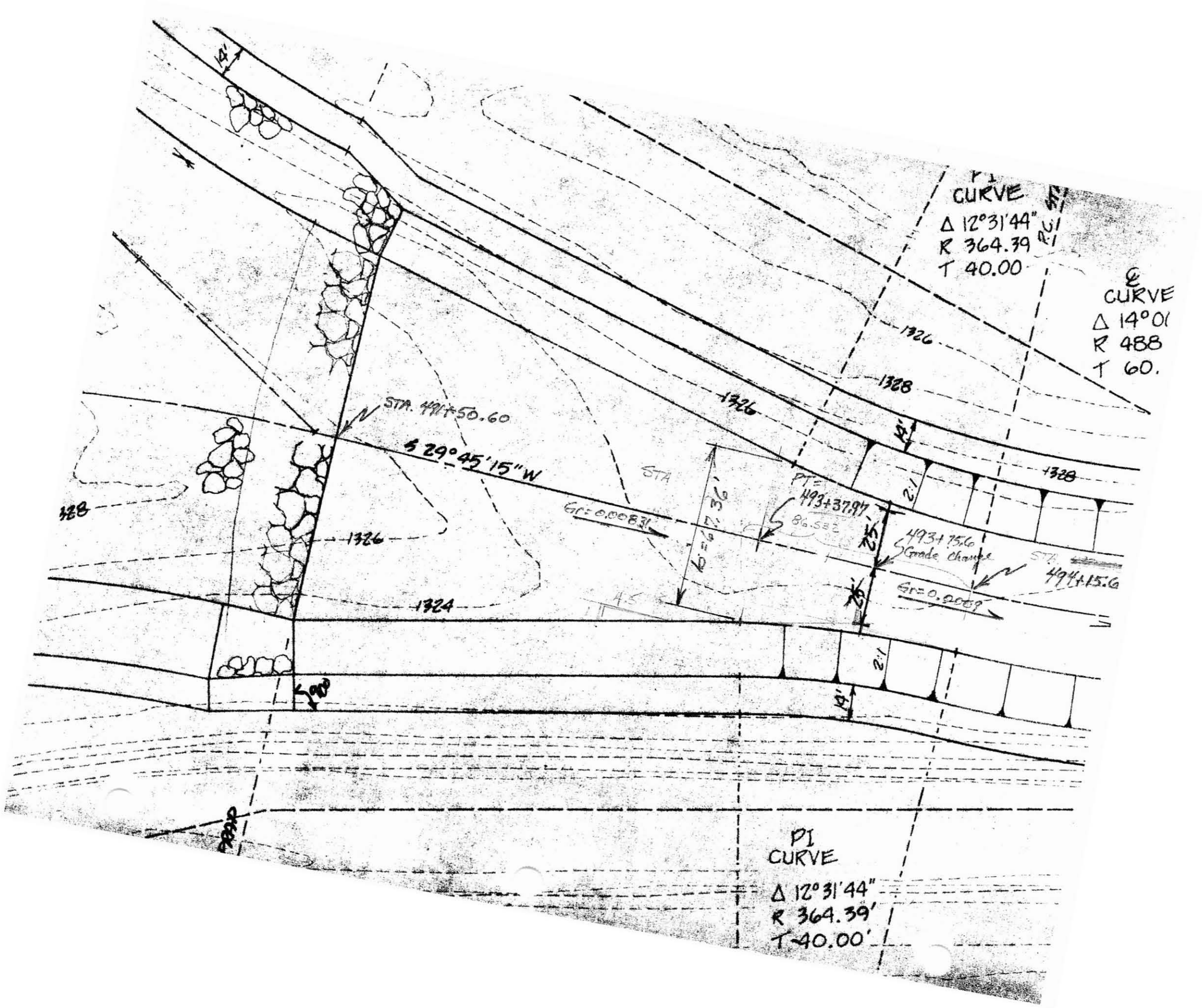
Δ = 12° 31' 44" = 12.5289°

$y_1 = (\sin\frac{\Delta}{2})(\text{chord}) = 8.677'$

$x_1 = (\cos\Delta)(\text{chord}) = 77.629'$

PT = 494 15.60 − 77.629 = **493 + 37.97**

$b = 2(25 + y_1) =$ **67.355'**


14'
CURVE
Δ 12°31'44"
R 364.39
T 40.00
℄ CURVE
Δ 14°01
R 488
T 60.
STA. 491+50.60
S 29°45'15" W
1326
1328
1324
Gr=0.00831
PT=
493+37.97
86.582
493+75.6
Grade change
STA
494+15.6
Gr=0.0009
2:1
4:1
PI
CURVE
Δ 12°31'44"
R 364.39'
T 40.00'

Determine joint spacing for R/c transition
STA. 49+55.60 to STA. 49+15.60

Criteria:

for ease of construction this criteria was exceeded for two reaches of channel. JMK

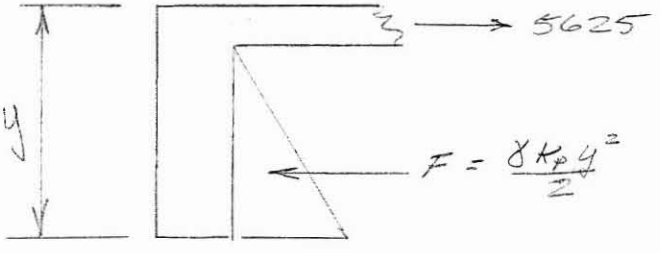
1. Distance between expansion joints shall not exceed 100 feet
2. T & S reinforcement shall be same as channel lining.
3. Section Thickness = 6"
4. Where lining is restrained (cutoff, wall), distance (in restrained direction) between joints shall not exceed 50 feet.

Design cutoff wall at upstream end to provide under cutting protection.

1. Dry 3.0 foot depth (equal to earth lining)
2. Design to resist movement from subgrade drag

Subgrade drag = 5625 lbs/ft (for 50' length)

Sht 3 of R/c lining comps dated 2/28/85



Assume $\gamma_m \simeq 120$ lbs/ft³

$K_p = 3.0$

$y = 3$ $F = 1620$ lbs

$M = 1620$ ft.lbs.

Provide sufficient section thickness for moment due to passive soil load on cutoff.

$M = 1620$ ft lbs

$A_s = \frac{M}{\phi d}$ $\quad \phi = 1.4$

$V_c = (2\sqrt{f'c}) = 126$ psi

$v = \frac{V}{\phi b} = \frac{5625}{d(12)} = \frac{468}{d}$

$d = \frac{468}{126} = 3.7$

Use min. thickness (t) = 8"

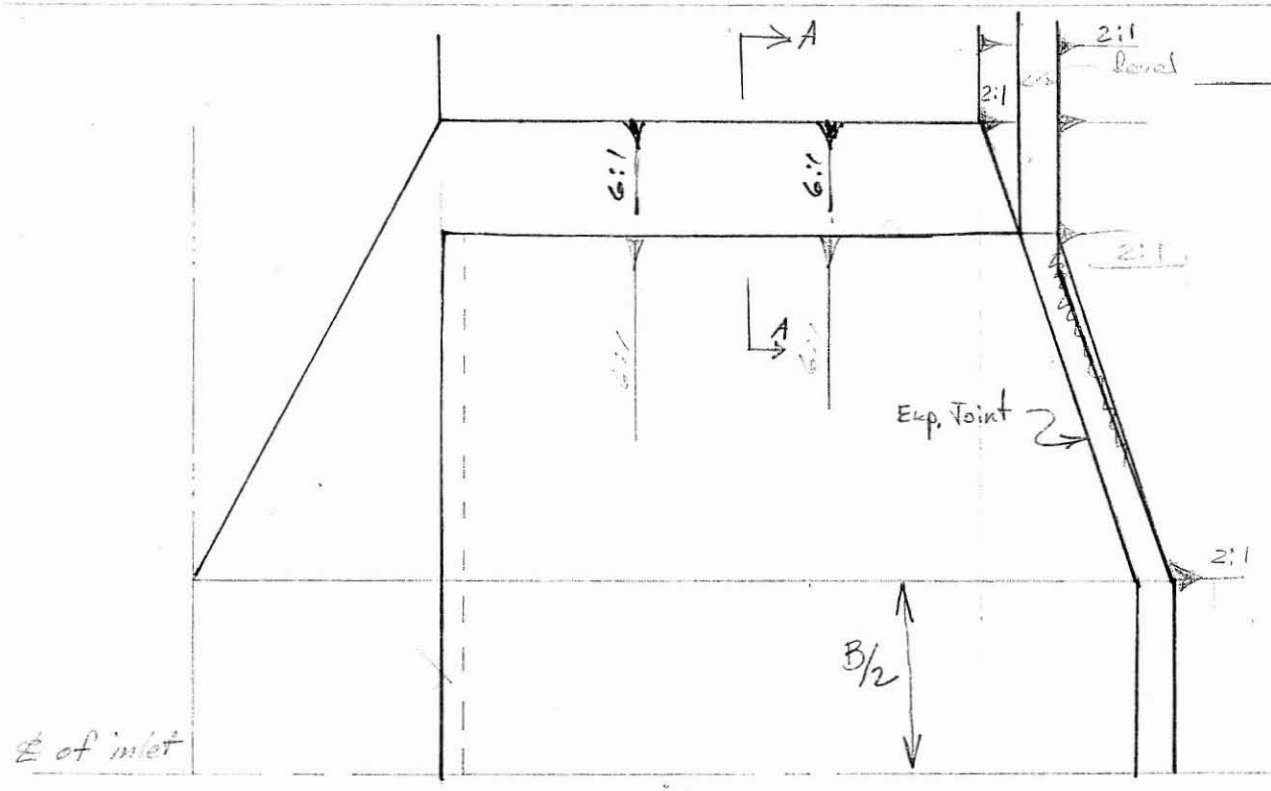
$A_s = \frac{1620}{(144)(4)} = \underline{0.28}$ "

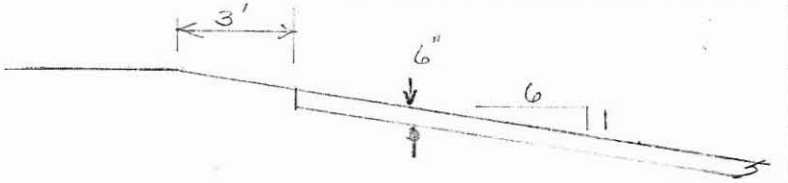
#5 @ 10" from channel lining $A_s = 0.37$ <u>OK</u>

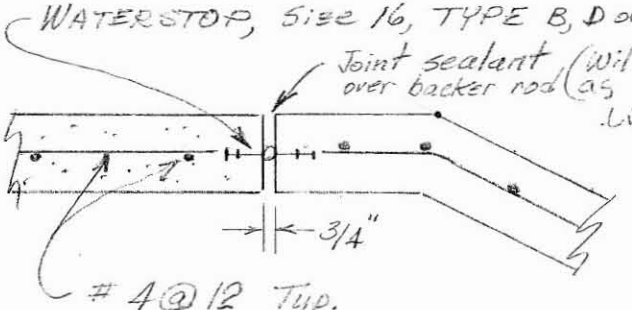
Cutoff will not be fully restrained some movement can occur. This should be <u>OK</u>.

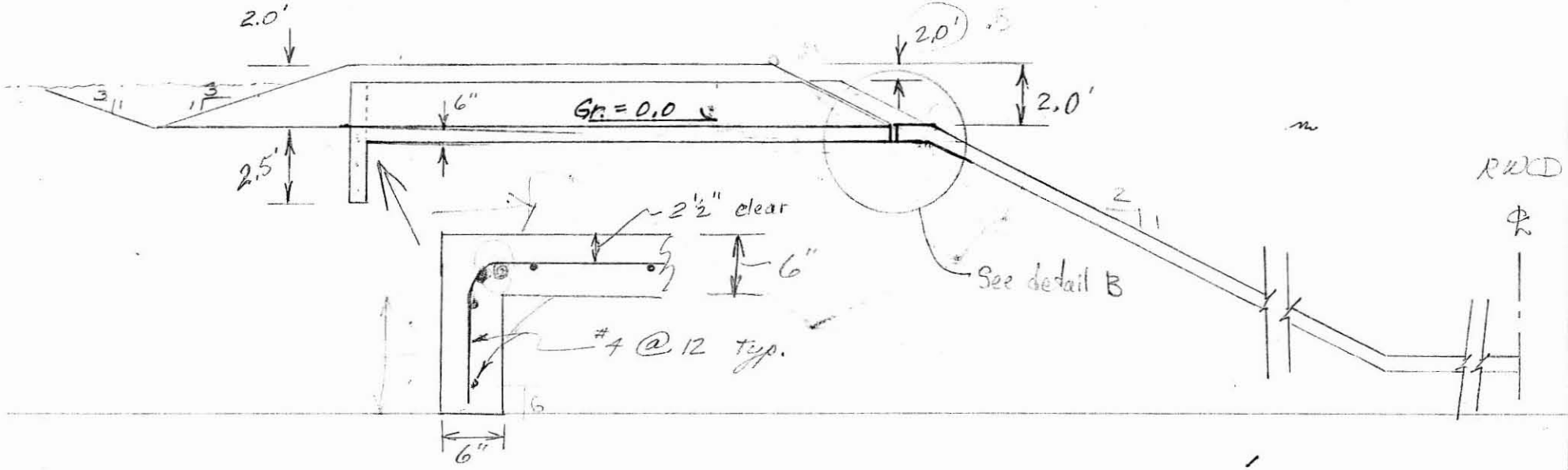
NATIONAL 42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE

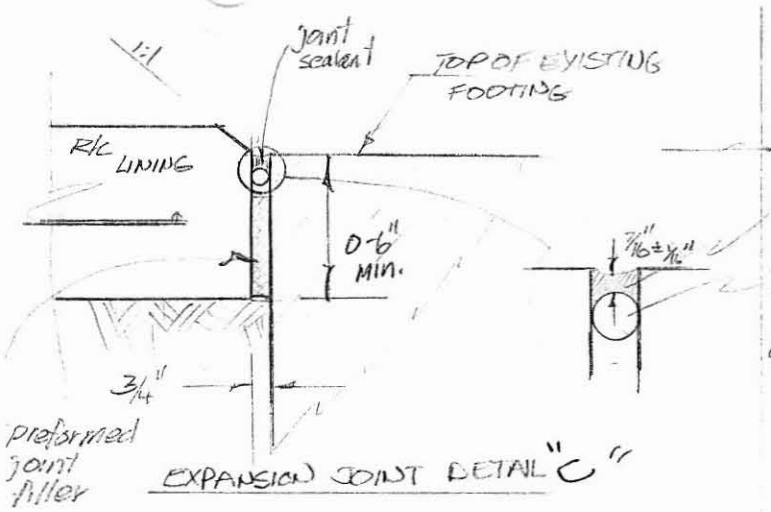
RWCD R4 Az. Lins 3/95 Side Inlets



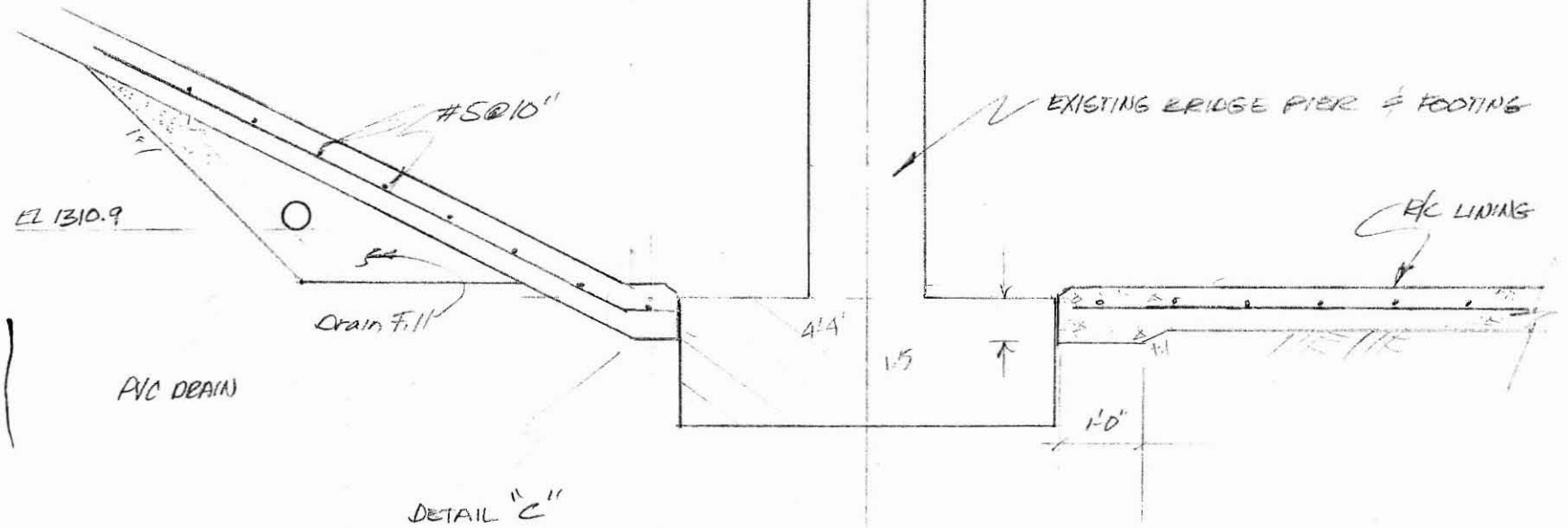






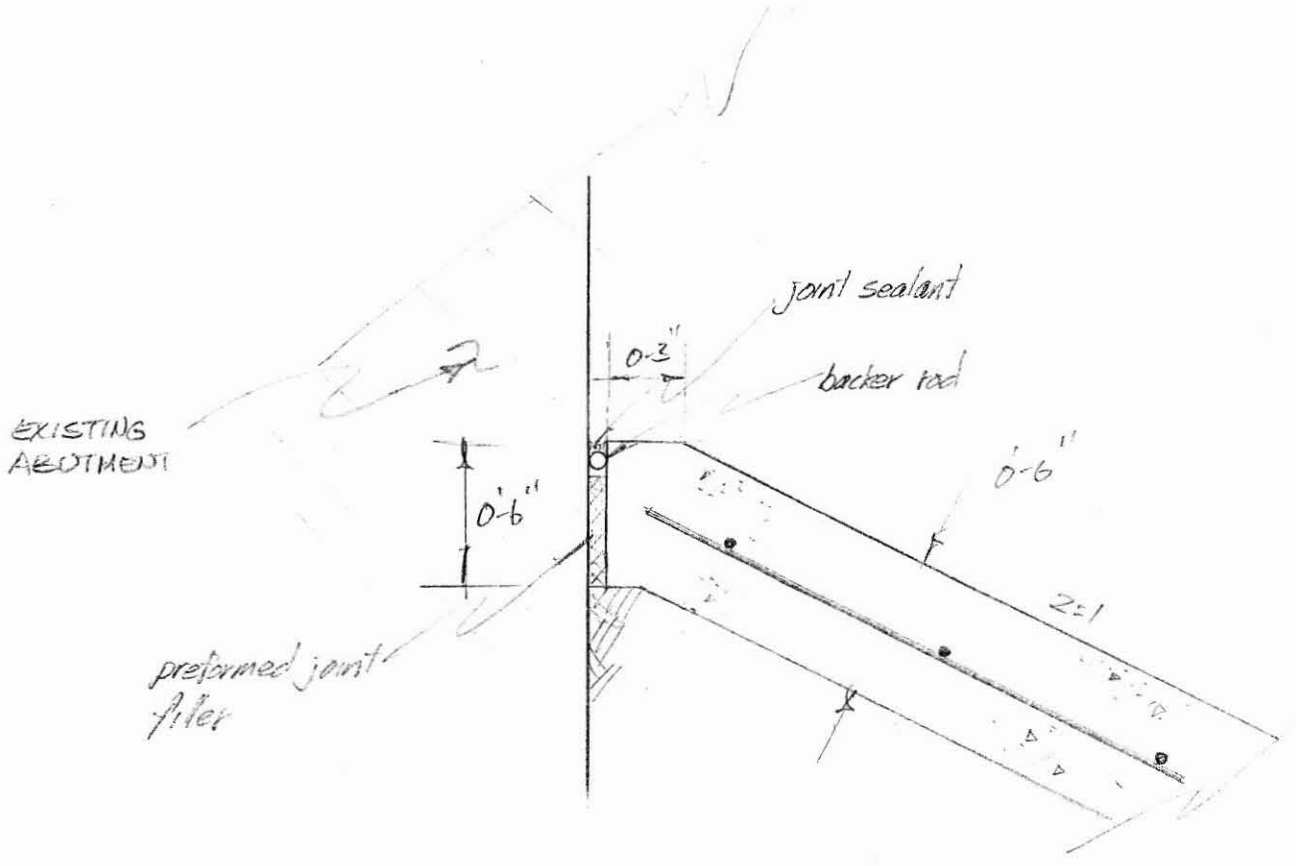


EXPANSION JOINT DETAIL "C"

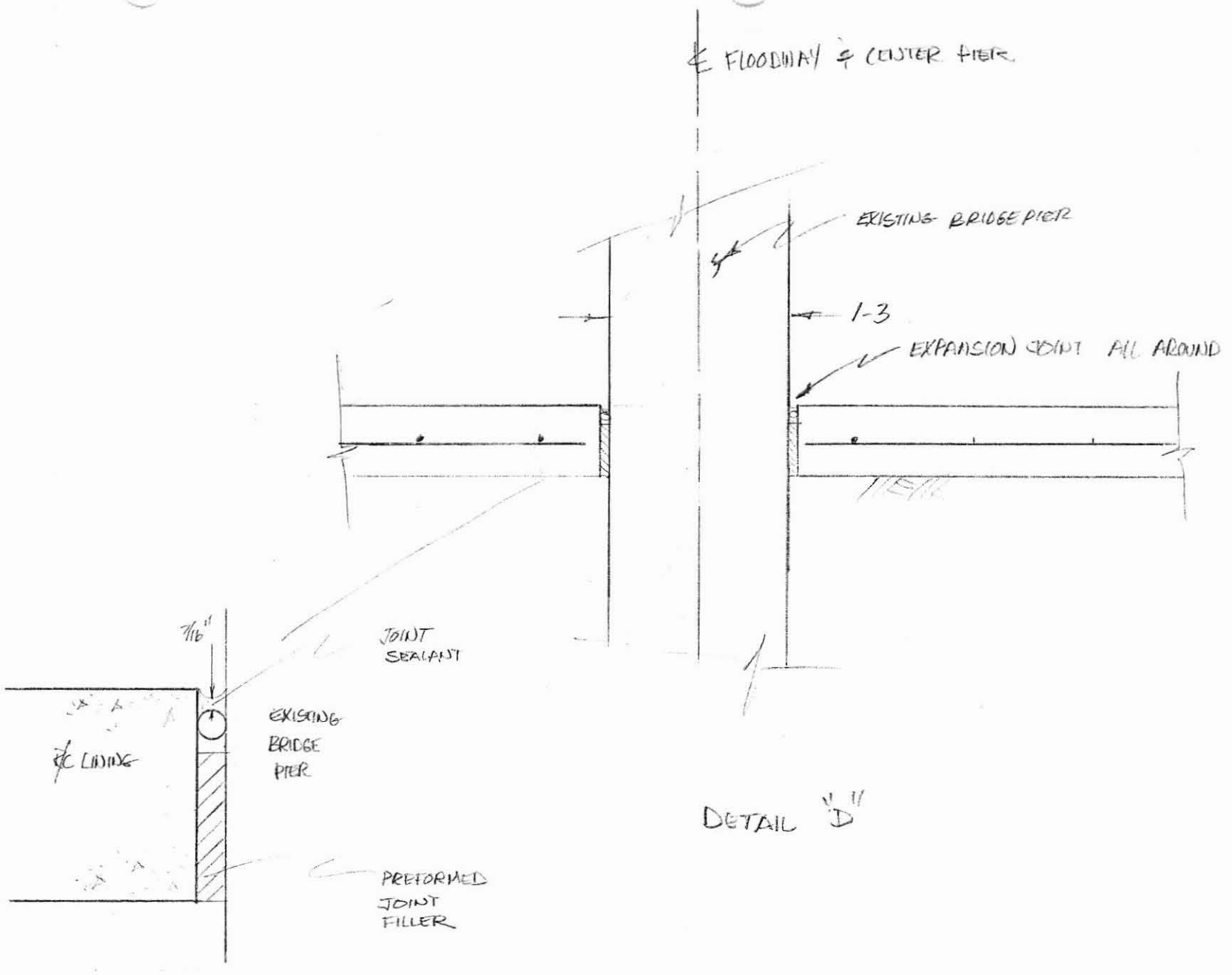


DETAIL "C"

DETAIL "A"


joint sealant
backer rod
0-3"
EXISTING ABUTMENT
0'-6"
0'-6"
2:1
preformed joint filler

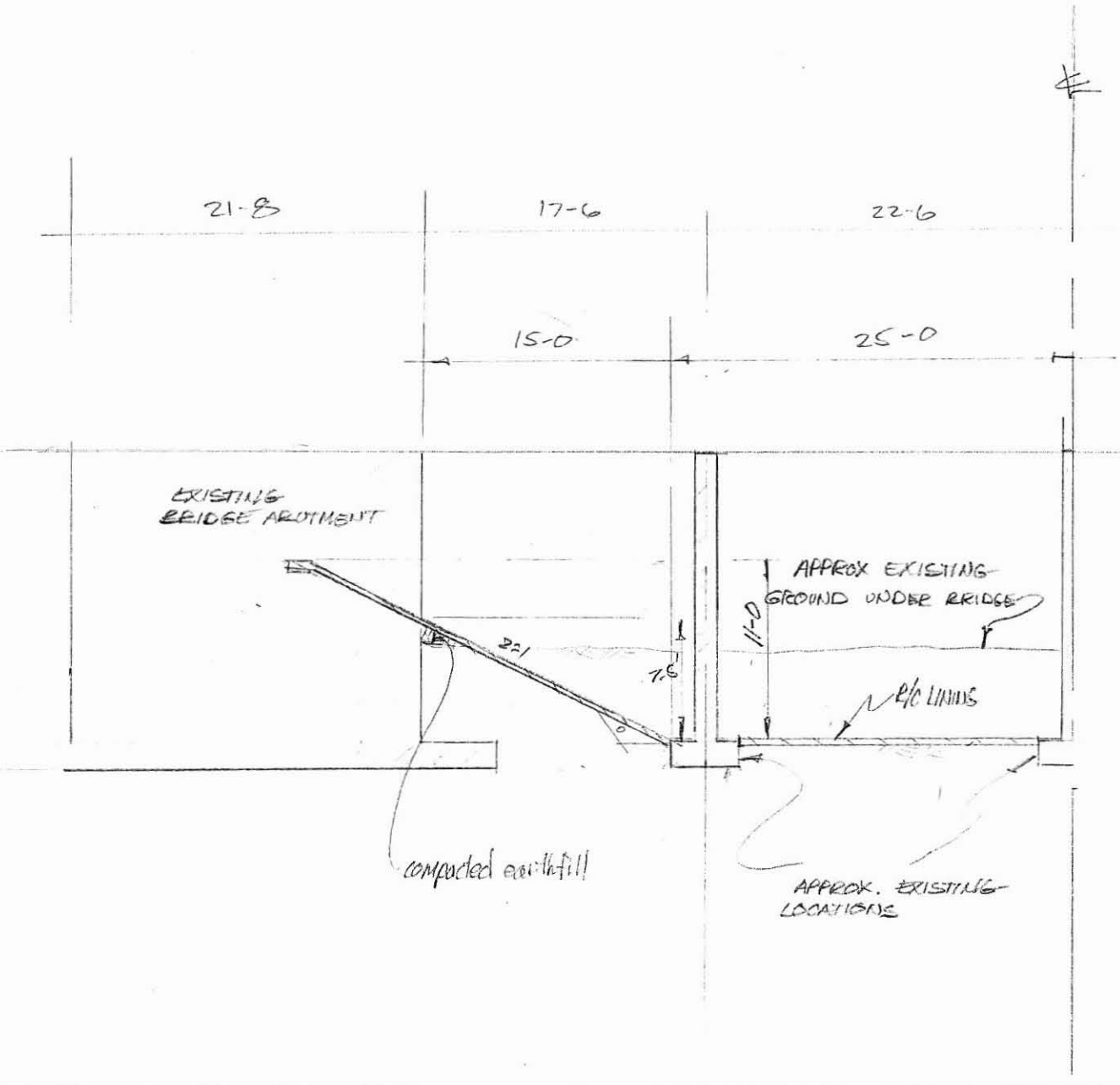
DETAIL "E"



DETAIL "D"

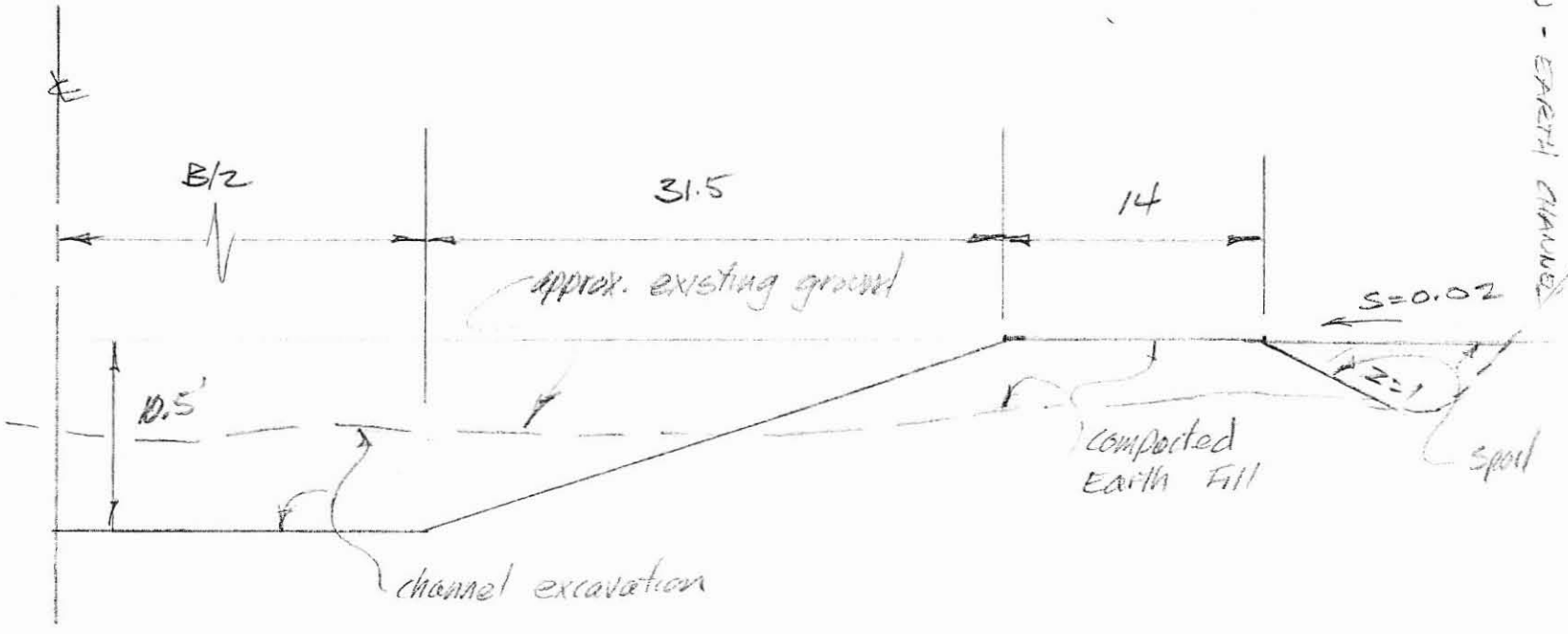
ARIZONA ROAD OVER CT CREEK
WILLIAMS FIELD ROAD BRIDGE
JMA

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



ST 3/25/85 JMK
TOWER RD BRIDGE

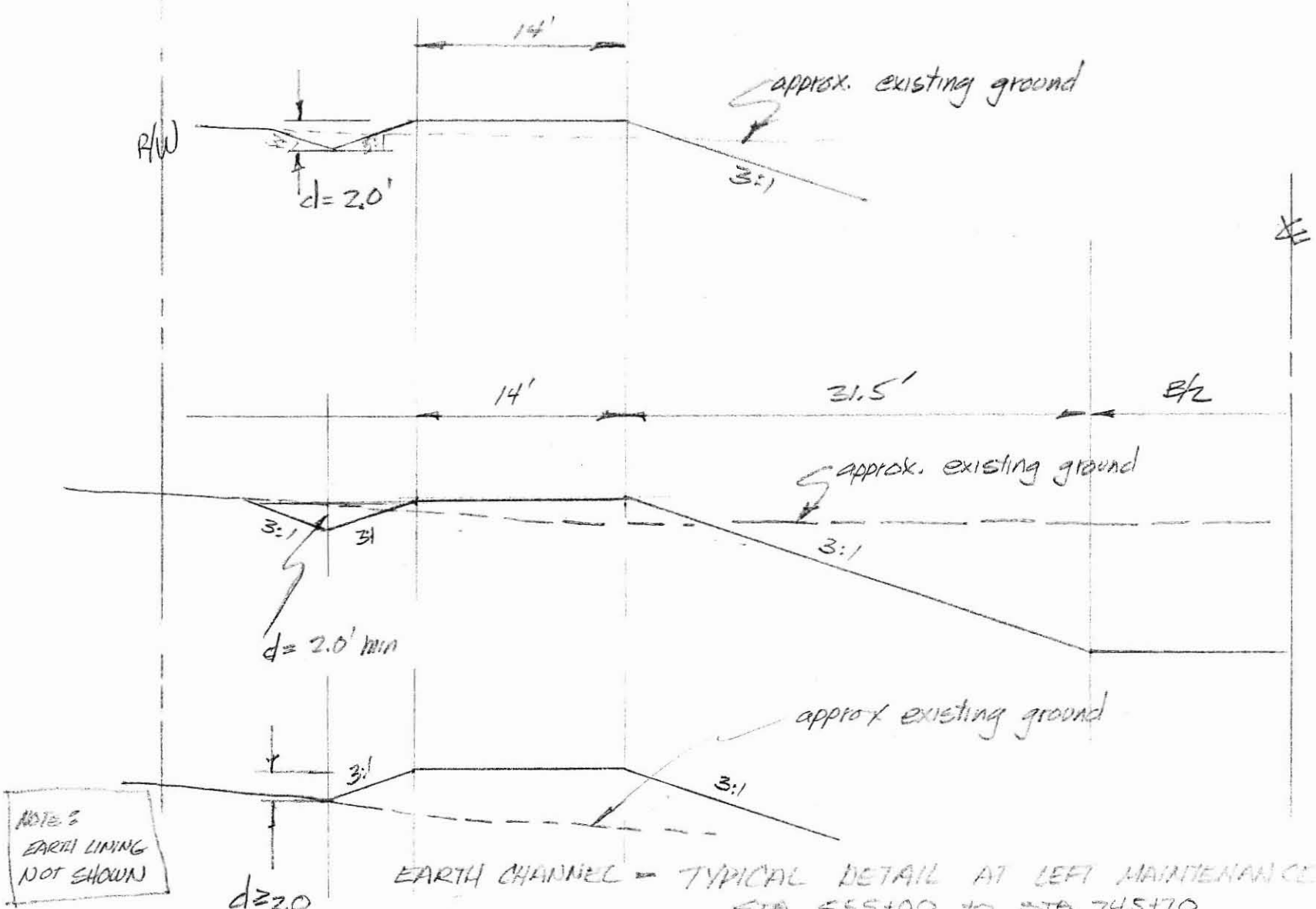
APP'D
DT 11/10/85
TYPICAL SECTION - EARTH CHANNEL
CKD RT
TMK



