ENGINEERING

PLANNING

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STORM WATER DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
COOL SPRINGS INDUSTRIAL- O'FALLON, MO
BAX PROJECT NO. **04-13117A**
August 8, 2006 – CALCULATIONS PERFORMED ON AS-BUILT BASIN AND
STRUCTURE

INTRODUCTION:

The presently undeveloped tract of land is located in the City of O'Fallon, Missouri. A dry
detention basin is proposed off site to the south of Cool Springs Industrial Drive. The proposed
basin has been sized to accommodate the proposed development and possible future
development on the same tract of land, which the proposed basin will be created on. The storage
volume and outflow rate shall be proportioned to insure that the peak rate of runoff leaving the
site under post-developed conditions is less than or equal to the peak rate of runoff leaving the
site under pre-developed conditions for the 2, 15, 25 and 100 Year – 20 Minute design storms for
the proposed site. The detention facility was also analyzed for safe passage of the 100 Year - 20
Minute duration design storms under an emergency situation.

GENERAL SITE DATA AND RUNOFF CALCULATIONS:

The pre-developed P.I. factors to be used for the analysis are:

2 year	0-5%	Impervious	1.15	cfs/ac
15 year	0-5%	Impervious	1.87	cfs/a
25 year	0-5%	Impervious	2.31	cfs/ac
100 year	0-5%	Impervious	2.95	cfs/ac

The post-developed P.I. factors to be used for the analysis are:

2 year	100%	Impervious	2.39	cfs/ac
15 year	100%	Impervious	3.85	cfs/ac
25 year	100%	Impervious	4.75	cfs/ac
100 year	100%	Impervious	6.08	cfs/ac

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CAL/CLH

TIME OF CONCENTRATION:

Of the inflows to the basin, the approximate flow path used will start at the northwest corner of the property. It will flow southeast toward inlet 152. From CI 152, it will flow via storm sewer into the basin. Time of concentration is estimated as follows:

T(overland):   L = 381 feet

Elevation difference = 9.66' feet
T(overland) = 3.2 minutes: See Figure 1

T(pipe) = 410' @ 7 fps = 58.57 sec = .98 min

Total time = 3.2 min. + .98 min. = 4.18 min => **use 4 min.**

REQUIRED ATTENUATION: (20 minute storms)

The Required Attenuation can be found by subtracting the existing runoff rate from the proposed runoff rate for the developed portion of the site. Since the offsite water will remain constant in the pre-developed and post-developed run off rates, it can be left out of this calculation.

PRE-DEVELOPED Q
1.25 Ac + 2.84 Ac + 7.32 Ac = 11.41 Ac
0-5% IMPERVIOUS

AREA	X PI FACTOR	=	FLOW	
Acres	cfs/Ac.		cfs	
11.41	1.15		13.12	2 YR
11.41	1.87		21.34	15 YR
11.41	2.31		26.36	25 YR
11.41	2.95		33.66	100 YR

POST-DEVELOPED Q
0-5% IMPERVIOUS
7.32 Ac.-2.07 Ac. = 5.25 Ac.

AREA	X PI FACTOR	=	FLOW	
Acres	cfs/Ac.		cfs	
5.25	1.15		6.04	2 YR
5.25	1.87		9.82	15 YR
5.25	2.31		12.13	25 YR
5.25	2.95		15.49	100 YR

100% IMPERVIOUS

1.25 Ac + 2.84 Ac + 2.07Ac = 6.16 Ac

AREA	X PI FACTOR	=	FLOW	
Acres	cfs/Ac.		cfs	
6.16	2.39		14.72	2 YR
6.16	3.85		23.72	15 YR
6.16	4.75		29.26	25 YR
6.16	6.08		37.45	100 YR

0-5% cfs		100% cfs		TOTAL cfs	
6.04	+	14.72	=	20.76	2 YR
9.82	+	23.72	=	33.53	15 YR
12.13	+	29.26	=	41.39	25 YR
15.49	+	37.45	=	52.94	100 YR

POST DEV Q	-	PRE DEV Q	=	REQ. ATTENUATION
cfs		cfs		cfs
20.76	-	13.12	=	7.64
33.53	-	21.34	=	12.20
41.39	-	26.36	=	15.03
52.94	-	33.66	=	19.28

BASIN PEAK INFLOWS:

Inflows to the basin have been estimated from the drainage area map included in the construction plans.

FLOW TO BASIN

0-5% IMPERVIOUS

11.74 Ac. + 1.83 Ac. = 13.57 Ac.

AREA	X PI FACTOR	=	FLOW	
13.57	1.15		15.61	2 YR
13.57	1.87		25.38	15 YR
13.57	2.31		31.35	25 YR
13.57	2.95		40.03	100 YR

100% IMPERVIOUS

3.88 Ac. + 0.27 Ac. + 0.30 Ac. + 2.07 Ac. = 6.52 Ac.

AREA	X	PI FACTOR	=	FLOW	
Acres		cfs/Ac.		cfs	
6.52		2.39		15.58	2 YR
6.52		3.85		25.10	15 YR
6.52		4.75		30.97	25 YR
6.52		6.08		39.64	100 YR

0-5% cfs		100% cfs		TOTAL FLOW TO BASIN cfs	
15.61	+	15.58	=	31.19	2 YR
25.38	+	25.10	=	50.48	15 YR
31.35	+	30.97	=	62.32	25 YR
40.03	+	39.64	=	79.67	100 YR

PERMITTED RELEASE RATE:

The permitted release rate of the basin was found by subtracting the required attenuation from the peak inflow to the basin for each design storm:

TOTAL FLOW TO BASIN	-	REQ. ATTEN.	=	PERMITTED RELEASE RATE
cfs		cfs		cfs
31.19	-	7.64	=	23.55
50.48	-	12.20	=	38.28
62.32	-	15.03	=	47.29
79.67	-	19.28	=	60.39

STORM ROUTING CALCULATIONS AND RESULTS:

A computer program was used in routing the 2, 15, 25 and 100 Year Design storms through the basin. As found in the routing calculations, the results are as follows:

20 MIN STORM	PEAK INFLOW	PERMITTED RELEASE RATE	CALCULATED RELEASE RATE	PEAK ELEVATION
	cfs	cfs	cfs	ft
2 YR	31.19	23.55	22.48	472.73
15 YR	50.48	38.28	34.21	473.62
25 YR	62.32	47.29	46.41	474.30
100 YR	79.67	60.39	60.25	474.93

SEDIMENT VOLUME CALCULATIONS:

The basin shall be analyzed to accommodate 2 years of sediment storage.

- The drainage area to the basin = 20.15 acres
- Rational Method runoff coefficient 'c' = 0.6
- Annual sediment storage volume (from figure 2) = 120 cf/ac
- The sediment storage and volume required =

    2 yrs of sediment storage = 20.15 acres (120 cf/ac/year)(2 years) = **4,836** cf
    Additional storage of 4,836 cf can be accommodated between the 100 year high-water and elevation 475.11

    ft

SUMMARY:

2 Year – 20 MINUTE HIGH-WATER	472.73 ft.
15 Year - 20 MINUTE HIGH-WATER	473.62 ft.
25 Year – 20 MINUTE HIGH-WATER	474.30 ft.
100 Year - 20 MINUTE HIGH-WATER	474.93 ft.
100 Year – 20 MINUTE LOW FLOW BLOCKED HIGH WATER	476.51 ft.
LOW FLOW SLOT	21" W x 24" H
LOW FLOW SLOT ELEVATION	469.11
UPPER FLOW SLOT	36" W x 24.5" H
UPPER FLOW SLOT ELEVATION	472.51 ft
EMERGENCY OVERFLOW SILL ELEVATION	475.11 ft
TOP OF BERM	478.00 ft
FREEBOARD	1.68 ft

TIME OF CONCENTRATION FOR SMALL DRAINAGE BASINS

EXAMPLE
Height = 100 Ft.
Length = 3,000 Ft.
Time of concentration = 14 Min.

