

WWHM2012
PROJECT REPORT

General Model Information

Project Name: QCF Phase III - East Pond Sizing
Site Name: Queen City Farms
Site Address: 17825 Cedar Grove Rd SE
City: Maple Valley
Report Date: 8/26/2019
Gage: Seatac
Data Start: 1948/10/01
Data End: 2009/09/30
Timestep: 15 Minute
Precip Scale: 1.167
Version Date: 2018/10/10
Version: 4.2.16

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Cedar Hills dev sub-basin

Bypass: No

GroundWater: No

Pervious Land Use acre

C, Forest, Mod 333

C, Pasture, Mod 11

Pervious Total 344

Impervious Land Use acre

POND 8.5

Impervious Total 8.5

Basin Total 352.5

Element Flows To:

Surface

Interflow

Groundwater

Maple Hills sub-basin

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
A B, Forest, Mod	128
C, Pasture, Mod	8
Pervious Total	136
Impervious Land Use	acre
ROADS FLAT	38
Impervious Total	38
Basin Total	174

Element Flows To:		
Surface	Interflow	Groundwater

Phase III to QCL

Bypass:	No
GroundWater:	No
Pervious Land Use C, Pasture, Mod	acre 13
Pervious Total	13
Impervious Land Use	acre
Impervious Total	0
Basin Total	13

Element Flows To:		
Surface	Interflow	Groundwater

Mitigated Land Use

Maple Hills sub-basin

Bypass: No

GroundWater: No

Pervious Land Use acre

A B, Forest, Mod 128

C, Pasture, Mod 8

Pervious Total 136

Impervious Land Use acre

ROADS FLAT 38

Impervious Total 38

Basin Total 174

Element Flows To:

Surface	Interflow	Groundwater
Queen City Lake	Queen City Lake	

Cedar Hills sub-basin

Bypass: No

GroundWater: No

Pervious Land Use acre

C, Forest, Mod 333

C, Pasture, Mod 11

Pervious Total 344

Impervious Land Use acre

POND 8.5

Impervious Total 8.5

Basin Total 352.5

Element Flows To:

Surface

Queen City Lake

Interflow

Queen City Lake

Groundwater

Phase III Refill to QCL

Bypass: No

GroundWater: No

Pervious Land Use acre
C, Pasture, Mod 13

Pervious Total 13

Impervious Land Use acre

Impervious Total 0

Basin Total 13

Element Flows To:

Surface	Interflow	Groundwater
Queen City Lake	Queen City Lake	

Routing Elements
Predeveloped Routing

Mitigated Routing

Queen City Lake

Depth: 10.9 ft.
 Discharge Structure: 1
 Riser Height: 7.96 ft.
 Riser Diameter: 36 in.
 Orifice 1 Diameter: 12 in. Elevation: 5 ft.
 Element Flows To:
 Outlet 1 Outlet 2
 Trapezoidal Pond 1

SSD Table Hydraulic Table

Stage (feet)	Area (ac.)	Volume (ac-ft.)	Outlet Struct	Infil (cfs)	NotUsed	NotUsed	NotUsed
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.400	0.006	0.001	0.000	0.300	0.000	0.000	0.000
1.400	1.870	0.663	0.000	0.800	0.000	0.000	0.000
2.400	4.092	3.572	0.000	1.200	0.000	0.000	0.000
3.400	5.584	8.391	0.000	1.600	0.000	0.000	0.000
4.400	7.107	14.72	0.000	1.800	0.000	0.000	0.000
5.400	8.533	22.53	2.471	2.000	0.000	0.000	0.000
6.400	9.937	31.76	4.624	3.000	0.000	0.000	0.000
7.400	11.73	42.58	6.054	7.000	0.000	0.000	0.000
8.400	13.12	55.00	16.33	15.70	0.000	0.000	0.000
9.400	14.54	68.82	41.95	15.70	0.000	0.000	0.000
10.90	15.19	91.11	58.10	15.70	0.000	0.000	0.000

Trapezoidal Pond 1

Bottom Length: 300.00 ft.
 Bottom Width: 100.00 ft.
 Depth: 4 ft.
 Volume at riser head: 3.2543 acre-feet.
 Infiltration On
 Infiltration rate: 20
 Infiltration safety factor: 1
 Total Volume Infiltrated (ac-ft.): 7340.564
 Total Volume Through Riser (ac-ft.): 0
 Total Volume Through Facility (ac-ft.): 7340.564
 Percent Infiltrated: 100
 Total Precip Applied to Facility: 34.083
 Total Evap From Facility: 2.499
 Side slope 1: 3 To 1
 Side slope 2: 3 To 1
 Side slope 3: 3 To 1
 Side slope 4: 3 To 1
 Discharge Structure
 Riser Height: 4 ft.
 Riser Diameter: 72 in.
 Element Flows To:
 Outlet 1 Outlet 2