NOTE:
EARTH LINING NOT SHOWN

TYPICAL SECTION - EARTH CHANNEL RIGHT OF ℄

CTA 555+00 TO STA 741+70



EARTH CHANNEL - TYPICAL DETAIL AT LEFT MAINTENANCE BERM
STA 555+00 to STA 745+70

EARTH CHANNEL - TYPICAL SECTION
11/85
RWCD RH
ARIZ
DT

AR12.
OT

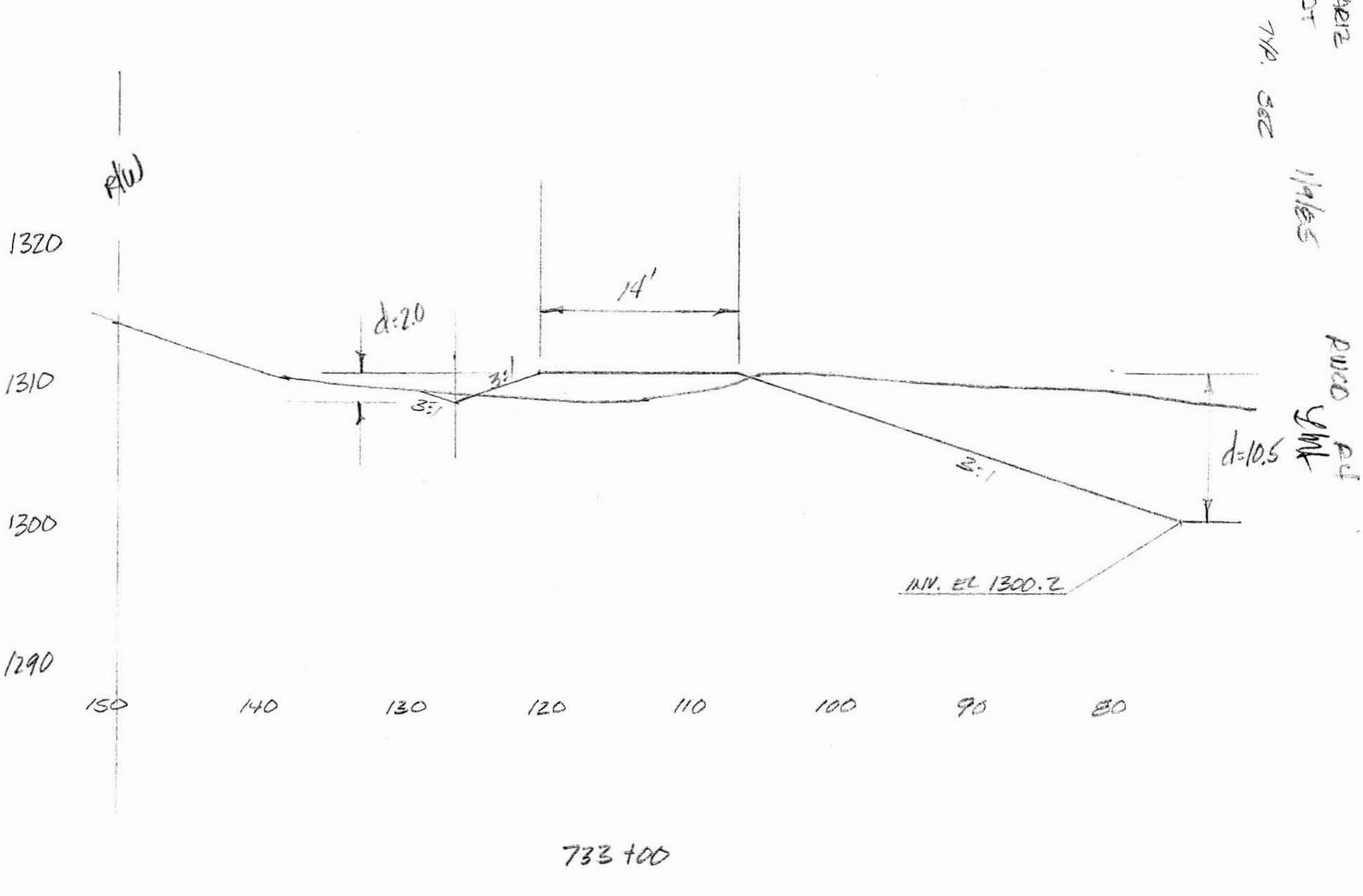
11/10/85

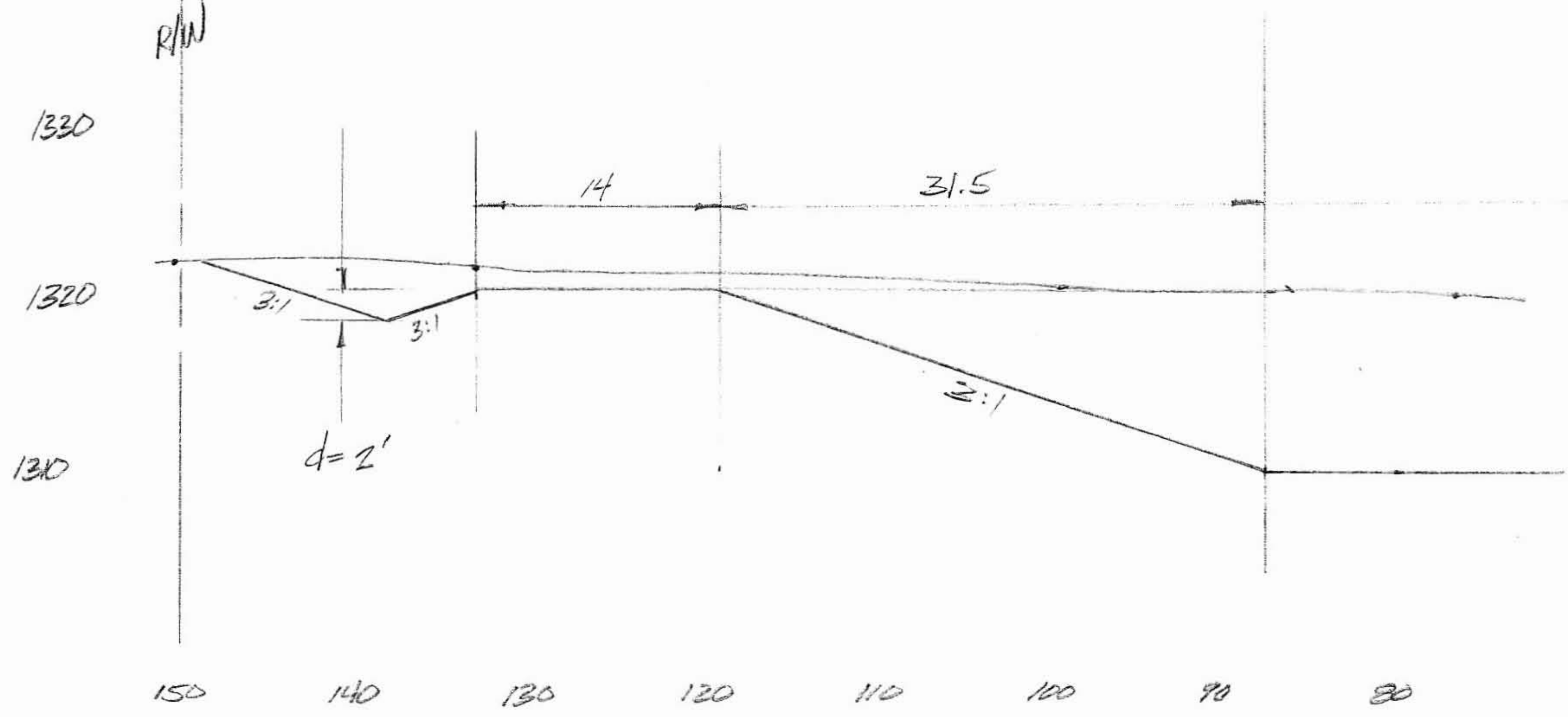
TENCD R4
YMK

TYPICAL SECTIONS - EARTH CHANNEL

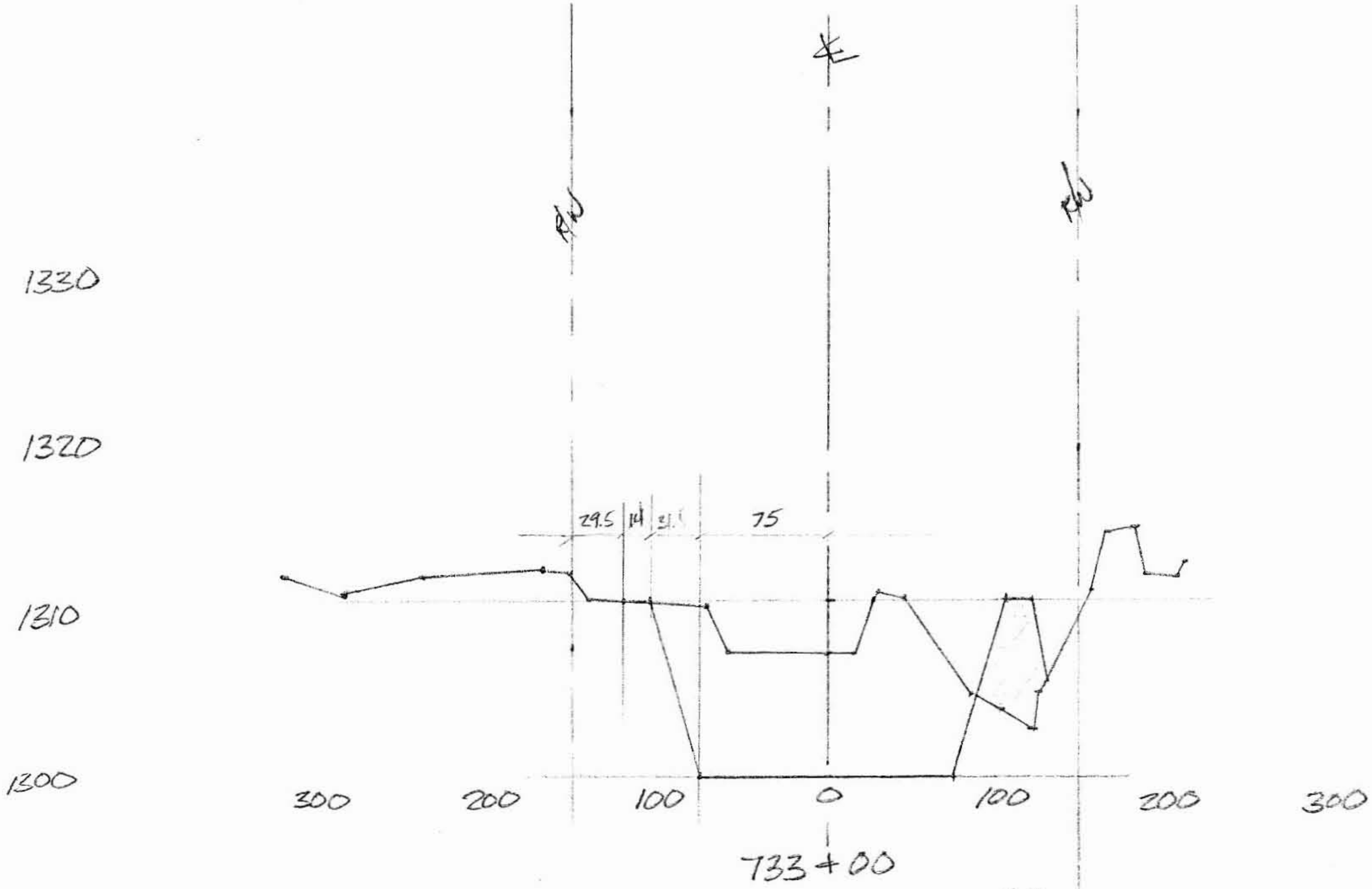
NOTE:
EARTH LINING
NOT SHOWN

TYPICAL SECTION - EARTH CHANNEL LEFT OF ℄
STATION 555+00 TO STA 745+70
(not to scale)


R/W
1320
1310
1300
1290
14'
d:2.0
3:1
3:1
3:1
d=10.5
INV. EL 1300.2
150
140
130
120
110
100
90
80
733+00
ARIZ
DOT
TYP. SEC
1/9/85