Notes:
Use nomograph T_c for natural basins with well-defined channels, for overland flow on bare earth, and for mowed grass road side channels.
For overland flow, grass surfaces multiply T_c by 2.0
For overland flow, concrete or asphalt surfaces multiply T_c by 0.4
For overland flow, concrete channels multiply TC by 0.2
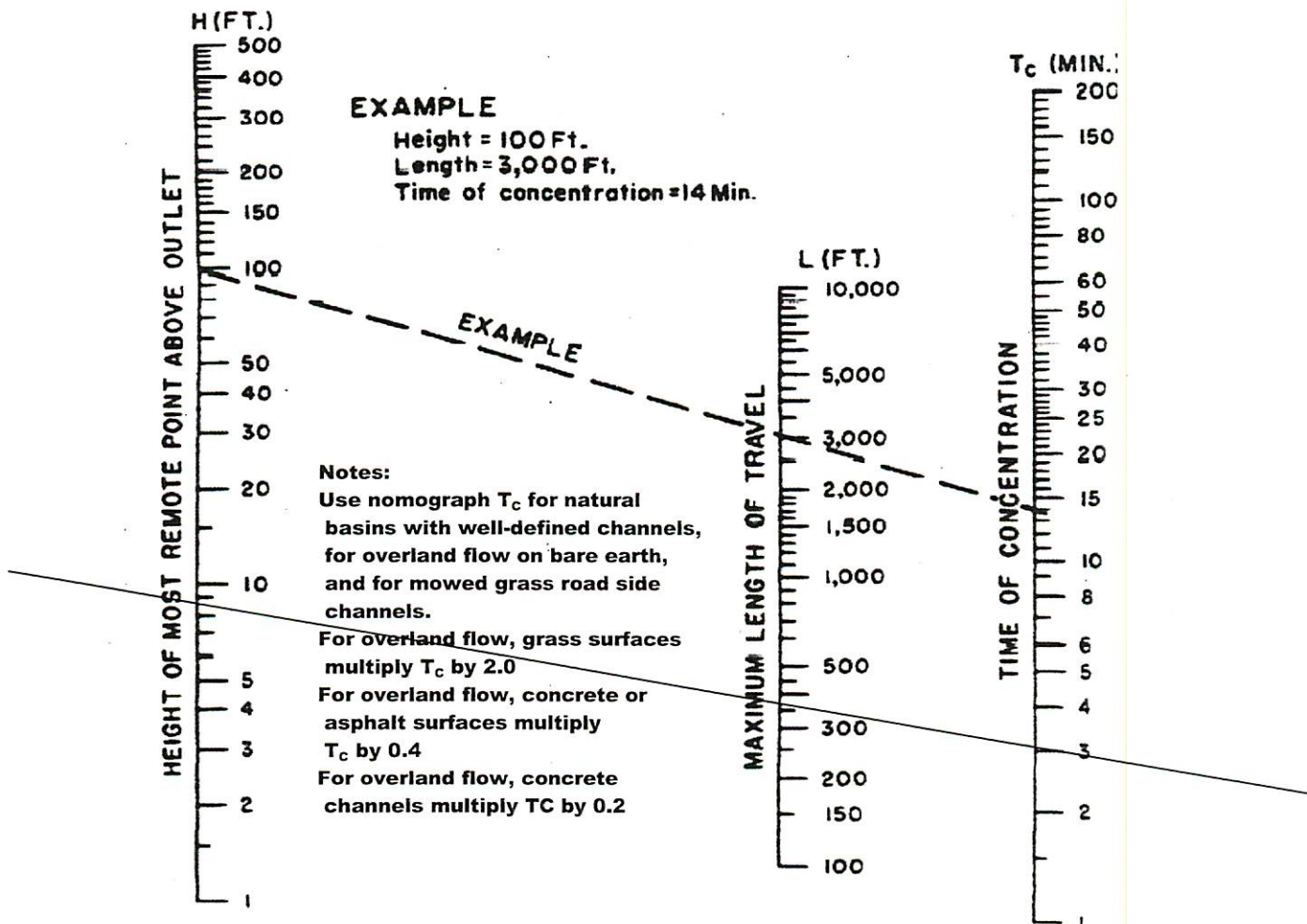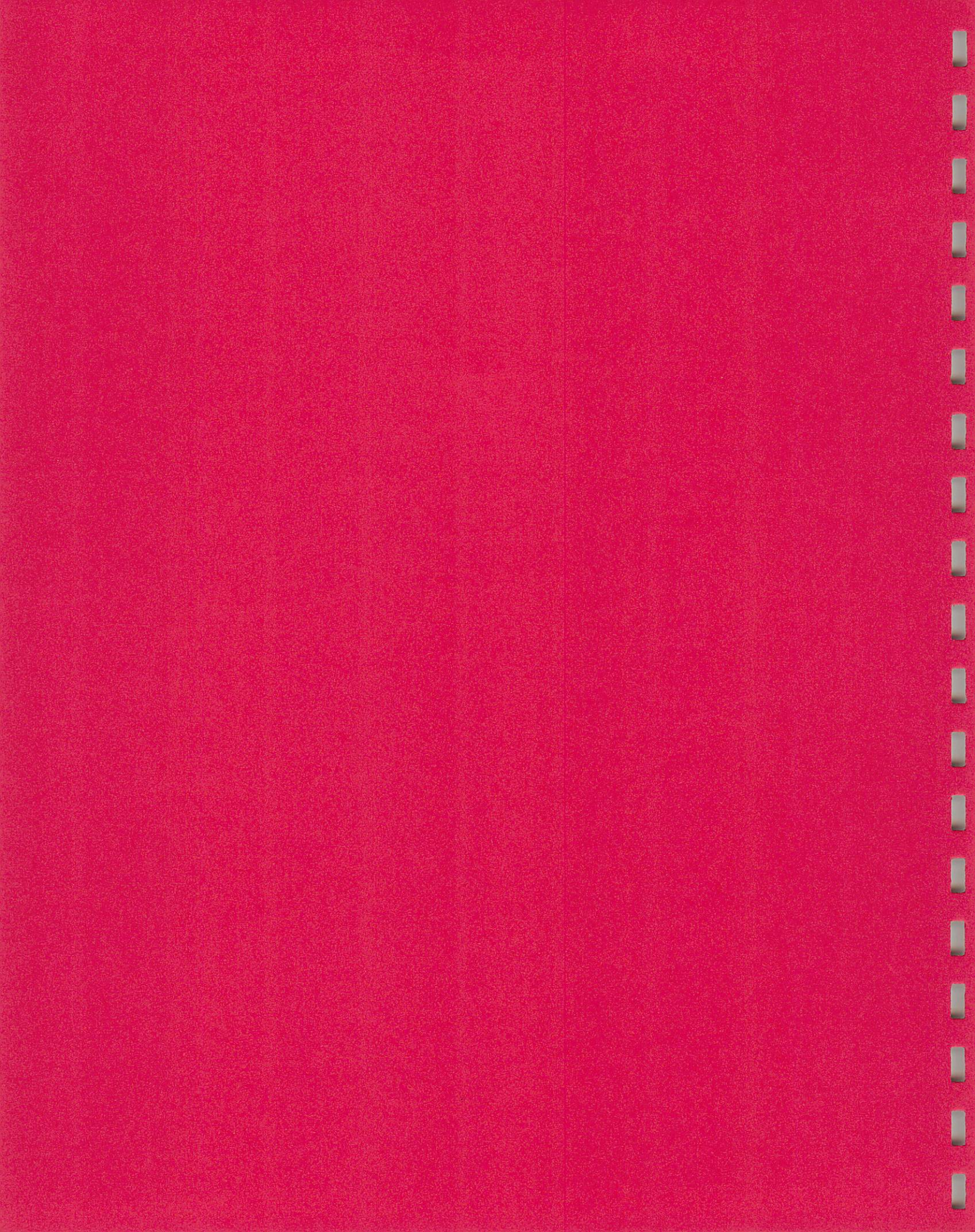
FIGURE 1

Of the inflows to the basin, the approximate flow path used will start at the northwest corner of the property. It will flow southeast toward inlet 152. From CI 152, it will flow via storm sewer into the basin. Time of concentration is estimated as **4 minutes**.

STRUCTURE DETAILS

TRASH GRATE
#5 BARS AT 6" CENTERS
BOLT TO BARREL IN
BOTH DIRECTIONS
ELEV. 475.11

STRUCTURE TO BE
WRAPPED WITH
FILTER FABRIC FOR
SEDIMENT CONTROL.

SILL 472.51

3'   2.05'

60" PRECAST
CONCRETE
STANDPIPE

48" R.C.P.
OUTLET PIPE
TO F.E. 100
FL = 468.94

1.75'

2'