Pond Hydraulic Table

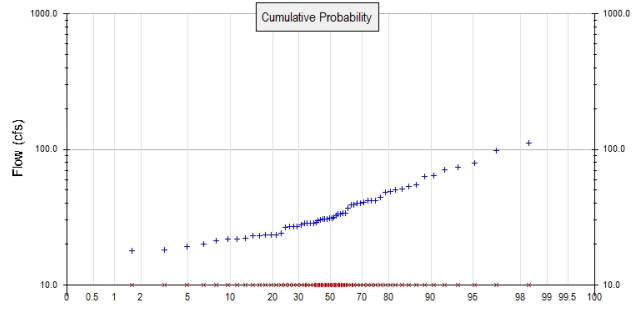
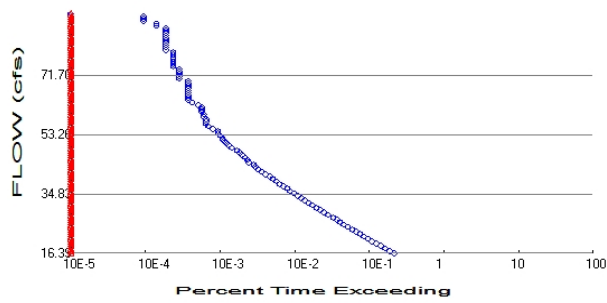
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
386.00	0.688	0.000	0.000	0.000
386.04	0.691	0.030	0.000	13.88
386.09	0.693	0.061	0.000	13.88
386.13	0.696	0.092	0.000	13.88
386.18	0.698	0.123	0.000	13.88
386.22	0.701	0.154	0.000	13.88
386.27	0.703	0.185	0.000	13.88
386.31	0.705	0.216	0.000	13.88
386.36	0.708	0.248	0.000	13.88
386.40	0.710	0.279	0.000	13.88
386.44	0.713	0.311	0.000	13.88
386.49	0.715	0.343	0.000	13.88
386.53	0.718	0.375	0.000	13.88
386.58	0.720	0.407	0.000	13.88
386.62	0.723	0.439	0.000	13.88
386.67	0.725	0.471	0.000	13.88
386.71	0.728	0.503	0.000	13.88
386.76	0.730	0.536	0.000	13.88
386.80	0.733	0.568	0.000	13.88
386.84	0.735	0.601	0.000	13.88
386.89	0.738	0.634	0.000	13.88
386.93	0.740	0.667	0.000	13.88
386.98	0.743	0.700	0.000	13.88
387.02	0.745	0.733	0.000	13.88
387.07	0.748	0.766	0.000	13.88
387.11	0.750	0.799	0.000	13.88
387.16	0.753	0.833	0.000	13.88
387.20	0.756	0.866	0.000	13.88
387.24	0.758	0.900	0.000	13.88

387.29	0.761	0.934	0.000	13.88
387.33	0.763	0.967	0.000	13.88
387.38	0.766	1.001	0.000	13.88
387.42	0.768	1.036	0.000	13.88
387.47	0.771	1.070	0.000	13.88
387.51	0.773	1.104	0.000	13.88
387.56	0.776	1.139	0.000	13.88
387.60	0.779	1.173	0.000	13.88
387.64	0.781	1.208	0.000	13.88
387.69	0.784	1.243	0.000	13.88
387.73	0.786	1.278	0.000	13.88
387.78	0.789	1.313	0.000	13.88
387.82	0.791	1.348	0.000	13.88
387.87	0.794	1.383	0.000	13.88
387.91	0.797	1.418	0.000	13.88
387.96	0.799	1.454	0.000	13.88
388.00	0.802	1.489	0.000	13.88
388.04	0.804	1.525	0.000	13.88
388.09	0.807	1.561	0.000	13.88
388.13	0.810	1.597	0.000	13.88
388.18	0.812	1.633	0.000	13.88
388.22	0.815	1.669	0.000	13.88
388.27	0.817	1.705	0.000	13.88
388.31	0.820	1.742	0.000	13.88
388.36	0.823	1.778	0.000	13.88
388.40	0.825	1.815	0.000	13.88
388.44	0.828	1.852	0.000	13.88
388.49	0.831	1.889	0.000	13.88
388.53	0.833	1.926	0.000	13.88
388.58	0.836	1.963	0.000	13.88
388.62	0.838	2.000	0.000	13.88
388.67	0.841	2.037	0.000	13.88
388.71	0.844	2.075	0.000	13.88
388.76	0.846	2.112	0.000	13.88
388.80	0.849	2.150	0.000	13.88
388.84	0.852	2.188	0.000	13.88
388.89	0.854	2.226	0.000	13.88
388.93	0.857	2.264	0.000	13.88
388.98	0.860	2.302	0.000	13.88
389.02	0.862	2.340	0.000	13.88
389.07	0.865	2.379	0.000	13.88
389.11	0.868	2.417	0.000	13.88
389.16	0.870	2.456	0.000	13.88
389.20	0.873	2.495	0.000	13.88
389.24	0.876	2.533	0.000	13.88
389.29	0.878	2.572	0.000	13.88
389.33	0.881	2.612	0.000	13.88
389.38	0.884	2.651	0.000	13.88
389.42	0.886	2.690	0.000	13.88
389.47	0.889	2.730	0.000	13.88
389.51	0.892	2.769	0.000	13.88
389.56	0.895	2.809	0.000	13.88
389.60	0.897	2.849	0.000	13.88
389.64	0.900	2.889	0.000	13.88
389.69	0.903	2.929	0.000	13.88
389.73	0.905	2.969	0.000	13.88
389.78	0.908	3.009	0.000	13.88
389.82	0.911	3.050	0.000	13.88