STA 591+00



BW = 150
EL = 1300.22

ARIZ
DT
CROSS
11/8/85
RWCD R4
JMK

ARIZ.
DT

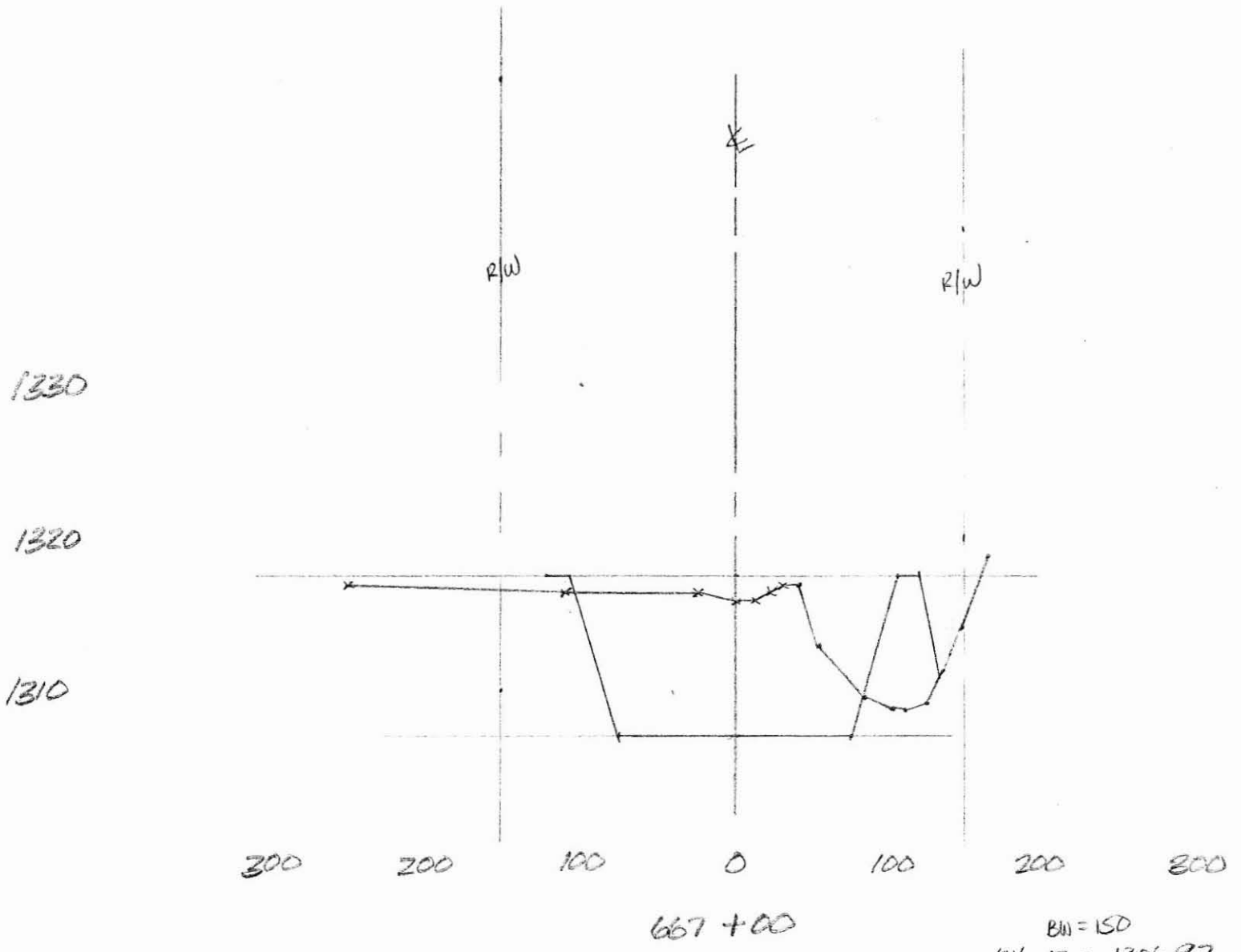
1/8/85

ROCK RL
JMK

685+00

BW = 150
INV EL = 1303.10

AE12.
DT 1/8/85 RWCD KL



BW = 150
INV EL = 1306.97

ARIZONA DT

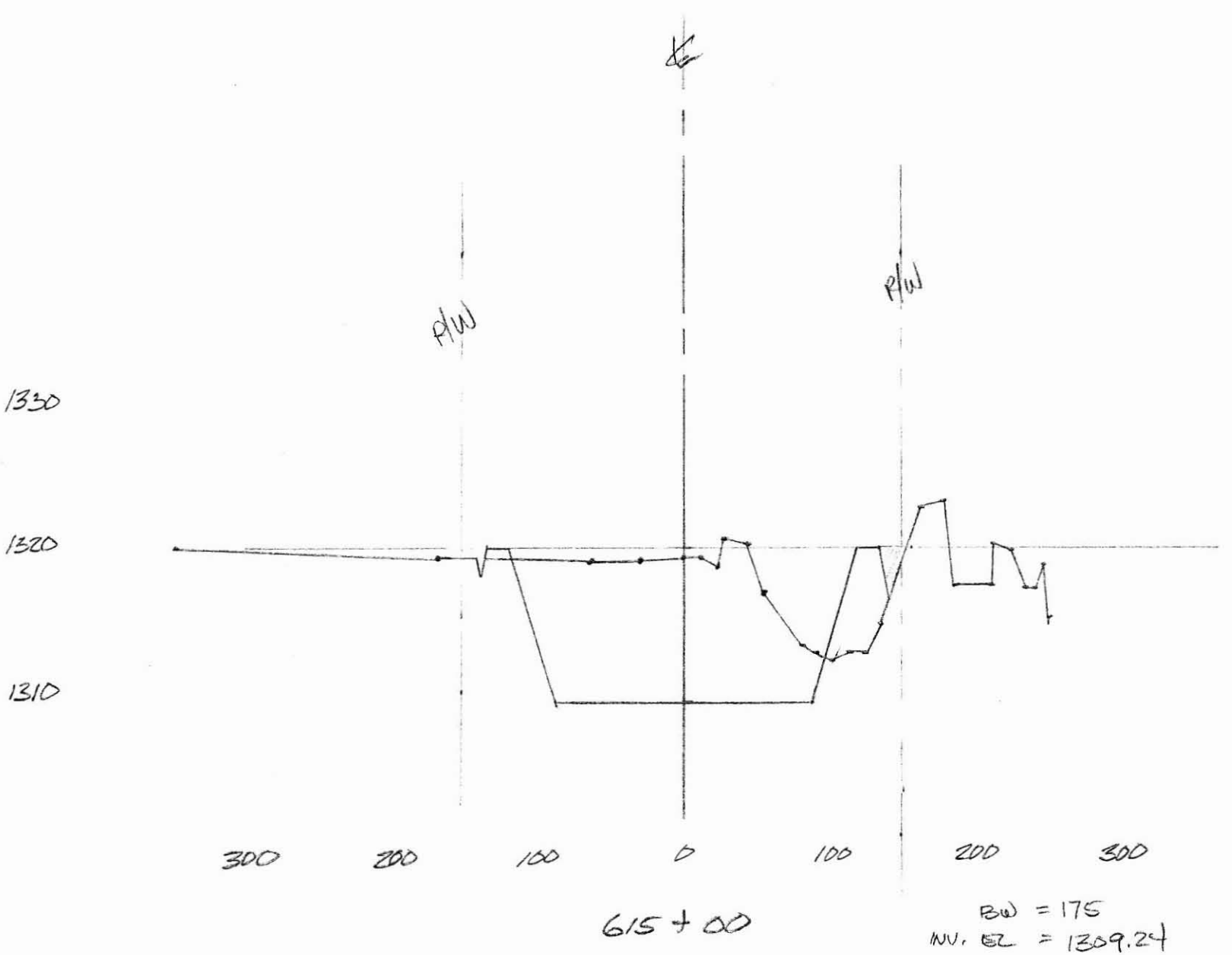
1/8/85

RWCD R4

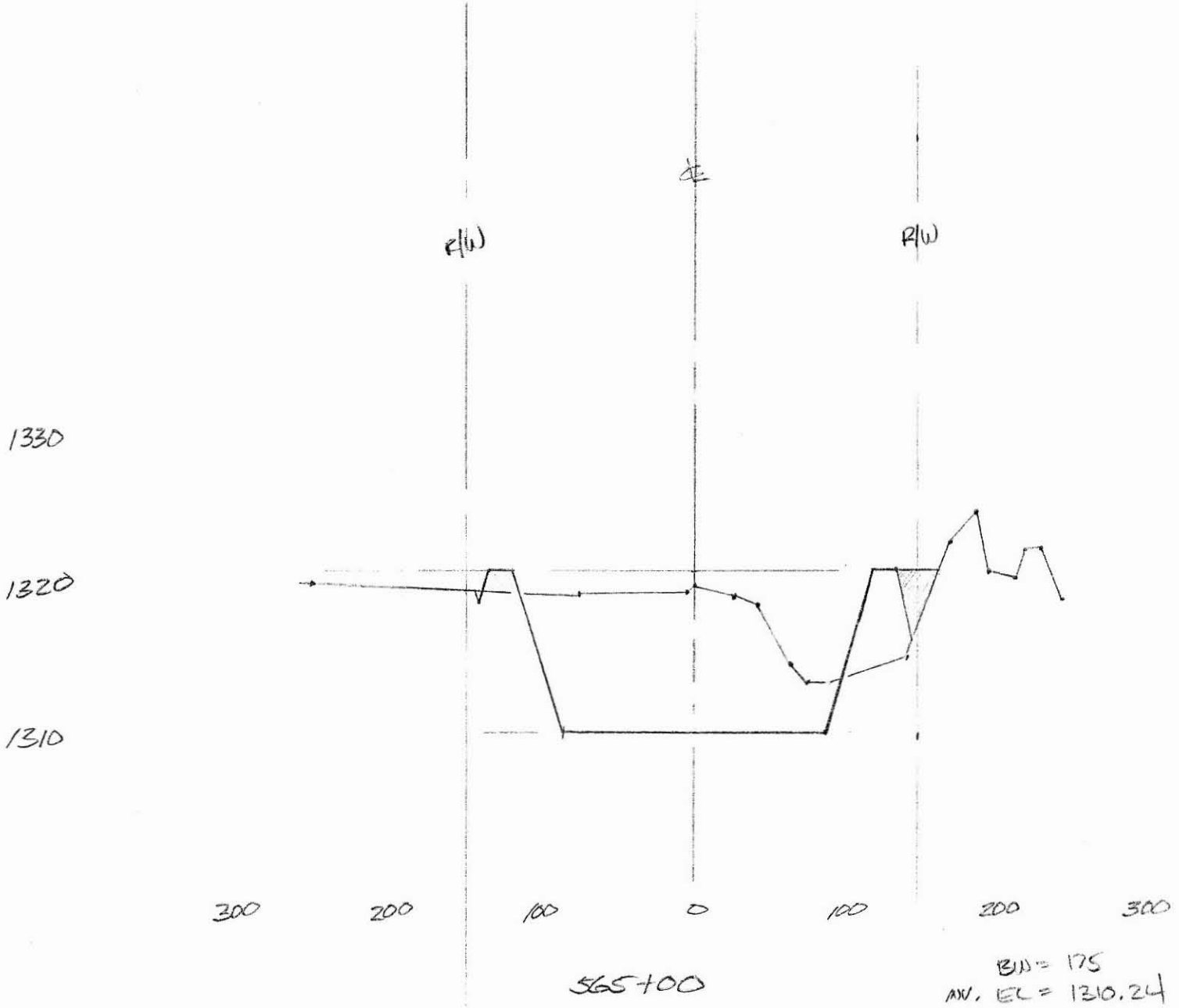
653+00

RW = 150

INV. EL = 1307.67


ARIZONA
DT
1/7/85
RWCD RL
R/W
R/W
1330
1320
1310
300
200
100
0
100
200
300
615 + 00
BW = 175
INV. EL = 1309.24

ARIZONA
DT 11/7/85 RACD R4

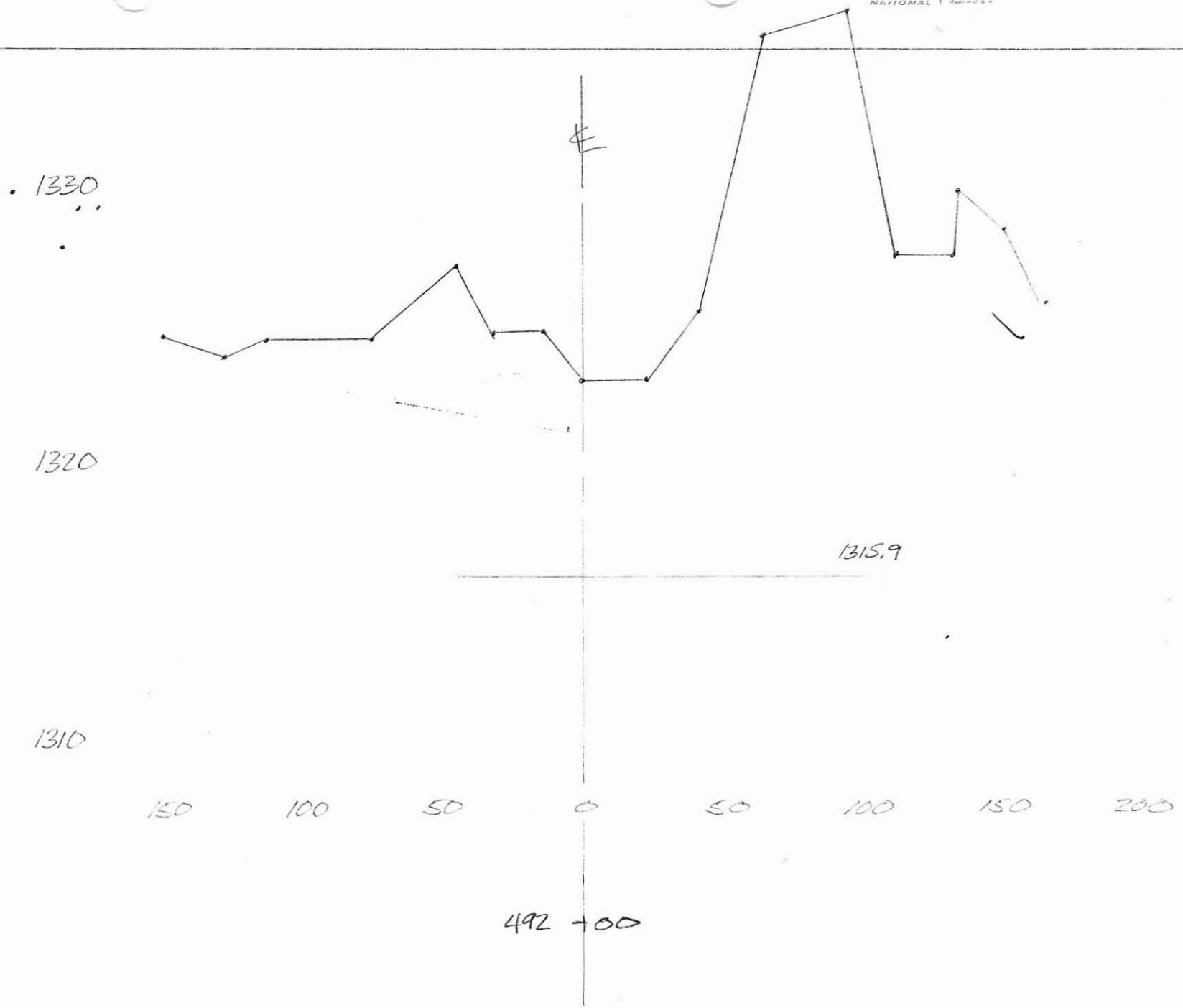


NATIONAL
42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE

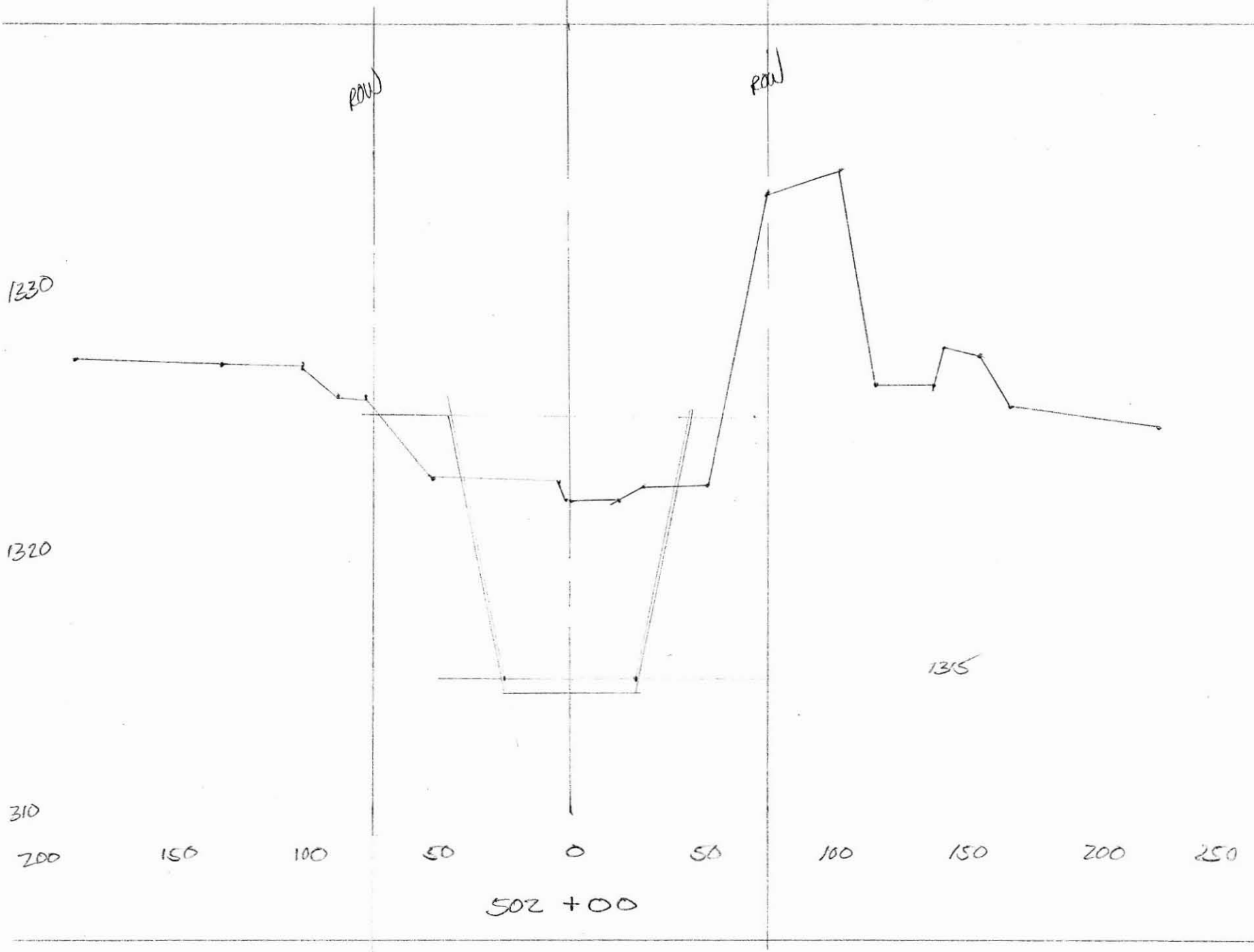
DT 1/21/85

KNOLL AT ARIZONA

CROSS SECTIONS



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



DT 1/21/85

KUELL RD
APACHE JCT AZ

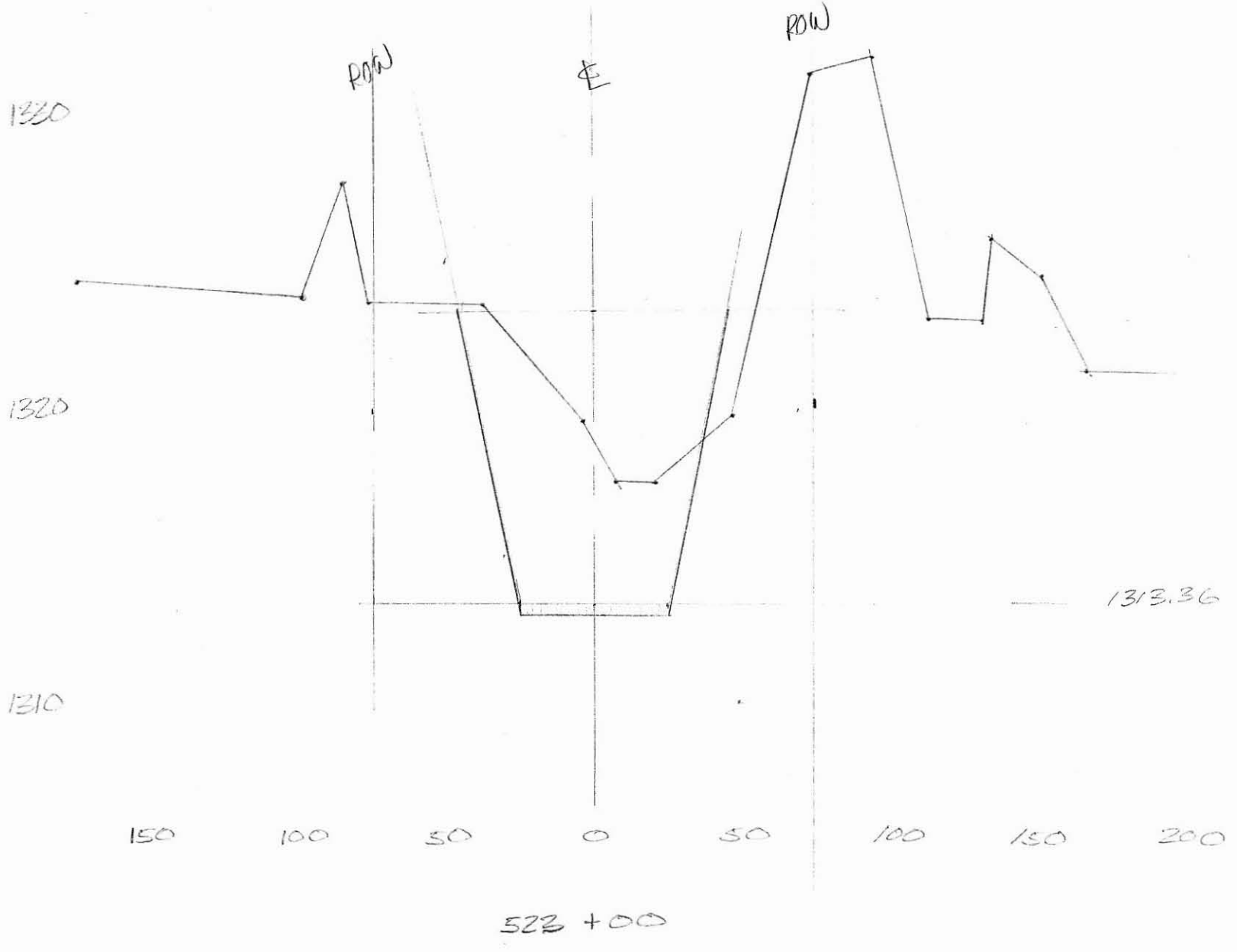
CROSS SECTIONS

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

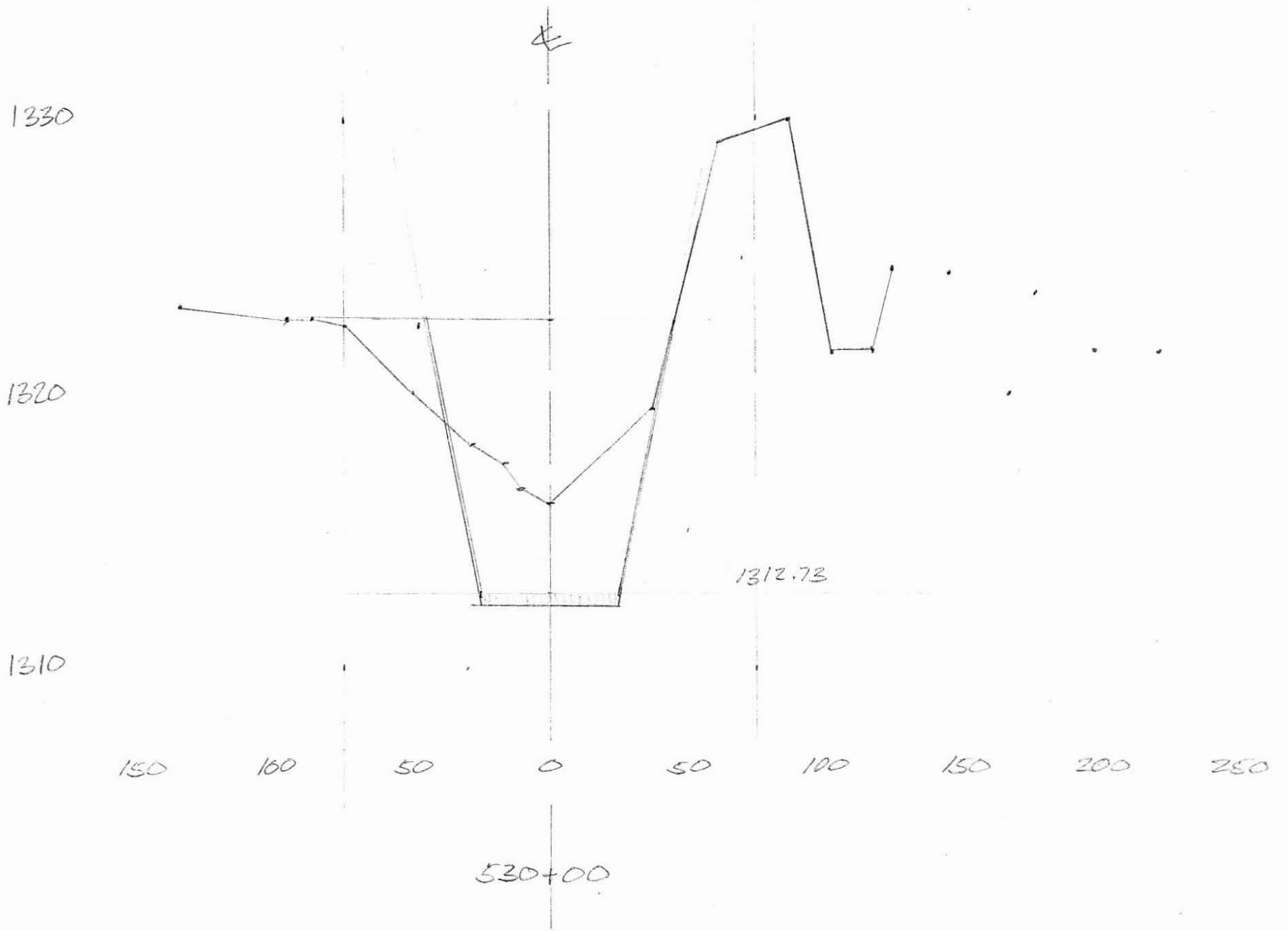
DT 1/21/85

TWELVE MILE ROAD

CROSS SECTIONS



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

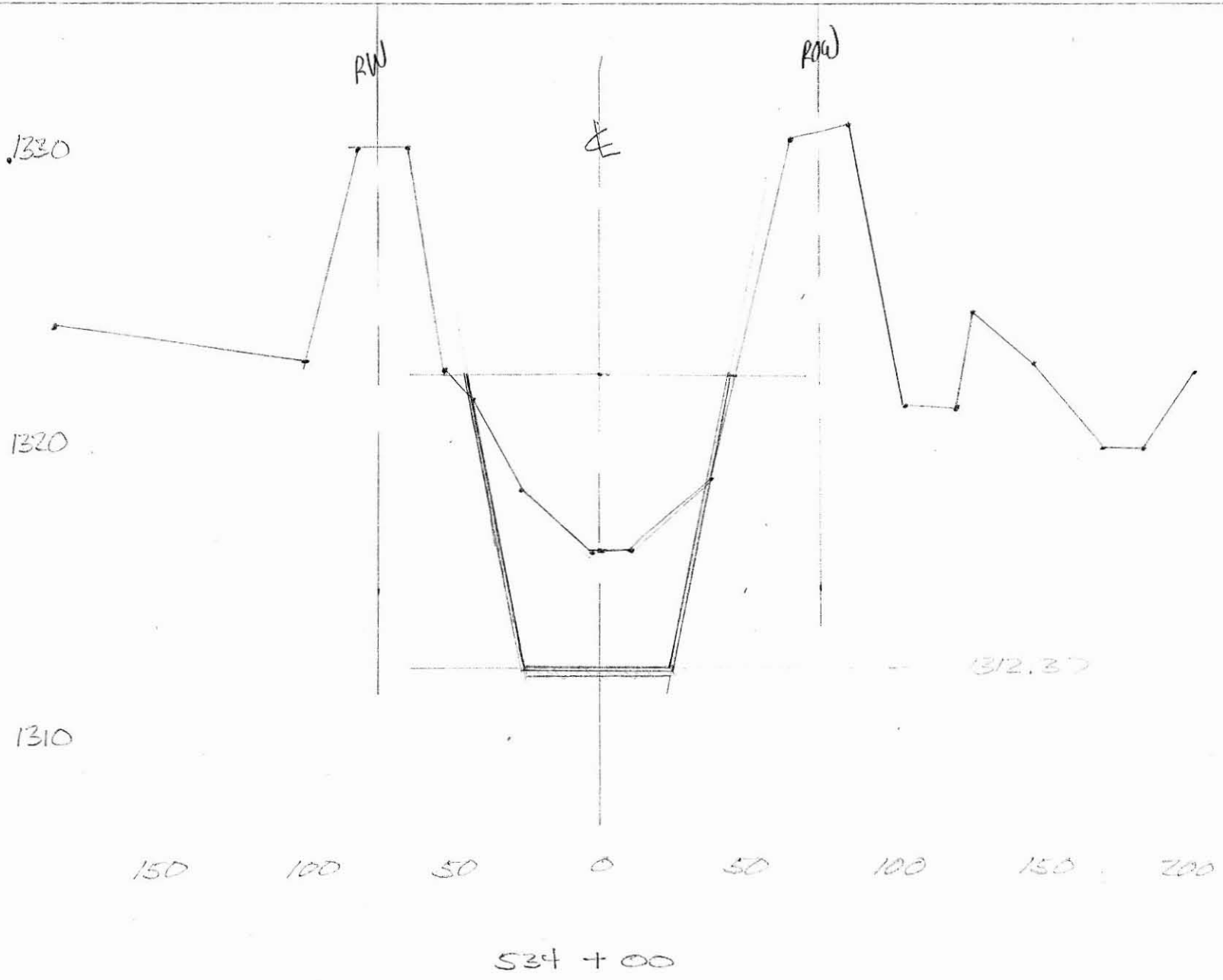


CT 11/21/85

ROUTE 77
APACHE JCT

CROSS SECTIONS

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

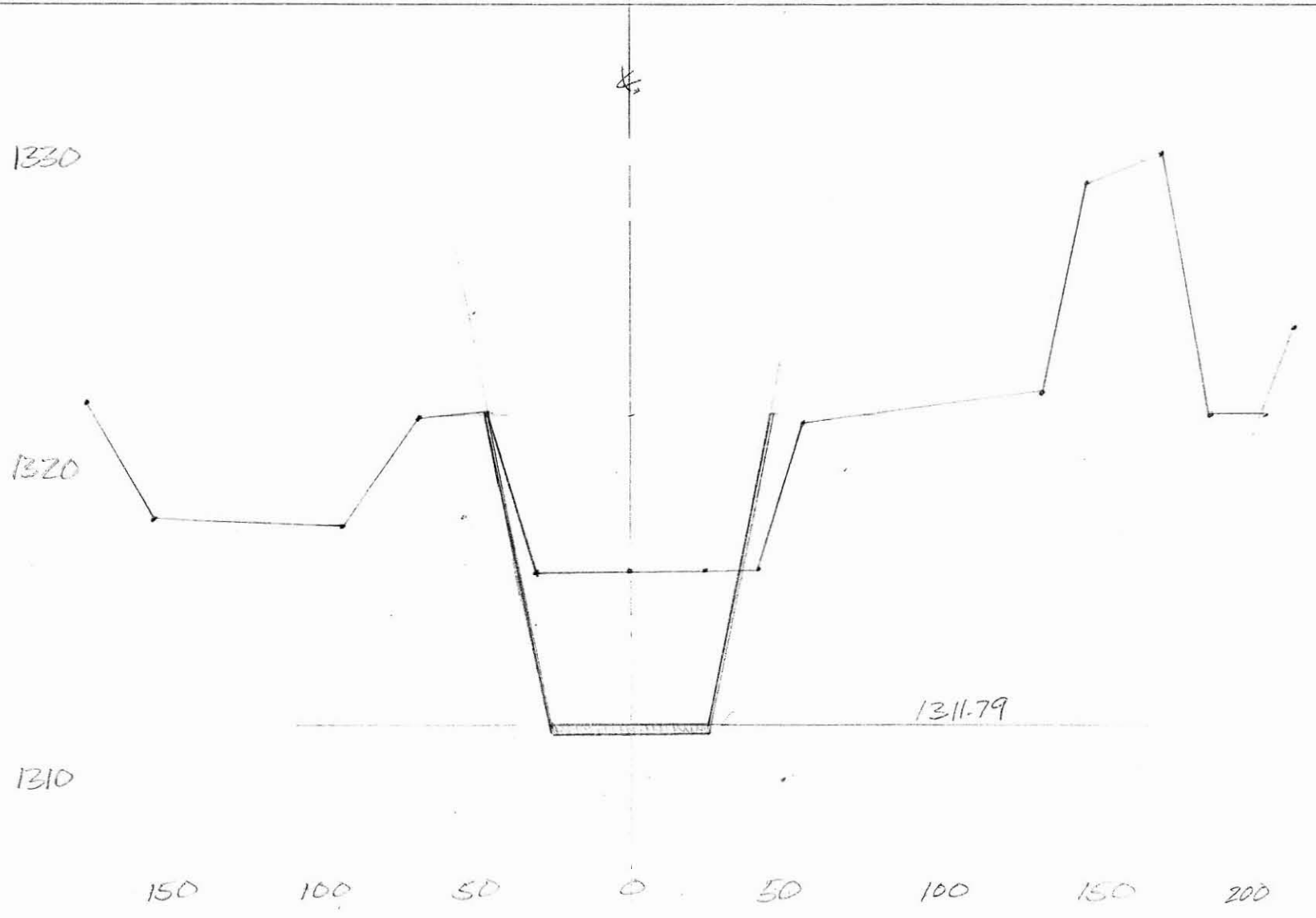


DT 1/21/85

RYALL ET AL
ARIZONA

CROSS SECTIONS

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



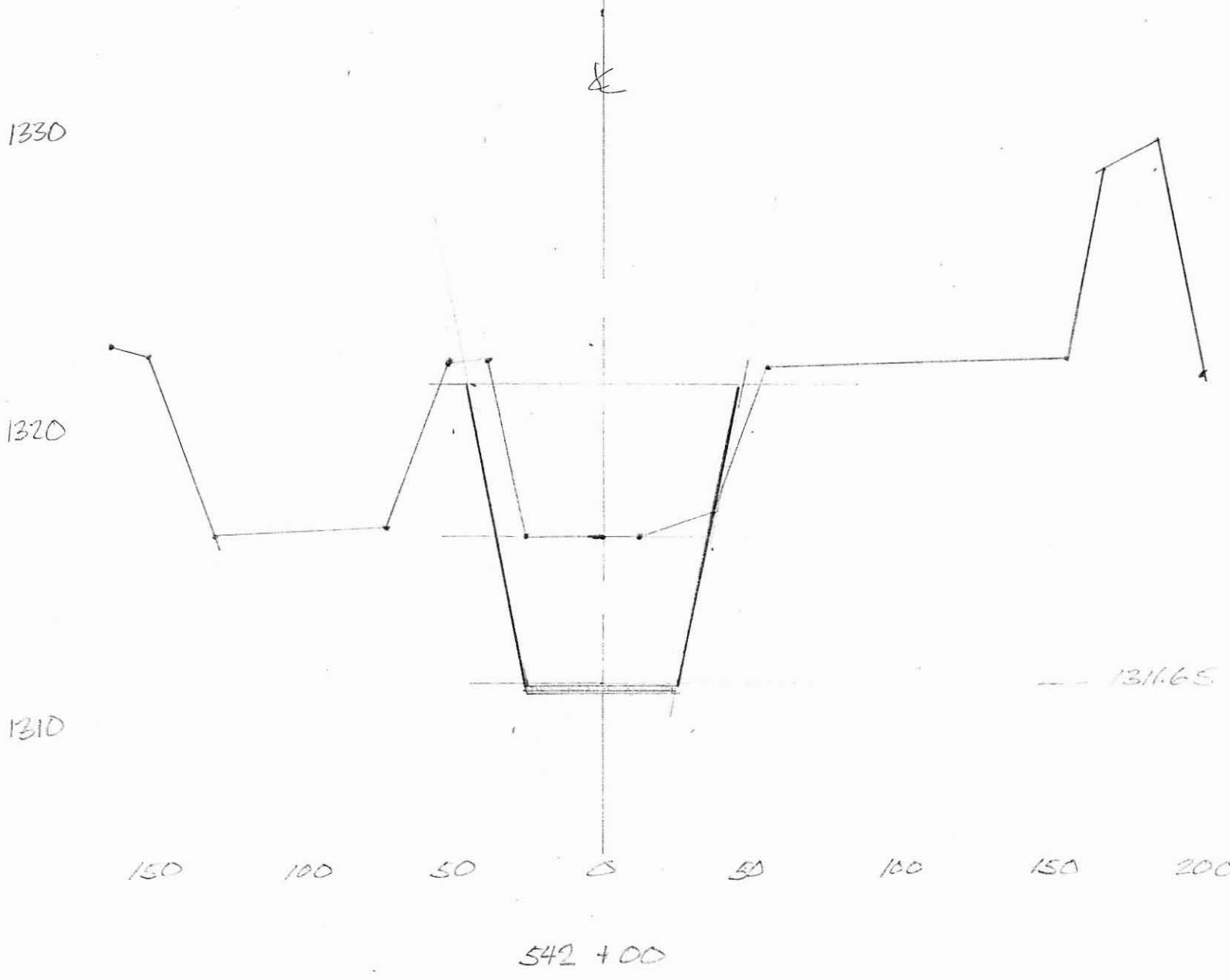
540 + 34.25

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

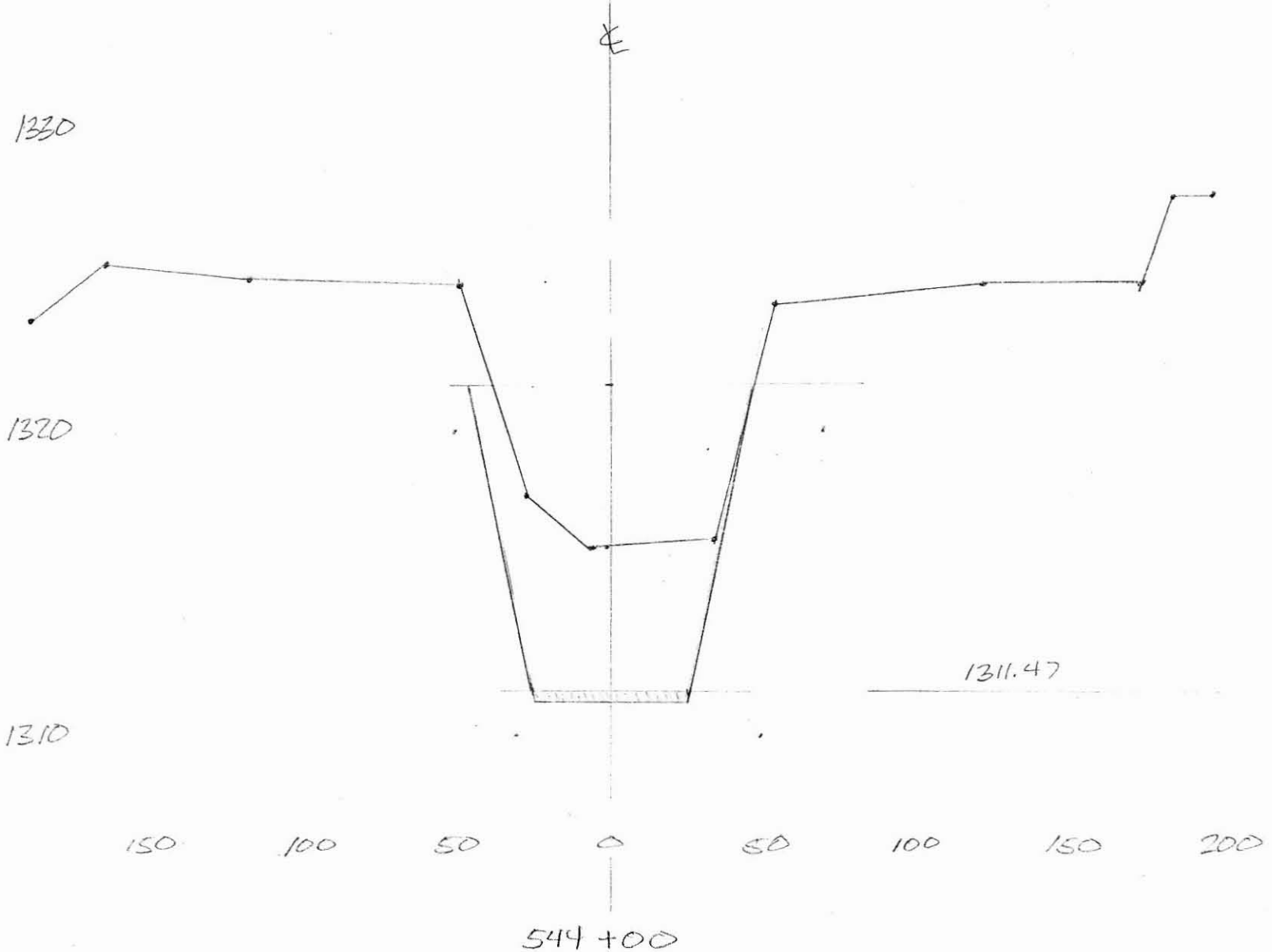
DT 1/21/85

RENO, NEVADA

CROSS SECTION



42.381 50 SHEETS 5 SQUARE
42.382 100 SHEETS 5 SQUARE
42.383 200 SHEETS 5 SQUARE
NATIONAL

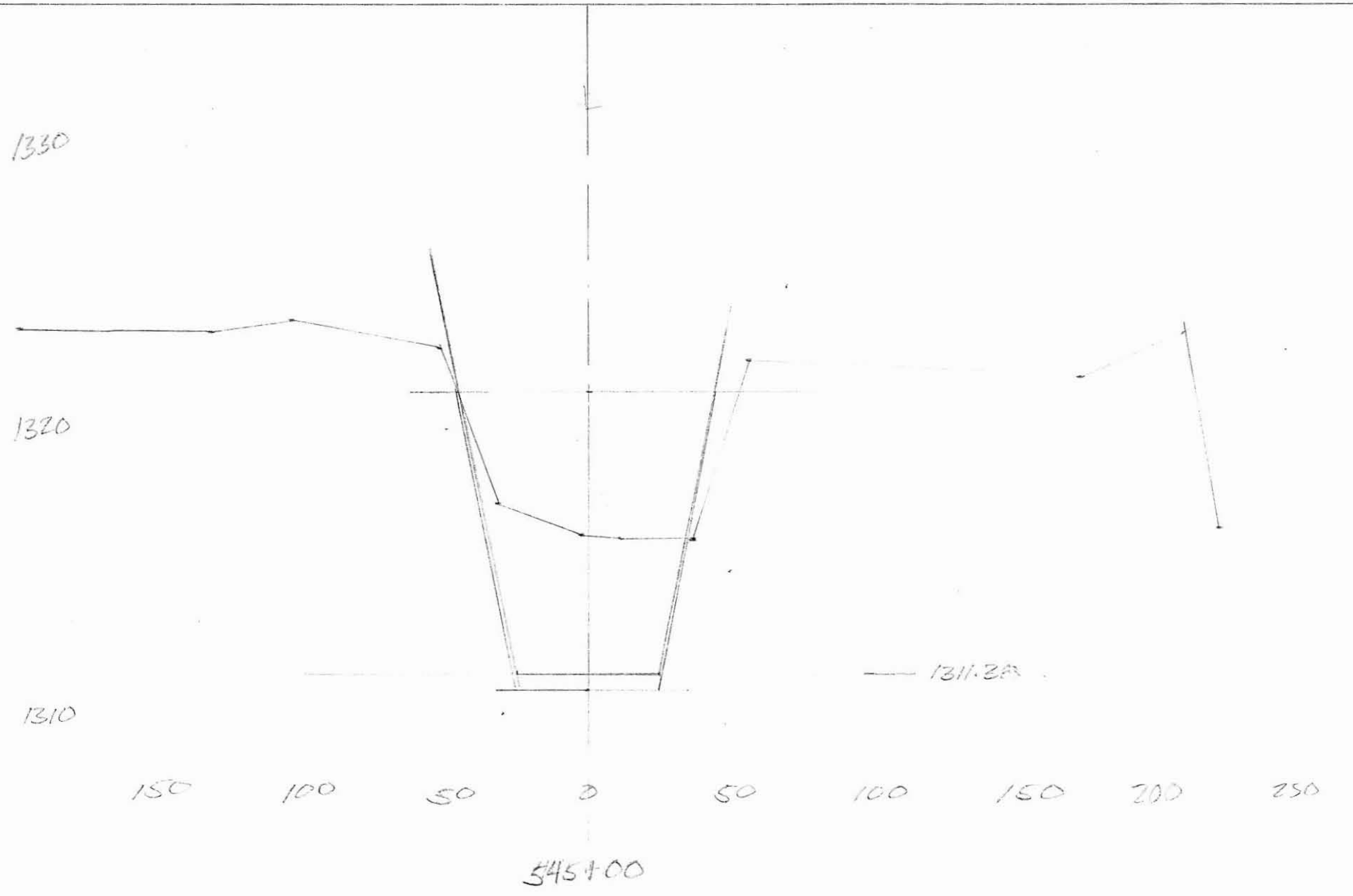


DT 1/21/86

ADDED

CROSS SECTIONS

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



DT 1/21/85

POND K-4

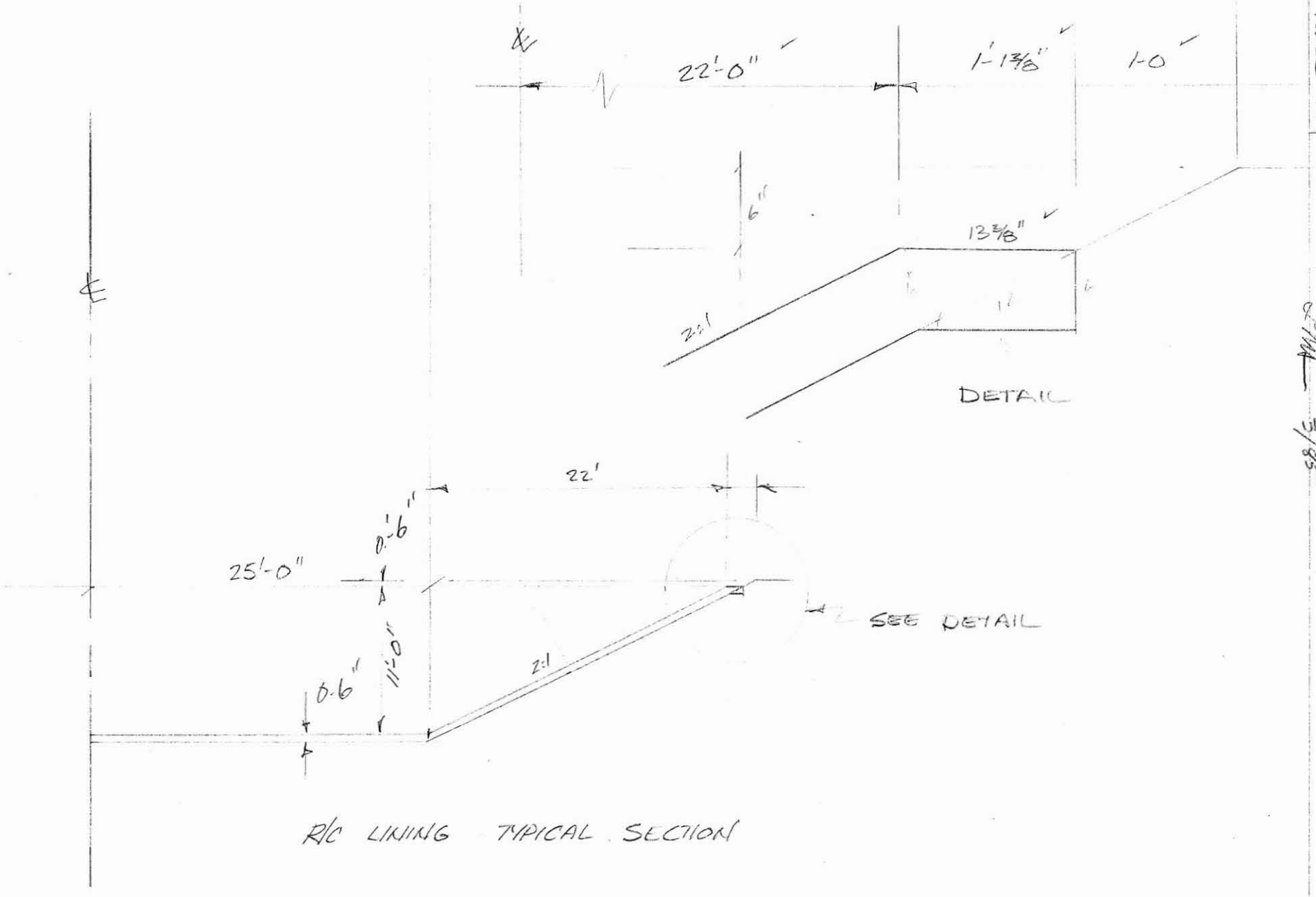
CROSS SECTIONS

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

ARIZONA
RWCD R4

DT 2/28/85
3/85

R/C LINING TYP SEC.



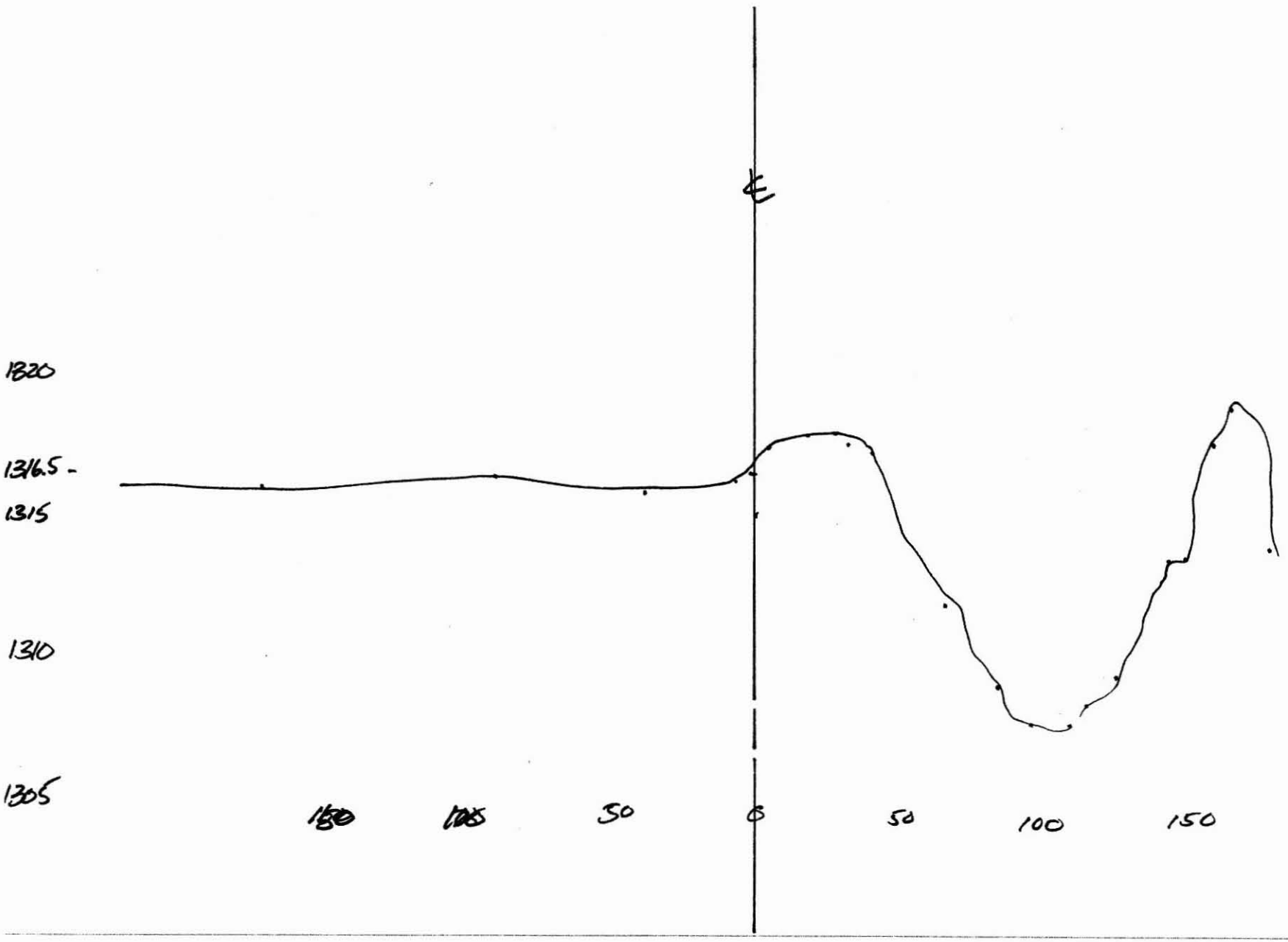
R/C LINING TYPICAL SECTION

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

RWCD RH

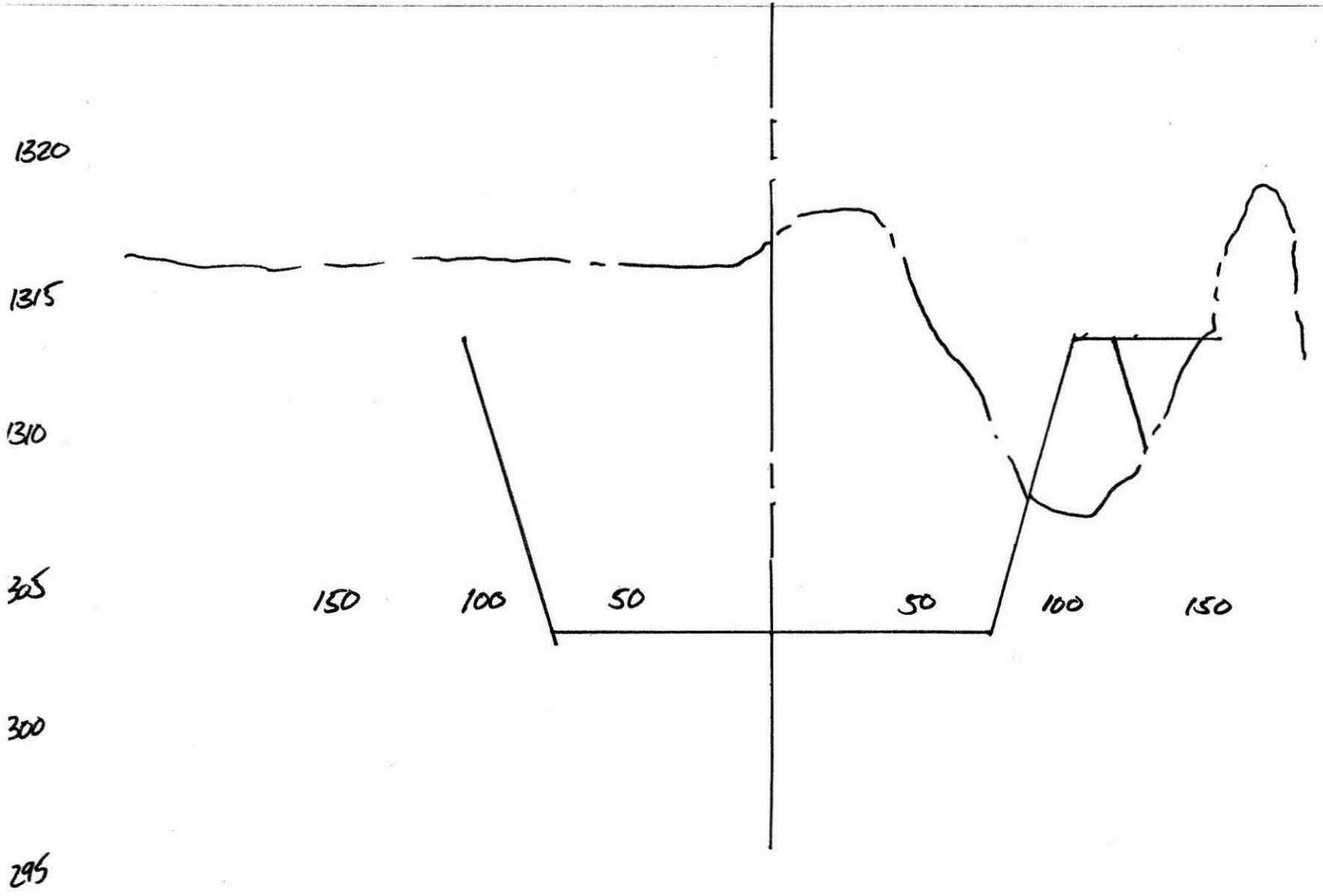
DT 3/25

Y-SEC @ 676+00



STA 676+00

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



ABLE PWCO RJ

DT 3/65'

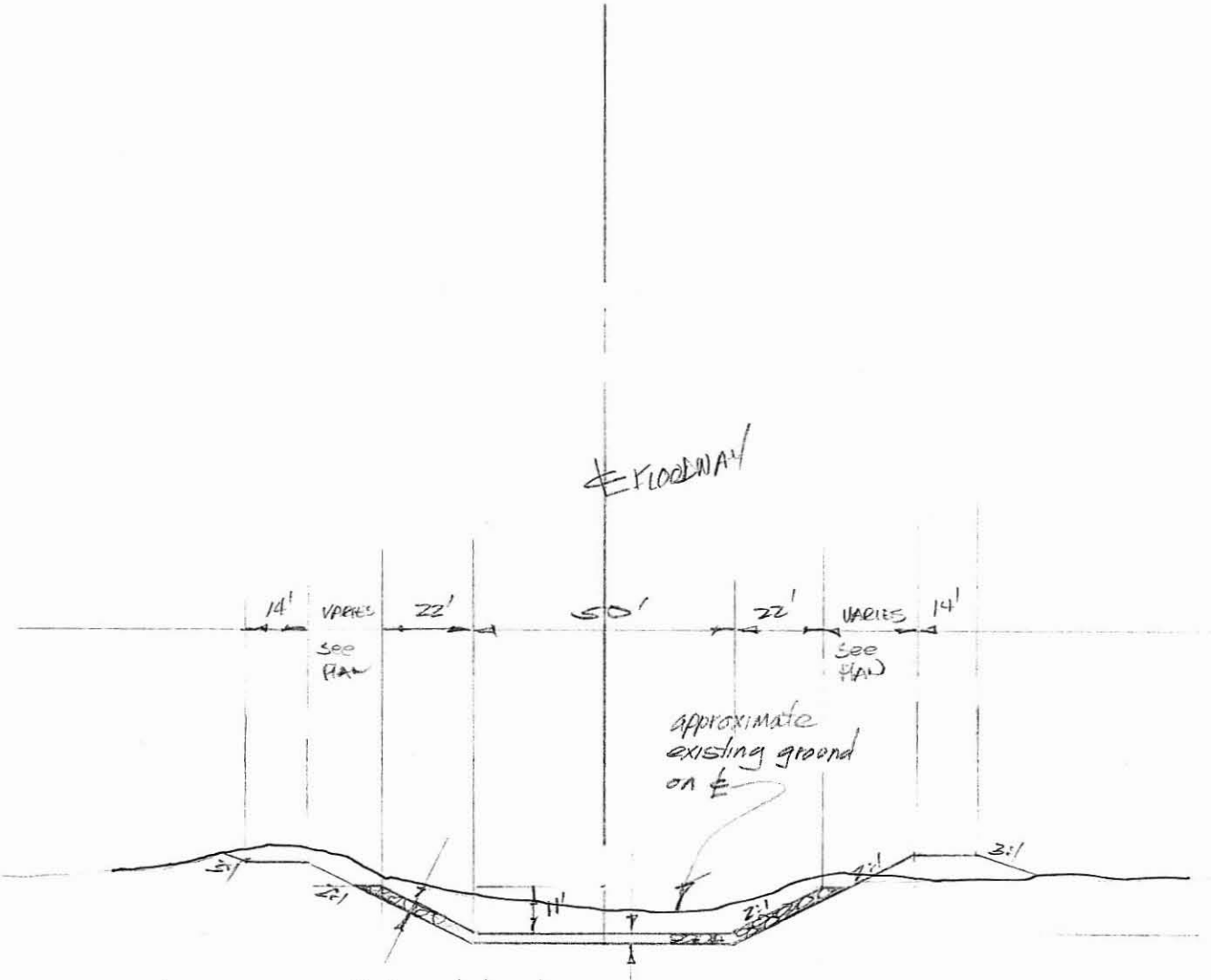
X-SEC @

Not on Sheet

FROM STATION	TO STATION	b	z	h
485+88.08	491+20.60	150	3	11.0
(491+20.60	555+000	R/C CHANNEL AND TRANSITIONS)		
555+00	626+00	175	3	10.5
(626+00	627+00)	TRANSITION		
627+00	675+00	150	3	10.5
(675+00	676+97.5)	DROP STRUCTURE		
676+97.5	742+00	150	3	10.5
(742+00	744+00)	TRANSITION		
744+00	745+28.27	200	3	10.5

CHANNEL BOTTOM WIDTH SCHEDULE

42-381 10 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
NATIONAL

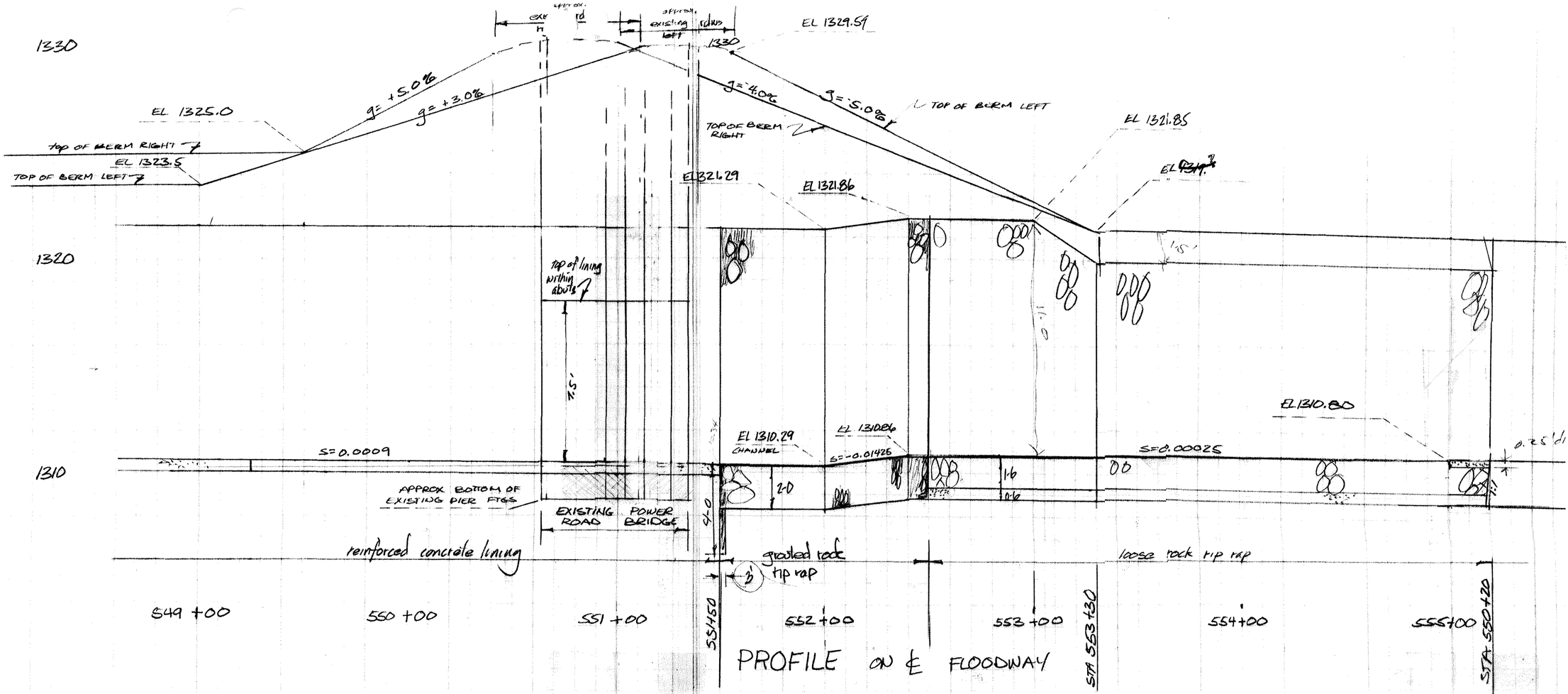


JACK — REVERSE THIS ONE

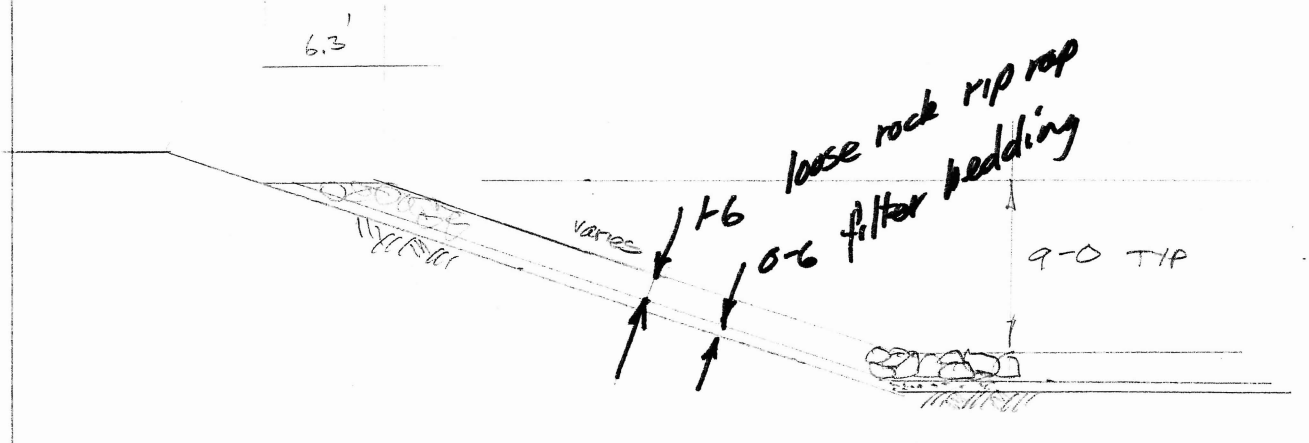
SKETCH (A)(A) LOOKING UPSTREAM

Show looking D.S.

ARIZONA
BOND RY
DT 3/26/85
OUTLET TRANS.