SILL 469.11

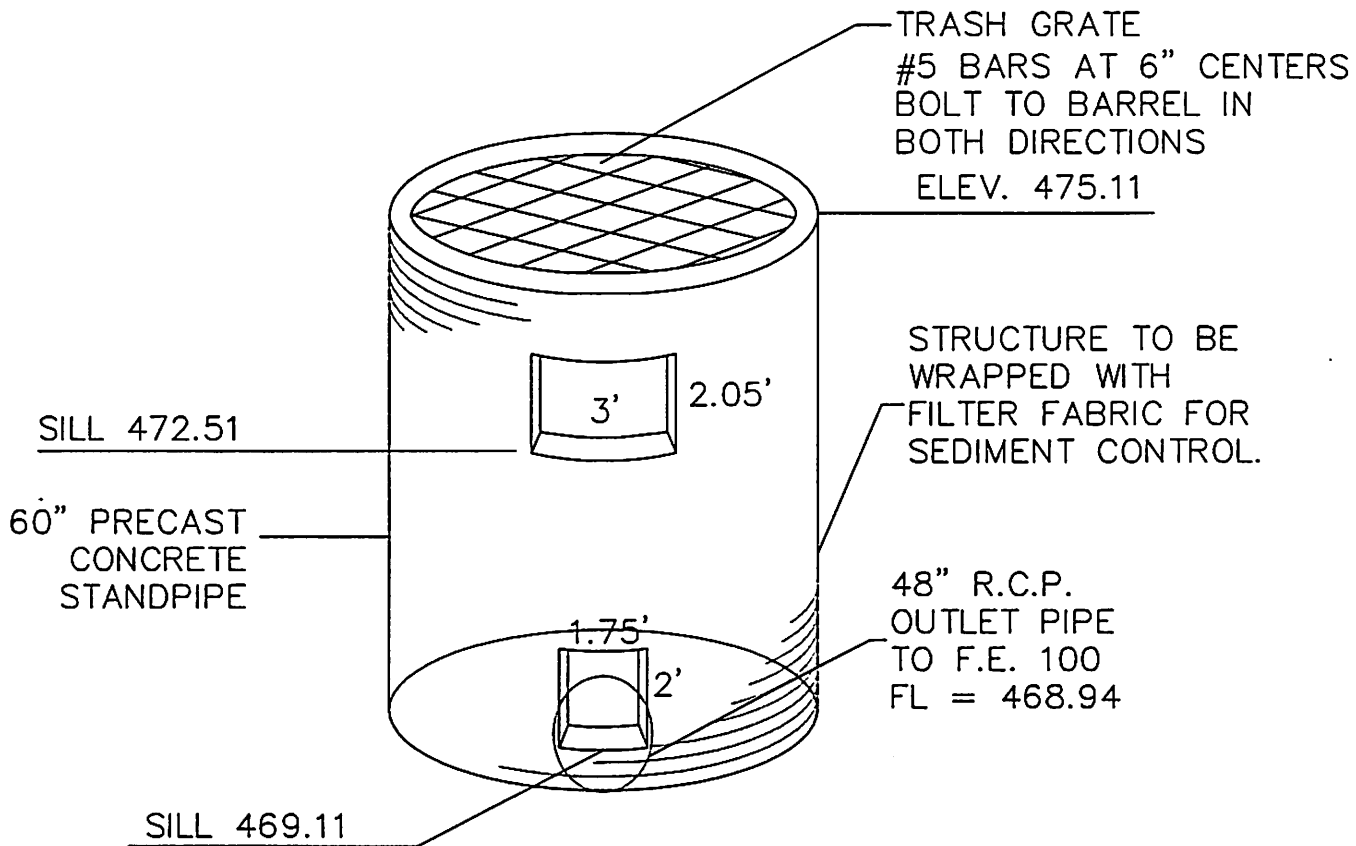## AS-BUILT OVERFLOW STRUCTURE
DETAIL

2 YEAR HIGHWATER 472.73
15 YEAR HIGHWATER 473.62
25 YEAR HIGHWATER 474.30
100 YEAR HIGHWATER 474.93

ROUTING CALCULATIONS
2, 15 ,25 AND 100 YEAR 20 MINUTE

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Table of Contents (continued)

```
          HYG file =
          HYG ID   = 2 YR
          HYG Tag  =
          ------------------------------------
          Peak Discharge =        31.19 cfs
          Time to Peak   =         4.00 min
          HYG Volume     =        37428 cu.ft
          ------------------------------------
```

```
                     HYDROGRAPH ORDINATES (cfs)
     Time  |          Output Time increment = 1.00 min
     min   |    Time on left represents time for first value in each row.
   --------|-------------------------------------------------------------
       .00 |        .00       7.80      15.60      23.39      31.19
      5.00 |      31.19      31.19      31.19      31.19      31.19
     10.00 |      31.19      31.19      31.19      31.19      31.19
     15.00 |      31.19      31.19      31.19      31.19      31.19
     20.00 |      31.19      23.39      15.60       7.80        .00
```

```
                HYG file =
                HYG ID   = 15 YR
                HYG Tag  =
                ------------------------------------
                Peak Discharge =        46.48 cfs
                Time to Peak   =         4.00 min
                HYG Volume     =        55776 cu.ft
                ------------------------------------
```

```
                         HYDROGRAPH ORDINATES (cfs)
      Time  |            Output Time increment = 1.00 min
      min   |    Time on left represents time for first value in each row.
     -------|-----------------------------------------------------------------
        .00 |        .00      11.62      23.24      34.86      46.48
       5.00 |      46.48      46.48      46.48      46.48      46.48
      10.00 |      46.48      46.48      46.48      46.48      46.48
      15.00 |      46.48      46.48      46.48      46.48      46.48
      20.00 |      46.48      34.86      23.24      11.62        .00
```

```
            HYG file =
            HYG ID   = 25 YR
            HYG Tag  =
            ----------------------------------
            Peak Discharge =       62.32 cfs
            Time to Peak   =        4.00 min
            HYG Volume     =       74784 cu.ft
            ----------------------------------

                       HYDROGRAPH ORDINATES (cfs)
        Time  |         Output Time increment = 1.00 min
        min   |    Time on left represents time for first value in each row.
      --------|-------------------------------------------------------------
         .00  |       .00      15.58      31.16      46.74      62.32
        5.00  |     62.32      62.32      62.32      62.32      62.32
       10.00  |     62.32      62.32      62.32      62.32      62.32
       15.00  |     62.32      62.32      62.32      62.32      62.32
       20.00  |     62.32      46.74      31.16      15.58        .00
```

```
            HYG file =
            HYG ID   = 100 YR
            HYG Tag  =
            ------------------------------------
            Peak Discharge =        79.67 cfs
            Time to Peak   =         4.00 min
            HYG Volume     =        95604 cu.ft
            ------------------------------------
```

```
                      HYDROGRAPH ORDINATES (cfs)
      Time  |         Output Time increment = 1.00 min
      min   |   Time on left represents time for first value in each row.
     -------|-----------------------------------------------------------
       .00  |       .00      19.92      39.84      59.75      79.67
      5.00  |     79.67      79.67      79.67      79.67      79.67
     10.00  |     79.67      79.67      79.67      79.67      79.67
     15.00  |     79.67      79.67      79.67      79.67      79.67
     20.00  |     79.67      59.75      39.84      19.92        .00
```

Type.... Read HYG
Name.... COOL SPRINGS
File.... H:\PONDPACK\A13000PLUS\13117A\DETENTION\13117A-ASB.05.05.06.JLJ-CAL.ppw
Storm... Tag: 100

Page 1.04

Event: 100 yr

TIME vs. ELEVATION (ft)

Output Time increment = 1.00 min
Time on left represents time for first value in each row.

Time min					
.00	469.11	469.76	470.16	470.54	470.91
5.00	471.19	471.40	471.57	471.71	471.84
10.00	471.95	472.05	472.14	472.23	472.31
15.00	472.39	472.46	472.53	472.59	472.65
20.00	472.71	472.73	472.72	472.66	472.55
25.00	472.42	472.29	472.15	472.02	471.88
30.00	471.73	471.58	471.43	471.26	471.09
35.00	470.93	470.78	470.63	470.48	470.34
40.00	470.20	470.06	469.92	469.77	469.61
45.00	469.38	469.11			

```
                      TIME vs. ELEVATION (ft)

     Time  |           Output Time increment = 1.00 min
     min   |    Time on left represents time for first value in each row.
   --------|----------------------------------------------------------
       .00 |     469.11      469.87      470.36      470.83      471.25
      5.00 |     471.60      471.87      472.09      472.28      472.46
     10.00 |     472.62      472.76      472.90      473.01      473.12
     15.00 |     473.22      473.31      473.39      473.46      473.53
     20.00 |     473.59      473.62      473.60      473.53      473.40
     25.00 |     473.26      473.12      472.98      472.85      472.71
     30.00 |     472.58      472.45      472.32      472.18      472.05
     35.00 |     471.91      471.77      471.62      471.46      471.30
     40.00 |     471.13      470.97      470.82      470.67      470.52
     45.00 |     470.37      470.23      470.09      469.96      469.82
     50.00 |     469.65      469.46      469.14      469.11
```

TIME vs. ELEVATION (ft)

```
    Time  |            Output Time increment = 1.00 min
    min   |    Time on left represents time for first value in each row.
  --------|-----------------------------------------------------------
     .00  |     469.11      469.96      470.53      471.06      471.55
    5.00  |     471.95      472.27      472.55      472.79      473.00
   10.00  |     473.19      473.35      473.50      473.63      473.75
   15.00  |     473.86      473.96      474.04      474.13      474.20
   20.00  |     474.27      474.30      474.28      474.19      474.05
   25.00  |     473.89      473.73      473.58      473.43      473.28
   30.00  |     473.14      473.00      472.87      472.73      472.60
   35.00  |     472.47      472.34      472.21      472.07      471.93
   40.00  |     471.79      471.64      471.49      471.33      471.16
   45.00  |     471.00      470.85      470.70      470.55      470.40
   50.00  |     470.26      470.12      469.98      469.84      469.69
   55.00  |     469.51      469.20      469.11
```

TIME vs. ELEVATION (ft)

Time min		Output Time increment = 1.00 min Time on left represents time for first value in each row.			
.00		469.11	470.04	470.69	471.28	471.82
5.00		472.28	472.66	472.98	473.26	473.49
10.00		473.70	473.88	474.05	474.19	474.33
15.00		474.45	474.56	474.65	474.74	474.82
20.00		474.90	474.93	474.90	474.79	474.62
25.00		474.43	474.24	474.07	473.91	473.75
30.00		473.60	473.45	473.30	473.16	473.02
35.00		472.88	472.75	472.62	472.49	472.36
40.00		472.22	472.09	471.95	471.81	471.66
45.00		471.51	471.35	471.18	471.02	470.87
50.00		470.72	470.57	470.42	470.28	470.14
55.00		470.00	469.86	469.71	469.53	469.24
60.00		469.11				

TIME vs. VOLUME (cu.ft)

Time min	Output Time increment = 1.00 min Time on left represents time for first value in each row.				
.00	0	170	688	1535	2695
5.00	3885	4924	5890	6809	7673
10.00	8501	9296	10058	10792	11502
15.00	12182	12840	13480	14092	14675
20.00	15234	15530	15359	14737	13691
25.00	12462	11271	10122	9020	7955
30.00	6943	5980	5072	4219	3441
35.00	2784	2244	1777	1374	1032
40.00	748	512	324	178	77
45.00	12	0			

TIME vs. VOLUME (cu.ft)

Time min		Output Time increment = 1.00 min Time on left represents time for first value in each row.			
.00	0	269	1079	2400	4167
5.00	6078	7875	9597	11248	12840
10.00	14378	15838	17222	18522	19738
15.00	20877	21941	22931	23855	24720
20.00	25523	25935	25644	24700	23150
25.00	21363	19700	18140	16678	15307
30.00	14003	12758	11561	10401	9285
35.00	8217	7187	6214	5288	4425
40.00	3619	2935	2379	1891	1473
45.00	1115	816	569	367	213
50.00	98	27	0	0	

TIME vs. VOLUME (cu.ft)

Time min	Output Time increment = 1.00 min Time on left represents time for first value in each row.				
.00	0	374	1493	3290	5757
5.00	8502	11130	13661	16085	18374
10.00	20519	22523	24397	26138	27760
15.00	29271	30677	31987	33204	34336
20.00	35384	35910	35494	34208	32111
25.00	29709	27475	25395	23460	21654
30.00	19969	18396	16916	15529	14218
35.00	12963	11757	10595	9469	8390
40.00	7357	6372	5441	4565	3748
45.00	3055	2480	1982	1548	1182
50.00	869	614	403	238	117
55.00	39	0	0		

TIME vs. VOLUME (cu.ft)

Time min	Output Time increment = 1.00 min Time on left represents time for first value in each row.				
.00	0	492	1951	4293	7555
5.00	11240	14782	18155	21320	24280
10.00	27038	29601	31991	34212	36274
15.00	38187	39923	41462	42865	44189
20.00	45440	46040	45446	43722	40933
25.00	37826	35018	32413	29994	27736
30.00	25641	23686	21868	20166	18580
35.00	17091	15691	14373	13113	11901
40.00	10733	9604	8517	7483	6488
45.00	5554	4666	3844	3135	2546
50.00	2040	1597	1223	904	642
55.00	428	256	131	45	1
60.00	0				

POND VOLUME CALCULATIONS

Planimeter scale: 1.00 ft/in

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (cu.ft)	Volume Sum (cu.ft)
469.11	.000	0	0	0	0
470.00	1442.190	1442	1442	428	428
472.00	7890.170	7890	12706	8470	8898
474.00	14898.320	14898	33631	22420	31319
476.00	18863.180	18863	50525	33684	65002
478.00	22979.180	22979	62662	41775	106777

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2   = Lower and upper elevations of the increment
       Area1,Area2 = Areas computed for EL1, EL2, respectively
       Volume   = Incremental volume between EL1 and EL2

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                    REQUESTED POND WS ELEVATIONS:

                    Min. Elev.=   469.11 ft
                    Increment =   .10 ft
                    Max. Elev.=   478.00 ft