389.87	0.914	3.090	0.000	13.88
389.91	0.916	3.131	0.000	13.88
389.96	0.919	3.172	0.000	13.88
390.00	0.922	3.213	0.000	13.88
390.04	0.925	3.254	0.596	13.88

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 493
 Total Impervious Area: 46.5

Mitigated Landuse Totals for POC #1

Total Pervious Area: 493
 Total Impervious Area: 46.5

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	32.775625
5 year	47.768722
10 year	59.378734
25 year	76.101607
50 year	90.141409
100 year	105.616188

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	50.858	0.000
1950	48.944	0.000
1951	40.610	0.000
1952	22.991	0.000
1953	19.226	0.000
1954	26.830	0.000
1955	31.257	0.000
1956	30.418	0.000
1957	37.020	0.000
1958	23.401	0.000

1959	21.848	0.000
1960	41.900	0.000
1961	29.078	0.000
1962	17.999	0.000
1963	28.627	0.000
1964	28.480	0.000
1965	33.299	0.000
1966	23.074	0.000
1967	50.189	0.000
1968	32.405	0.000
1969	28.592	0.000
1970	30.871	0.000
1971	33.688	0.000
1972	41.832	0.000
1973	21.813	0.000
1974	33.485	0.000
1975	40.273	0.000
1976	30.365	0.000
1977	21.235	0.000
1978	27.562	0.000
1979	30.632	0.000
1980	70.258	0.000
1981	29.868	0.000
1982	54.614	0.000
1983	26.534	0.000
1984	22.009	0.000
1985	23.259	0.000
1986	38.988	0.000
1987	39.060	0.000
1988	17.832	0.000
1989	24.169	0.000
1990	111.627	0.000
1991	63.831	0.000
1992	27.125	0.000
1993	19.894	0.000
1994	15.454	0.000
1995	26.805	0.000
1996	63.304	0.000
1997	41.862	0.000
1998	28.411	0.000
1999	73.944	0.000
2000	30.697	0.000
2001	23.447	0.000
2002	40.328	0.000
2003	48.488	0.000
2004	53.182	0.000
2005	33.648	0.000
2006	31.518	0.000
2007	98.549	0.000
2008	79.507	0.000
2009	44.157	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	111.6270	0.0000
2	98.5492	0.0000
3	79.5073	0.0000