1330
1320
1310
EL 1325.0
TOP OF BERM RIGHT
EL 1323.5
TOP OF BERM LEFT
g= +5.0%
g= +3.0%
EL 1329.59
1330
g= -4.0%
g= -5.0%
TOP OF BERM RIGHT
TOP OF BERM LEFT
EL 1321.85
EL 1321.29
EL 1321.86
top of lining within about
EL 1310.29
CHANNEL
EL 1310.86
EL 1310.80
S=0.0009
S=-0.01425
S=0.00025
APPROX BOTTOM OF EXISTING PIER FTGS
EXISTING ROAD
POWER BRIDGE
reinforced concrete lining
grouted rock rip rap
loose rock rip rap
549+00
550+00
551+00
552+00
553+00
554+00
555+00
STA 550+20
STA 553+30
PROFILE ON ℄ FLOODWAY

ARIZONA RWCD #4 | DT 3/25/25 LMK | N POWER RD. LAYOUT



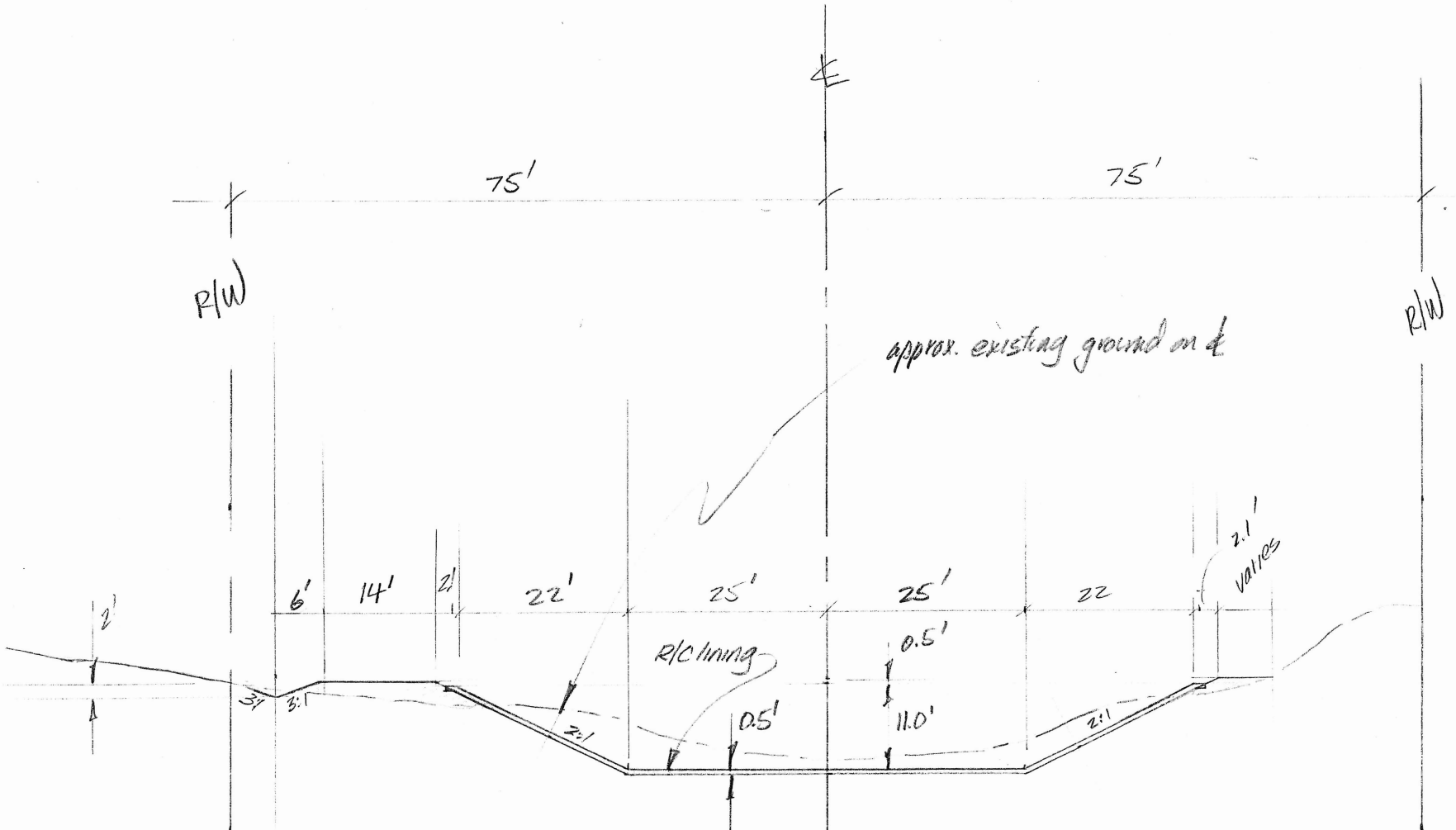
42.381 50 SHEETS 5 SQUARE
42.382 100 SHEETS 5 SQUARE
42.389 200 SHEETS 5 SQUARE
NATIONAL

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

ARIZONA RUSD RL

DT 2/28/05 JWL R/C LINING TYP SECT

1/8

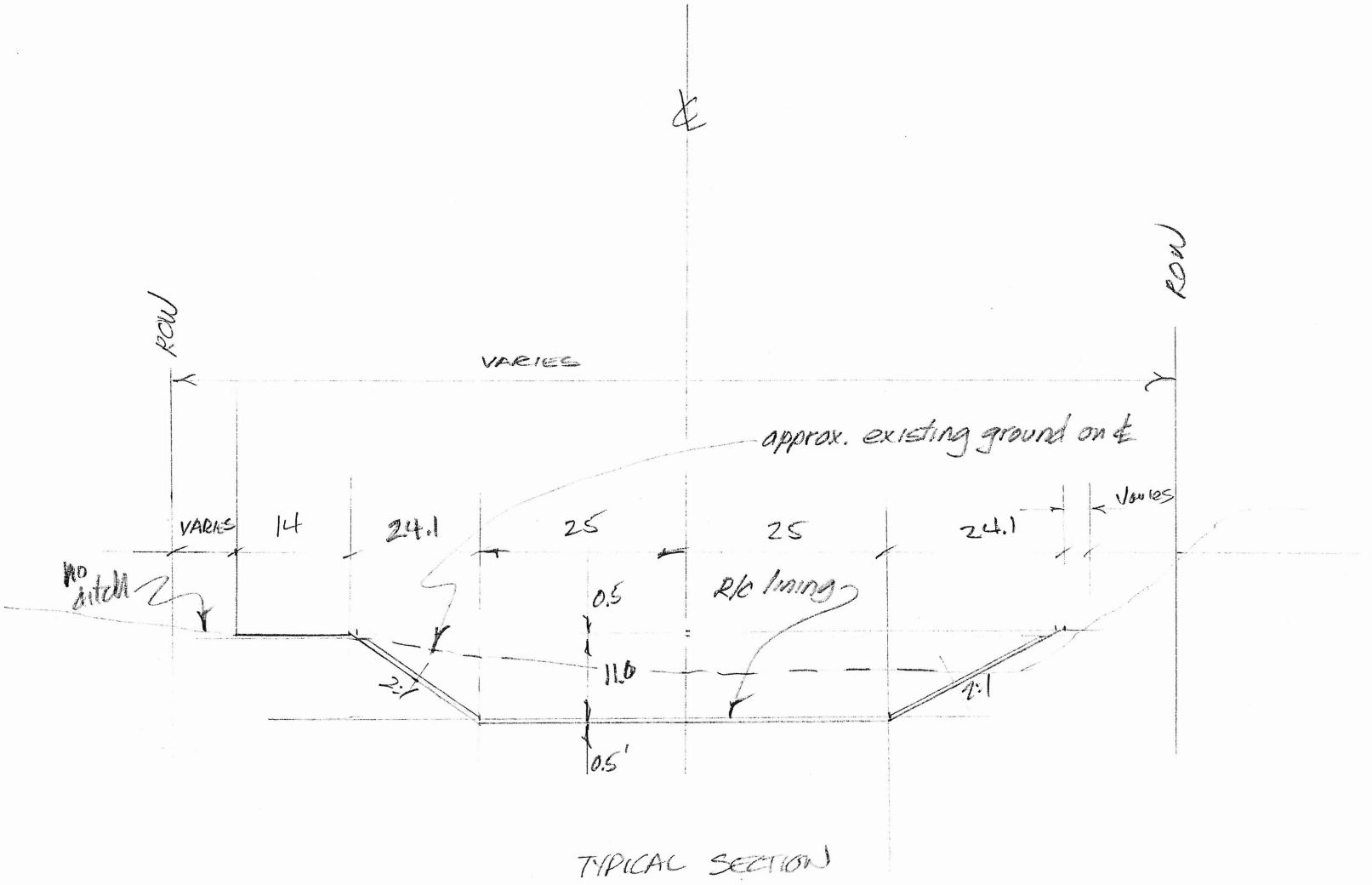


TYPICAL SECTION

STA 495+35 to 521+00

not to scale

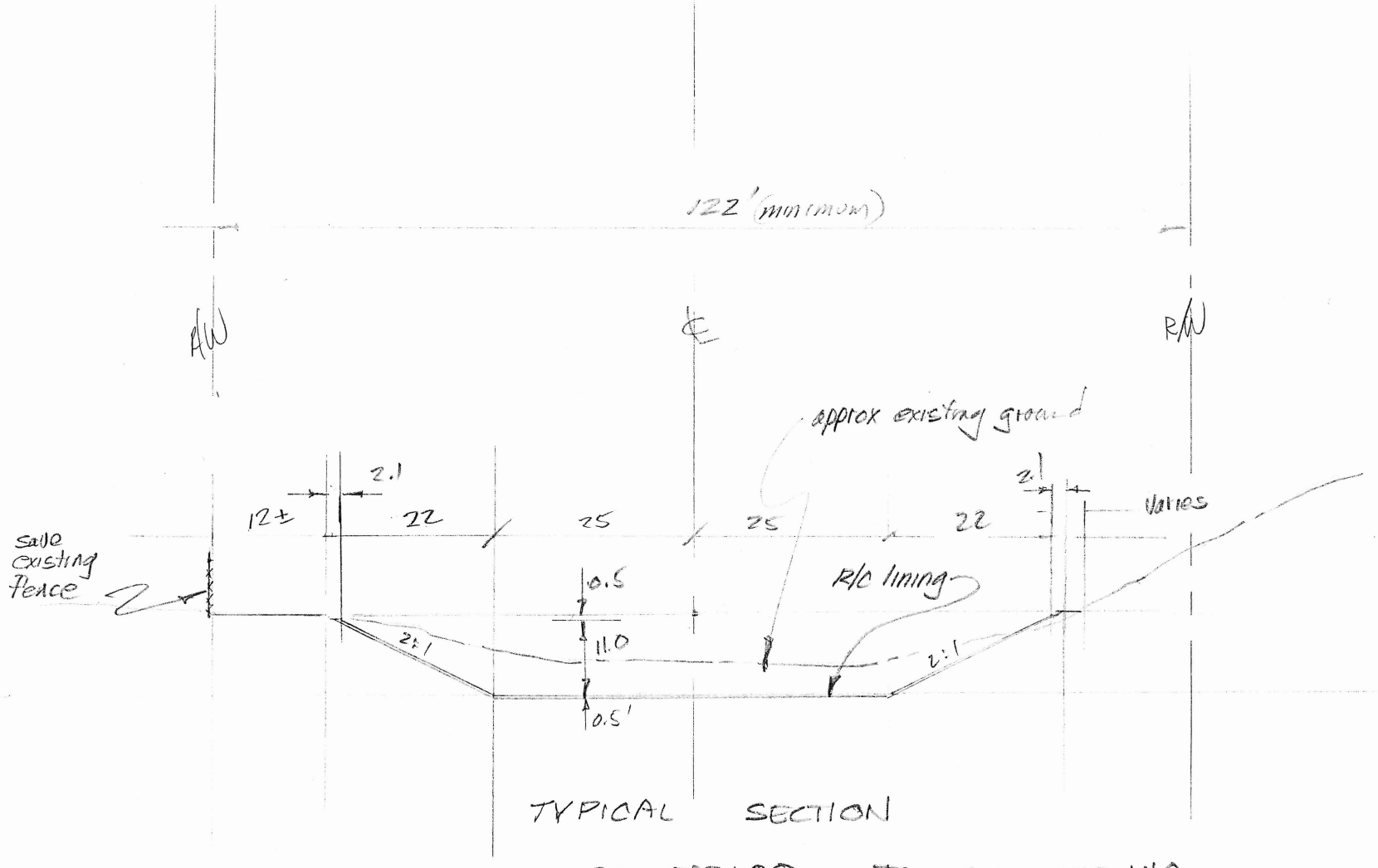
NATIONAL
42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE



TYPICAL SECTION

STA 521+00 TO STA 527+00

not to scale



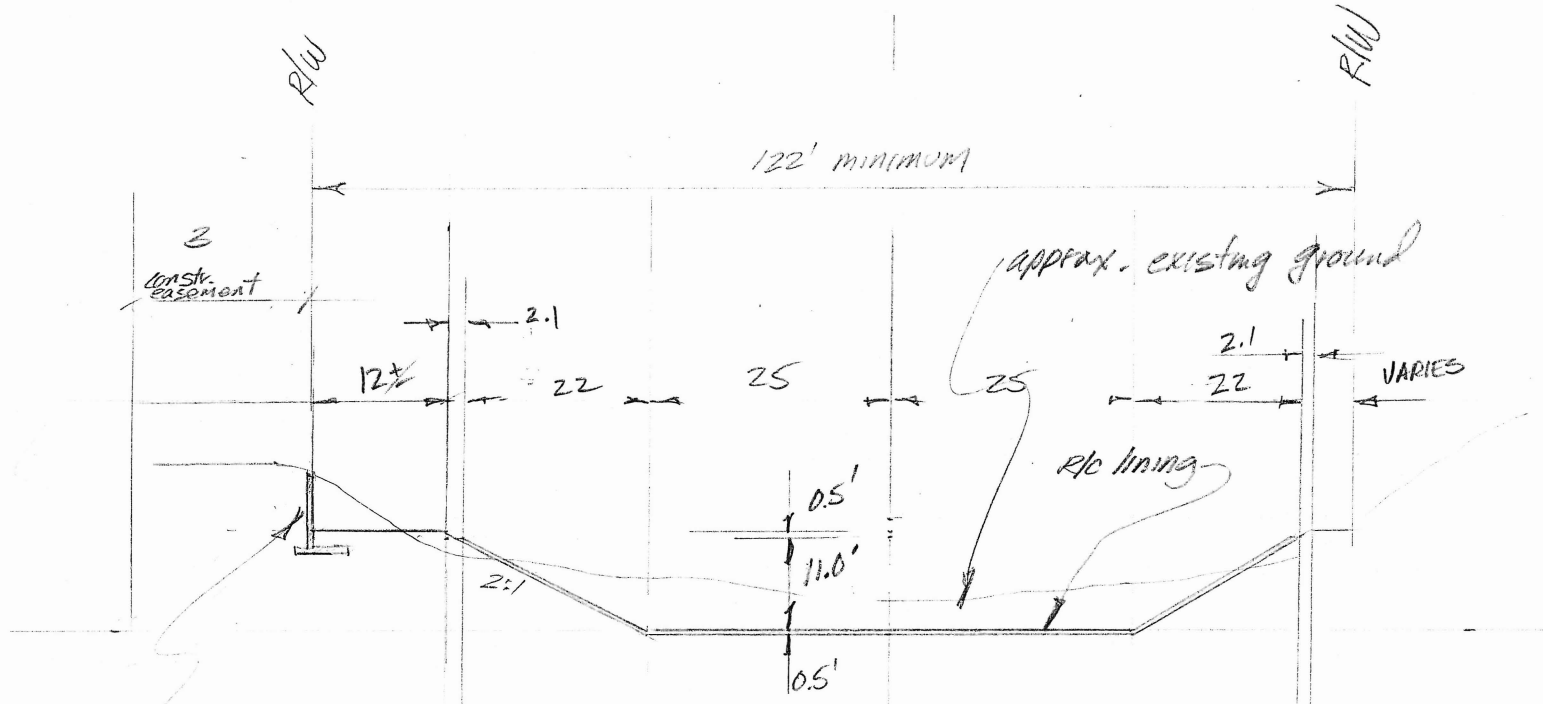
TYPICAL SECTION

approx STA 527+00 TO STA 532+40

not to scale

ARIZONA
REACH J
07 285
R/C LINING
TYPICAL SECTIONS
3/8

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



TYPICAL SECTION
approx. STA 532+40 TO 534+50

not to scale

ROAD RESEARCH
D 2185
1/8

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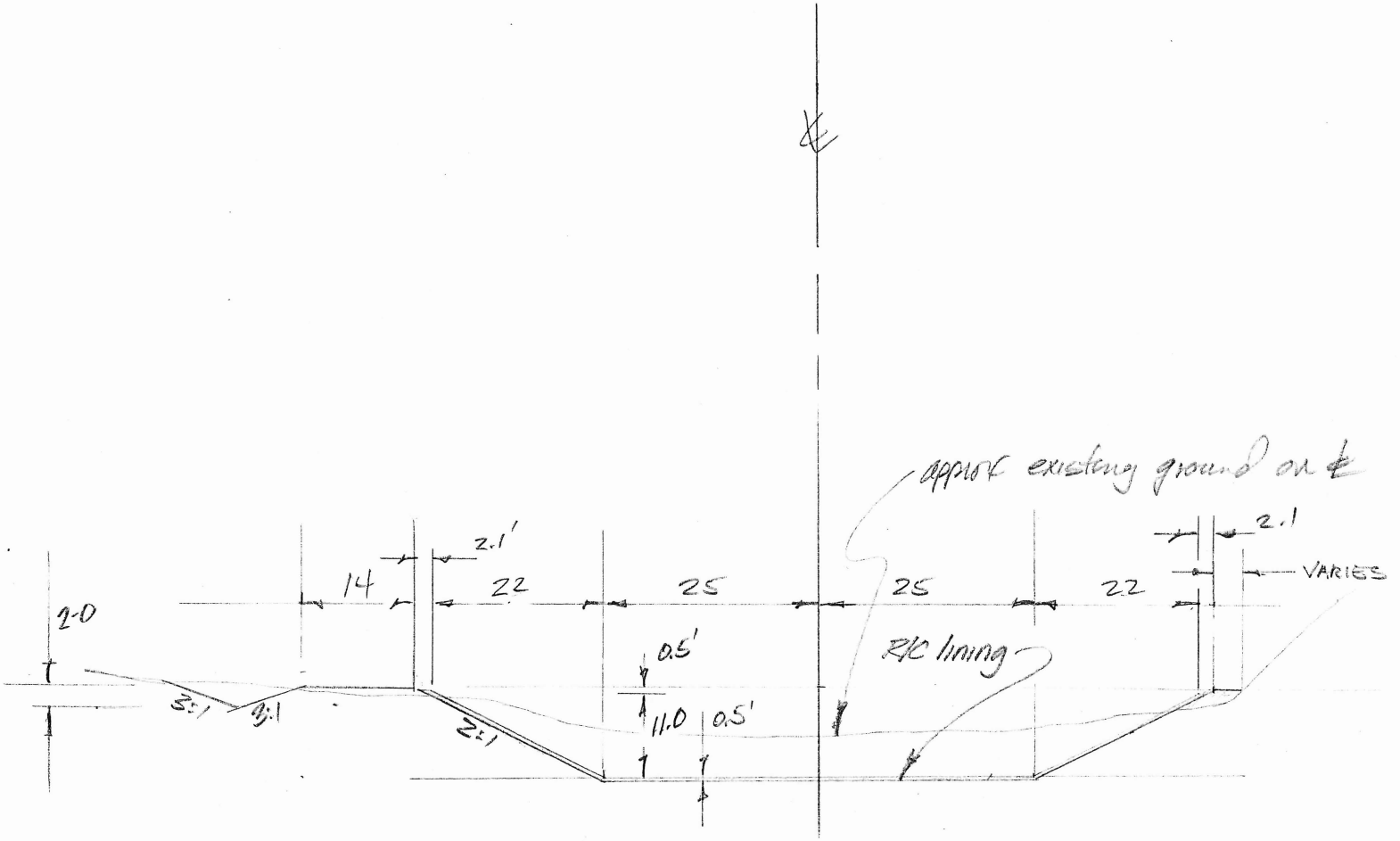
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE



TYPICAL SECTION

STA 524+50 TO STA 536+50

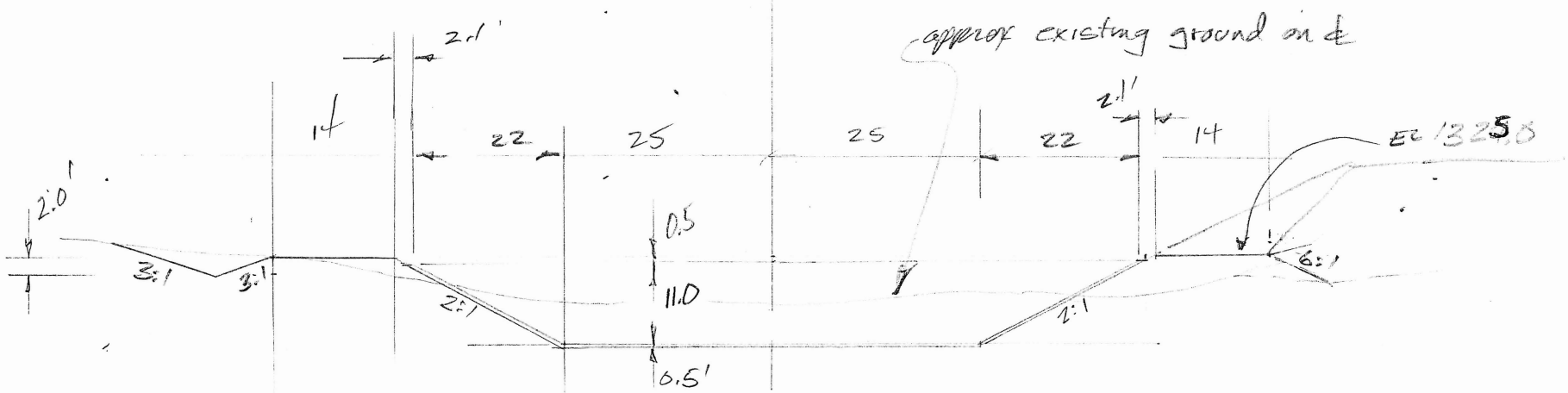
not to scale

EXCD REACH 4

ST 2/65

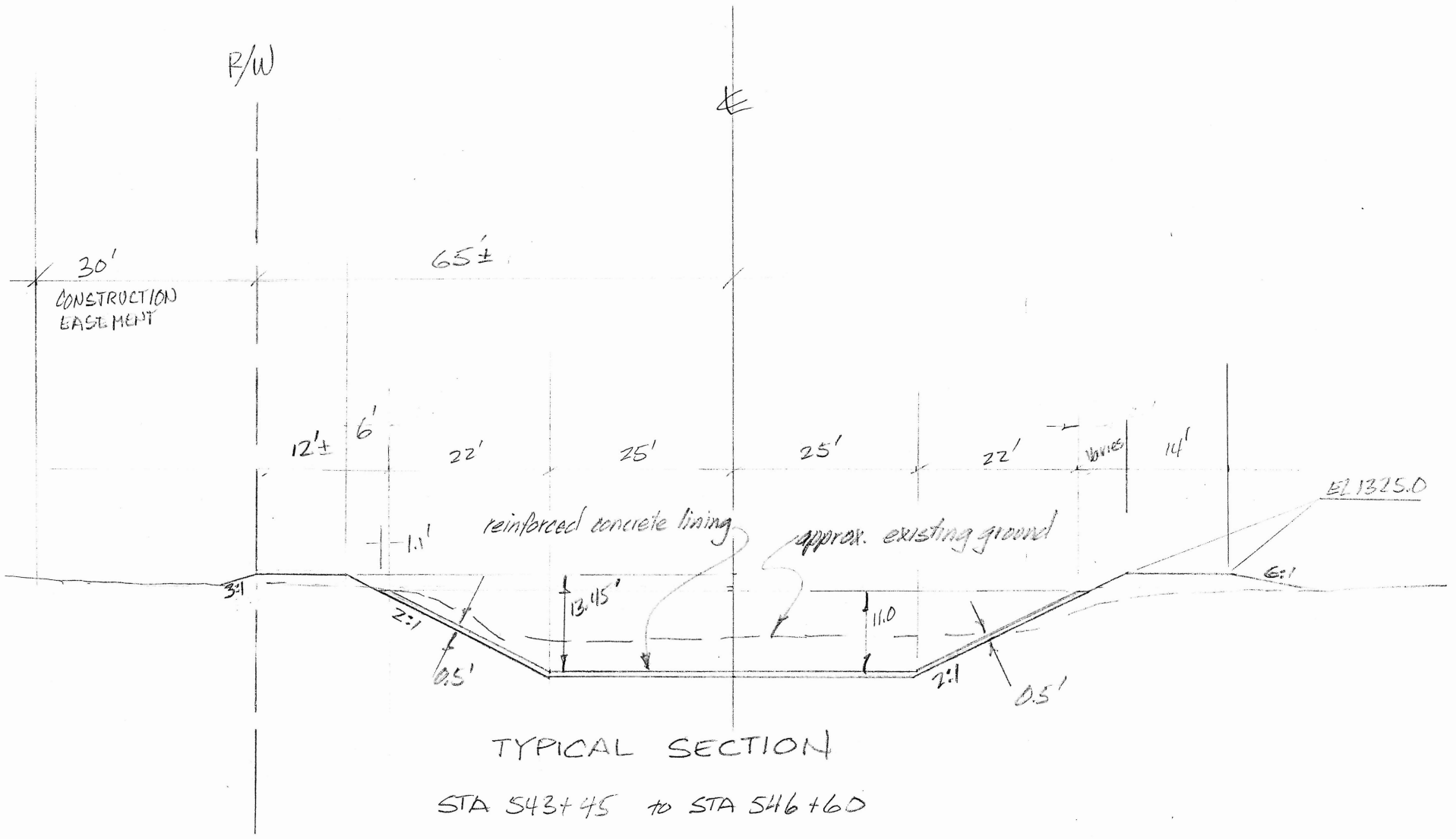
RC LINING TYPICAL SECTIONS

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
STA 528+50 TO 541+50
not to scale

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



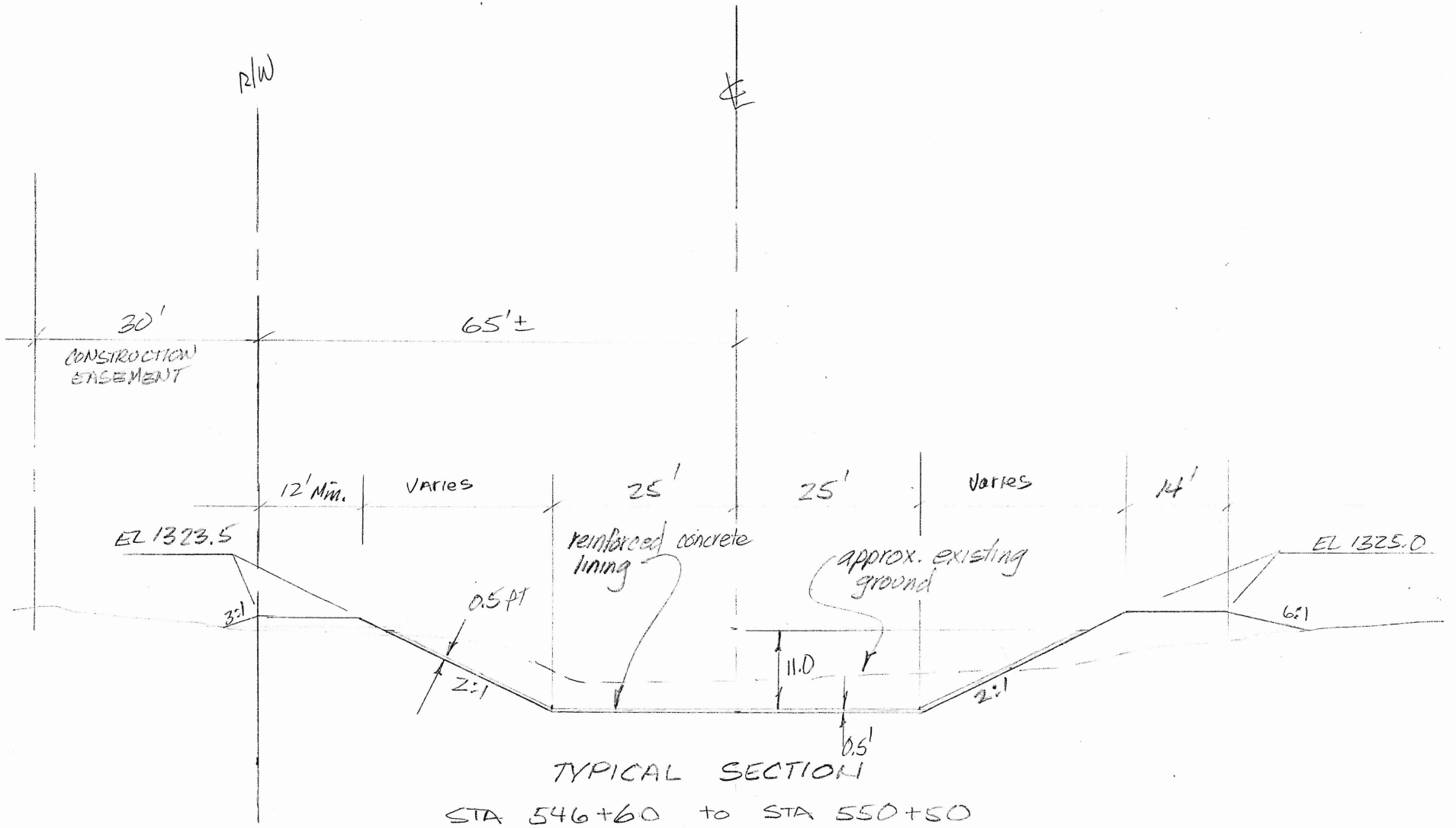
TYPICAL SECTION

STA 543+45 to STA 546+60

not to scale

ARIZONA
RWCD REACH 4
DT
2/82
RC LINING
TYP SECTION
7/8

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



TYPICAL SECTION

STA 546+60 to STA 550+50

not to scale

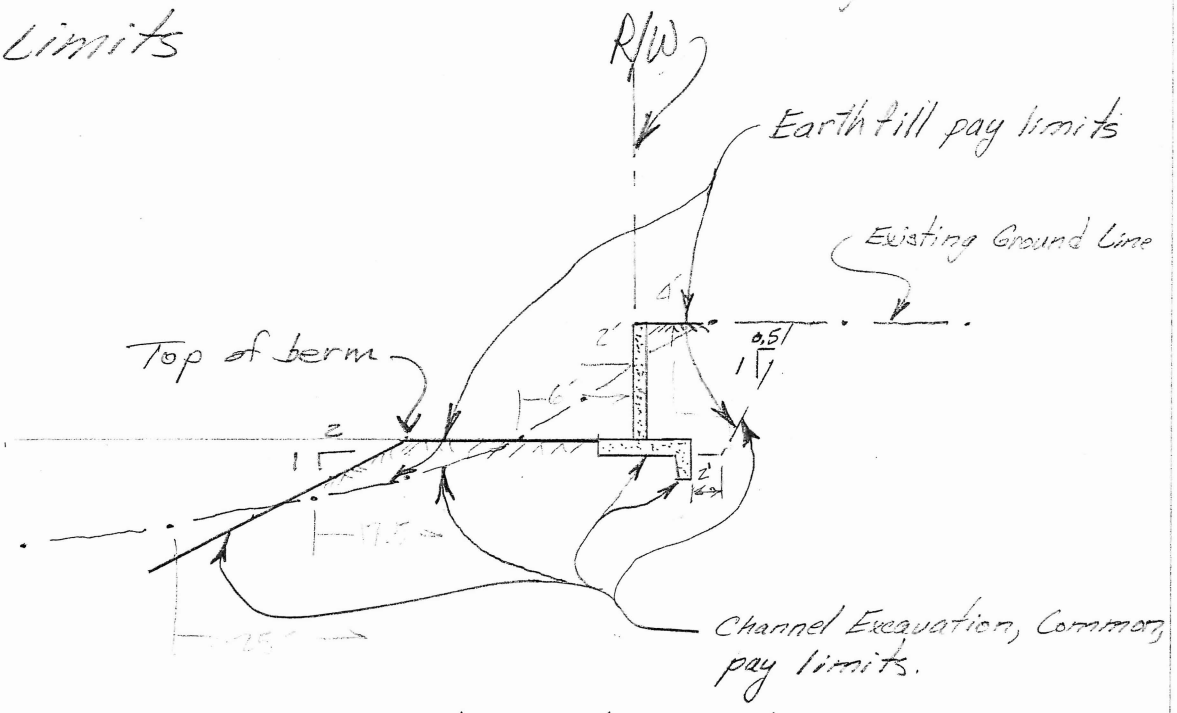
ARIZONA
BWCD REACH 4

DT 2/85

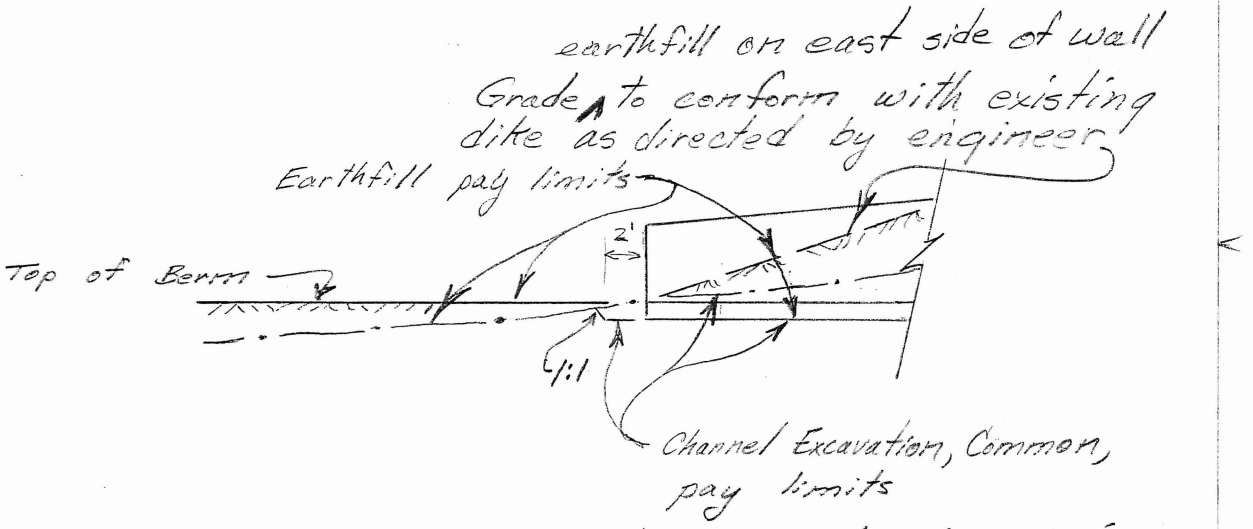
RC LINING
TYPICAL SECTION

8/9

Pay limits



Typical section along retaining wall



Typical pay limits at end of retaining wall

Retaining wall to support containment berm between STA. 532+20 ± to STA. 534+70 ±

Assumed soil conditions:

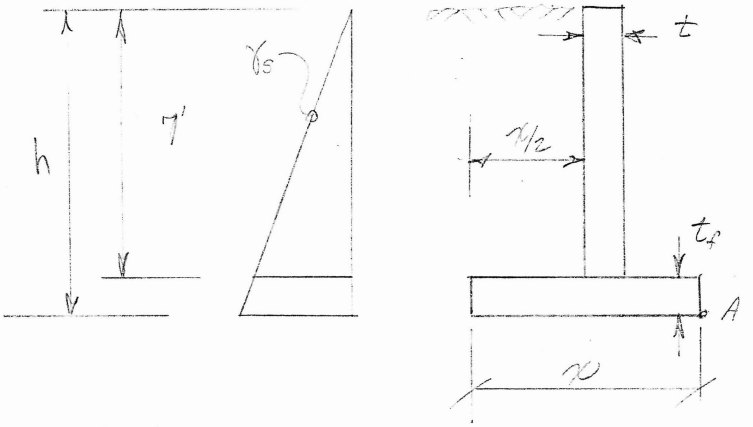
$\gamma_m = 130$ lbs/ft^3 SM, CL

$\gamma_s = 134$

$\phi_{ave} = 27°$ $K_o = 0.65$

No wall drainage

Design concrete wall for maximum height of fill, STA. 533+00 ± $h = 7'$



Check Over turning about A.

Try $w = 6'$ ∴ $h = 8'$

$t = t_f = 12''$

Item		Weight [Force]	Arm	Moment
Horiz. Soil	$[(\gamma_s - 62.4)(K_o) + 62.4][h] =$	= 3486	$\frac{h}{3} = 2.67$	9296 '# ↻
Vert. Soil	$(\gamma_s)(7)(\frac{w}{2})$ =	2814 lbs/ft	$\frac{w}{2} + \frac{w}{4} = 4.5$	12,663 '# ↺
Conc. (Wall)		1050	$\frac{t}{2} - \frac{t_f}{2} = 2.5$	2625 '# ↺
Conc. (Base)		900	$\frac{w}{2} = 3$	2700 '# ↺
		$\Sigma W = 4764$		$\Sigma M = 8692$ ↺

$R_f = \frac{\Sigma M}{\Sigma W} = 1.83 < \frac{w}{3}$ ∴ N.G.

NW

Saturated fill is probably too conservative analysis. The site is well above stream flows. Most likely chance of water accumulation against wall would be Thunderstorm. Following a dry spell - fill dry and cracked - Pressure on wall would be mostly hydrostatic under this condition.

Moist soil condition will be used for design.