            ****
                          OUTLET CONNECTIVITY
            ****

            ---> Forward Flow Only (UpStream to DnStream)
            <--- Reverse Flow Only (DnStream to UpStream)
            <---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	W0	--->	C0	469.110	471.110
Orifice-Area	O1	--->	C0	474.560	478.000
Weir-Rectangular	W1	--->	C0	472.510	474.560
Stand Pipe	R0	--->	C0	475.110	478.000
Orifice-Area	O0	--->	C0	471.110	478.000
Culvert-Circular	C0	--->	TW	468.940	478.000

TW SETUP, DS Channel

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OUTLET STRUCTURE INPUT DATA

Structure ID   = W0
Structure Type   = Weir-Rectangular

# of Openings   =   1
Crest Elev.   =   469.11 ft
Weir Length   =   1.75 ft
Weir Coeff.   =   3.000000

Weir TW effects   (Use adjustment equation)

Structure ID   = O1
Structure Type   = Orifice-Area

# of Openings   =   1
Invert Elev.   =   472.51 ft
Area   =   6.1500 sq.ft
Top of Orifice   =   474.56 ft
Datum Elev.   =   473.54 ft
Orifice Coeff.   =   .600

Structure ID   = W1
Structure Type   = Weir-Rectangular

# of Openings   =   1
Crest Elev.   =   472.51 ft
Weir Length   =   3.00 ft
Weir Coeff.   =   3.000000

Weir TW effects   (Use adjustment equation)

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OUTLET STRUCTURE INPUT DATA


```
Structure ID        = R0
Structure Type      = Stand Pipe
--------------------------------------
# of Openings       =          1
Invert Elev.        =     475.11 ft
Diameter            =     5.0000 ft
Orifice Area        =    19.6350 sq.ft
Orifice Coeff.      =       .600
Weir Length         =      15.71 ft
Weir Coeff.         =      3.000
K, Reverse          =      1.000
Mannings n          =      .0000
Kev,Charged Riser   =       .000
Weir Submergence    = No
```


```
Structure ID        = O0
Structure Type      = Orifice-Area
--------------------------------------
# of Openings       =          1
Invert Elev.        =     469.11 ft
Area                =     3.5000 sq.ft
Top of Orifice      =     471.11 ft
Datum Elev.         =     470.11 ft
Orifice Coeff.      =       .600
```

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OUTLET STRUCTURE INPUT DATA

```
            Structure ID     = C0
            Structure Type   = Culvert-Circular
            ------------------------------------
            No. Barrels      =          1
            Barrel Diameter  =     4.0000 ft
            Upstream Invert  =     468.94 ft
            Dnstream Invert  =     468.26 ft
            Horiz. Length    =      74.33 ft
            Barrel Length    =      74.33 ft
            Barrel Slope     =     .00915 ft/ft

            OUTLET CONTROL DATA...
            Mannings n       =      .0130
            Ke               =      .5000   (forward entrance loss)
            Kb               =    .004925   (per ft of full flow)
            Kr               =      .5000   (reverse entrance loss)
            HW Convergence   =       .001   +/- ft

            INLET CONTROL DATA...
            Equation form    =          1
            Inlet Control K  =      .0098
            Inlet Control M  =     2.0000
            Inlet Control c  =     .03980
            Inlet Control Y  =      .6700
            T1 ratio (HW/D)  =       .000
            T2 ratio (HW/D)  =      1.302
            Slope Factor     =      -.500
```

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use   submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =   468.94 ft   ---> Flow =   87.96 cfs
At T2 Elev =   474.15 ft   ---> Flow =   100.53 cfs

```
            Structure ID     = TW
            Structure Type   = TW SETUP, DS Channel
            ------------------------------------
            FREE OUTFALL CONDITIONS SPECIFIED

            CONVERGENCE TOLERANCES...
            Maximum Iterations=     40
            Min. TW tolerance =    .01 ft
            Max. TW tolerance =    .01 ft
            Min. HW tolerance =    .01 ft
            Max. HW tolerance =    .01 ft
            Min.  Q tolerance =    .00 cfs
            Max.  Q tolerance =    .00 cfs
```

File.... H:\PONDPACK\A13000PLUS\13117A\DETENTION\13117A-ASB.05.05.06.JLJ-CAL.ppw

---

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q				Notes
			Converge	
Elev.	Q	TW Elev	Error	
ft	cfs	ft	+/-ft	Contributing Structures
469.11	.00	Free Outfall		(no Q: W0,O1,W1,R0,O0,C0)
469.21	.16	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
469.31	.40	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
469.41	.67	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
469.51	.99	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
469.61	1.36	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
469.71	1.78	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
469.81	2.23	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
469.91	2.72	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.01	3.25	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.11	3.81	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.21	4.40	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.31	5.03	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.41	5.69	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.51	6.37	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.61	7.08	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.71	7.84	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.81	8.60	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
470.91	9.41	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
471.01	10.23	Free Outfall		W0,C0 (no Q: O1,W1,R0,O0)
471.11	12.72	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
471.21	13.37	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
471.31	13.99	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
471.41	14.60	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
471.51	15.20	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
471.61	15.79	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
471.71	16.35	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
471.81	16.92	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
471.91	17.48	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
472.01	18.03	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
472.11	18.56	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
472.21	19.09	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
472.31	19.61	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
472.41	20.13	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
472.51	20.62	Free Outfall		O0,C0 (no Q: W0,O1,W1,R0)
472.61	21.35	Free Outfall		W1,O0,C0 (no Q: W0,O1,R0)
472.71	22.21	Free Outfall		W1,O0,C0 (no Q: W0,O1,R0)
472.81	23.20	Free Outfall		W1,O0,C0 (no Q: W0,O1,R0)

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes	
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures	
472.91	24.29	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.01	25.47	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.11	26.70	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.21	28.02	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.31	29.42	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.41	30.83	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.51	32.33	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.61	33.92	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.71	35.52	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.81	37.18	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
473.91	38.89	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
474.01	40.70	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
474.11	42.49	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
474.21	44.36	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
474.31	46.26	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
474.41	48.21	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
474.51	50.23	Free Outfall		W1,O0,C0	(no Q: W0,O1,R0)
474.61	54.89	Free Outfall		O1,O0,C0	(no Q: W0,W1,R0)
474.71	56.51	Free Outfall		O1,O0,C0	(no Q: W0,W1,R0)
474.81	58.08	Free Outfall		O1,O0,C0	(no Q: W0,W1,R0)
474.91	59.63	Free Outfall		O1,O0,C0	(no Q: W0,W1,R0)
475.01	61.11	Free Outfall		O1,O0,C0	(no Q: W0,W1,R0)
475.11	62.55	Free Outfall		O1,O0,C0	(no Q: W0,W1,R0)
475.21	65.21	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
475.31	68.83	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
475.41	73.13	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
475.51	77.93	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
475.61	82.88	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
475.71	87.18	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
475.81	91.84	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
475.91	96.64	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
476.01	101.59	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
476.11	106.64	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
476.21	111.09	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
476.31	115.65	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
476.41	120.07	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
476.51	124.46	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)
476.61	128.77	Free Outfall		O1,R0,O0,C0	(no Q: W0,W1)

***** COMPOSITE OUTFLOW SUMMARY ****

```
WS Elev, Total Q                         Notes
----------------  -------- Converge ------------------------
  Elev.     Q     TW Elev  Error
   ft      cfs      ft     +/-ft    Contributing Structures
--------  -------  -------- -----   -------------------------
476.71   132.87   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
476.81   136.78   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
476.91   140.51   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.01   143.76   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.11   146.65   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.21   148.26   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.31   149.80   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.41   151.32   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.51   152.76   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.61   154.20   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.71   155.58   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.81   156.91   Free Outfall      O1,R0,O0,C0  (no Q: W0,W1)
477.91   158.13   Free Outfall      R0,C0  (no Q: W0,O1,W1,O0)
478.00   159.34   Free Outfall      R0,C0  (no Q: W0,O1,W1,O0)
```

```
                       LEVEL POOL ROUTING DATA

    HYG Dir          = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
    Inflow  HYG file = NONE STORED - COOL SPRINGS IN  2
    Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

    Pond Node   Data = COOL SPRINGS
    Pond Volume Data = COOL SPRINGS
    Pond Outlet Data = ASB

    No Infiltration

    INITIAL CONDITIONS
    ----------------------------------
    Starting WS Elev  =    469.11 ft
    Starting Volume   =         0 cu.ft
    Starting Outflow  =       .00 cfs
    Starting Infiltr. =       .00 cfs
    Starting Total Qout=      .00 cfs
    Time Increment    =      1.00 min
```

Elevation ft	Outflow cfs	Storage cu.ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
469.11	.00	0	0	.00	.00	.00
469.21	.16	1	18	.00	.16	.19
469.31	.40	5	73	.00	.40	.56
469.41	.67	16	164	.00	.67	1.22
469.51	.99	39	291	.00	.99	2.29
469.61	1.36	76	455	.00	1.36	3.89
469.71	1.78	131	655	.00	1.78	6.14
469.81	2.23	208	892	.00	2.23	9.17
469.91	2.72	311	1165	.00	2.72	13.08
470.01	3.25	442	1462	.00	3.25	17.99
470.11	3.81	598	1662	.00	3.81	23.76
470.21	4.40	775	1876	.00	4.40	30.24
470.31	5.03	974	2103	.00	5.03	37.50
470.41	5.69	1196	2343	.00	5.69	45.56
470.51	6.37	1443	2595	.00	6.37	54.47
470.61	7.08	1716	2861	.00	7.08	64.27
470.71	7.84	2016	3139	.00	7.84	75.03
470.81	8.60	2344	3431	.00	8.60	86.74
470.91	9.41	2702	3735	.00	9.41	99.48
471.01	10.23	3091	4052	.00	10.23	113.28

LEVEL POOL ROUTING DATA

HYG Dir   = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow HYG file = NONE STORED - COOL SPRINGS IN   2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   469.11 ft
Starting Volume   =   0 cu.ft
Starting Outflow   =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   1.00 min