$\gamma_m = 130$ lbs/ft^3 $\quad K_o = 0.65$

⟹ Cross section data indicates a wall height of 6.75 feet above berm is adequate. see sheet 22

Recheck overturning using following

Wall height = 6'-9"

h = 7'-9" includes footing

Try $Y = 5.5'$ footing width

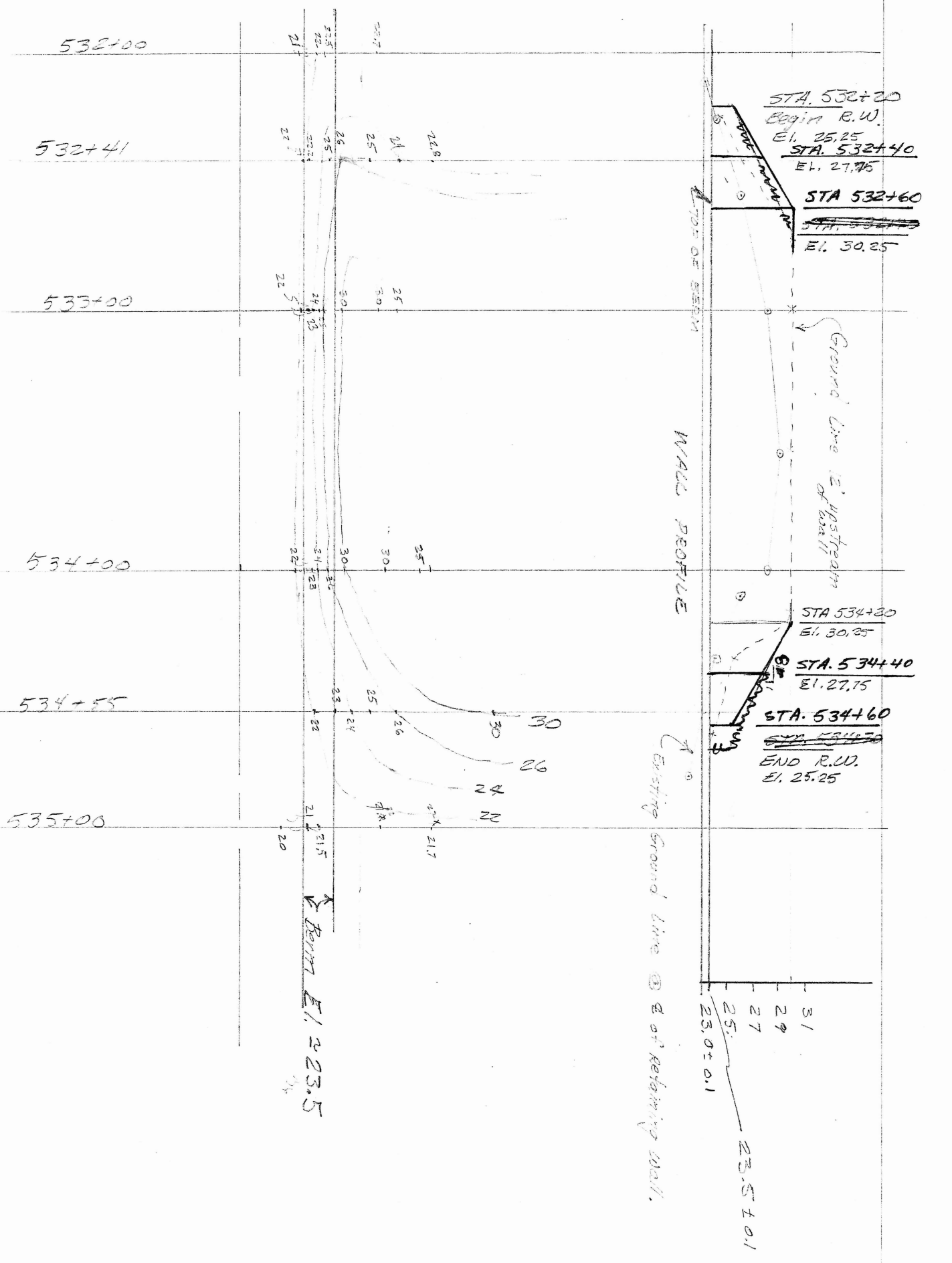
$t = 10"$

$t_f = 11"$

			Wt.	Force	Arm	Mom.	
Hor. Soil	$(130)(0.65)\frac{(6.75)^2}{2} =$			2537.6	2.58	6556	)
Vert. Soil	$(130)(6.75)(\frac{5.5}{2}) =$		2413		4.13	9954	)
Conc. Wall	$(10/12)(6.75)(150)$		844		2.33	1969	)
" footing	$1/2(5.5)(150)$		756		2.75	2080	)
		Σ	4013			$\Sigma M = 7447$	

$R_M = \frac{\Sigma M}{\Sigma Wt} = \frac{7447}{4013} = 1.86 > \frac{5.5}{3}$ ∴ OK

RWCD R4 | LMS | 3/13/85 | Retaining Wall | 2



Check sliding:

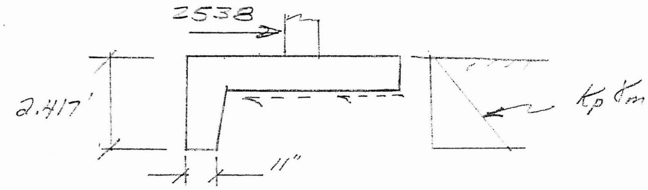
Friction: Concrete to soil ⇒ $f = 0.4$

$R_f = (f)(\Sigma Wt) = (0.4)(4013) = 1605$

F_s = driving force = 2538 *

$R_f < F_s$ N.G.

Try 1.5 deep cutoff
Also include cohesion $c = 200$



$K_p = 2.7$

$\Sigma Wt = 4013 + 206 = 4219$ $R_f = f_s \Sigma Wt + CA$

$R_f = (0.4)(4219) + (200)(5.5) = 2788$

$R_s = (2.7)(130)\frac{(2.417)^2}{2} = 1025$

F.S. for sliding

$F.S. = \frac{2788 + 1025}{2538} = 1.5$ Ok

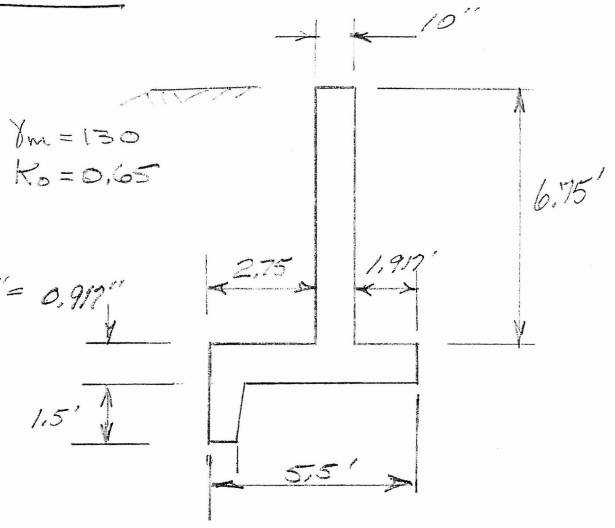
* At rest driving force since backfill may contain CL soils that creep after initial strength is mobilized.

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

R/C design

Design wall at maximum section

Proposed



Determine wall moments:

$$M = \frac{W\ell^3}{6} \quad , \quad w = \gamma_m K_o = 130(.65) = 84.5 \text{ lbs/ft}^3$$

An EFP = 100 lbs/ft^3 will be used for design. This will allow for temporary vehicle loads that may occur on the containment site.

$\therefore$ $W = 100$ lbs/ft^3

$$M_{@\,base} = \frac{(100)(6.75)^3}{6} = 5.1^{1K} \qquad f_c' = 4000$$

$$d = \sqrt{\frac{M}{R}} = \left(\frac{5126}{272}\right)^{1/2} = 4.34 \text{ in.} \quad \therefore \text{ 10" wall OK}$$

$$A_s = \frac{M^{1K}}{ad} = \frac{5.1}{(1.44)(7.5)} = 0.47 \text{ in}^2 \quad (+)$$

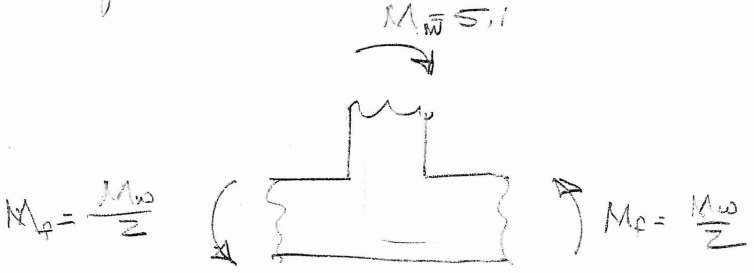
Shear OK by inspection

(+) #6 @ 12" $\Rightarrow A_s = 0.44$ This will result in overstress if design loading is realized; however going to larger bar size or closer spacing [illegible]

Footing

Maximum moment in footing will be moment induced from wall.

Since this is a small structure and effective thickness of wall (10") and footing (11" - poured against earth) are the same moment distribution into the footing is assumed equal.



$$M_f = \frac{5.1}{2} = 2.55^{k}$$

$$A_s = \frac{2.55}{(1.44)(7.5)} = 0.24^{\square''}$$

Keywall

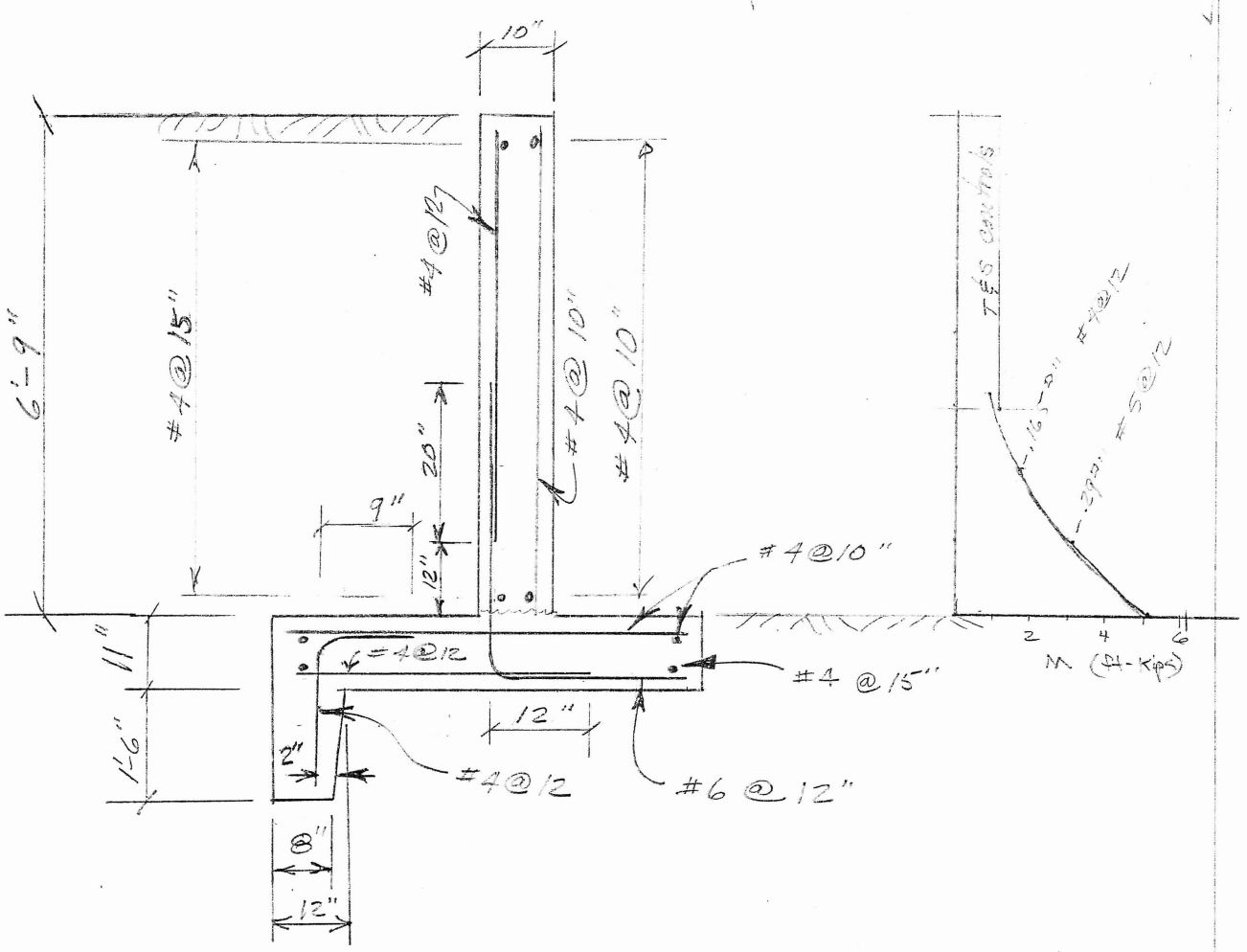
$M_K = K_p \gamma_m \frac{\ell^3}{6}$ from sheet 3

$M_K = (2.7)(130)\frac{(2.417)^3}{6} = 0.8^{k} *$

* Moment is on conservative side - since I did not reduce for soil load against edge of footing.

STA. 532+60 TO STA. 534+20

Note: Provide 2" cover except 3" bottom of footing



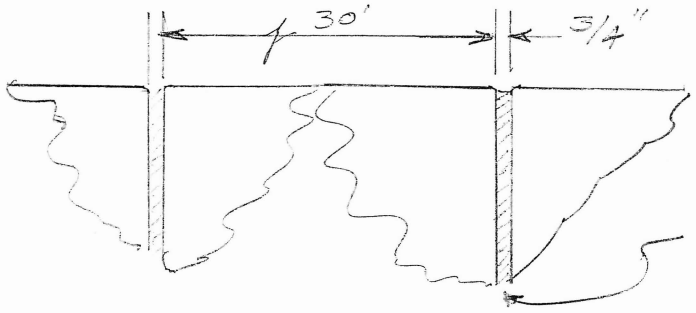
h = 4.2
d = 1.94

Grade 60 steel	
~~#4~~	l_d = 12"
#5	l_d = 15"
#6	l_d = 18"

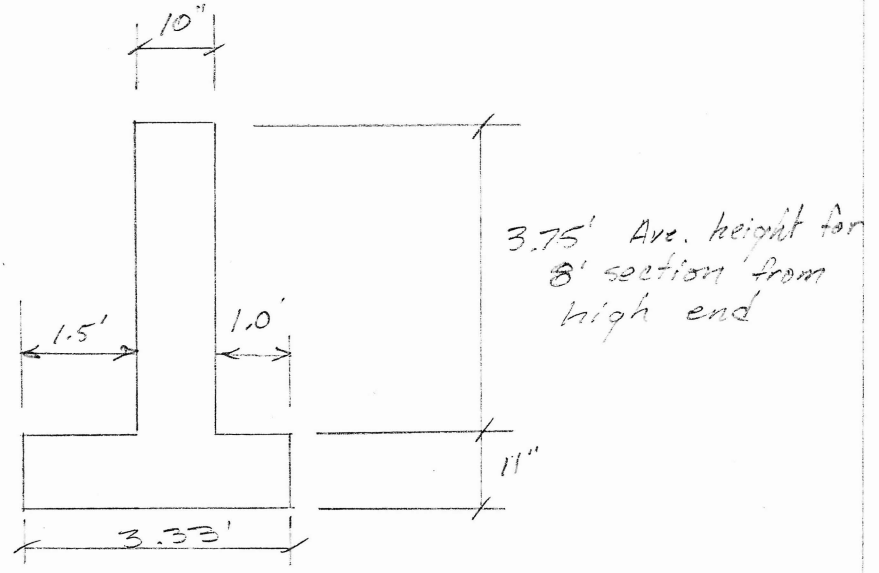
T & S L ≤ 30'

Exposed	ρ_t = .002	A_s = 0.24
Un Exposed	ρ_t = .001	A_s = 0.12

Expansion joints at 30 foot intervals



STA. 532+20 to STA. 532+40
534+40 to STA. 534+60



Check Over turning:
$\gamma_m = 130$ $K_a = 0.65$

Soil Horiz.	$(130)(.65)\frac{(4.667)^2}{2}$ =	920	$\frac{4.67}{3}$	1432	↻
" Vert	$(130)(1.5)(3.75)$ =	731	2.58	1888	↻
Conc. Wall	$(50)\frac{1^0}{12}(3.75)$ =	469	1.83	860	↺
" foot	$(150)\frac{1}{12}(3.33)$ =	458	$\frac{3.33}{2}$	763	↺
	Σ Wt = 1658			ΣM = 2079	

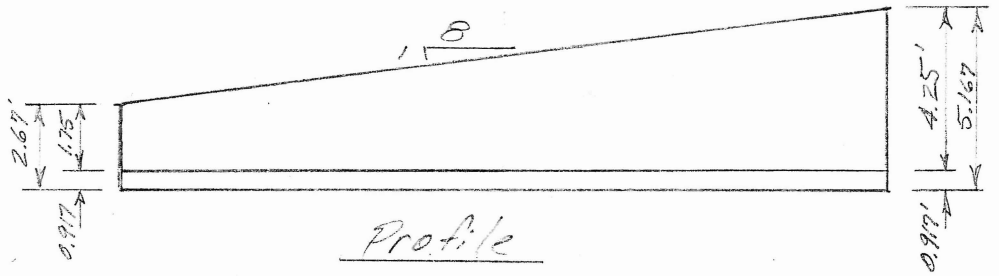
$\frac{\Sigma M}{\Sigma Wt} = 1.25 > \frac{3.33}{3}$ ∴ Ok

Check Sliding

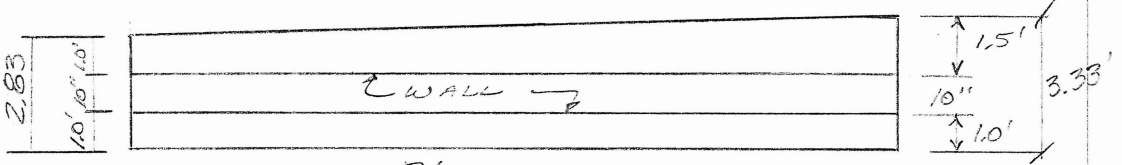
$R_F = (f)(\Sigma Wt) + CA = (0.4)(1658) + (200)(3.33) = 1329$

$F.S. = \frac{1329}{920} = 1.45 \simeq 1.5$ Ok

STA. 532+20 To STA 532+40 and STA 534+40 To STA 534+60

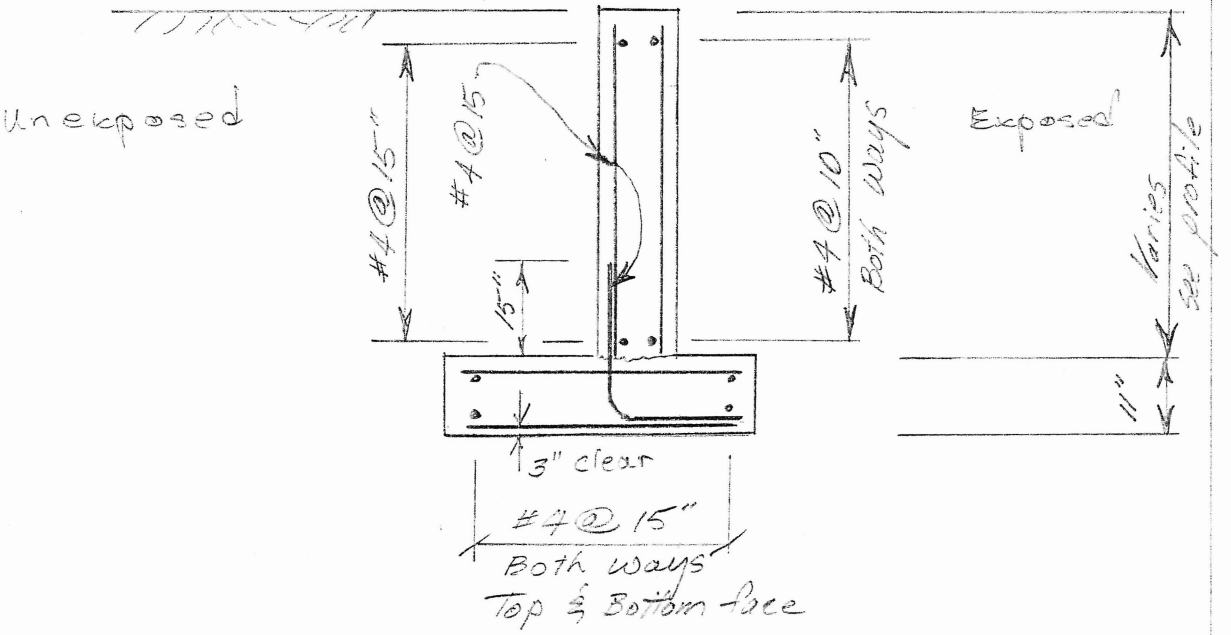


Profile



Plan

STEEL DESIGN BY INSPECTION (REFERENCE SHT 6)



STA. 532+40 To STA 532+60

STA 534+20 To STA 534+40

Reference sheets 6 & 8

Check sliding using ave. wall height over 8 ~~foot length~~ between STA. 532+52 and STA 532+60

Consider footing width tapering from 1.917' to 1.0' in 20' on channel side and 2.75' to 1.5' on emb. side.

Assume no key.

Ave Wall height above footing = 6.25'
footing thickness = 11" = 0.917'
footing width (ave) channel side = 1.73
footing width (ave) emb. side = 2.50

Soil Horiz	$(130)(1.65)\left(\frac{7.167}{2}\right)^2$		2170	2.389	5184
" Vert	$(130)(2.15)(6.25)$		2031	3.813	7745
Conc. Wall	$(150)\left(\frac{1.0}{2}\right)(6.25)$		781	2.146	1674
Conc foot	$(150)(5.06)\left(\frac{1.5}{2}\right)$		696	$\frac{5.06}{2}$	1760
		ΣW	3503	ΣM	5997

$$\frac{\Sigma M}{\Sigma W} = 1.71 > \frac{5.06}{3} \quad \therefore OK$$

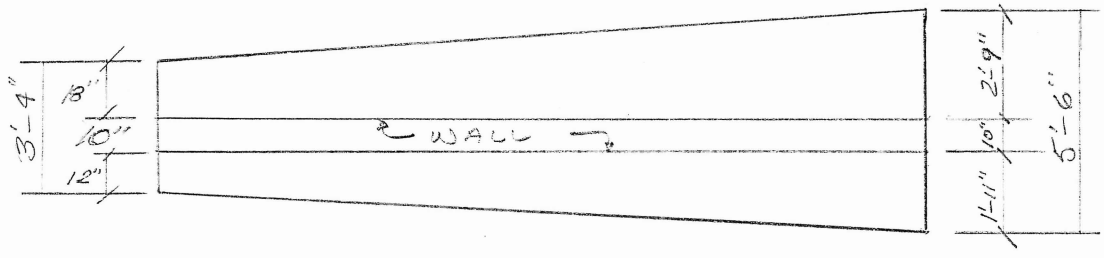
$R_E = (0.4)(3508) + (200)(5.06) = 2415$

$FS = \frac{2415}{2170} = 1.11 < 1.5$ This is less than 1.5 generally recommended, however the passive restraint at d.s. end of footing is ignored as well as using at rest mobilizing forces. Therefore I believe design is acceptable.

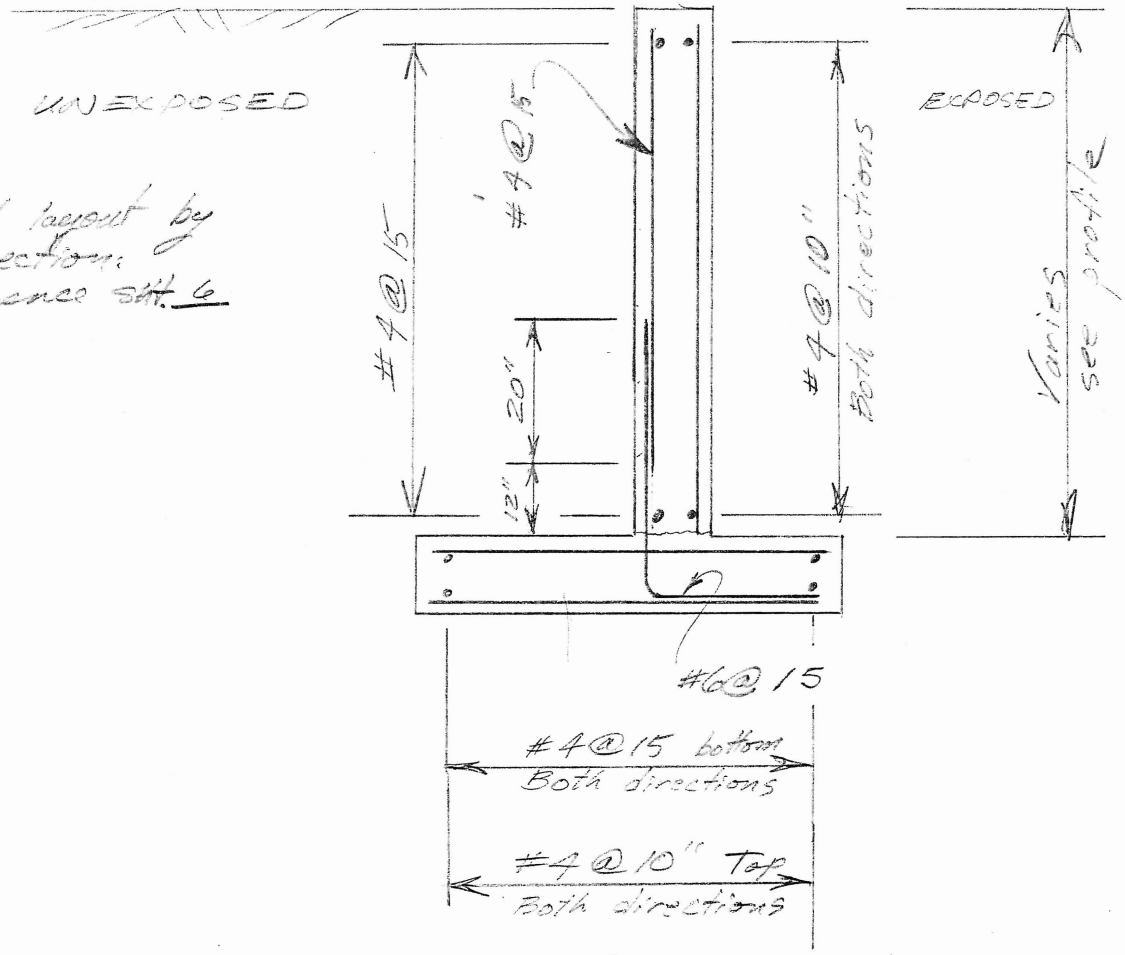
LMS.

STA. 532+40 To STA. 532+60 and
STA. 534+20 To STA. 534+40

Layout

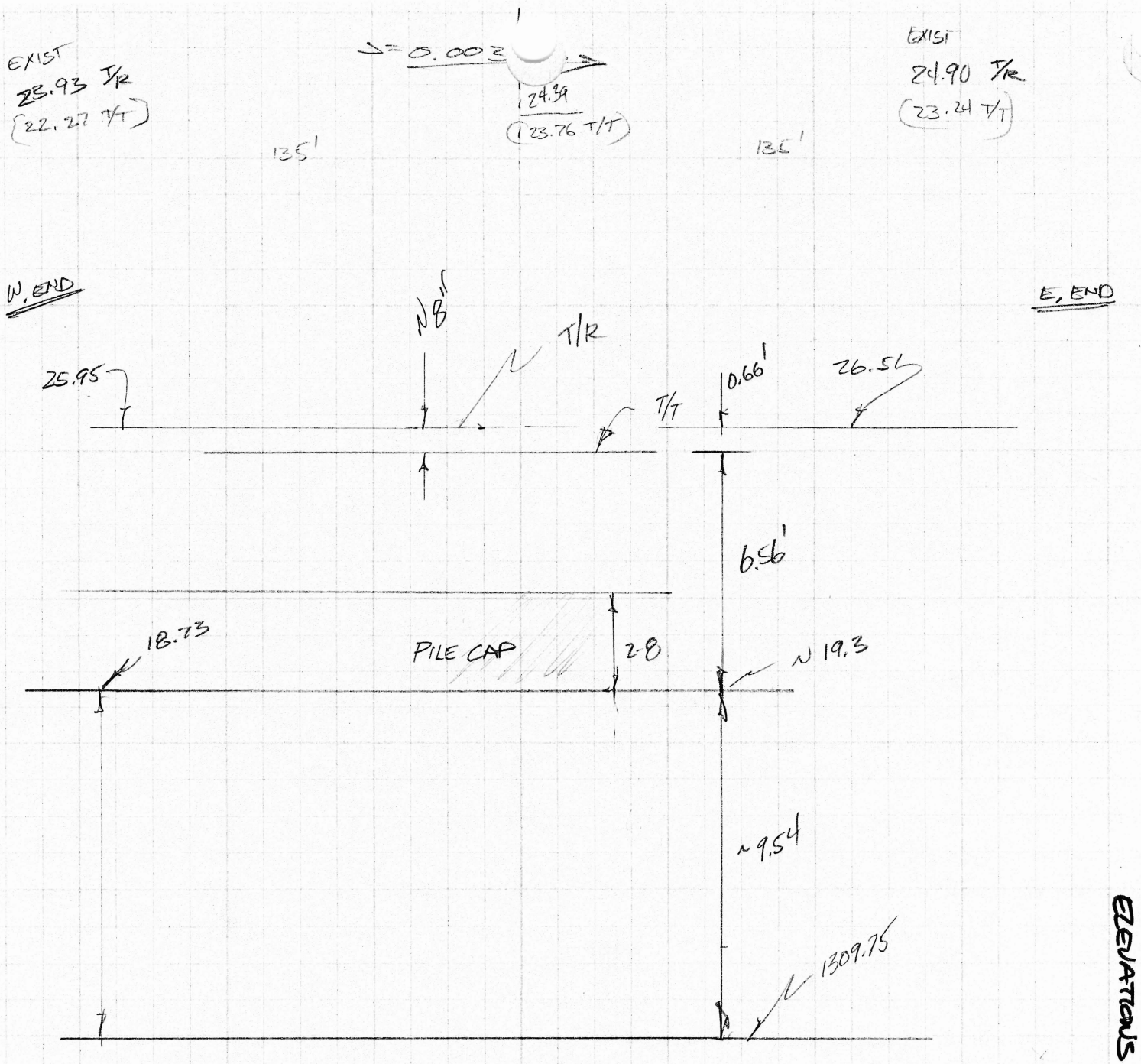


PLAN



Steel layout by Inspection. Reference SH. 6

Typical Section



NOTE: IT APPEARS THAT THE RR & SCS DATUMS ARE VERY CLOSE

ARLEDGE RWCD #4

SOUTH PAC. RR & UR STA 576+00

3/85

ELEVATIONS

POWER ROAD BRIDGE

RWCD TOP CENTER OF DECK EL 1329.80

- DECK OVER PIER #2 1-0½ + 4 + 1½ = 1'-6"

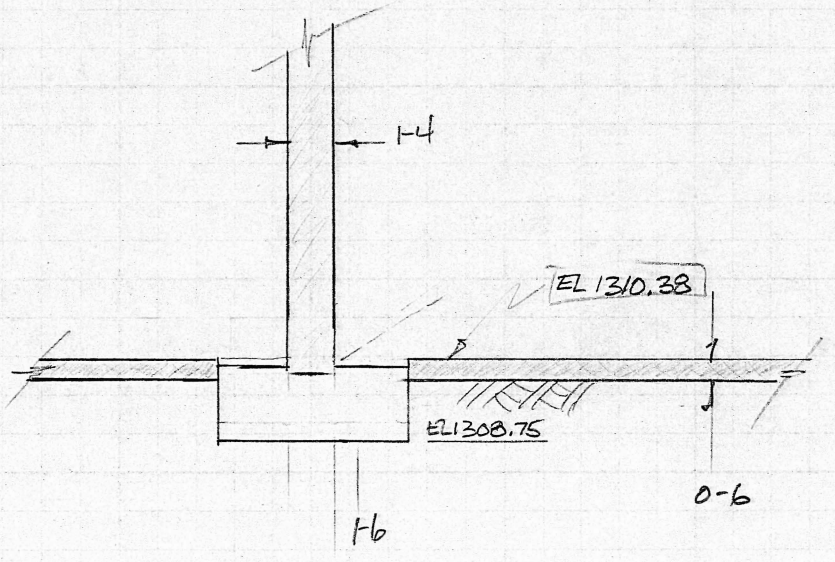
(EAST) LEFT PIER 1330.10
RIGHT PIER 1329.00
MID 1329.55 + 1.50 = 1331.05

- RWCD DRAWINGS PT 110 @ 1329.80, Δ ≈ 1.25 FT

- TOP OF FOOTINGS 1310.0 + 1.5 = 1311.5 — BRIDGE DRWG ≈ 1308.75 RWCD DATUM

BRIDGE DRWG = 1310.25 RWCD DATUM
1.50
1308.75

- CHANNEL INVERT STA 55+00 EL 1310.38



ARIZONA RWCD FLOODWAY REACH 4

D.T. 10/29/84

HIGLEY RD BR

YW

PROBLEM: COMPARE DATUMS USED:

SOLUTION:

1. TOP CENTER DECK

	AS BUILT	SCS PLAN & PROF
	1319.69	1316.30
	Δ = 3.4	

LOWEST BOTTOM SIDE OF DECK APPROX. = 4.0

2. RITTENHOUSE RD. BRIDGE

ON BRIDGE DRWGS AT CANAL BRIDGE	1325.81
SCS PLAN & PROFILE " "	1322.50
Δ	3.31

IT APPEARS THAT THE MCHD DATUM IS APPROX 3.3 to 3.4 FT HIGHER THAN THE REACH 4 DATUM.

ARIZONA RWCD R4

DT 1/21/85

POWER RD BRIDGE

CHECK FIT AT POWER RD. BRIDGE

TOP ~ ℄ ROAD & ℄ FLOODWAY

PT 110 EL ~~1329.80~~ RWCD DRWGS

BRIDGE DRWGS 1330.50

~~Δ = 0.70~~

FROM DRWGS: SH 6/8

SH 8/8

MIDDLE TOP CENTER = 1329.55

+ Deck "t" AT PIER 1.50

1331.05

RWCD R4 1329.80

Δ = 1.25'

ARIZONA
OT 1/21/85
WMS FIELD DO BR.

RWCD R4

TOP CENTER OF DECK

EL 1327.20 RWCD DRWGS

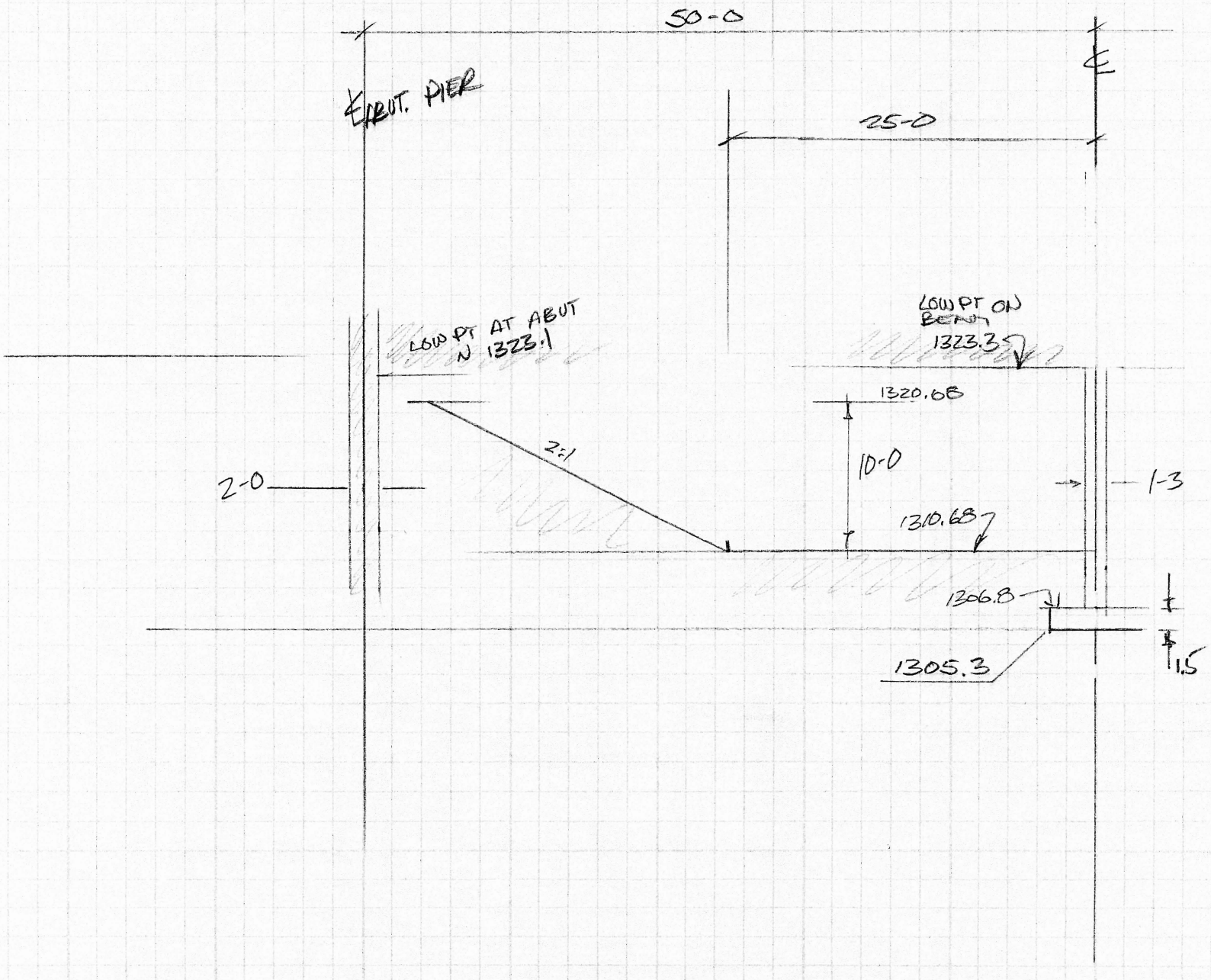
EL 1328.86 BRIDGE DRWGS. SH 1/10

Δ = 1.66 FT

PROP BOTT CH AS SHOWN ON DRWGS 1312.1 (MCHD)
− 1.66
1310.44

(current planned 1/21/85 1310.68)

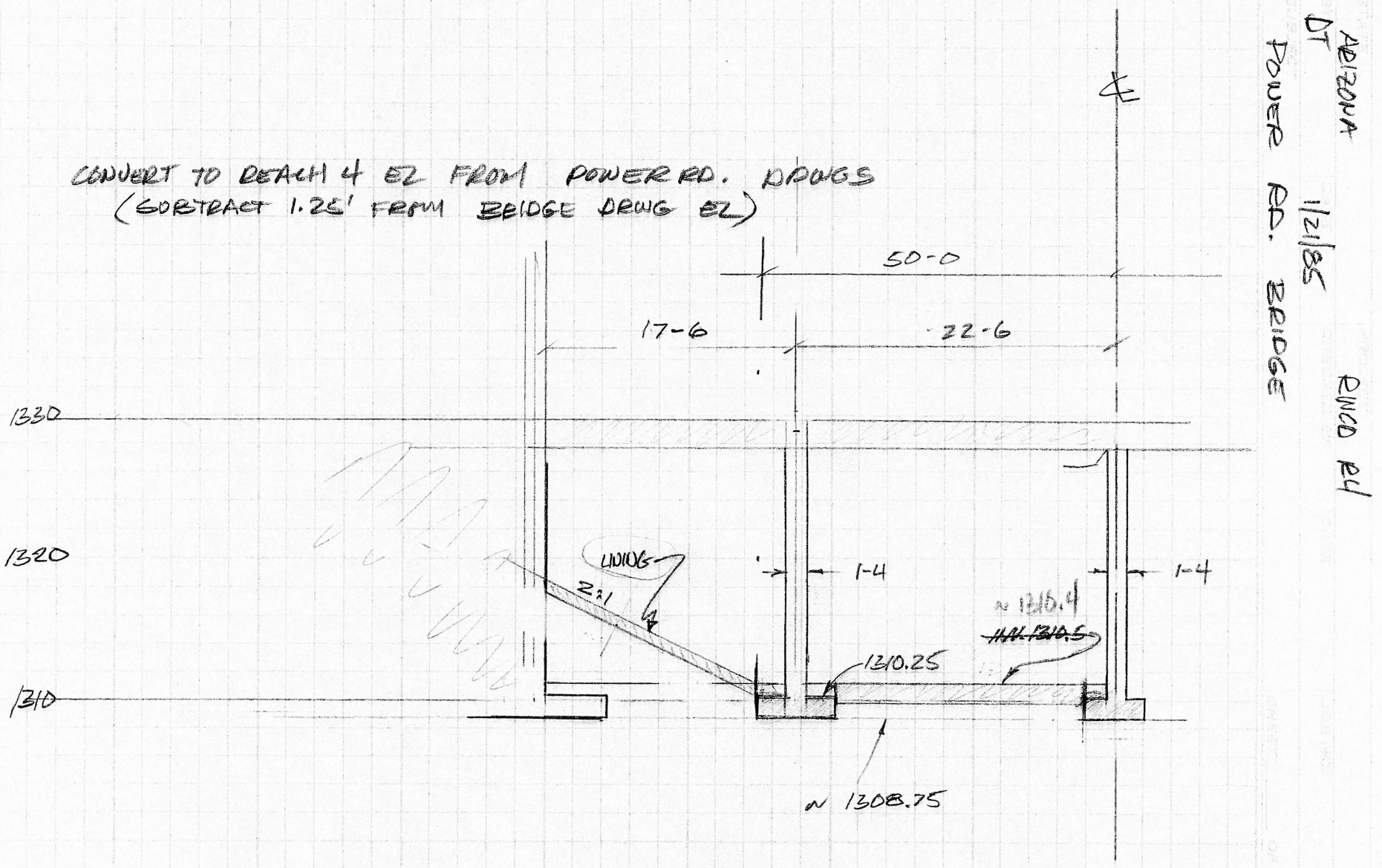
ARIZONA DT 1/21/85 RWCD RT
WILLIAMS FIELD RD. BRIDGE



ARIZONA DT 11/21/85 RUCO RD

POWER RD. BRIDGE

CONVERT TO REACH 4 EZ FROM POWER RD. DRWGS
(SUBTRACT 1.25' FROM BRIDGE DRWG EZ)



ARIZONA DT 12/18/84 RWCD REACH 4

SIDE INLET DESIGN Q'S

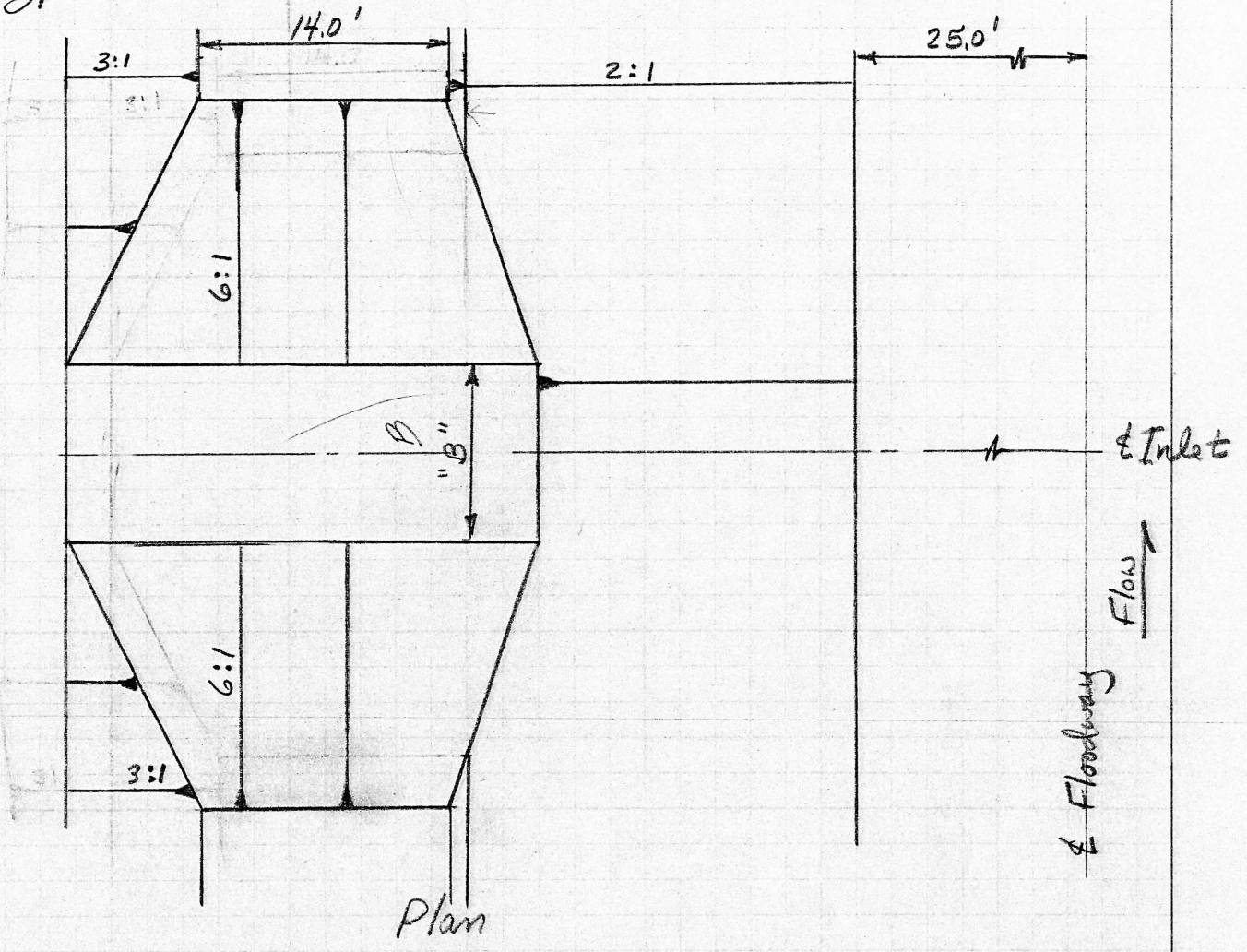
DESIGN Q'S ARE AS OBTAINED FROM 1984 REPORT "RWCD REACH 4" HYDROLOGY SIDE INLETS.

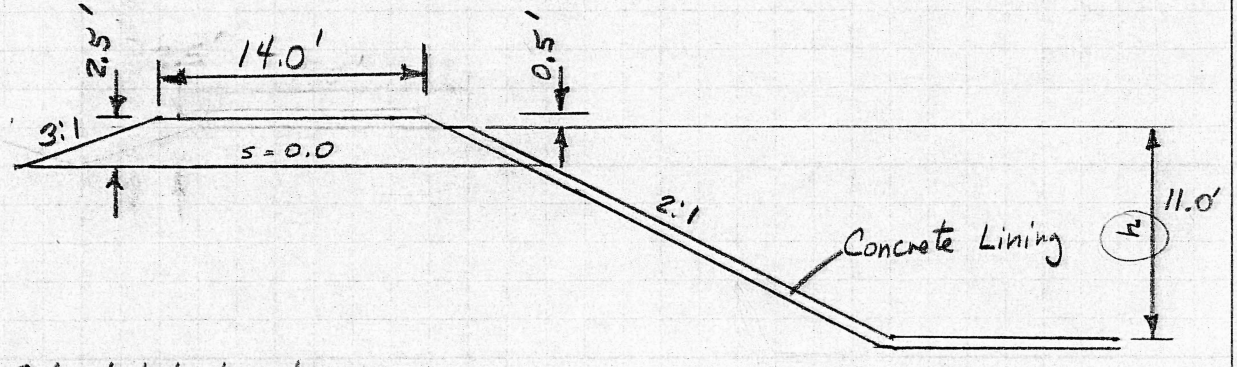
NO	APPROX. STA	Q_{100}	Q_{10}
1	498+40 or 501+60	115	30
2	513+79.50	350	110
3	534+18.5	CMP / HEADWALL	
4	540+34.25	25	5
5	546+[illegible]	350	90
6	550+00	25	5
7	567+30	90	20
8	580+00	100	25
9	596+10	750	200
10	597+60	100	50
11	~~580+10~~ 600+00	100	20
12	~~626+75~~ 625+25	100	20
13	685+50	100	20
14	714+00	100	20
15	726+50	100	20

R/C LINED CHANNEL

EARTH CHANNEL

Typical Side Inlet – Concrete Lined Section



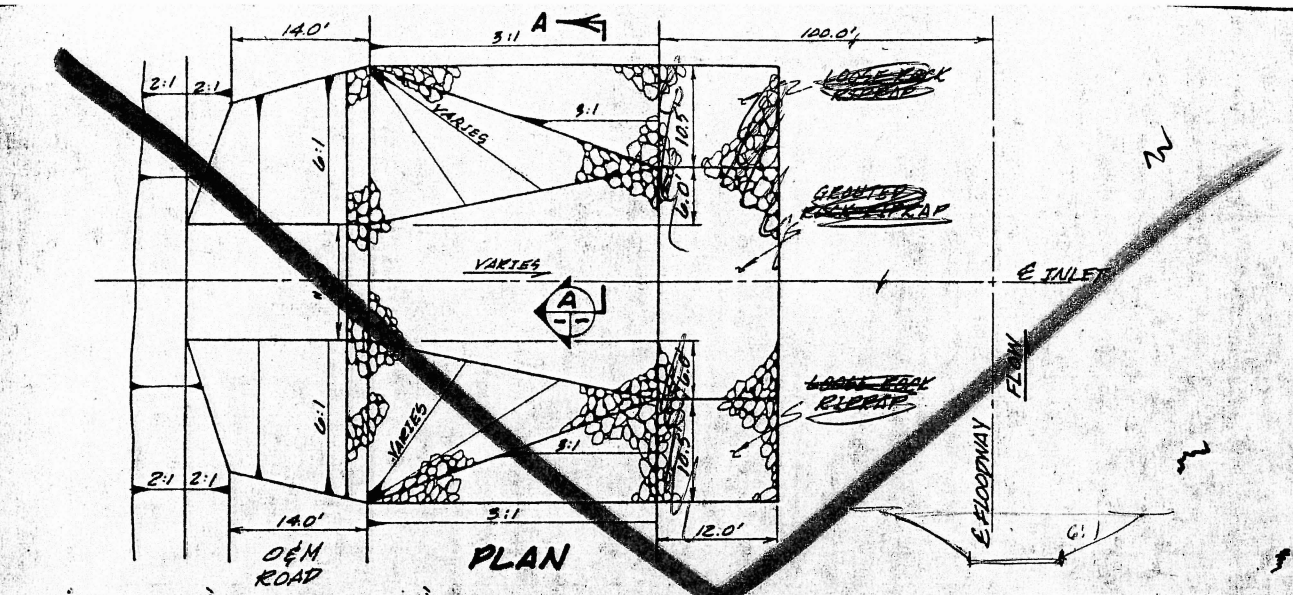


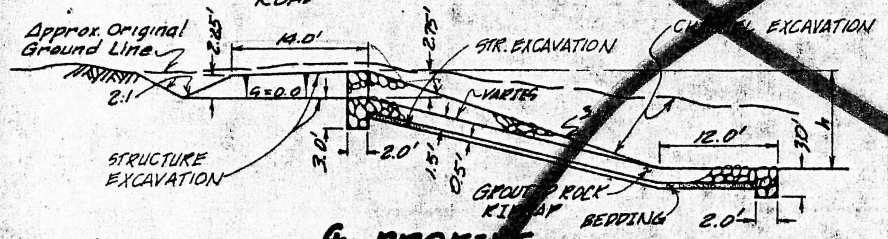
Side Inlet Location

Inlet Station	Inlet Bottom Width - "B"	h
501+60 Lt.	10.0'	11.0'
513+79.5 Lt	40.0'	11.0'
541+50 Lt.	10.0'	11.0'
~~545+60~~ Lt	40.0'	11.0'

(11.5')

546+60 DT 3/1/85 Typical Side Inlet Upstream of Sta. 560+00





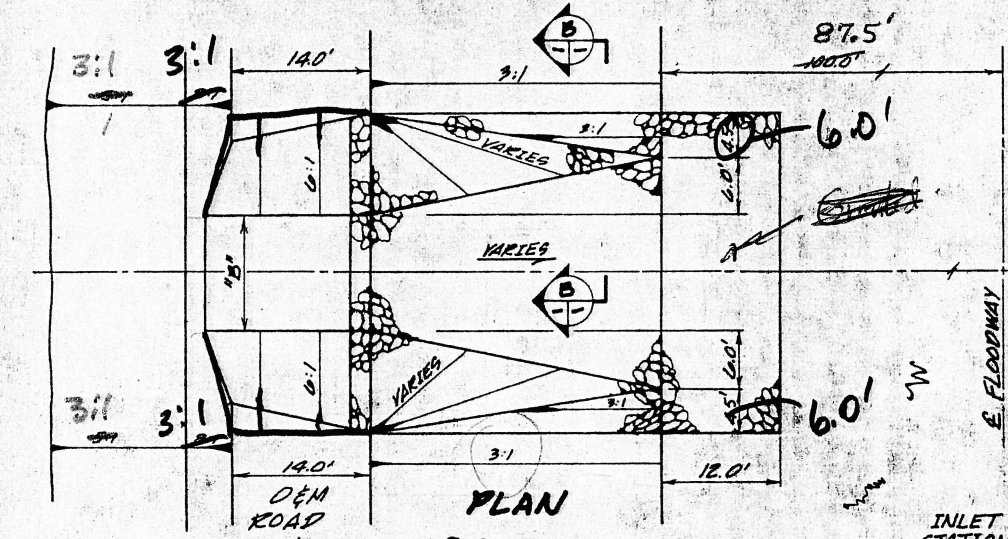
SIDE INLET LOCATION

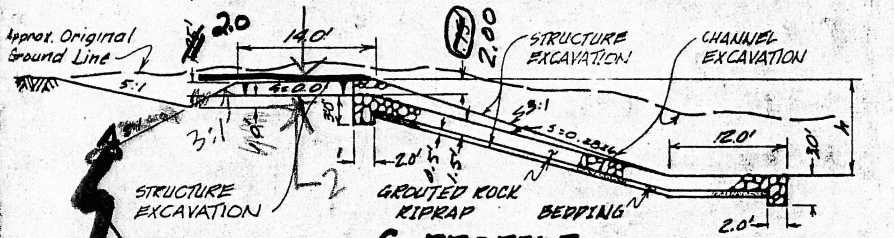
INLET STATION	INLET BOTTOM WIDTH - "B"	h
752+00 Lt.	10.0'	10.5'
79[illegible]00 Lt.	10.0'	10.5'
835+00 Lt.	10.0'	10.5'
773+60 Lt.	10.0'	10.5'

Lt. = Left of Floodway Channel

Approx. Original Ground Line

TYPICAL SIDE INLET UPSTREAM OF STA. 860+00





SIDE INLET LOCATION

INLET STATION	INLET BOTTOM WIDTH - "B"	h
8[illegible] Lt.	12.0'	11.5'
886+50 Lt.	12.0'	11.5'
900+00 Lt.	12.0'	11.5'
914+60 Lt.	12.0'	11.5'
947+00 Lt.	12.0'	11.5'
962+00 Lt.	12.0'	11.5'

Lt. = Left of Floodway Channel

See next sheet

TYPICAL SIDE INLET DOWNSTREAM OF STA. ~~860+00~~ 560+00

SCALE 10 5 0 10 20 IN FEET

~~5[illegible]~~ 580+00 Lt. 10.0' 10.5'

580+00 Lt. 10.0'

~~5[illegible]~~ 585+75 Lt. 80.0'

~~685+50 Lt.~~ 10' 597+75 Lt. 10 10.5

~~711+00 Lt.~~ 10' 600+00 Lt. 10

~~726+50 Lt.~~ 10' 626+75 Lt 10.

Side Inlet Locations ROCK

Inlet Station	Inlet Bottom Width - "B"	h
567+30 Lt.	10.0'	10.5'
580+00 Lt.	10.0'	10.5'
595+75 Lt.	80.0'	11.22'
597+40 Lt.	10.0'	10.5
600+00 Lt.	10.0'	10.5
626+75 Lt.	10.0'	10.5
685+50 Lt.	10.0'	10.5
714+00 Lt.	10.0'	10.5
726+50 Lt.	10.0'	10.5

GROUTED ROCK GR
RIPRAP SIDE INLET

Side Inlets:

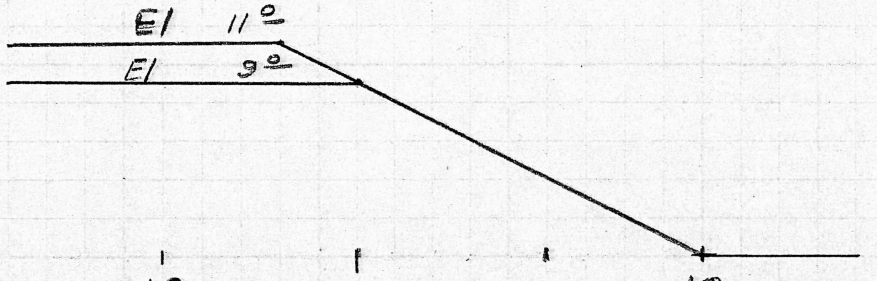
No.	Station	Q_{100}	Q_{10}	Channel Invert elev.
1	501+60	115	30	1314.83
2	513+79.5	350	110	1313.73
3	534+18.5	CMP/HEADWALL		
4	541+50	25	5	
5	546+60	350	90	1310.87
6	550+00	25	5	(Combined with 5)
7	567+30	90	20	1310.49
8	580+00	100	25	1310.17
9	595+75	750	200	1309.78
10	597+40	100	50	1309.74
11	600+00	100	20	1309.67
12	625+75	100	20	1309.98
13	685+50	100	20	1302.73
14	714+00	100	20	1301.30
15	726+50	100	20	1300.61

Hydraulics of Side Channel Inlets - Concrete Lined Section

$Q = 350$ cfs

bottom width = 40 feet

$n = .030$ upstream
$n = .015$ downstream



Sta.	Bottom Width	Side Slope	Channel Elev.	W.S. Elev	EGL Elev.	Depth	Velocity	FR
-40	40.0	6.	9.0	10.779	11.01	1.779	3.88	
-30				10.719	10.97	1.719	4.04	
-20				10.646	10.93	1.646	4.26	
-10				10.545	10.87	1.545	4.60	
-5				10.471	10.84	1.471	4.872	
0	40.0	↓		10.250		1.250	5.895	1.0

$Q = 115$ cfs

bottom width = 10 feet

-40	10.0	6:1	9.0	10.741	10.90	1.741	3.23	
-30				10.687	10.86	1.687	3.39	
-20				10.619	10.82	1.619	3.60	
-10				10.525	10.77	1.525	3.94	
-5				10.456	10.73	1.457	4.21	
0				10.244	10.679	1.244	5.29	
5								

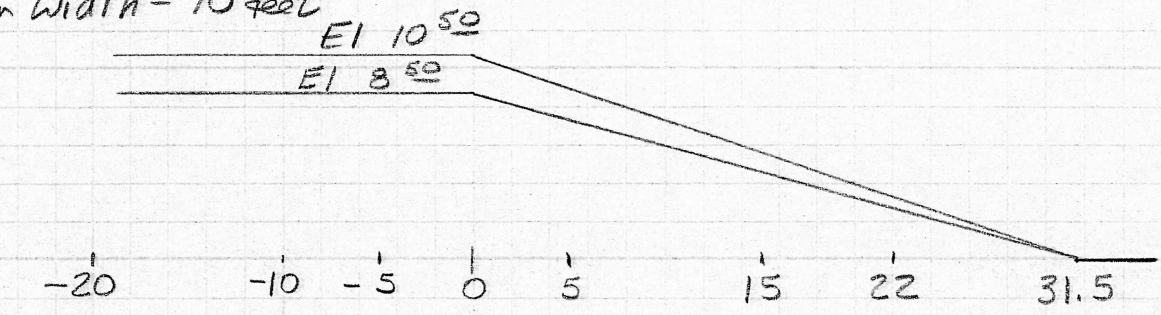
COMPUTATION SHEET
SCS–ENG–523 Rev. 8–69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE ARIZONA		PROJECT RWCD – Reach 4		
BY GLC	DATE 1-11-85	CHECKED BY ✓	DATE	JOB NO.
SUBJECT Hydraulics of Side Channel Inlets				SHEET ____ OF ____

Q = 100 cfs

bottom width = 10 feet



Used HP41 WSP Program "PWSP"

n = 0.03 in channel upstream of crest
= 0.035 grouted rock riprap downstream of Crest

Water Surface Profile

Sta.	Bottom Width	Side Slope	Channel Elev.	WS Elev.	EGL Elev.	Depth	Velocity	Fe
-40	10.0	6.	8.50	10.13	10.28	1.64	3.09	.52
-30				10.08	10.25	1.58	3.24	.55
-20				10.02	10.20	1.52	3.45	.60
-10				9.93	10.15	1.43	3.78	.67
-5			8.50	9.86	10.11	1.36	4.05	.74
0	10.0		8.50	9.65	10.06	1.152	5.13	1.0
5	11.90		7.15	7.75	9.58	0.595	10.86	2.75
15	15.71		4.45	4.90	7.23	0.44	12.26	3.47
22	18.38		2.56	2.97	5.14	0.41	11.83	3.46
31.5	22.00		0.00	0.37	2.31	0.37	11.19	3.39

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

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ		PROJECT RWCD, Reach 4		
BY GLC	DATE 1-11-85	CHECKED BY ✓	DATE	JOB NO.
SUBJECT Hydraulics - Inlet @ 596+10				SHEET ____ OF ____

Water Surface Profile -

Q = 750
bottom width = 80 feet

Sta.	Bottom Width	Side Slope	Channel Elev.	WS Elev.	EGL Elev.	Depth	Vel.	FR
-50	80.	6.	8.50					
-40				10.40	10.69	1.90	4.32	0.59
-30				10.34	10.65	1.84	4.49	0.62
-20				10.26	10.60	1.76	4.71	0.66
-10				10.15	10.55	1.65	5.04	0.73
-5				10.08	10.52	1.58	5.32	0.78
0	80.		8.50	9.85	10.47	1.35	6.31	1.00
5	81.90		7.15	7.88	10.10	0.73	11.96	2.54
15	85.71		4.45	5.04	8.23	0.59	14.33	3.36
22	88.38		2.56	3.12	6.43	0.56	1459	3.50
31.5	92.0		0.0	0.54	3.83	0.54	14.55	3.54

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

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE AZ		PROJECT RWCD – Reach 4		
BY GLC	DATE 1-11-85	CHECKED BY ✓	DATE	JOB NO.
SUBJECT Sizing of Side Inlets – Length of Apron				SHEET ____ OF ____

Approx. length of hydraulic jump

For Q = 100 and btm width = 22'

for $d_1 = 0.37'$
$V_1 = 11.19$

d_2 – Eq. 5-4-28 (NEHS) for rect. section

$d_2 = 1.52$ length ≈ 8'

For Q = 750 and btm width = 92'

for $d_1 = 0.54$
$V_1 = 14.55$

$d_2 = 2.41$ length ≈ 12'

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

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
BY	DATE	CHECKED BY	DATE	JOB NO.
SUBJECT Inlets - Earth Channel				SHEET ____ OF ____

No.	Approx Sta.	Q_{100}	Width	Main channel Invert	Inlet invert	Aprox natural ground @ inlet
7	567+30	90	10	1310.19	1318.69	1320
8	580+00	100	10	1309.94	1318.44	1320
9	596+10	750	80	1309.62	1318.12	1319
10	597+60	100	10	1309.59	1318.09	
11	600+00	100	10	1309.54	1318.04	1320
12	626+75	100	10	1308.98	1317.48	1318
13	685+50	100	10	1302.73	1311.23	1313
14	714+00	100	10	1301.30	1309.80	1311.5
15	726+50	100	10	1300.61	1309.11	1311

ARIZONA RWCD R4	DT 4/9/85	LOW CROP LAYOUT

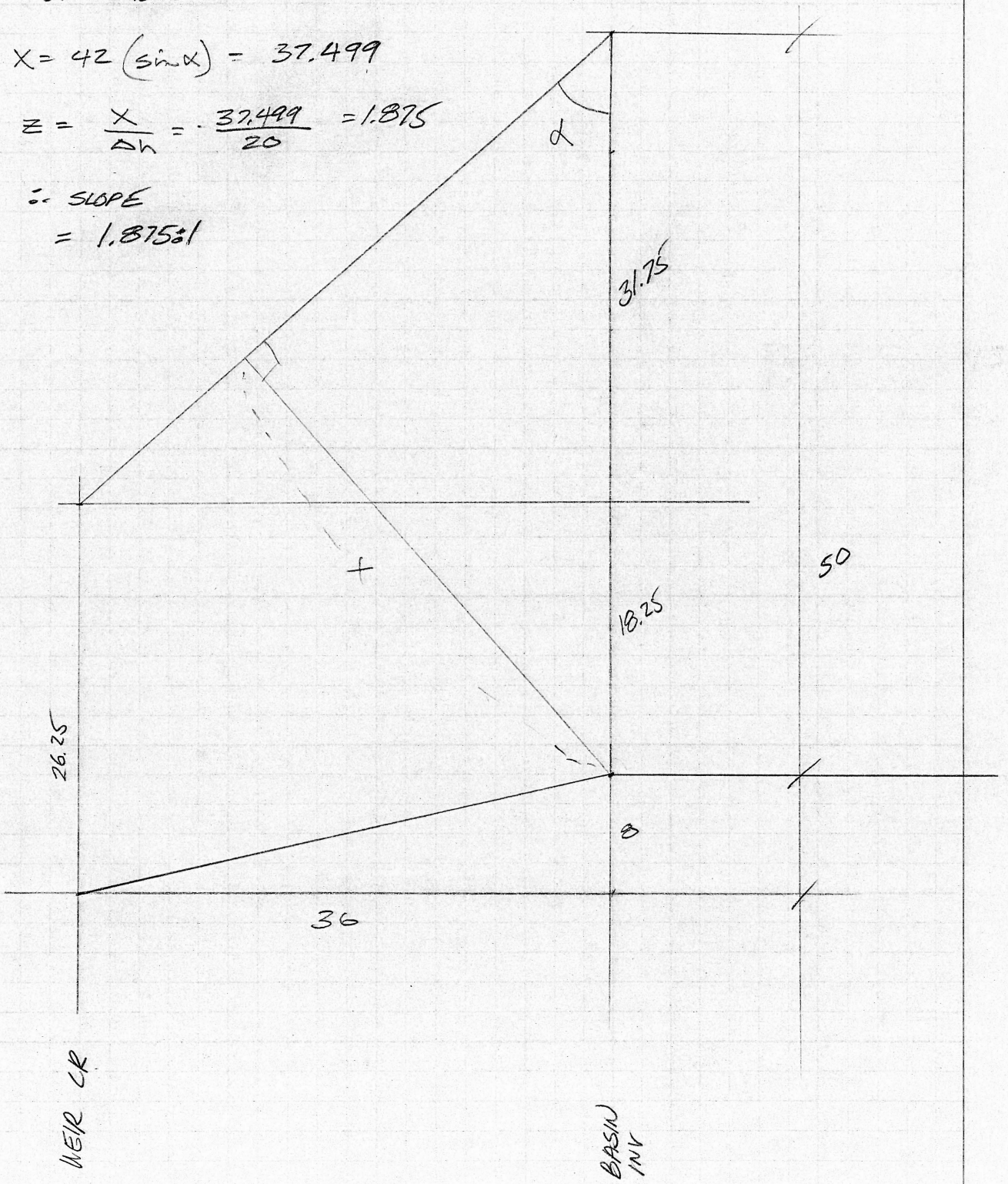
TAN α = 36/31.75

α = 48.5895°

$X = 42(\sin\alpha) = 37.499$

$Z = \frac{X}{\Delta h} = \frac{37.499}{20} = 1.875$

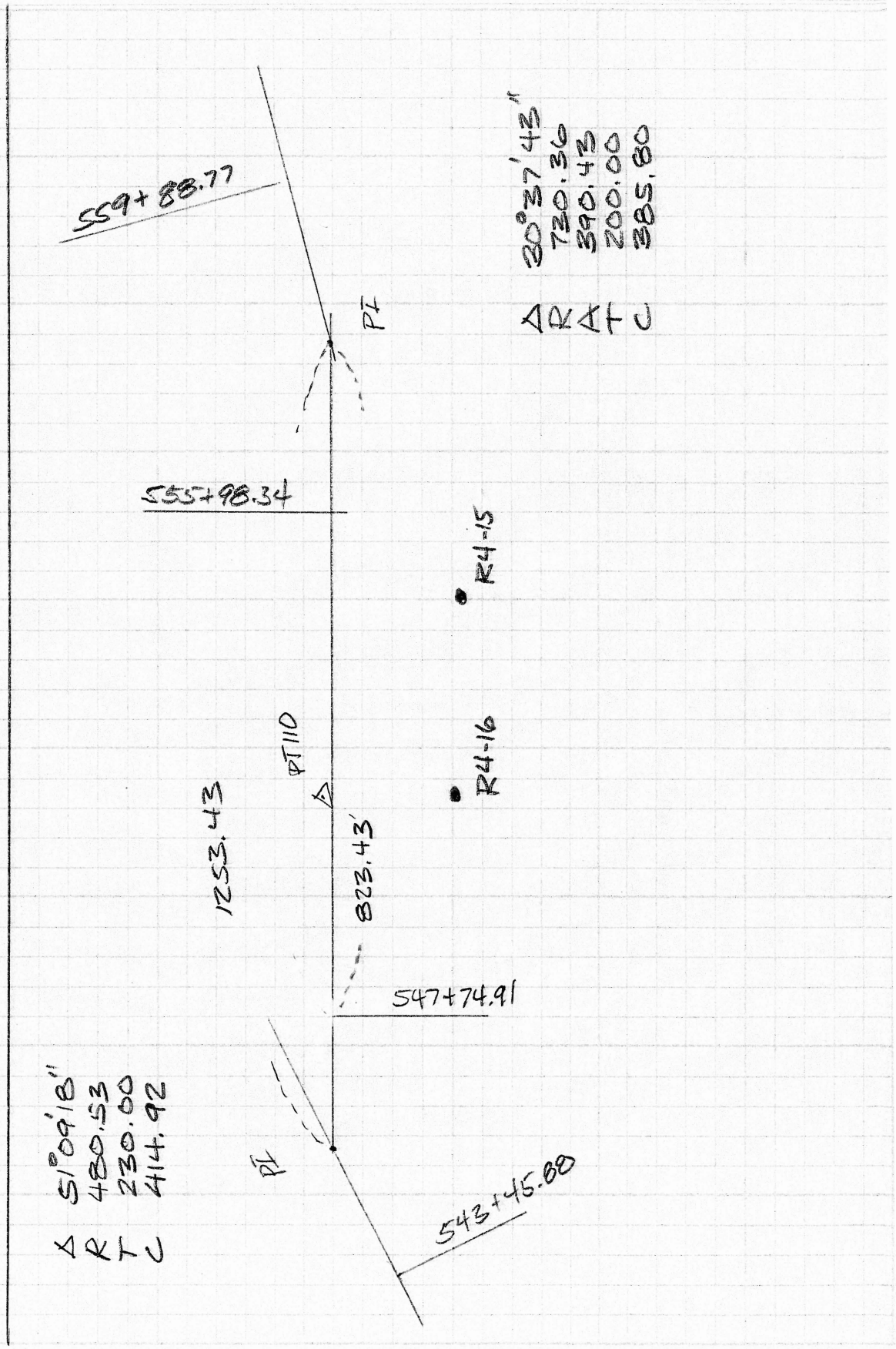
∴ SLOPE = 1.875:1



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

ARIZONA TRWCD REACH 4

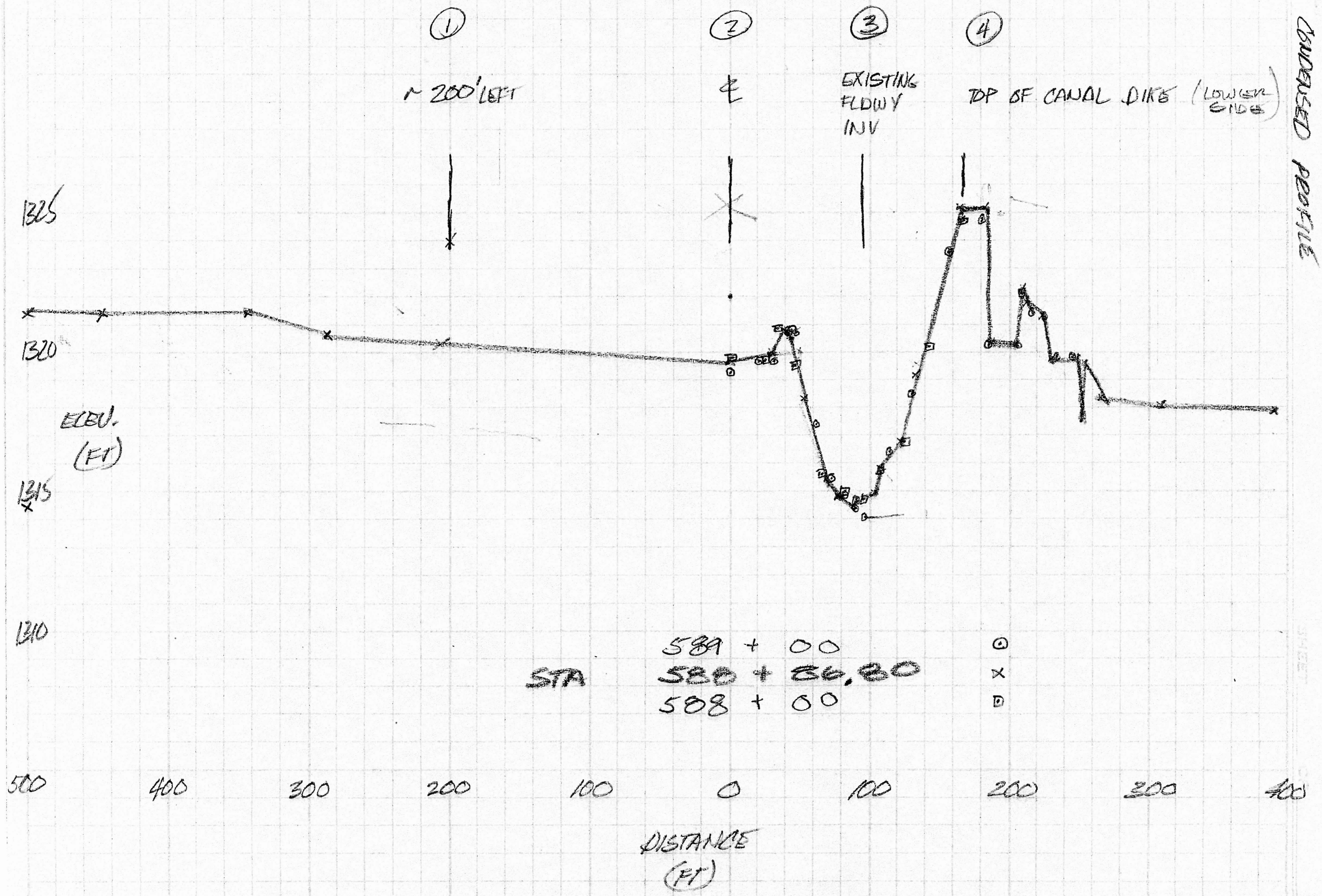
DT 12/7/84



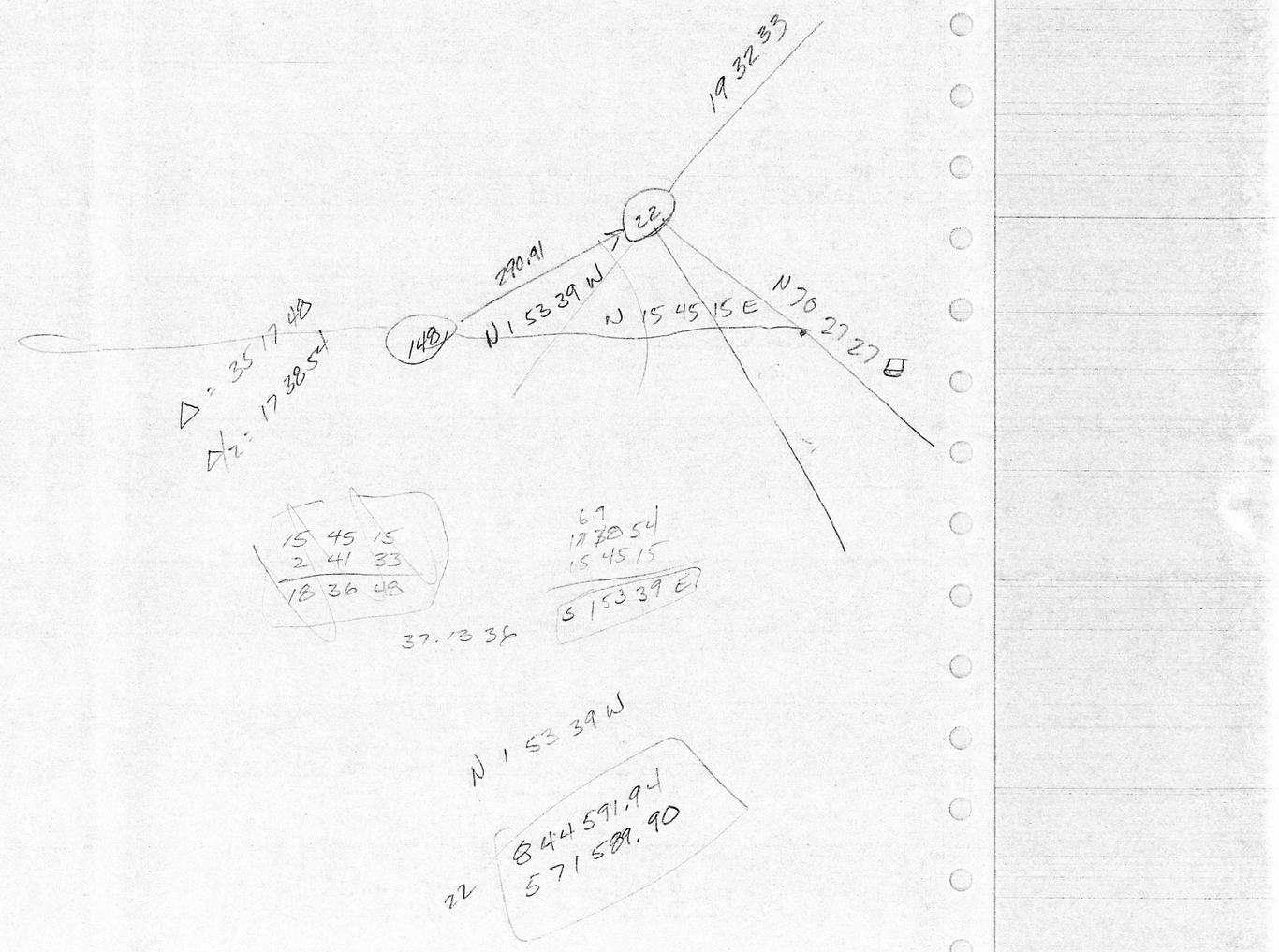
ARIZ

D. THACKERAY 7/23/84 DWCD R24U

CONDENSED PROFILE



POWERLINE JCT. LAYOUT




```
>>>   <<<
>>> JOB:


INVERSE/BEARINGS  22 148
     FROM     22 TO    148 S    2  41  33.000E          290.9100

320 325
     FROM    320 TO    325 S   15  17  16.768W          331.6456

300 22
     FROM    300 TO     22 N   89  43   0.043W           95.5110

LIST/COORDINATES  (1-500)
     POINT     22       N     844591.7730,  E     571585.8488
     POINT    101       N     844500.0000,  E     571500.0000
     POINT    102       N     844500.0000,  E     572000.0000
     POINT    103       N     844000.0000,  E     571500.0000
     POINT    104       N     844000.0000,  E     572000.0000
     POINT    130       N     842327.7072,  E     571042.8041
     POINT    148       N     844301.1842,  E     571599.5145
     POINT    200       N     844413.8958,  E     571709.2387
     POINT    201       N     844280.8209,  E     571671.6972
     POINT    205       N     844058.0834,  E     571608.8612
     POINT    210       N     844658.4203,  E     571770.2090
     POINT    215       N     844473.3705,  E     571835.8921
     POINT    220       N     844473.3705,  E     571835.8921
     POINT    222       N     844473.3705,  E     571835.8921
     POINT    225       N     844473.3705.  E     571835.8921
```