Elevation ft	Outflow cfs	Storage cu.ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
471.11	12.72	3513	4382	.00	12.72	129.82
471.21	13.37	3968	4725	.00	13.37	145.65
471.31	13.99	4459	5081	.00	13.99	162.61
471.41	14.60	4985	5450	.00	14.60	180.76
471.51	15.20	5549	5832	.00	15.20	200.16
471.61	15.79	6152	6227	.00	15.79	220.85
471.71	16.35	6795	6635	.00	16.35	242.84
471.81	16.92	7479	7055	.00	16.92	266.23
471.91	17.48	8206	7489	.00	17.48	291.02
472.01	18.03	8977	7920	.00	18.03	317.27
472.11	18.56	9784	8218	.00	18.56	344.70
472.21	19.09	10621	8522	.00	19.09	373.12
472.31	19.61	11489	8832	.00	19.61	402.57
472.41	20.13	12387	9147	.00	20.13	433.04
472.51	20.62	13318	9467	.00	20.62	464.56
472.61	21.35	14281	9794	.00	21.35	497.39
472.71	22.21	15277	10125	.00	22.21	531.45
472.81	23.20	16307	10462	.00	23.20	566.75
472.91	24.29	17370	10805	.00	24.29	603.28
473.01	25.47	18468	11153	.00	25.47	641.06

LEVEL POOL ROUTING DATA

HYG Dir   = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow HYG file = NONE STORED - COOL SPRINGS IN   2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   469.11 ft
Starting Volume   =   0 cu.ft
Starting Outflow   =   .00 cfs
Starting Infiltr.   =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   1.00 min

Elevation ft	Outflow cfs	Storage cu.ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
473.11	26.70	19601	11507	.00	26.70	680.05
473.21	28.02	20769	11866	.00	28.02	720.32
473.31	29.42	21974	12231	.00	29.42	761.89
473.41	30.83	23215	12601	.00	30.83	804.68
473.51	32.33	24494	12977	.00	32.33	848.81
473.61	33.92	25811	13358	.00	33.92	894.29
473.71	35.52	27166	13745	.00	35.52	941.07
473.81	37.18	28561	14138	.00	37.18	989.20
473.91	38.89	29994	14535	.00	38.89	1038.68
474.01	40.70	31467	14917	.00	40.70	1089.61
474.11	42.49	32969	15104	.00	42.49	1141.44
474.21	44.36	34488	15293	.00	44.36	1193.97
474.31	46.26	36027	15482	.00	46.26	1247.17
474.41	48.21	37585	15673	.00	48.21	1301.03
474.51	50.23	39162	15865	.00	50.23	1355.62
474.61	54.89	40758	16058	.00	54.89	1413.48
474.71	56.51	42374	16252	.00	56.51	1468.96
474.81	58.08	44009	16448	.00	58.08	1525.03
474.91	59.63	45663	16644	.00	59.63	1581.72
475.01	61.11	47337	16842	.00	61.11	1639.02

LEVEL POOL ROUTING DATA

HYG Dir   = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow HYG file = NONE STORED - COOL SPRINGS IN 2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   469.11 ft
Starting Volume   =   0 cu.ft
Starting Outflow   =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   1.00 min

Elevation ft	Outflow cfs	Storage cu.ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
475.11	62.55	49031	17041	.00	62.55	1696.93
475.21	65.21	50746	17241	.00	65.21	1756.73
475.31	68.83	52480	17443	.00	68.83	1818.16
475.41	73.13	54234	17645	.00	73.13	1880.92
475.51	77.93	56009	17849	.00	77.93	1944.88
475.61	82.88	57804	18053	.00	82.88	2009.67
475.71	87.18	59620	18259	.00	87.18	2074.50
475.81	91.84	61456	18466	.00	91.84	2140.37
475.91	96.64	63313	18675	.00	96.64	2207.05
476.01	101.59	65191	18883	.00	101.59	2274.60
476.11	106.64	67089	19079	.00	106.64	2342.93
476.21	111.09	69007	19276	.00	111.09	2411.31
476.31	115.65	70944	19475	.00	115.65	2480.46
476.41	120.07	72901	19674	.00	120.07	2550.11
476.51	124.46	74879	19874	.00	124.46	2620.41
476.61	128.77	76876	20076	.00	128.77	2691.31
476.71	132.87	78894	20278	.00	132.87	2762.68
476.81	136.78	80932	20481	.00	136.78	2834.51
476.91	140.51	82990	20686	.00	140.51	2906.84
477.01	143.76	85069	20891	.00	143.76	2979.39

LEVEL POOL ROUTING DATA

```
HYG Dir              = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow  HYG file = NONE STORED - COOL SPRINGS IN   2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

Pond Node    Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB
```

No Infiltration

INITIAL CONDITIONS

```
Starting WS Elev   =    469.11 ft
Starting Volume    =         0 cu.ft
Starting Outflow   =       .00 cfs
Starting Infiltr.  =       .00 cfs
Starting Total Qout=       .00 cfs
Time Increment     =      1.00 min
```

| Elevation | Outflow | Storage | Area | Infilt. | Q Total | 2S/t + O |
ft	cfs	cu.ft	sq.ft	cfs	cfs	cfs
477.11	146.65	87169	21097	.00	146.65	3052.26
477.21	148.26	89289	21305	.00	148.26	3124.55
477.31	149.80	91430	21513	.00	149.80	3197.46
477.41	151.32	93591	21723	.00	151.32	3271.02
477.51	152.76	95774	21933	.00	152.76	3345.22
477.61	154.20	97978	22145	.00	154.20	3420.12
477.71	155.58	100203	22357	.00	155.58	3495.68
477.81	156.91	102450	22571	.00	156.91	3571.89
477.91	158.13	104717	22785	.00	158.13	3648.69
478.00	159.34	106777	22979	.00	159.34	3718.56

SUMMARY FOR HYDROGRAPH ADDITION
at Node: COOL SPRINGS IN

HYG Directory: H:\PONDPACK\A13000PLUS\13117A\DETENTION\

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
COOL SPRINGS	COOL SPRINGS		2 YR	

INFLOWS TO: COOL SPRINGS IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	2 YR		37428	4.00	31.19

TOTAL FLOW INTO: COOL SPRINGS IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	COOL SPRINGS IN	2	37428	4.00	31.19

```
              TOTAL NODE INFLOW...
              HYG file =
              HYG ID   = COOL SPRINGS IN
              HYG Tag  = 2
              ------------------------------------
              Peak Discharge =        31.19 cfs
              Time to Peak   =         4.00 min
              HYG Volume     =        37428 cu.ft
              ------------------------------------
```

	HYDROGRAPH ORDINATES (cfs)				
Time min	Output Time increment = 1.00 min Time on left represents time for first value in each row.				
.00	.00	7.80	15.60	23.39	31.19
5.00	31.19	31.19	31.19	31.19	31.19
10.00	31.19	31.19	31.19	31.19	31.19
15.00	31.19	31.19	31.19	31.19	31.19
20.00	31.19	23.39	15.60	7.80	.00

SUMMARY FOR HYDROGRAPH ADDITION
at Node: COOL SPRINGS IN

HYG Directory: H:\PONDPACK\A13000PLUS\13117A\DETENTION\

```
================================================================
Upstream Link ID  Upstream Node ID   HYG file   HYG ID        HYG tag
----------------------------------------------------------------
COOL SPRINGS      COOL SPRINGS                   15 YR
================================================================
```

INFLOWS TO: COOL SPRINGS IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	15 YR		55776	4.00	46.48

TOTAL FLOW INTO: COOL SPRINGS IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	COOL SPRINGS IN	15	55776	4.00	46.48

```
            TOTAL NODE INFLOW...
            HYG file =
            HYG ID   = COOL SPRINGS IN
            HYG Tag  = 15
            ------------------------------------
            Peak Discharge =       46.48 cfs
            Time to Peak   =        4.00 min
            HYG Volume     =       55776 cu.ft
            ------------------------------------
```

```
                          HYDROGRAPH ORDINATES (cfs)
      Time  |             Output Time increment = 1.00 min
      min   |    Time on left represents time for first value in each row.
     -------|---------------------------------------------------------------
        .00 |       .00     11.62     23.24     34.86     46.48
       5.00 |     46.48     46.48     46.48     46.48     46.48
      10.00 |     46.48     46.48     46.48     46.48     46.48
      15.00 |     46.48     46.48     46.48     46.48     46.48
      20.00 |     46.48     34.86     23.24     11.62       .00
```

SUMMARY FOR HYDROGRAPH ADDITION
at Node: COOL SPRINGS IN

HYG Directory: H:\PONDPACK\A13000PLUS\13117A\DETENTION\

```
===================================================================
Upstream Link ID  Upstream Node ID   HYG file    HYG ID         HYG tag
-------------------------------------------------------------------
COOL SPRINGS      COOL SPRINGS                   25 YR
===================================================================
```

INFLOWS TO: COOL SPRINGS IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	25 YR		74784	4.00	62.32

TOTAL FLOW INTO: COOL SPRINGS IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	COOL SPRINGS IN	25	74784	4.00	62.32

```
            TOTAL NODE INFLOW...
            HYG file =
            HYG ID   = COOL SPRINGS IN
            HYG Tag  = 25
            ------------------------------------
            Peak Discharge =        62.32 cfs
            Time to Peak   =         4.00 min
            HYG Volume     =        74784 cu.ft
            ------------------------------------

                        HYDROGRAPH ORDINATES (cfs)
      Time  |            Output Time increment = 1.00 min
      min   |    Time on left represents time for first value in each row.
    --------|----------------------------------------------------------------
        .00 |       .00      15.58      31.16      46.74      62.32
       5.00 |     62.32      62.32      62.32      62.32      62.32
      10.00 |     62.32      62.32      62.32      62.32      62.32
      15.00 |     62.32      62.32      62.32      62.32      62.32
      20.00 |     62.32      46.74      31.16      15.58        .00
```

```
                         SUMMARY FOR HYDROGRAPH ADDITION
                         at Node: COOL SPRINGS IN

HYG Directory: H:\PONDPACK\A13000PLUS\13117A\DETENTION\

==================================================================
Upstream Link ID  Upstream Node ID   HYG file     HYG ID        HYG tag
------------------------------------------------------------------
COOL SPRINGS      COOL SPRINGS                     100 YR
==================================================================


INFLOWS TO:  COOL SPRINGS IN
-------------------------------------- Volume    Peak Time   Peak Flow
HYG file    HYG ID         HYG tag     cu.ft       min         cfs
----------------------------------------------------------------
            100 YR                     95604       4.00       79.67


TOTAL FLOW INTO:  COOL SPRINGS IN
-------------------------------------- Volume    Peak Time   Peak Flow
HYG file    HYG ID         HYG tag     cu.ft       min         cfs
----------------------------------------------------------------
            COOL SPRINGS IN   100      95604       4.00       79.67
```

```
           TOTAL NODE INFLOW...
           HYG file =
           HYG ID   = COOL SPRINGS IN
           HYG Tag  = 100
           -----------------------------------
           Peak Discharge =        79.67 cfs
           Time to Peak   =         4.00 min
           HYG Volume     =        95604 cu.ft
           -----------------------------------
```

| | HYDROGRAPH ORDINATES (cfs) | | | | |
| Time | Output Time increment = 1.00 min | | | | |
min	Time on left represents time for first value in each row.				
.00	.00	19.92	39.84	59.75	79.67
5.00	79.67	79.67	79.67	79.67	79.67
10.00	79.67	79.67	79.67	79.67	79.67
15.00	79.67	79.67	79.67	79.67	79.67
20.00	79.67	59.75	39.84	19.92	.00

LEVEL POOL ROUTING SUMMARY

HYG Dir   = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow HYG file = NONE STORED - COOL SPRINGS IN 2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   469.11 ft
Starting Volume   =   0 cu.ft
Starting Outflow   =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   1.00 min

INFLOW/OUTFLOW HYDROGRAPH SUMMARY
===
Peak Inflow   =   31.19 cfs   at   4.00 min
Peak Outflow   =   22.46 cfs   at   21.00 min

Peak Elevation   =   472.73 ft
Peak Storage =   15530 cu.ft
===

MASS BALANCE (cu.ft)

+ Initial Vol =   0
+ HYG Vol IN   =   37428
- Infiltration =   0
- HYG Vol OUT =   37428
- Retained Vol =   0

  Unrouted Vol =   0 cu.ft   (.000% of Outflow Volume)

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow  HYG file = NONE STORED - COOL SPRINGS IN  15
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 15

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB
```

No Infiltration

INITIAL CONDITIONS

```
Starting WS Elev    =     469.11 ft
Starting Volume     =          0 cu.ft
Starting Outflow    =        .00 cfs
Starting Infiltr.   =        .00 cfs
Starting Total Qout=         .00 cfs
Time Increment      =       1.00 min
```

INFLOW/OUTFLOW HYDROGRAPH SUMMARY
```
=========================================================
Peak Inflow       =       46.48 cfs     at       4.00 min
Peak Outflow      =       34.07 cfs     at      21.00 min
---------------------------------------------------------
Peak Elevation    =      473.62 ft
Peak Storage =           25935 cu.ft
=========================================================
```

MASS BALANCE (cu.ft)

```
+ Initial Vol  =            0
+ HYG Vol IN   =        55776
- Infiltration =            0
- HYG Vol OUT  =        55776
- Retained Vol =            0
                   ----------
  Unrouted Vol =            0 cu.ft  (.000% of Outflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir         = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow  HYG file = NONE STORED - COOL SPRINGS IN   25
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 25

Pond Node    Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB
```

No Infiltration

INITIAL CONDITIONS

```
Starting WS Elev   =    469.11 ft
Starting Volume    =         0 cu.ft
Starting Outflow   =       .00 cfs
Starting Infiltr.  =       .00 cfs
Starting Total Qout=       .00 cfs
Time Increment     =      1.00 min
```

INFLOW/OUTFLOW HYDROGRAPH SUMMARY
```
=======================================================
Peak Inflow      =      62.32 cfs    at      4.00 min
Peak Outflow     =      46.12 cfs    at     21.00 min
-------------------------------------------------------
Peak Elevation   =     474.30 ft
Peak Storage =         35910 cu.ft
=======================================================
```

MASS BALANCE (cu.ft)

```
+ Initial Vol  =          0
+ HYG Vol IN   =      74784
- Infiltration =          0
- HYG Vol OUT  =      74784
- Retained Vol =          0
                  ----------
  Unrouted Vol =          0 cu.ft   (.000% of Outflow Volume)
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow  HYG file = NONE STORED - COOL SPRINGS IN  100
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 100

Pond Node    Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB
```

No Infiltration

INITIAL CONDITIONS

```
Starting WS Elev    =    469.11 ft
Starting Volume     =         0 cu.ft
Starting Outflow    =       .00 cfs
Starting Infiltr.   =       .00 cfs
Starting Total Qout=       .00 cfs
Time Increment      =      1.00 min
```

INFLOW/OUTFLOW HYDROGRAPH SUMMARY
```
=========================================================
Peak Inflow     =       79.67 cfs    at       4.00 min
Peak Outflow    =       59.97 cfs    at      21.00 min
---------------------------------------------------------
Peak Elevation  =      474.93 ft
Peak Storage =          46040 cu.ft
=========================================================
```

MASS BALANCE (cu.ft)

```
+ Initial Vol  =             0
+ HYG Vol IN   =         95604
- Infiltration =             0
- HYG Vol OUT  =         95604
- Retained Vol =             0
                   ----------
  Unrouted Vol = -           cu.ft   (.000% of Inflow Volume)
```

```
----- A -----
ASB... 5.01, 5.05

----- C -----
COOL SPRINGS... 4.01, 6.01, 1.01,
   1.02, 1.03, 1.04
COOL SPRINGS IN 2... 6.06, 6.08,
   6.10, 6.12
COOL SPRINGS OUT 2... 2.01, 3.01,
   6.14, 2.02, 3.02, 6.15, 2.03,
   3.03, 6.16, 2.04, 3.04, 6.17
```

ROUTING CALCULATIONS
100 YEAR 20 MINUTE
LOW FLOW BLOCKED

Table of Contents

_____

Table of Contents (continued)

```
            HYG file  =
            HYG ID    = 100 YR
            HYG Tag   =
            ----------------------------------
            Peak Discharge =        79.67 cfs
            Time to Peak   =         4.00 min
            HYG Volume     =        95604 cu.ft
            ----------------------------------
```

```
                        HYDROGRAPH ORDINATES (cfs)
    Time  |           Output Time increment = 1.00 min
    min   |    Time on left represents time for first value in each row.
  --------|--------------------------------------------------------------
     .00  |       .00      19.92      39.84      59.75      79.67
    5.00  |     79.67      79.67      79.67      79.67      79.67
   10.00  |     79.67      79.67      79.67      79.67      79.67
   15.00  |     79.67      79.67      79.67      79.67      79.67
   20.00  |     79.67      59.75      39.84      19.92        .00
```

TIME vs. ELEVATION (ft)

```
   Time   |           Output Time increment = 1.00 min
   min    |    Time on left represents time for first value in each row.
 ---------|-------------------------------------------------------------
     .00  |    475.11       475.14       475.24       475.40       475.59
    5.00  |    475.79       475.94       476.07       476.17       476.25
   10.00  |    476.31       476.36       476.40       476.43       476.45
   15.00  |    476.47       476.48       476.49       476.50       476.51
   20.00  |    476.51       476.49       476.42       476.31       476.16
   25.00  |    476.02       475.90       475.80       475.72       475.65
   30.00  |    475.60       475.55       475.50       475.47       475.43
   35.00  |    475.41       475.38       475.36       475.34       475.32
   40.00  |    475.31       475.30       475.28       475.27       475.26
   45.00  |    475.25       475.24       475.23       475.23       475.22
   50.00  |    475.22       475.21       475.20       475.20       475.20
   55.00  |    475.19       475.19       475.18       475.18       475.18
   60.00  |    475.17       475.17       475.17       475.16       475.16
   65.00  |    475.16       475.16       475.15       475.15       475.15
   70.00  |    475.15       475.15       475.14       475.14       475.14
   75.00  |    475.14       475.14       475.14       475.13       475.13
   80.00  |    475.13       475.13       475.13       475.13       475.13
   85.00  |    475.13       475.13       475.13       475.12       475.12
   90.00  |    475.12       475.12       475.12       475.12       475.12
   95.00  |    475.12       475.12       475.12       475.12       475.12
  100.00  |    475.12       475.12       475.12       475.12       475.12
  105.00  |    475.12       475.12       475.12       475.12       475.11
  110.00  |    475.11       475.11       475.11       475.11       475.11
  115.00  |    475.11       475.11       475.11       475.11       475.11
  120.00  |    475.11       475.11       475.11       475.11       475.11
  125.00  |    475.11       475.11       475.11       475.11       475.11
  130.00  |    475.11       475.11       475.11       475.11       475.11
  135.00  |    475.11       475.11       475.11       475.11       475.11
  140.00  |    475.11       475.11       475.11       475.11       475.11
  145.00  |    475.11       475.11       475.11       475.11       475.11
  150.00  |    475.11       475.11       475.11       475.11       475.11
  155.00  |    475.11       475.11       475.11       475.11       475.11
  160.00  |    475.11       475.11       475.11       475.11       475.11
  165.00  |    475.11       475.11       475.11       475.11       475.11
  170.00  |    475.11       475.11
```

TIME vs. VOLUME (cu.ft)

Time min	Output Time increment = 1.00 min Time on left represents time for first value in each row.				
.00	49031	49611	51317	54015	57502
5.00	61019	63934	66309	68218	69739
10.00	70947	71893	72637	73219	73671
15.00	74023	74297	74511	74678	74807
20.00	74908	74453	73039	70870	68089
25.00	65340	63123	61315	59824	58579
30.00	57535	56647	55891	55237	54671
35.00	54180	53746	53362	53023	52724
40.00	52458	52218	51999	51800	51620
45.00	51456	51307	51171	51047	50935
50.00	50834	50740	50653	50571	50492
55.00	50417	50347	50280	50216	50155
60.00	50098	50044	49992	49943	49897
65.00	49853	49811	49771	49734	49698
70.00	49664	49632	49601	49572	49545
75.00	49519	49494	49471	49448	49427
80.00	49407	49388	49369	49352	49336
85.00	49320	49306	49292	49279	49266
90.00	49254	49243	49232	49222	49212
95.00	49203	49194	49186	49178	49171
100.00	49164	49157	49151	49144	49139
105.00	49133	49128	49123	49118	49114
110.00	49110	49106	49102	49099	49095
115.00	49092	49089	49086	49083	49080
120.00	49078	49076	49074	49072	49069
125.00	49067	49066	49064	49062	49061
130.00	49059	49057	49056	49055	49054
135.00	49053	49052	49051	49050	49049
140.00	49048	49047	49046	49046	49045
145.00	49044	49043	49043	49042	49042
150.00	49041	49041	49040	49040	49039
155.00	49039	49039	49038	49038	49038
160.00	49037	49037	49037	49037	49036
165.00	49036	49036	49036	49035	49035
170.00	49035	49035			

POND VOLUME CALCULATIONS

Planimeter scale: 1.00 ft/in

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (cu.ft)	Volume Sum (cu.ft)
469.11	.000	0	0	0	0
470.00	1442.190	1442	1442	428	428
472.00	7890.170	7890	12706	8470	8898
474.00	14898.320	14898	33631	22420	31319
476.00	18863.180	18863	50525	33684	65002
478.00	22979.180	22979	62662	41775	106777

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

   Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

   where: EL1, EL2   = Lower and upper elevations of the increment
          Area1,Area2 = Areas computed for EL1, EL2, respectively
          Volume   = Incremental volume between EL1 and EL2

File.... H:\PONDPACK\A13000PLUS\13117A\DETENTION\13117A-ASB.05.05.06.JLJ-CAL.ppw

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REQUESTED POND WS ELEVATIONS:

```
        Min. Elev.=     469.11 ft
        Increment =        .10 ft
        Max. Elev.=     478.00 ft
```

```
        ************************************************
                    OUTLET CONNECTIVITY
        ************************************************
```

```
        ---> Forward Flow Only (UpStream to DnStream)
        <--- Reverse Flow Only (DnStream to UpStream)
        <---> Forward and Reverse Both Allowed
```

Structure	No.		Outfall	E1, ft	E2, ft
Stand Pipe	R0	--->	C0	475.110	478.000
Culvert-Circular	C0	--->	TW	468.940	478.000
TW SETUP, DS Channel					

File.... H:\PONDPACK\A13000PLUS\13117A\DETENTION\13117A-ASB.05.05.06.JLJ-CAL.ppw

---

OUTLET STRUCTURE INPUT DATA

Structure ID   = R0
Structure Type   = Stand Pipe

# of Openings   =   1
Invert Elev.   =   475.11 ft
Diameter   =   5.0000 ft
Orifice Area   =   19.6350 sq.ft
Orifice Coeff.   =   .600
Weir Length   =   15.71 ft
Weir Coeff.   =   3.000
K, Reverse   =   1.000
Mannings n   =   .0000
Kev,Charged Riser   =   .000
Weir Submergence   = No

.

                    OUTLET STRUCTURE INPUT DATA

                    Structure ID   = C0
                    Structure Type   = Culvert-Circular

                    No. Barrels   =   1
                    Barrel Diameter   =   4.0000 ft
                    Upstream Invert   =   468.94 ft
                    Dnstream Invert   =   468.26 ft
                    Horiz. Length   =   74.33 ft
                    Barrel Length   =   74.33 ft
                    Barrel Slope   =   .00915 ft/ft

                    OUTLET CONTROL DATA...
                    Mannings n   =   .0130
                    Ke   =   .5000   (forward entrance loss)
                    Kb   =   .004925   (per ft of full flow)
                    Kr   =   .5000   (reverse entrance loss)
                    HW Convergence   =   .001   +/- ft

                    INLET CONTROL DATA...
                    Equation form   =   1
                    Inlet Control K   =   .0098
                    Inlet Control M   =   2.0000
                    Inlet Control c   =   .03980
                    Inlet Control Y   =   .6700
                    T1 ratio (HW/D)   =   .000
                    T2 ratio (HW/D)   =   1.302
                    Slope Factor   =   -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use   submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =   468.94 ft   --->   Flow =   87.96 cfs
At T2 Elev =   474.15 ft   --->   Flow =   100.53 cfs

                    Structure ID   = TW
                    Structure Type   = TW SETUP, DS Channel

                    FREE OUTFALL CONDITIONS SPECIFIED

                    CONVERGENCE TOLERANCES...
                    Maximum Iterations=   40
                    Min. TW tolerance =   .01 ft
                    Max. TW tolerance =   .01 ft
                    Min. HW tolerance =   .01 ft
                    Max. HW tolerance =   .01 ft
                    Min. Q tolerance =   .00 cfs
                    Max. Q tolerance =   .00 cfs

File.... H:\PONDPACK\A13000PLUS\13117A\DETENTION\13117A-ASB.05.05.06.JLJ-CAL.ppw

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q				Notes
		Converge		
Elev.	Q	TW Elev	Error	
ft	cfs	ft	+/-ft	Contributing Structures
469.11	.00	Free Outfall		(no Q: R0,C0)
469.21	.00	Free Outfall		(no Q: R0,C0)
469.31	.00	Free Outfall		(no Q: R0,C0)
469.41	.00	Free Outfall		(no Q: R0,C0)
469.51	.00	Free Outfall		(no Q: R0,C0)
469.61	.00	Free Outfall		(no Q: R0,C0)
469.71	.00	Free Outfall		(no Q: R0,C0)
469.81	.00	Free Outfall		(no Q: R0,C0)
469.91	.00	Free Outfall		(no Q: R0,C0)
470.01	.00	Free Outfall		(no Q: R0,C0)
470.11	.00	Free Outfall		(no Q: R0,C0)
470.21	.00	Free Outfall		(no Q: R0,C0)
470.31	.00	Free Outfall		(no Q: R0,C0)
470.41	.00	Free Outfall		(no Q: R0,C0)
470.51	.00	Free Outfall		(no Q: R0,C0)
470.61	.00	Free Outfall		(no Q: R0,C0)
470.71	.00	Free Outfall		(no Q: R0,C0)
470.81	.00	Free Outfall		(no Q: R0,C0)
470.91	.00	Free Outfall		(no Q: R0,C0)
471.01	.00	Free Outfall		(no Q: R0,C0)
471.11	.00	Free Outfall		(no Q: R0,C0)
471.21	.00	Free Outfall		(no Q: R0,C0)
471.31	.00	Free Outfall		(no Q: R0,C0)
471.41	.00	Free Outfall		(no Q: R0,C0)
471.51	.00	Free Outfall		(no Q: R0,C0)
471.61	.00	Free Outfall		(no Q: R0,C0)
471.71	.00	Free Outfall		(no Q: R0,C0)
471.81	.00	Free Outfall		(no Q: R0,C0)
471.91	.00	Free Outfall		(no Q: R0,C0)
472.01	.00	Free Outfall		(no Q: R0,C0)
472.11	.00	Free Outfall		(no Q: R0,C0)
472.21	.00	Free Outfall		(no Q: R0,C0)
472.31	.00	Free Outfall		(no Q: R0,C0)
472.41	.00	Free Outfall		(no Q: R0,C0)
472.51	.00	Free Outfall		(no Q: R0,C0)
472.61	.00	Free Outfall		(no Q: R0,C0)
472.71	.00	Free Outfall		(no Q: R0,C0)
472.81	.00	Free Outfall		(no Q: R0,C0)

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q				Notes
		--------- Converge		-------------------------
Elev.	Q	TW Elev	Error	
ft	cfs	ft	+/-ft	Contributing Structures
472.91	.00	Free Outfall		(no Q: R0,C0)
473.01	.00	Free Outfall		(no Q: R0,C0)
473.11	.00	Free Outfall		(no Q: R0,C0)
473.21	.00	Free Outfall		(no Q: R0,C0)
473.31	.00	Free Outfall		(no Q: R0,C0)
473.41	.00	Free Outfall		(no Q: R0,C0)
473.51	.00	Free Outfall		(no Q: R0,C0)
473.61	.00	Free Outfall		(no Q: R0,C0)
473.71	.00	Free Outfall		(no Q: R0,C0)
473.81	.00	Free Outfall		(no Q: R0,C0)
473.91	.00	Free Outfall		(no Q: R0,C0)
474.01	.00	Free Outfall		(no Q: R0,C0)
474.11	.00	Free Outfall		(no Q: R0,C0)
474.21	.00	Free Outfall		(no Q: R0,C0)
474.31	.00	Free Outfall		(no Q: R0,C0)
474.41	.00	Free Outfall		(no Q: R0,C0)
474.51	.00	Free Outfall		(no Q: R0,C0)
474.61	.00	Free Outfall		(no Q: R0,C0)
474.71	.00	Free Outfall		(no Q: R0,C0)
474.81	.00	Free Outfall		(no Q: R0,C0)
474.91	.00	Free Outfall		(no Q: R0,C0)
475.01	.00	Free Outfall		(no Q: R0,C0)
475.11	.00	Free Outfall		(no Q: R0,C0)
475.21	1.49	Free Outfall		R0,C0
475.31	4.21	Free Outfall		R0,C0
475.41	7.75	Free Outfall		R0,C0
475.51	11.92	Free Outfall		R0,C0
475.61	16.66	Free Outfall		R0,C0
475.71	21.90	Free Outfall		R0,C0
475.81	27.60	Free Outfall		R0,C0
475.91	33.72	Free Outfall		R0,C0
476.01	40.25	Free Outfall		R0,C0
476.11	47.12	Free Outfall		R0,C0
476.21	54.36	Free Outfall		R0,C0
476.31	61.93	Free Outfall		R0,C0
476.41	69.85	Free Outfall		R0,C0
476.51	78.08	Free Outfall		R0,C0
476.61	86.55	Free Outfall		R0,C0

File.... H:\PONDPACK\A13000PLUS\13117A\DETENTION\13117A-ASB.05.05.06.JLJ-CAL.ppw

_____

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev,	Total Q			Notes
		--------	Converge	-------------------------
Elev.	Q	TW Elev	Error	
ft	cfs	ft	+/-ft	Contributing Structures
476.71	95.36	Free Outfall		R0,C0
476.81	104.45	Free Outfall		R0,C0
476.91	113.80	Free Outfall		R0,C0
477.01	123.42	Free Outfall		R0,C0
477.11	133.29	Free Outfall		R0,C0
477.21	136.95	Free Outfall		R0,C0
477.31	140.17	Free Outfall		R0,C0
477.41	143.32	Free Outfall		R0,C0
477.51	146.40	Free Outfall		R0,C0
477.61	149.42	Free Outfall		R0,C0
477.71	152.38	Free Outfall		R0,C0
477.81	155.29	Free Outfall		R0,C0
477.91	158.13	Free Outfall		R0,C0
478.00	159.31	Free Outfall		R0,C0

LEVEL POOL ROUTING DATA

HYG Dir   = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow HYG file = NONE STORED - COOL SPRINGS IN 2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB BLOCKED

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   475.11 ft
Starting Volume   =   49031 cu.ft
Starting Outflow   =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   1.00 min

| Elevation | Outflow | Storage | Area | Infilt. | Q Total | 2S/t + O |
ft	cfs	cu.ft	sq.ft	cfs	cfs	cfs
469.11	.00	0	0	.00	.00	.00
469.21	.00	1	18	.00	.00	.02
469.31	.00	5	73	.00	.00	.16
469.41	.00	16	164	.00	.00	.55
469.51	.00	39	291	.00	.00	1.29
469.61	.00	76	455	.00	.00	2.53
469.71	.00	131	655	.00	.00	4.37
469.81	.00	208	892	.00	.00	6.94
469.91	.00	311	1165	.00	.00	10.36
470.01	.00	442	1462	.00	.00	14.74
470.11	.00	598	1662	.00	.00	19.95
470.21	.00	775	1876	.00	.00	25.84
470.31	.00	974	2103	.00	.00	32.47
470.41	.00	1196	2343	.00	.00	39.88
470.51	.00	1443	2595	.00	.00	48.10
470.61	.00	1716	2861	.00	.00	57.19
470.71	.00	2016	3139	.00	.00	67.19
470.81	.00	2344	3431	.00	.00	78.13
470.91	.00	2702	3735	.00	.00	90.07
471.01	.00	3091	4052	.00	.00	103.05

LEVEL POOL ROUTING DATA