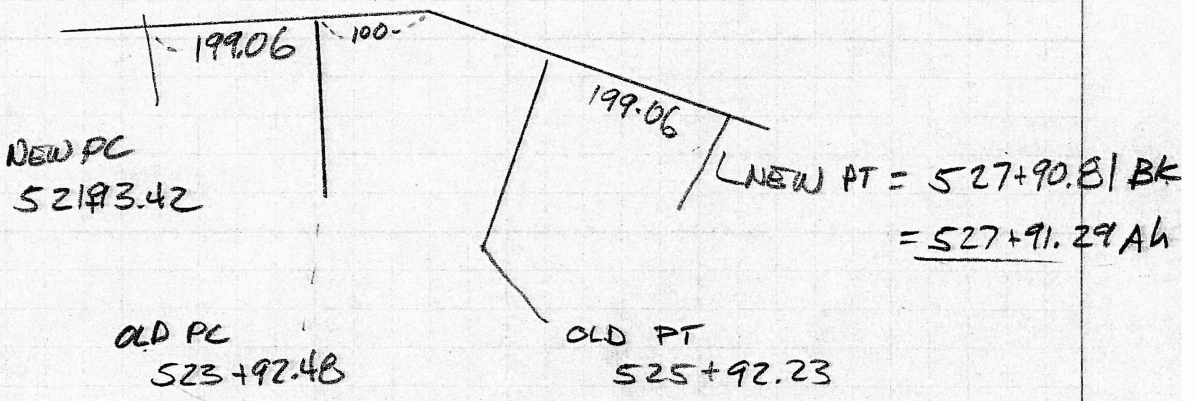
```
        POINT     302        N      844183.0670,  E      571912.7891
        POINT     303        N      843908.0168,  E      571643.4107
        POINT     304        N      843948.4709,  E      571500.0114
        POINT     305        N      843995.9766,  E      571513.4132
        POINT     306        N      843928.1076,  E      571572.1941
        POINT     310        N      843627.4793,  E      571409.4572
        POINT     311        N      843603.6983,  E      571557.5601
        POINT     320        N      844587.8198,  E      572181.3465
        POINT     321        N      844658.6742,  E      571774.3276
        POINT     322        N      844725.5754,  E      571962.8063
        POINT     325        N      844267.9102,  E      572093.9012
        POINT     350        N      843715.4546,  E      571580.9156

END/OF/RUN
JOB  85  1  IS COMPLETED AT 01:07:09
LAST FIGURE NUMBER USED=       3 MAXIMUM ALLOWED=     50
LAST POINT NUMBER USED=      497 MAXIMUM ALLOWED=   1000
END/OF/RUN - PROGRAM TERMINATED
```

N 844,658.84 571,778.38
N 844725.74 571 966.86

POWERLINE 12A.
LAYOUT

PROBLEM: CHECK REVISED CURVE #3

SOLUTION:



	NEW	OLD
Δ =	6°57'25"	"
L =	597.39	
T =	299.06	100
R =	4920	

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

JOB 85 2 3 FILE

S23 92.48
S21 22
270.48

S21+12.62

S22+92.48

S25+92.23

S24+89.70

FIT CURVE

560.25

POT S22+92.48

N74°14'09"E

100' 100' 100' 61' 61'

150.22

S 22°43'16"W

S 15°45'51"W

270.48
279.86

53.86
53.86

23.15

75'

FIG 2
FIG 1
FIG 3

R = 4920

T = 300

4919.66

$R\left(\frac{1}{\cos(\Delta/2)} - R\right)$

$E = R\left(\frac{1}{\cos\Delta/2} - 1\right)$

$R = \frac{E}{\left(\frac{1}{\cos\frac{\Delta}{2}} - 1\right)} = \frac{9.1}{\left(\frac{1}{\cos 1°57'52''} - 1\right)}$

ROW $\Delta = 6\ 57\ 52$ — ALIGN $\Delta = 6\ 57\ 25$ USE
$R = 1085.15$
$T = 62.99$ ~~62.99~~ 53.86
$R = 885.15$ ~~885.15~~ check

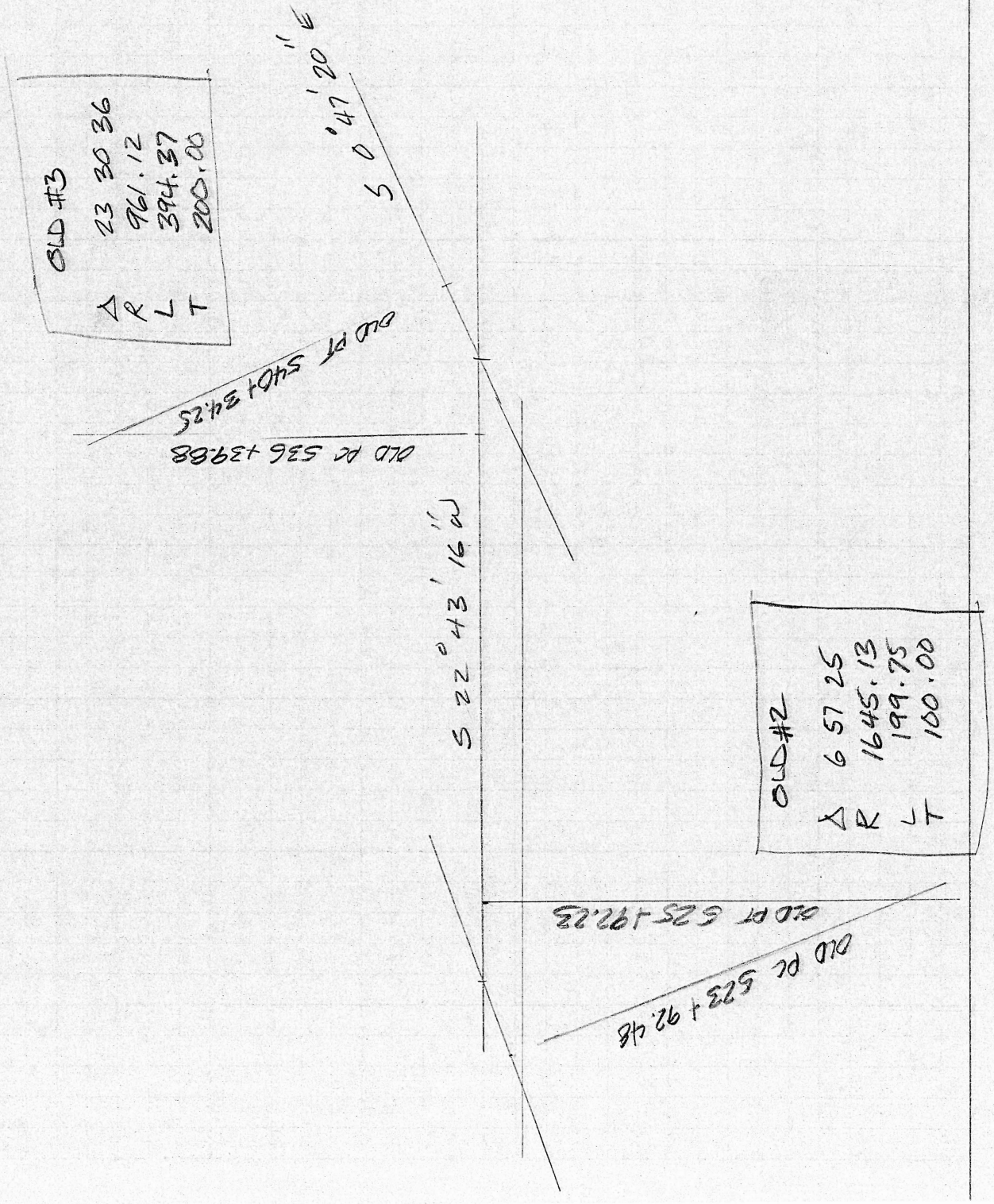
(11) CENTER 1-11-3

(15) CENTER 7-15-8

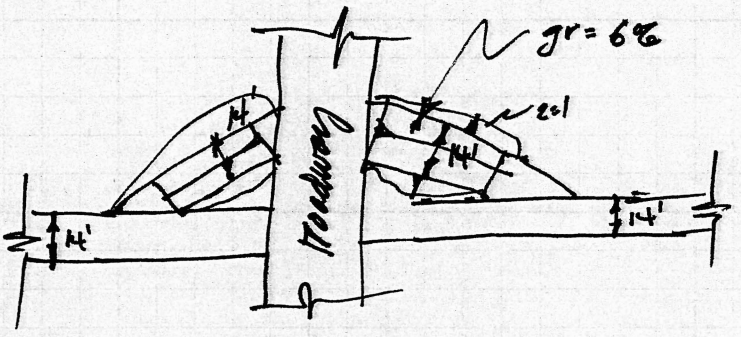
ARIZONA
RWCD R4

DT 1/28/85

PROBLEM: NEED TO ADJUST ALIGNMENT BETWEEN CURVE #2 AND CURVE #3



TYPICAL RAMPS AT ROAD CROSSINGS:



NOTE TYPICAL RAMPS AT ROADWAYS:

grade = 6%
width = 14 ft
side slopes = 2:1

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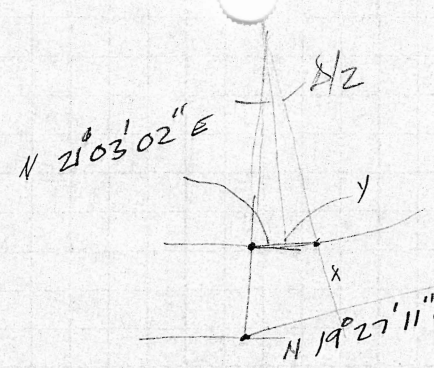
42-389 200 SHEETS 5 SQUARE
Made in U.S.A.
NATIONAL



$Y = 2r\sin(\Delta/4)$

$= 2(885.15)\left(\sin\left(\frac{6°57'52"}{4}\right)\right)$

$Y = 53.78'$

Δ 6 57 52
R 885.15
L 107.59
T 53.86

N

N 22 47 30 E

53.86

N 19°27'11"E

N 22 47 30 E

3° 20' 19"

N 9949.8091
E 49980.6827

N 10,000
E 50,000

2 S21 0302W 1

53.78'

S70°32'49"E 120.29 FT

122

S 67°12'30" W

60.86

3 N 19 27 11 E

N 9902.5486
E 50093.1569

20.1
JCD RCE

04 4/5/85

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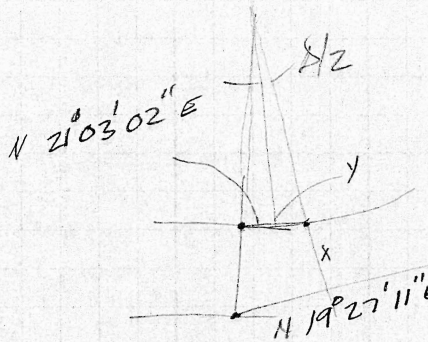


$Y = 2r \sin(\Delta/4)$

$= 2(885.15)\left(\sin\left(\frac{6°57'52"}{4}\right)\right)$

$Y = 53.78'$

Δ 6 57 52
R 885.15
L 107.59
T 53.86

N

N 22 47 30 E

53.86

N 19°27'11" E

N 22 47 30 E

3° 20' 19"

N 9949.8091
E 49980.6827

N 10,000
E 50,000

2 S21 03 02 W 1

53.78'

S 70° 32' 49" E

120.29 FT

122

S 67° 12' 30" W

60.86

3

N 19 27 11 E

N 9902.5486
E 50093.1569

ALTERNATE RWCD RL

OT 4/5/85

ARIZONA
RWCD R4

DT 4/16/85

CHECK CURVE DATA

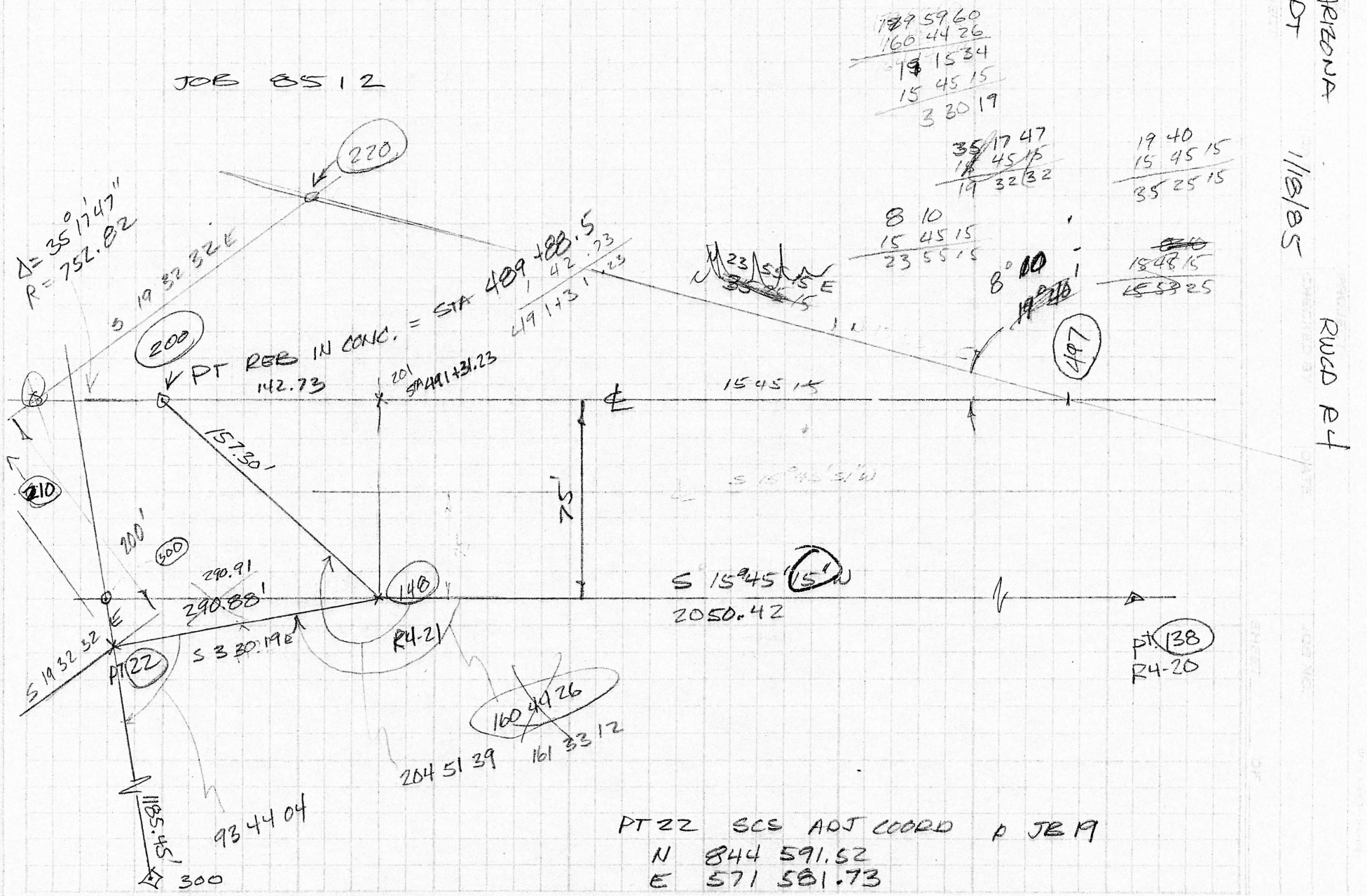
CURVE NUMBER	BEARING	Δ	R	T	L	D
	S19°31'57"E					
1		✓ 49°17'48"	653.80			
	S29°45'51"W					
2		✓ 14°00'00"	488.66			
	S15°45'51"W					
3		✓ 6°57'25"	4920.00			
	S22°43'16"W					
4		✓ 23°30'36"	961.12			
	S 0°47'20"E					
5		✓ 51°09'19"	480.53	230.00	429.03	
	S50°21'59"W					
6		30°37'43"	730.36			7 50 42
	S19°44'16"W					
7		✓ 22°06'14"	1077.56			5 19 02
	S 41 50 20 W					
		XPT				
	S 41 48 47 W					
8		✓ 13°28'50"	1555.02			3 41 04
	S 28 19 57 W					
9		33°55'26"	921.60			6 13 01
	S 62 15 23 W					
10		36°27'36"	505.00			11 20 45
	S 25 47 47 W					
11		22°13'57"	1472.58			3 53 27
	S 48 01 44 W					
12		17°45'17"	1447.49			3 57 30
	S 30 16 27 W					

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

ARIZONA DT 11/18/85 RWCD R4

215 PC
220 CC
225 PT

JOB 8512



PT 22 SCS ADJ COORD & JB 19
N 844 591.52
E 571 581.73

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

PT	N	E	BRG	D
1	10000	50000		
			S 61 04 09 E	45.6792
2	9977.9025	50039.9786		
			S 61 04 09 E	49.3208
3	9963.7185	50065.6403		
4				

↳ INT 10,030.65 50126.5305

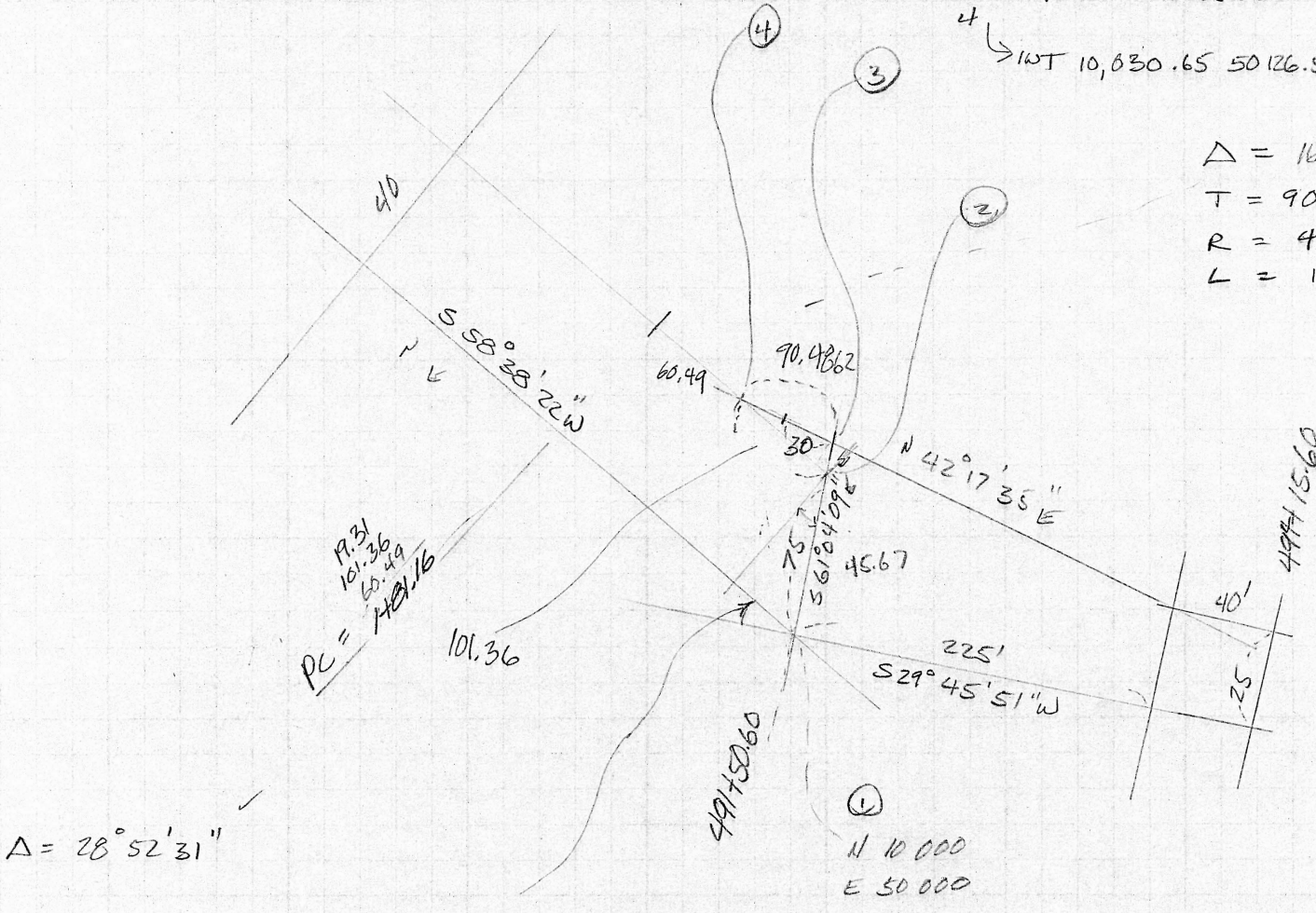
$\Delta = 16^\circ 20' 47''$

$T = 90.49 - 30 = 60.49$

$R = 421.17'$

$L = 120.16$

POWERLINE FLOODWAY



$\Delta = 28^\circ 52' 31''$

40 sin (28° 52' 31") = 19.31

```
* E *NO OFFSET FOR  70
* E *NO OFFSET FOR  71
* E *NO OFFSET FOR  72
* E *NO OFFSET FOR  73
* E *NO OFFSET FOR  12

STATIONS/AND/OFFSETS  4 52112.62 2
   POINT      14: OFFSET =     -4.3223, STATION =  52524.1601
                  LOCAL TANGENT :  NORTH AZIMUTH    29  20   1.586
   POINT      50: OFFSET =     -0.5017, STATION =  52502.0890
                  LOCAL TANGENT :  NORTH AZIMUTH    29   4  36.283
   POINT      51: OFFSET =      3.2197, STATION =  52479.9841
                  LOCAL TANGENT :  NORTH AZIMUTH    28  49   9.560
   POINT      52: OFFSET =      6.8418, STATION =  52457.8460
                  LOCAL TANGENT :  NORTH AZIMUTH    28  33  41.452
   POINT      53: OFFSET =     10.3642, STATION =  52435.6758
                  LOCAL TANGENT :  NORTH AZIMUTH    28  18  11.993
   POINT      54: OFFSET =     13.7869, STATION =  52413.4742
                  LOCAL TANGENT :  NORTH AZIMUTH    28   2  41.218
   POINT      55: OFFSET =     17.1094, STATION =  52391.2421
                  LOCAL TANGENT :  NORTH AZIMUTH    27  47   9.163
   POINT      56: OFFSET =     20.3317, STATION =  52368.9802
                  LOCAL TANGENT :  NORTH AZIMUTH    27  31  35.863
   POINT      57: OFFSET =     23.4535, STATION =  52346.6895
                  LOCAL TANGENT :  NORTH AZIMUTH    27  16   1.354
   POINT      58: OFFSET =     26.4748, STATION =  52324.3708
                  LOCAL TANGENT :  NORTH AZIMUTH    27   0  25.672
* E *NO OFFSET FOR  59
* E *NO OFFSET FOR  60
* E *NO OFFSET FOR  61
* E *NO OFFSET FOR  62
* E *NO OFFSET FOR  63
* E *NO OFFSET FOR  64
* E *NO OFFSET FOR  65
* E *NO OFFSET FOR  66
* E *NO OFFSET FOR  67
* E *NO OFFSET FOR  68
* E *NO OFFSET FOR  69
* E *NO OFFSET FOR  70
* E *NO OFFSET FOR  71
* E *NO OFFSET FOR  72
* E *NO OFFSET FOR  73
* E *NO OFFSET FOR  12

END/OF/JOB
JOB  85  2  IS COMPLETED AT 23:00:17
LAST FIGURE NUMBER USED=       4 MAXIMUM ALLOWED=     15
LAST POINT NUMBER USED=       73 MAXIMUM ALLOWED=    100

END/OF/RUN
END/OF/RUN - PROGRAM TERMINATED
```

Δ 6 57 25

T = 299.06

R = 4920

L = 600.26

NEW PC = 523+92.48
+ 1 99.06
521+93.42
+ 600.26
NEW PT = 527+93.68

EQUATION 525+92.23
+ 1 99.06
527+91.29

PT EQN ~~525+92.23 BK~~
= 527+93.68 BK
= 527+91.29 AH

```
    POINT      68: OFFSET =     -54.2830, STATION =   52533.0952
                   LOCAL TANGENT :  NORTH AZIMUTH    200  39  40.840
    POINT      69: OFFSET =     -54.9282, STATION =   52554.7765
                   LOCAL TANGENT :  NORTH AZIMUTH    201  24  59.211
    POINT      70: OFFSET =     -55.8684, STATION =   52576.4375
                   LOCAL TANGENT :  NORTH AZIMUTH    202  10  15.049
    POINT      71: OFFSET =     -57.0925, STATION =   52598.2733
                   LOCAL TANGENT :  NORTH AZIMUTH    202  43  16.000
    POINT      72: OFFSET =     -58.3950, STATION =   52620.6454
                   LOCAL TANGENT :  NORTH AZIMUTH    202  43  16.000
    POINT      73: OFFSET =     -59.6975, STATION =   52643.0175
                   LOCAL TANGENT :  NORTH AZIMUTH    202  43  16.000
    POINT      12: OFFSET =     -61.0000, STATION =   52665.3896
                   LOCAL TANGENT :  NORTH AZIMUTH    202  43  16.000

STATIONS/AND/OFFSETS  1 52112.62 (2)
    POINT       2: OFFSET =      -3.0365, STATION =   52492.3601
                   LOCAL TANGENT :  NORTH AZIMUTH    199  14  33.500

UNUSED/POINTS  (1-100)
 9  21  22  23  24  25  26  27  28  29  30  31
 32  33  34  35  36  37  38  39  40  41  42  43
 44  45  46  47  48  49  74  75  76  77  78  79
 80  81  82  83  84  85  86  87  88  89  90  91
 92  93  94  95  96  97  98  99  100

FIT/CURVE  14 2 18 21 23 22 4920
     POINT      21       N       10065.0565,  E       50054.7787
     POINT      23       N        7836.5530,  E       54441.1407
     POINT      22       N        9736.8830,  E       49902.9532

STORE/FIGURE  4 (13 21 C 23 R 22)
     FIGURE  4     :  13  21 C  23 R  22

STATIONS/AND/OFFSETS  4 52112.62 2
    POINT      14: OFFSET =      -4.3223, STATION =   52524.1601
                   LOCAL TANGENT :  NORTH AZIMUTH     29  20   1.586
    POINT      50: OFFSET =      -0.5017, STATION =   52502.0890
                   LOCAL TANGENT :  NORTH AZIMUTH     29   4  36.283
    POINT      51: OFFSET =       3.2197, STATION =   52479.9841
                   LOCAL TANGENT :  NORTH AZIMUTH     28  49   9.560
    POINT      52: OFFSET =       6.8418, STATION =   52457.8460
                   LOCAL TANGENT :  NORTH AZIMUTH     28  33  41.452
    POINT      53: OFFSET =      10.3642, STATION =   52435.6758
                   LOCAL TANGENT :  NORTH AZIMUTH     28  18  11.993
    POINT      54: OFFSET =      13.7868, STATION =   52413.4742
                   LOCAL TANGENT :  NORTH AZIMUTH     28   2  41.218
    POINT      55: OFFSET =      17.1094, STATION =   52391.2421
                   LOCAL TANGENT :  NORTH AZIMUTH     27  47   9.163
    POINT      56: OFFSET =      20.3317, STATION =   52368.9802
                   LOCAL TANGENT :  NORTH AZIMUTH     27  31  35.863
    POINT      57: OFFSET =      23.4535, STATION =   52346.6895
                   LOCAL TANGENT :  NORTH AZIMUTH     27  16   1.354
    POINT      58: OFFSET =      26.4748, STATION =   52324.3708
                   LOCAL TANGENT :  NORTH AZIMUTH     27   0  25.672
* E *NO OFFSET FOR  59
* E *NO OFFSET FOR  60
* E *NO OFFSET FOR  61
* E *NO OFFSET FOR  62
* E *NO OFFSET FOR  63
* E *NO OFFSET FOR  64
* E *NO OFFSET FOR  65
* E *NO OFFSET FOR  66
* E *NO OFFSET FOR  67
* E *NO OFFSET FOR  68
```

```
>>>   <<<
>>> JOB:

     POINT     63      N        9953.0144,  E       50044.0558
     POINT     64      N        9931.8754,  E       50036.6161
     POINT     65      N        9910.7364,  E       50029.1763
     POINT     66      N        9889.5973,  E       50021.7366
     POINT     67      N        9868.4583,  E       50014.2969
     POINT     68      N        9847.3193,  E       50006.8572
     POINT     69      N        9826.1802,  E       49999.4175
     POINT     70      N        9805.0412,  E       49991.9777
     POINT     71      N        9783.9022,  E       49984.5380
     POINT     72      N        9762.7631,  E       49977.0983
     POINT     73      N        9741.6241,  E       49969.6586
     POINT     12      N        9720.4851,  E       49962.2189

INVERSE/BEARINGS  13 1
     FROM     13 TO      1 S   15 45 51.000W          279.8629


STATIONS/AND/OFFSETS  1 (52392.48-279.86) 2
   POINT     14: OFFSET =    -75.0000, STATION =  52112.6200
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     50: OFFSET =    -73.5831, STATION =  52134.9852
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     51: OFFSET =    -72.1662, STATION =  52157.3503
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     52: OFFSET =    -70.7494, STATION =  52179.7155
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     53: OFFSET =    -69.3325, STATION =  52202.0807
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     54: OFFSET =    -67.9156, STATION =  52224.4458
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     55: OFFSET =    -66.4987, STATION =  52246.8110
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     56: OFFSET =    -65.0819, STATION =  52269.1761
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     57: OFFSET =    -63.6650, STATION =  52291.5413
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     58: OFFSET =    -62.2481, STATION =  52313.9065
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     59: OFFSET =    -60.8312, STATION =  52336.2716
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     60: OFFSET =    -59.4143, STATION =  52358.6368
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     61: OFFSET =    -57.9975, STATION =  52381.0020
               LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT     62: OFFSET =    -56.6154, STATION =  52403.0051
               LOCAL TANGENT :  NORTH AZIMUTH   196   7  50.258
   POINT     63: OFFSET =    -55.4888, STATION =  52424.6495
               LOCAL TANGENT :  NORTH AZIMUTH   196  53   4.009
   POINT     64: OFFSET =    -54.6569, STATION =  52446.3188
               LOCAL TANGENT :  NORTH AZIMUTH   197  38  20.887
   POINT     65: OFFSET =    -54.1202, STATION =  52468.0055
               LOCAL TANGENT :  NORTH AZIMUTH   198  23  39.953
   POINT     66: OFFSET =    -53.8789, STATION =  52489.7022
               LOCAL TANGENT :  NORTH AZIMUTH   199   9   0.265
   POINT     67: OFFSET =    -53.9332, STATION =  52511.4013
```

```
>>>   <<<
>>> JOB:

 **> COORDINATES CHANGED <**
     POINT      64 OLD  N        9923.2105,  E       50033.4805
                   NEW  N        9931.8754,  E       50036.6161
 **> COORDINATES CHANGED <**
     POINT      65 OLD  N        9902.0958,  E       50026.0017
                   NEW  N        9910.7364,  E       50029.1763
 **> COORDINATES CHANGED <**
     POINT      66 OLD  N        9880.9811,  E       50018.5229
                   NEW  N        9889.5973,  E       50021.7366
 **> COORDINATES CHANGED <**
     POINT      67 OLD  N        9859.8664,  E       50011.0441
                   NEW  N        9868.4583,  E       50014.2969
 **> COORDINATES CHANGED <**
     POINT      68 OLD  N        9838.7517,  E       50003.5653
                   NEW  N        9847.3193,  E       50006.8572
 **> COORDINATES CHANGED <**
     POINT      69 OLD  N        9817.6370,  E       49996.0865
                   NEW  N        9826.1802,  E       49999.4175
 **> COORDINATES CHANGED <**
     POINT      70 OLD  N        9796.5224,  E       49988.6077
                   NEW  N        9805.0412,  E       49991.9777
 **> COORDINATES CHANGED <**
     POINT      71 OLD  N        9775.4077,  E       49981.1289
                   NEW  N        9783.9022,  E       49984.5380
 **> COORDINATES CHANGED <**
     POINT      72 OLD  N        9754.2930,  E       49973.6501
                   NEW  N        9762.7631,  E       49977.0983
 **> COORDINATES CHANGED <**
     POINT      73 OLD  N        9733.1783,  E       49966.1713
                   NEW  N        9741.6241,  E       49969.6586

LIST/COORDINATES  2
     POINT      14      N       10248.9609,  E       50148.2118
     POINT      50      N       10227.8218,  E       50140.7721
     POINT      51      N       10206.6828,  E       50133.3324
     POINT      52      N       10185.5438,  E       50125.8927
     POINT      53      N       10164.4048,  E       50118.4530
     POINT      54      N       10143.2657,  E       50111.0132
     POINT      55      N       10122.1267,  E       50103.5735
     POINT      56      N       10100.9877,  E       50096.1338
     POINT      57      N       10079.8486,  E       50088.6941
     POINT      58      N       10058.7096,  E       50081.2544
     POINT      59      N       10037.5706,  E       50073.8146
     POINT      60      N       10016.4315,  E       50066.3749
     POINT      61      N        9995.2925,  E       50058.9352
     POINT      62      N        9974.1535,  E       50051.4955
```

>>> <<<
>>> JOB:

INVERSE/BEARINGS 14 17
FROM 14 TO 17 N 74 14 9.000W 150.0000

DIVIDE/LINE 14 12 25 50

> COORDINATES CHANGED <						
POINT	50	OLD	N	10218.8162,	E	50138.1839
		NEW	N	10227.8218,	E	50140.7721
> COORDINATES CHANGED <						
POINT	51	OLD	N	10197.7015,	E	50130.7051
		NEW	N	10206.6828,	E	50133.3324
> COORDINATES CHANGED <						
POINT	52	OLD	N	10176.5868,	E	50123.2263
		NEW	N	10185.5438,	E	50125.8927
> COORDINATES CHANGED <						
POINT	53	OLD	N	10155.4721,	E	50115.7474
		NEW	N	10164.4048,	E	50118.4530
> COORDINATES CHANGED <						
POINT	54	OLD	N	10134.3574,	E	50108.2686
		NEW	N	10143.2657,	E	50111.0132
> COORDINATES CHANGED <						
POINT	55	OLD	N	10113.2427,	E	50100.7898
		NEW	N	10122.1267,	E	50103.5735
> COORDINATES CHANGED <						
POINT	56	OLD	N	10092.1280,	E	50093.3110
		NEW	N	10100.9877,	E	50096.1338
> COORDINATES CHANGED <						
POINT	57	OLD	N	10071.0133,	E	50085.8322
		NEW	N	10079.8486,	E	50088.6941
> COORDINATES CHANGED <						
POINT	58	OLD	N	10049.8986,	E	50078.3534
		NEW	N	10058.7096,	E	50081.2544
> COORDINATES CHANGED <						
POINT	59	OLD	N	10028.7839,	E	50070.8746
		NEW	N	10037.5706,	E	50073.8146
> COORDINATES CHANGED <						
POINT	60	OLD	N	10007.6693,	E	50063.3958
		NEW	N	10016.4315,	E	50066.3749
> COORDINATES CHANGED <						
POINT	61	OLD	N	9986.5546,	E	50055.9170
		NEW	N	9995.2925,	E	50058.9352
> COORDINATES CHANGED <						
POINT	62	OLD	N	9965.4399,	E	50048.4382
		NEW	N	9974.1535,	E	50051.4955
> COORDINATES CHANGED <						
POINT	63	OLD	N	9944.3252,	E	50040.9593
		NEW	N	9953.0144,	E	50044.0558

```
>>>   <<<
>>> JOB:

     FROM     18 TO      8 N   67  16  44.000W          61.0000

INVERSE/BEARINGS  17 13
     FROM     17 TO     13 S   74  14   9.000E          75.0000

13 14
     FROM     13 TO     14 S   74  14   9.000E          75.0000

13 1
     FROM     13 TO      1 S   15  45  51.000W         270.4800

1 2
     FROM      1 TO      2 S   15  45  51.000W         100.0000

2 3
     FROM      2 TO      3 S   22  43  16.000W         100.0000

3 18
     FROM      3 TO     18 S   22  43  16.000W          73.1525

UNUSED/POINTS  (1-20)
 9  19  20

LOCATE/BEARING  19 14 (A 2 1)100
     POINT    19       N       10336.1697,  E       50172.8305

20 14 (A 2 1) 50
     POINT    20       N       10288.0503,  E       50159.2466

ARC/LINE/AZIMUTH  14 12 560.25 19 (A 1 2) 20
 **> COORDINATES CHANGED <**
     POINT    14 OLD   N       10239.9309,  E       50145.6627
              NEW   N       10248.9609,  E       50148.2118

INVERSE/BEARINGS  14 12
     FROM     14 TO     12 S   19  23  20.846W         560.2500

LOCATE/BEARING  13 14 (A 1 2 +90) 75
 **> COORDINATES CHANGED <**
     POINT    13 OLD   N       10260.3067,  E       50073.4836
              NEW   N       10269.3368,  E       50076.0327

17 13 (A 14 13) 75
 **> COORDINATES CHANGED <**
     POINT    17 OLD   N       10280.6826,  E       50001.3045
              NEW   N       10289.7126,  E       50003.8536
```

```
>>>   <<<
>>> JOB:


*JOB 85  2 USING FILE 3  AT 22:11:37
LAST FIGURE NUMBER USED=       3 MAXIMUM ALLOWED=     15
LAST POINT NUMBER USED=       73 MAXIMUM ALLOWED=    100

START/OF/JOB  85 2 3

INVERSE/BEARINGS  2 18
     FROM      2 TO     18 S   22  43  16.000W          182.2825

3 18
     FROM      3 TO     18 S   22  43  16.000W           82.2825

2 13
     FROM      2 TO     13 N   15  45  51.000E          370.4800

LOCATE/BEARING  8 6 (A 2 3) 53.86
 **> COORDINATES CHANGED <**
     POINT      8 OLD  N        9759.1856,  E       49846.1601
                NEW  N        9767.6071,  E       49849.6866

7 6 (A 2 1) 53.86
 **> COORDINATES CHANGED <**
     POINT      7 OLD  N        9877.9081,  E       49887.6028
                NEW  N        9869.1215,  E       49885.1224

BEARING/INTERSECT  18 2 (A 2 3) 8 (A 2 3 -90)
 **> COORDINATES CHANGED <**
     POINT     18 OLD  N        9735.6246,  E       49902.4263
                NEW  N        9744.0461,  E       49905.9527

LOCATE/BEARING  12 18 (A 8 18) 61
 **> COORDINATES CHANGED <**
     POINT     12 OLD  N        9712.0636,  E       49958.6924
                NEW  N        9720.4851,  E       49962.2189

INVERSE/BEARINGS  3 18
     FROM      3 TO     18 S   22  43  16.000W           73.1525

14 12
     FROM     14 TO     12 S   19  27   2.968W          550.8862

13 1
     FROM     13 TO      1 S   15  45  51.000W          270.4800

INVERSE/BEARINGS  18 8
```

```
>>>   <<<
>>> JOB:


STATIONS/AND/OFFSETS  4 52112.62 2
   POINT      14: OFFSET =    -75.0000, STATION =  52112.6200
                  LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT      50: OFFSET =    -73.5831, STATION =  52134.9852
                  LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
   POINT      51: OFFSET =    -72.1662, STATION =  52157.3503
```

```
                LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
POINT     53: OFFSET =    -69.3400, STATION =  52201.9603
                LOCAL TANGENT :  NORTH AZIMUTH   195  51  49.111
POINT     54: OFFSET =    -68.0121, STATION =  52224.0230
                LOCAL TANGENT :  NORTH AZIMUTH   196   7  14.061
POINT     55: OFFSET =    -66.7846, STATION =  52246.0969
                LOCAL TANGENT :  NORTH AZIMUTH   196  22  39.485
POINT     56: OFFSET =    -65.6575, STATION =  52268.1813
                LOCAL TANGENT :  NORTH AZIMUTH   196  38   5.346
POINT     57: OFFSET =    -64.6309, STATION =  52290.2753
                LOCAL TANGENT :  NORTH AZIMUTH   196  53  31.607
POINT     58: OFFSET =    -63.7048, STATION =  52312.3779
                LOCAL TANGENT :  NORTH AZIMUTH   197   8  58.231
POINT     59: OFFSET =    -62.8794, STATION =  52334.4883
                LOCAL TANGENT :  NORTH AZIMUTH   197  24  25.181
POINT     60: OFFSET =    -62.1546, STATION =  52356.6055
                LOCAL TANGENT :  NORTH AZIMUTH   197  39  52.419
POINT     61: OFFSET =    -61.5305, STATION =  52378.7288
                LOCAL TANGENT :  NORTH AZIMUTH   197  55  19.909
POINT     62: OFFSET =    -61.0072, STATION =  52400.8571
                LOCAL TANGENT :  NORTH AZIMUTH   198  10  47.612
POINT     63: OFFSET =    -60.5847, STATION =  52422.9897
                LOCAL TANGENT :  NORTH AZIMUTH   198  26  15.491
POINT     64: OFFSET =    -60.2630, STATION =  52445.1255
                LOCAL TANGENT :  NORTH AZIMUTH   198  41  43.508
POINT     65: OFFSET =    -60.0420, STATION =  52467.2638
                LOCAL TANGENT :  NORTH AZIMUTH   198  57  11.627
POINT     66: OFFSET =    -59.9220, STATION =  52489.4036
                LOCAL TANGENT :  NORTH AZIMUTH   199  12  39.810
POINT     67: OFFSET =    -59.9028, STATION =  52511.5440
                LOCAL TANGENT :  NORTH AZIMUTH   199  28   8.018
POINT     68: OFFSET =    -59.9844, STATION =  52533.6841
                LOCAL TANGENT :  NORTH AZIMUTH   199  43  36.215
POINT     69: OFFSET =    -60.1668, STATION =  52555.8231
                LOCAL TANGENT :  NORTH AZIMUTH   199  59   4.362
POINT     70: OFFSET =    -60.4501, STATION =  52577.9599
                LOCAL TANGENT :  NORTH AZIMUTH   200  14  32.423
POINT     71: OFFSET =    -60.8342, STATION =  52600.0938
                LOCAL TANGENT :  NORTH AZIMUTH   200  30   0.360
POINT     72: OFFSET =    -61.3191, STATION =  52622.2239
                LOCAL TANGENT :  NORTH AZIMUTH   200  45  28.134
POINT     73: OFFSET =    -61.9048, STATION =  52644.3492
                LOCAL TANGENT :  NORTH AZIMUTH   201   0  55.709
POINT     12: OFFSET =    -62.5912, STATION =  52666.4688
                LOCAL TANGENT :  NORTH AZIMUTH   201  16  23.048

STATIONS/AND/OFFSETS  4 52112.62 3
POINT     17: OFFSET =     75.0000, STATION =  52112.6200
                LOCAL TANGENT :  NORTH AZIMUTH   195  45  51.000
POINT      5: OFFSET =     70.9123, STATION =  52395.4508
                LOCAL TANGENT :  NORTH AZIMUTH   198   7   0.950
POINT      7: OFFSET =     61.9217, STATION =  52554.5132
                LOCAL TANGENT :  NORTH AZIMUTH   199  58   9.450
POINT      8: OFFSET =     59.3689, STATION =  52663.3482
                LOCAL TANGENT :  NORTH AZIMUTH   201  14  12.218
POINT     16: OFFSET =     60.7523, STATION =  52741.1336
                LOCAL TANGENT :  NORTH AZIMUTH   202   8  33.275

DIVIDE/ARC  7 15 8 6 80
     POINT     80      N       9851.9554,  E      49879.9512
     POINT     81      N       9834.8814,  E      49874.4838
     POINT     82      N       9817.9044,  E      49868.7219
     POINT     83      N       9801.0297,  E      49862.6672
     POINT     84      N       9784.2622,  E      49856.3214
```

MIN DIST NEW ℄ TO LEFT ROW = 59.90

```
STATIONS/AND/OFFSETS  4 52112.62 (5 7 80 81 82 83 84 8 16)
   POINT      5: OFFSET =     70.9123, STATION =  52395.4508
                 LOCAL TANGENT :  NORTH AZIMUTH   198   7   0.950
   POINT      7: OFFSET =     61.9217, STATION =  52554.5132
                 LOCAL TANGENT :  NORTH AZIMUTH   199  58   9.450
   POINT     80: OFFSET =     60.8865, STATION =  52572.6376
                 LOCAL TANGENT :  NORTH AZIMUTH   200  10  49.292
   POINT     81: OFFSET =     60.0950, STATION =  52590.7712
                 LOCAL TANGENT :  NORTH AZIMUTH   200  23  29.518
   POINT     82: OFFSET =     59.5475, STATION =  52608.9115
                 LOCAL TANGENT :  NORTH AZIMUTH   200  36  10.027
   POINT     83: OFFSET =     59.2439, STATION =  52627.0560
                 LOCAL TANGENT :  NORTH AZIMUTH   200  48  50.715
   POINT     84: OFFSET =     59.1844, STATION =  52645.2024
                 LOCAL TANGENT :  NORTH AZIMUTH   201   1  31.480
   POINT      8: OFFSET =     59.3689, STATION =  52663.3482
                 LOCAL TANGENT :  NORTH AZIMUTH   201  14  12.218
   POINT     16: OFFSET =     60.7523, STATION =  52741.1336
                 LOCAL TANGENT :  NORTH AZIMUTH   202   8  33.275
```

MIN DIST NEW ℄ TO RIGHT ROW = 59.18

Queen Creek Rd. to Germain R return

WS-93A
12-12-56

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WASHINGTON

JOB NO._____

TRANSIT TRAVERSE COMPUTATION SHEET

TRAVERSE OF_____ SECTION_____ SHEET NO. 1 OF____

PARTY_____ CHIEF_____ CALCULATED BY_____ DATA_____ CHECKED BY_____ DATE_____

STATION	DISTANCE	ANGLE LEFT	ANGLE RIGHT	BEARING	COSINE	SINE	LATITUDE N	LATITUDE S	DEPARTURE E	DEPARTURE W	CO-ORDINATES LATITUDE	CO-ORDINATES DEPARTURE
	2009.30			N 30°27'58"E	.861929	.507029	1731.87		1018.77		823,293.01 / 825,024.88	558,435.55 / 559,454.32
	249.54			"	.861929	.507029	215.10		126.53		825,239.98 / 825,454.88	559,580.85
	249.56			N 48°13'26"E	.666222	.745754	166.26		186.11		825,406.24 / 825,693.14	559,766.96
	522.07			N 48°13'26"E			347.81		389.34		825,754.05 / 826,041.95	560,156.30
	1134.49			"			755.82		846.05		826,509.87 / 826,796.77	561,002.35
	260.39			"			173.48		194.19		826,683.35 / 826,970.25	561,196.54
	260.39			N 25°52'54"E	.899189	.437560	234.14		113.94		826,917.49 / 827,204.39	561,310.48
	1460.73			N 25°52'54"E			1313.47		639.16		828,230.96 / 828,517.86	561,949.64
	216.04			"			194.24		94.53		828,425.20 / 828,712.10	562,044.17
	216.04			N 62°27'22"E	.462428	.886657	99.90		191.55		828,525.12 / 828,812.02	562,235.72
	150.22			"			69.47		133.19		828,594.59 / 828,881.49	562,368.91

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12-12-56

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WASHINGTON

JOB NO._____

TRANSIT TRAVERSE COMPUTATION SHEET

TRAVERSE OF_____ SECTION _____ SHEET NO. 2 OF ____

PARTY_____ CHIEF_____ CALCULATED BY_____ DATA_____ CHECKED BY_____ DATE_____

STATION	DISTANCE	ANGLE LEFT	ANGLE RIGHT	BEARING	COSINE	SINE	LATITUDE N	LATITUDE S	DEPARTURE E	DEPARTURE W	CO-ORDINATES LATITUDE	CO-ORDINATES DEPARTURE
	220.98			N 89°21'44"E	.011131	0.999938	2.46		220.97		828,594.59	562,368.9
											828,597.05	562,589.8
	184.83			"			2.06		184.82			
											828,599.11	562,774.70
	258.00			N 89°15'50"E	.012847	.999917	3.31		257.98			
											828,602.42	563,032.6
	742.38			S 62°27'22"W	.462428	.886657	~~343~~	343.30		658.24		
											828,259.12	562,374.4
	117.09			"				54.15		103.82		
											828,204.97	562,270.6
	117.09			S 25°56'54"W	.899189	.437560		105.29		51.23		
											828,099.68	562,219.39
	1460.73			"				1313.47		639.16		
											826,786.21	561,580.23
	319.45			"				287.25		139.78		
											826,498.96	561,440.45
	319.45			S 48°13'26"W	0.666222	0.745754		212.82		238.23		
											826,286.14	561,202.2
	1401.31			"				933.58		1045.03		
											825,352.56	560,157.19
	255.25			"				170.05		190.35		
											825,182.51	559,966.84

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12-12-56

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WASHINGTON

JOB NO._____

TRANSIT TRAVERSE COMPUTATION SHEET

TRAVERSE OF_____ SECTION_____ SHEET NO. 3 OF____

PARTY_____ CHIEF_____ CALCULATED BY_____ DATA_____ CHECKED BY_____ DATE_____

STATION	DISTANCE	ANGLE LEFT	ANGLE RIGHT	BEARING	COSINE	SINE	LATITUDE N	LATITUDE S	DEPARTURE E	DEPARTURE W	CO-ORDINATES LATITUDE	CO-ORDINATES DEPARTURE
	202.69			S 48°13'26"W	.666222	.745754		135.64		151.16	825,182.51 825,047.47	559,966.84 559,815.6
	202.69			S 30°27'58"W	.861929	.507029		174.70		102.77	824,872.77	559,712.9
	1833.28			"	"	"		1580.16		929.53	823,292.61	558,783.3
	231.88			N 89°56'09"W	.001120	.999999	0.26			231.88	823,292.87	558,551.5
	115.94			N 89°56'09"W	"	"	0.13			115.94	823,293.00	558,435.5

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12-12-56

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WASHINGTON

JOB NO._____

TRANSIT TRAVERSE COMPUTATION SHEET

TRAVERSE OF Traverse Germain Rd to Pecos Rd & Return SECTION _____ SHEET NO. 1 OF ____

PARTY_____ CHIEF_____ CALCULATED BY_____ DATA_____ CHECKED BY_____ DATE_____

STATION	DISTANCE	ANGLE LEFT	ANGLE RIGHT	BEARING	COSINE	SINE	LATITUDE N	LATITUDE S	DEPARTURE E	DEPARTURE W	CO-ORDINATES LATITUDE	CO-ORDINATES DEPARTURE
	820.26			N 62°27'22"E	.462428	.886657	379.31		727.29		828,594.59	562,368.91
											828,923.90	563,096.2
	235.67			"			108.98		208.96		829,082.88	563,305.1
	235.67			N 28°29'17"E	.878917	.476976	207.13		112.41		829,290.01	563,417.5
	2270.95			"			1995.98		1083.19		831,285.99	564,500.7
	327.34			"			287.70		156.13		831,573.69	564,656.89
	202.63			"			178.09		96.65		831,751.78	564,753.5
	202.63			N 42°02'34"E	.742645	.669685	150.48		135.70		831,902.26	564,889.2
	689.61			"			512.14		461.82		832,414.40	565,351.0
	2137.53			"			1587.43		1431.47		834,001.83	566,782.5
	135.57			N 89°34'24"E	.007447	.999972	1.01		135.57		834,002.84	566,918.1
	271.14			"			2.02		271.13		834,004.86	567,189.23

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12-12-56

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WASHINGTON

JOB NO._____

TRANSIT TRAVERSE COMPUTATION SHEET

TRAVERSE OF_____ SECTION_____ SHEET NO. 2 OF____

PARTY_____ CHIEF_____ CALCULATED BY_____ DATA_____ CHECKED BY_____ DATE_____

STATION	DISTANCE	ANGLE LEFT	ANGLE RIGHT	BEARING	COSINE	SINE	LATITUDE N	LATITUDE S	DEPARTURE E	DEPARTURE W	CO-ORDINATES LATITUDE	CO-ORDINATES DEPARTURE
	2736.47			S 42°02'34"W	.742645	.669685		2032.23		1832.57	834,004.86	562,189.23
											831,972.63	565,356.0
	365.27			"				271.27		244.62		
											831,701.36	565,112.0
	166.97			"				124.00		111.82		
											831,577.36	565,000.2
	166.97			S 28°29'17"W	.879917	.476976		146.75		79.64		
											831,430.61	564,920.5
	2441.00			"				2145.44		1164.30	829,146.93	563,681.26
	2598.29							2283.68		1239.32	829,285.17	563,756.2
	321.29			"				282.66		156.11	828,859.27	563,525.1
											828,997.51	563,600.1
	327.29			S 62°27'22"W	.462428	.886657		151.35		290.19	828,707.92	563,234.9
											828,846.16	563,309.9
	228.10			"				105.48		202.25	828,602.44	563,032.71
											828,740.68	563,107.73
	258.00			S 89°15'30"W	.012847	.999917		3.31		257.98	828,599.13	562,774.23
											828,737.37	562,849.7
	184.83			S 89°21'44"W	.011131	.999938		2.06		184.82	828,597.07	562,589.9
											828,735.00	562,664.9
	220.78			"				2.46		220.97	828,594.61	562,368.96
											828,732.16	562,443.9

Traverse Pecos Rd Co NE¼ NE¼ Sec. 35.

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12-12-56

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WASHINGTON

JOB NO._____

TRANSIT TRAVERSE COMPUTATION SHEET

TRAVERSE OF_____ SECTION_____ SHEET NO. 1 OF ____

PARTY_____ CHIEF_____ CALCULATED BY_____ DATA_____ CHECKED BY_____ DATE_____

STATION	DISTANCE	ANGLE LEFT	ANGLE RIGHT	BEARING	COSINE	SINE	LATITUDE N	LATITUDE S	DEPARTURE E	DEPARTURE W	CO-ORDINATES LATITUDE	CO-ORDINATES DEPARTURE
											834,001.83	566,782.5
	945.71			N 42°04'25"E	.742285	.670685	701.99		633.71		834,703.82	567,416.2
	282.64			N41°54'34"E	.744201	.667955	210.34		188.79		834,914.16	567,605.0
	720.49			N 41°59'39"E	.743213	.669055	535.48		482.65		835,449.64	568,087.6
	181.35			"	"	"	134.78		121.33		835,584.42	568,208.4
	181.35			N19°52'08"E	.940473	.339869	170.55		61.64		835,754.97	568,270.0
	2668.91			"	"	"	2507.22		906.06		838,262.19	569,176.11
	173.85			"	"	"	163.50		59.09		838,425.69	569,2352
	455.72			S 0°38'52"E	.999936	.011306	~~455.69~~	455.69	5.15		837,970.00	569,2403
	149.51			N89°38'04"E	.006380	.999980	0.95		149.51		837,970.95	569,389.8
	1402.88			S 19°52'08"W	.940473	.339869	~~1319.37~~	1319.37		476.80	836,651.58	568,913.0
	1061.78			"	"	"		998.58		360.87	835,653.00	568,552.19
	240.01			"	"	"		225.72		81.57	835,427.28	568,470.62

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WASHINGTON

JOB NO._____

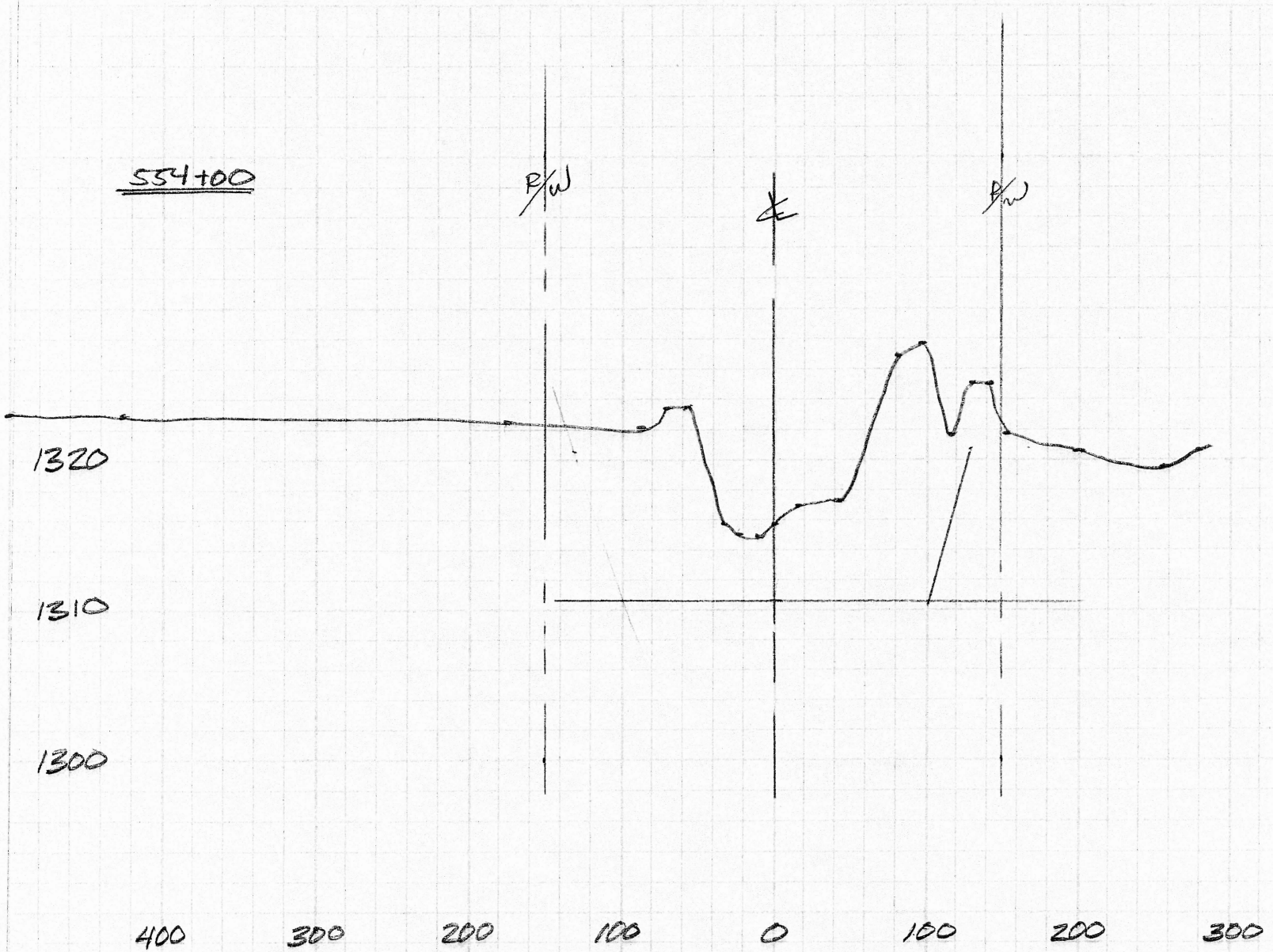
TRANSIT TRAVERSE COMPUTATION SHEET

TRAVERSE OF_____ SECTION_____ SHEET NO. 2 OF____

PARTY_____ CHIEF_____ CALCULATED BY_____ DATA_____ CHECKED BY_____ DATE_____

STATION	DISTANCE	ANGLE LEFT	ANGLE RIGHT	BEARING	COSINE	SINE	LATITUDE N	LATITUDE S	DEPARTURE E	DEPARTURE W	CO-ORDINATES LATITUDE	CO-ORDINATES DEPARTURE
	240.01			S41°59'39"W	.743213	.669055		178.38		160.58	835,427.28	568,470.62
											835,248.90	568,310.04
	524.59			S41°59'39"W	"	"		391.37		352.32		
											834,857.53	567,957.72
	165.53			S42°12'05"W	.740788	.671739		122.62		111.19		
											834,734.91	567,846.53
	282.60			S41°54'34"W	.744201	.667955		210.31		188.76		
											834,524.60	567,657.77
	699.79			S42°04'25"W	.742285	.670085		519.44		468.92		
											834,005.16	567,188.85
	406.68			S89°34'24"W	.007447	.999972		3.03		406.67		
											834,002.13	566,782.18

ARIZONA DT 12/3/84 RWCB REACH 1
CROSS SECTION

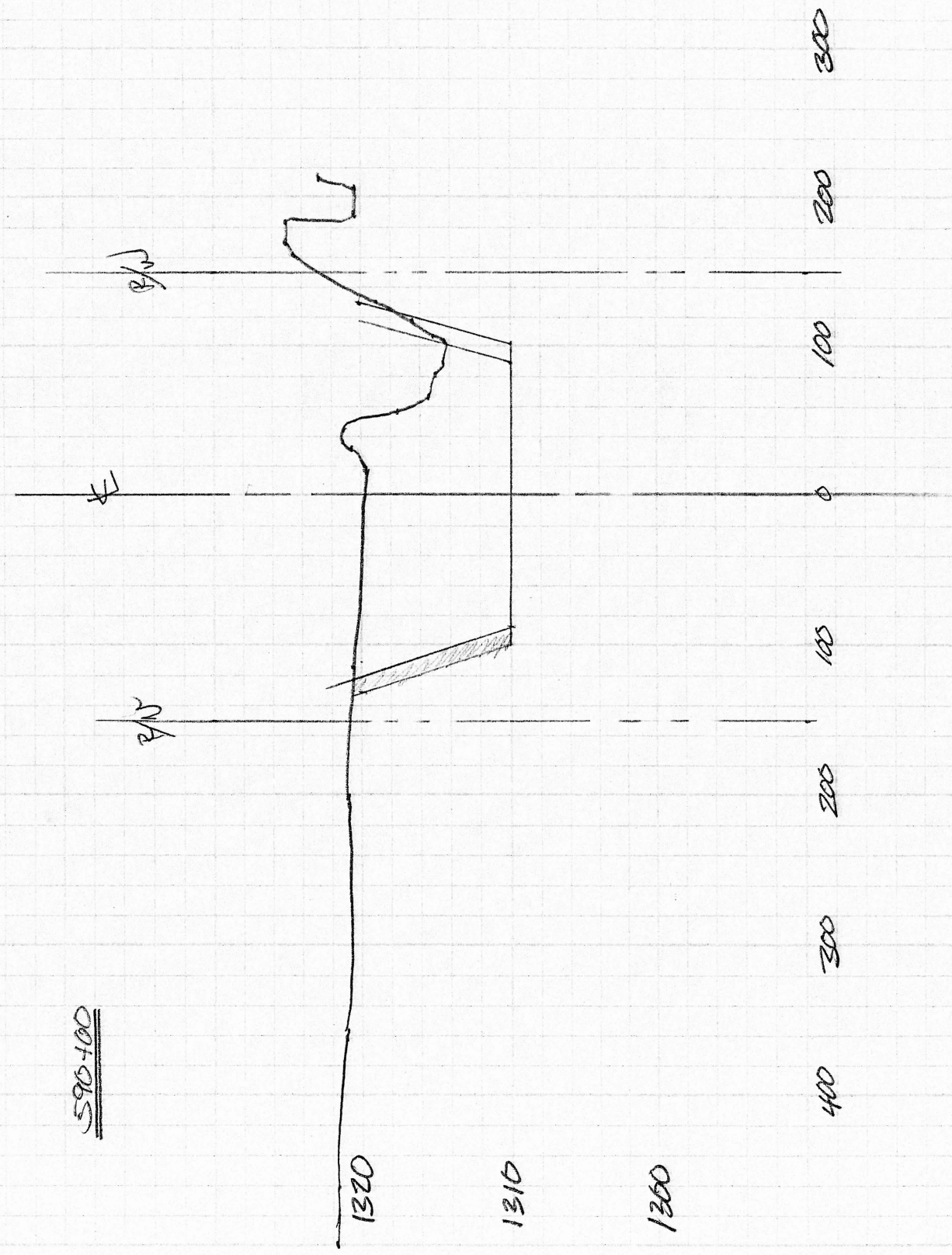


ARIZONA

DT 12/3/84

CROSS SECTION

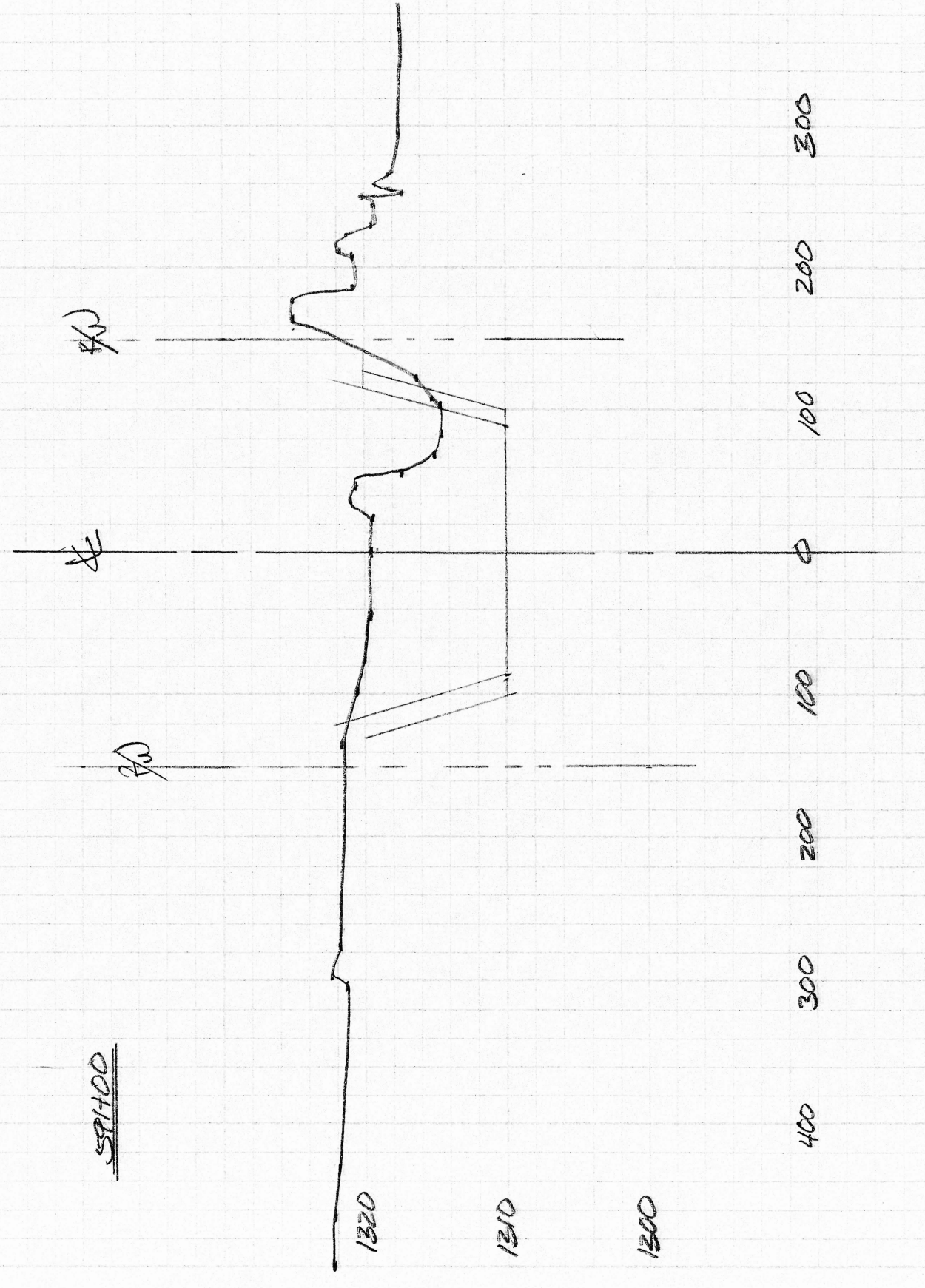
RWQD REACH 4

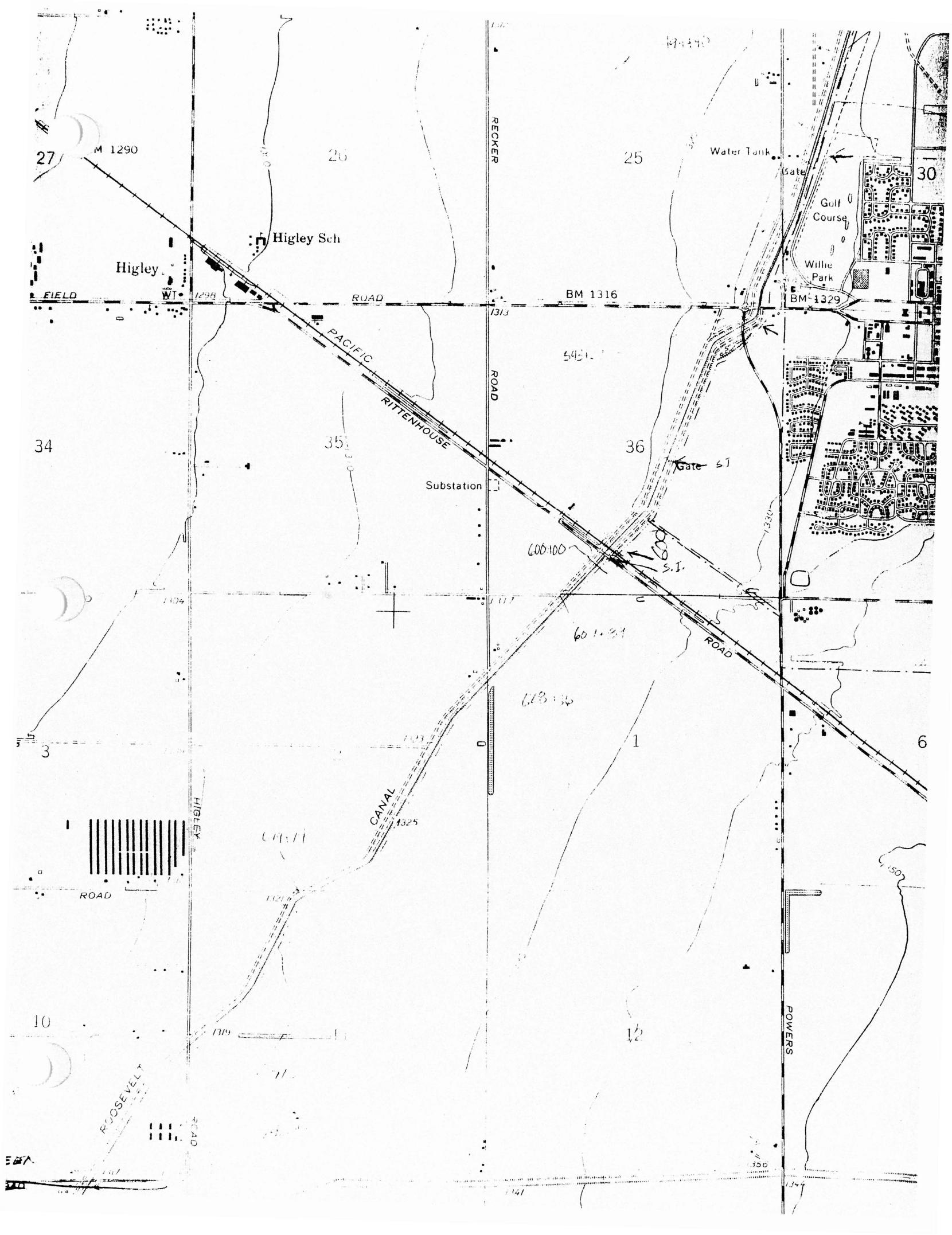


ARIZONA RWCD R4

DT 12/3/84

CROSS SECTION




M 1290
27
26
25
30
RECKER
Water Tank
Gate
Golf Course
Higley Sch
Higley
Willie Park
FIELD
WI
ROAD
BM 1316
BM 1329
PACIFIC
RITTENHOUSE
ROAD
34
35
36
Substation
Gate
600100
S.T.
ROAD
3
1
6
HIGLEY
CANAL
ROAD
10
12
POWERS
ROOSEVELT
ROAD

ARIZ. RWCD RH

DT 1/15/25

LAYOUT POWERLINE ELEVATIONS 1

— CORRELATE POWERLINE AS BUILTS TO REACH & ALIGNMENT.

POWERLINE
EOP
AT END OF RR : 467+50 EL 1323.00
464+00

350
× 0.00296
1.036 + 1.036

EL 1324.04

RWCD DRAWS

AT 463+50

50
0.00296
0.148 + 0.148

POWERL STA 463+50 INV EL 1324.19
RWCD 1324.5

CHANNEL BOTTOM

Δ = + 0.3 FT

AT 462+75

125
0.00296
0.37 1324.04 + .37

1324.41

TOP OF DIKE = 1324.41 + 7.5 = 1331.9
RWCD 1332.5

TOP OF DIKE Δ ≈ + 0.6

ARIZ
DT
LAYOUT JCT @ POWERLINE

2/14/05

RNCO R4

TANGENT OFFSET ℄

R=653.8000
D=8.4549
DELTA=49.1743
T=300
L=562.5224

PT=662.5224
PI=400.0004
PC=100.0000

CO=0.0000
CD=0.0000
STA=100.0000

TO=0.4779
TD=24.9939
STA=125.0000

TO=1.9110
TD=49.9513
STA=150.0000

TO=4.2971
TD=74.8356
STA=175.0000

TO=7.6327
TD=99.6106
STA=200.0000

TO=11.9130
TD=124.2399
STA=225.0000

TO=17.1318
TD=148.6875
STA=250.0000

TO=23.2813
TD=172.9178
STA=275.0000

TO=30.3526
TD=196.8953
STA=300.0000

TO=38.3354
TD=220.5850
STA=325.0000

TO=47.2179
TD=243.9521
STA=350.0000

TO=56.9673
TD=266.9626
STA=375.0000

TO=67.6292
TD=289.5028
STA=400.0000

TO=79.1280
TD=311.7797
STA=425.0000

TO=91.4670
TD=333.5207
STA=450.0000

TO=104.6281
TD=354.7742
STA=475.0000

TO=118.5921
TD=375.5090
STA=500.0000

TO=133.3386
TD=395.6948
STA=525.0000

TO=148.9459
TD=415.3021
STA=550.0000

TO=165.0915
TD=434.3022
STA=575.0000

TO=182.0515
TD=452.6674
STA=600.0000

TO=199.7012
TD=470.3708
STA=625.0000

TO=218.0148
TD=487.3866
STA=650.0000

TO=227.4292
TD=495.6434
PT=662.5224

ARIZONA RWCO R4

D.T. 2/14/85

JCT @ POWERLINE

TANGENT OFFSET (INSIDE BOTTOM)

9.8991°D

* —

* —

DELTA=49.1748 —

* L=497.9932

PT=597.9932
PI=365.5862
PC=100.0000

TO=0.0000
TD=0.0000
STA=100.0000

TO=0.5398
TD=24.9922
STA=125.0000

TO=2.1583
TD=49.9378
STA=150.0000

TO=4.8524
TD=74.7903
STA=175.0000

TO=8.6171
TD=99.5032
STA=200.0000

TO=13.4454
TD=124.0306
STA=225.0000

TO=19.3282
TD=148.3266
STA=250.0000

TO=26.2547
TD=172.3459
STA=275.0000

TO=34.2118
TD=196.0437
STA=300.0000

TO=43.1858
TD=219.3758
STA=325.0000

TO=53.1568
TD=242.2980
STA=350.0000

TO=64.1094
TD=264.7697
STA=375.0000

TO=76.0220
TD=286.7460
STA=400.0000

TO=88.8725
TD=308.1890
STA=425.0000

TO=102.6368
TD=329.0564
STA=450.0000

TO=117.2894
TD=349.3099

TD=368.9118
STA=500.0000

TO=149.1482
TD=387.8257
STA=525.0000

TO=166.2950
TD=406.0160
STA=550.0000

TO=184.2112
TD=423.4491
STA=575.0000

TO=201.3399
TD=438.7862
PT=597.9932