```
HYG Dir          = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow  HYG file = NONE STORED - COOL SPRINGS IN   2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT  2

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB BLOCKED
```

No Infiltration

INITIAL CONDITIONS

```
Starting WS Elev    =    475.11 ft
Starting Volume     =     49031 cu.ft
Starting Outflow    =       .00 cfs
Starting Infiltr.   =       .00 cfs
Starting Total Qout=       .00 cfs
Time Increment      =      1.00 min
```

Elevation ft	Outflow cfs	Storage cu.ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
471.11	.00	3513	4382	.00	.00	117.10
471.21	.00	3968	4725	.00	.00	132.28
471.31	.00	4459	5081	.00	.00	148.62
471.41	.00	4985	5450	.00	.00	166.16
471.51	.00	5549	5832	.00	.00	184.96
471.61	.00	6152	6227	.00	.00	205.06
471.71	.00	6795	6635	.00	.00	226.49
471.81	.00	7479	7055	.00	.00	249.31
471.91	.00	8206	7489	.00	.00	273.54
472.01	.00	8977	7920	.00	.00	299.24
472.11	.00	9784	8218	.00	.00	326.14
472.21	.00	10621	8522	.00	.00	354.04
472.31	.00	11489	8832	.00	.00	382.96
472.41	.00	12387	9147	.00	.00	412.91
472.51	.00	13318	9467	.00	.00	443.94
472.61	.00	14281	9794	.00	.00	476.04
472.71	.00	15277	10125	.00	.00	509.24
472.81	.00	16307	10462	.00	.00	543.55
472.91	.00	17370	10805	.00	.00	578.99
473.01	.00	18468	11153	.00	.00	615.58

LEVEL POOL ROUTING DATA

```
HYG Dir          = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow  HYG file = NONE STORED - COOL SPRINGS IN  2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB BLOCKED
```

No Infiltration

INITIAL CONDITIONS

```
Starting WS Elev   =    475.11 ft
Starting Volume    =     49031 cu.ft
Starting Outflow   =       .00 cfs
Starting Infiltr.  =       .00 cfs
Starting Total Qout=       .00 cfs
Time Increment     =      1.00 min
```

Elevation ft	Outflow cfs	Storage cu.ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
473.11	.00	19601	11507	.00	.00	653.35
473.21	.00	20769	11866	.00	.00	692.31
473.31	.00	21974	12231	.00	.00	732.47
473.41	.00	23215	12601	.00	.00	773.85
473.51	.00	24494	12977	.00	.00	816.48
473.61	.00	25811	13358	.00	.00	860.37
473.71	.00	27166	13745	.00	.00	905.54
473.81	.00	28561	14138	.00	.00	952.02
473.91	.00	29994	14535	.00	.00	999.79
474.01	.00	31467	14917	.00	.00	1048.91
474.11	.00	32969	15104	.00	.00	1098.95
474.21	.00	34488	15293	.00	.00	1149.61
474.31	.00	36027	15482	.00	.00	1200.91
474.41	.00	37585	15673	.00	.00	1252.82
474.51	.00	39162	15865	.00	.00	1305.39
474.61	.00	40758	16058	.00	.00	1358.60
474.71	.00	42374	16252	.00	.00	1412.45
474.81	.00	44009	16448	.00	.00	1466.95
474.91	.00	45663	16644	.00	.00	1522.09
475.01	.00	47337	16842	.00	.00	1577.91

LEVEL POOL ROUTING DATA

HYG Dir   = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow HYG file = NONE STORED - COOL SPRINGS IN 2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB BLOCKED

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   475.11 ft
Starting Volume   =   49031 cu.ft
Starting Outflow   =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   1.00 min

| Elevation | Outflow | Storage | Area | Infilt. | Q Total | 2S/t + O |
ft	cfs	cu.ft	sq.ft	cfs	cfs	cfs
475.11	.00	49031	17041	.00	.00	1634.38
475.21	1.49	50746	17241	.00	1.49	1693.01
475.31	4.21	52480	17443	.00	4.21	1753.54
475.41	7.75	54234	17645	.00	7.75	1815.54
475.51	11.92	56009	17849	.00	11.92	1878.87
475.61	16.66	57804	18053	.00	16.66	1943.46
475.71	21.90	59620	18259	.00	21.90	2009.21
475.81	27.60	61456	18466	.00	27.60	2076.13
475.91	33.72	63313	18675	.00	33.72	2144.14
476.01	40.25	65191	18883	.00	40.25	2213.26
476.11	47.12	67089	19079	.00	47.12	2283.42
476.21	54.36	69007	19276	.00	54.36	2354.58
476.31	61.93	70944	19475	.00	61.93	2426.74
476.41	69.85	72901	19674	.00	69.85	2499.89
476.51	78.08	74879	19874	.00	78.08	2574.04
476.61	86.55	76876	20076	.00	86.55	2649.09
476.71	95.36	78894	20278	.00	95.36	2725.16
476.81	104.45	80932	20481	.00	104.45	2802.19
476.91	113.80	82990	20686	.00	113.80	2880.13
477.01	123.42	85069	20891	.00	123.42	2959.04

LEVEL POOL ROUTING DATA

```
HYG Dir          = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow  HYG file = NONE STORED - COOL SPRINGS IN  2
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 2

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB BLOCKED
```

No Infiltration

INITIAL CONDITIONS

```
Starting WS Elev   =    475.11 ft
Starting Volume    =     49031 cu.ft
Starting Outflow   =       .00 cfs
Starting Infiltr.  =       .00 cfs
Starting Total Qout=       .00 cfs
Time Increment     =      1.00 min
```

Elevation ft	Outflow cfs	Storage cu.ft	Area sq.ft	Infilt. cfs	Q Total cfs	2S/t + O cfs
477.11	133.29	87169	21097	.00	133.29	3038.90
477.21	136.95	89289	21305	.00	136.95	3113.24
477.31	140.17	91430	21513	.00	140.17	3187.83
477.41	143.32	93591	21723	.00	143.32	3263.02
477.51	146.40	95774	21933	.00	146.40	3338.87
477.61	149.42	97978	22145	.00	149.42	3415.35
477.71	152.38	100203	22357	.00	152.38	3492.48
477.81	155.29	102450	22571	.00	155.29	3570.27
477.91	158.13	104717	22785	.00	158.13	3648.69
478.00	159.31	106777	22979	.00	159.31	3718.54

SUMMARY FOR HYDROGRAPH ADDITION
at Node: COOL SPRINGS IN

HYG Directory: H:\PONDPACK\A13000PLUS\13117A\DETENTION\

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
COOL SPRINGS	COOL SPRINGS		100 YR	

INFLOWS TO: COOL SPRINGS IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	100 YR		95604	4.00	79.67

TOTAL FLOW INTO: COOL SPRINGS IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	COOL SPRINGS IN	100	95604	4.00	79.67

```
               TOTAL NODE INFLOW...
               HYG file =
               HYG ID   = COOL SPRINGS IN
               HYG Tag  = 100
               ---------------------------------
               Peak Discharge =        79.67 cfs
               Time to Peak   =         4.00 min
               HYG Volume     =        95604 cu.ft
               ---------------------------------
```

	HYDROGRAPH ORDINATES (cfs)				
Time	Output Time increment = 1.00 min				
min	Time on left represents time for first value in each row.				
.00	.00	19.92	39.84	59.75	79.67
5.00	79.67	79.67	79.67	79.67	79.67
10.00	79.67	79.67	79.67	79.67	79.67
15.00	79.67	79.67	79.67	79.67	79.67
20.00	79.67	59.75	39.84	19.92	.00

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = H:\PONDPACK\A13000PLUS\13117A\DETENTION\
Inflow  HYG file = NONE STORED - COOL SPRINGS IN   100
Outflow HYG file = NONE STORED - COOL SPRINGS OUT 100

Pond Node   Data = COOL SPRINGS
Pond Volume Data = COOL SPRINGS
Pond Outlet Data = ASB BLOCKED
```

No Infiltration

INITIAL CONDITIONS

```
Starting WS Elev   =    475.11 ft
Starting Volume    =    49031 cu.ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =     1.00 min
```

INFLOW/OUTFLOW HYDROGRAPH SUMMARY
==
```
Peak Inflow      =     79.67 cfs   at      4.00 min
Peak Outflow     =     78.21 cfs   at     20.00 min
```

```
Peak Elevation   =    476.51 ft
Peak Storage =        74908 cu.ft
```
==

MASS BALANCE (cu.ft)

```
+ Initial Vol  =        49031
+ HYG Vol IN   =        95604
- Infiltration =            0
- HYG Vol OUT  =        95601
- Retained Vol =        49035
                   ----------
  Unrouted Vol = -           cu.ft  (.000% of Inflow Volume)
```

Index of Starting Page Numbers for ID Names