4	73.9443	0.0000
5	70.2581	0.0000
6	63.8307	0.0000
7	63.3038	0.0000
8	54.6140	0.0000
9	53.1816	0.0000
10	50.8580	0.0000
11	50.1890	0.0000
12	48.9439	0.0000
13	48.4878	0.0000
14	44.1568	0.0000
15	41.9000	0.0000
16	41.8620	0.0000
17	41.8315	0.0000
18	40.6099	0.0000
19	40.3283	0.0000
20	40.2733	0.0000
21	39.0604	0.0000
22	38.9884	0.0000
23	37.0198	0.0000
24	33.6880	0.0000
25	33.6479	0.0000
26	33.4852	0.0000
27	33.2994	0.0000
28	32.4045	0.0000
29	31.5179	0.0000
30	31.2571	0.0000
31	30.8712	0.0000
32	30.6971	0.0000
33	30.6323	0.0000
34	30.4175	0.0000
35	30.3647	0.0000
36	29.8675	0.0000
37	29.0776	0.0000
38	28.6270	0.0000
39	28.5924	0.0000
40	28.4797	0.0000
41	28.4106	0.0000
42	27.5616	0.0000
43	27.1253	0.0000
44	26.8298	0.0000
45	26.8052	0.0000
46	26.5342	0.0000
47	24.1692	0.0000
48	23.4469	0.0000
49	23.4009	0.0000
50	23.2587	0.0000
51	23.0736	0.0000
52	22.9911	0.0000
53	22.0086	0.0000
54	21.8475	0.0000
55	21.8128	0.0000
56	21.2348	0.0000
57	19.8937	0.0000
58	19.2256	0.0000
59	17.9993	0.0000
60	17.8317	0.0000
61	15.4538	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
16.3878	4552	0	0	Pass
17.1328	3974	0	0	Pass
17.8778	3454	0	0	Pass
18.6228	3018	0	0	Pass
19.3678	2620	0	0	Pass
20.1127	2289	0	0	Pass
20.8577	2032	0	0	Pass
21.6027	1805	0	0	Pass
22.3477	1606	0	0	Pass
23.0927	1417	0	0	Pass
23.8377	1257	0	0	Pass
24.5827	1102	0	0	Pass
25.3276	982	0	0	Pass
26.0726	859	0	0	Pass
26.8176	783	0	0	Pass
27.5626	698	0	0	Pass
28.3076	602	0	0	Pass
29.0526	520	0	0	Pass
29.7976	475	0	0	Pass
30.5425	419	0	0	Pass
31.2875	373	0	0	Pass
32.0325	328	0	0	Pass
32.7775	288	0	0	Pass
33.5225	261	0	0	Pass
34.2675	235	0	0	Pass
35.0125	210	0	0	Pass
35.7574	186	0	0	Pass
36.5024	169	0	0	Pass
37.2474	150	0	0	Pass
37.9924	134	0	0	Pass
38.7374	122	0	0	Pass
39.4824	108	0	0	Pass
40.2274	99	0	0	Pass
40.9723	86	0	0	Pass
41.7173	77	0	0	Pass
42.4623	69	0	0	Pass
43.2073	64	0	0	Pass
43.9523	60	0	0	Pass
44.6973	52	0	0	Pass
45.4423	50	0	0	Pass
46.1872	47	0	0	Pass
46.9322	42	0	0	Pass
47.6772	39	0	0	Pass
48.4222	36	0	0	Pass
49.1672	31	0	0	Pass
49.9122	28	0	0	Pass
50.6572	26	0	0	Pass
51.4021	24	0	0	Pass
52.1471	23	0	0	Pass
52.8921	22	0	0	Pass
53.6371	20	0	0	Pass
54.3821	20	0	0	Pass
55.1271	17	0	0	Pass

55.8721	15	0	0	Pass
56.6170	14	0	0	Pass
57.3620	14	0	0	Pass
58.1070	14	0	0	Pass
58.8520	13	0	0	Pass
59.5970	13	0	0	Pass
60.3420	12	0	0	Pass
61.0870	12	0	0	Pass
61.8319	12	0	0	Pass
62.5769	11	0	0	Pass
63.3219	9	0	0	Pass
64.0669	8	0	0	Pass
64.8119	8	0	0	Pass
65.5569	8	0	0	Pass
66.3019	8	0	0	Pass
67.0468	8	0	0	Pass
67.7918	8	0	0	Pass
68.5368	8	0	0	Pass
69.2818	8	0	0	Pass
70.0268	8	0	0	Pass
70.7718	6	0	0	Pass
71.5168	6	0	0	Pass
72.2617	6	0	0	Pass
73.0067	6	0	0	Pass
73.7517	6	0	0	Pass
74.4967	5	0	0	Pass
75.2417	5	0	0	Pass
75.9867	5	0	0	Pass
76.7317	5	0	0	Pass
77.4767	5	0	0	Pass
78.2216	5	0	0	Pass
78.9666	5	0	0	Pass
79.7116	4	0	0	Pass
80.4566	4	0	0	Pass
81.2016	4	0	0	Pass
81.9466	4	0	0	Pass
82.6916	4	0	0	Pass
83.4365	4	0	0	Pass
84.1815	4	0	0	Pass
84.9265	4	0	0	Pass
85.6715	4	0	0	Pass
86.4165	4	0	0	Pass
87.1615	3	0	0	Pass
87.9065	3	0	0	Pass
88.6514	2	0	0	Pass
89.3964	2	0	0	Pass
90.1414	2	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	<input type="checkbox"/>	6679.91			<input type="checkbox"/>	100.00			
Queen City Lake	<input type="checkbox"/>	29242.24			<input type="checkbox"/>	77.26			
Total Volume Infiltrated		35922.15	0.00	0.00		81.49	0.00	0%	No Treat Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

POC 2

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

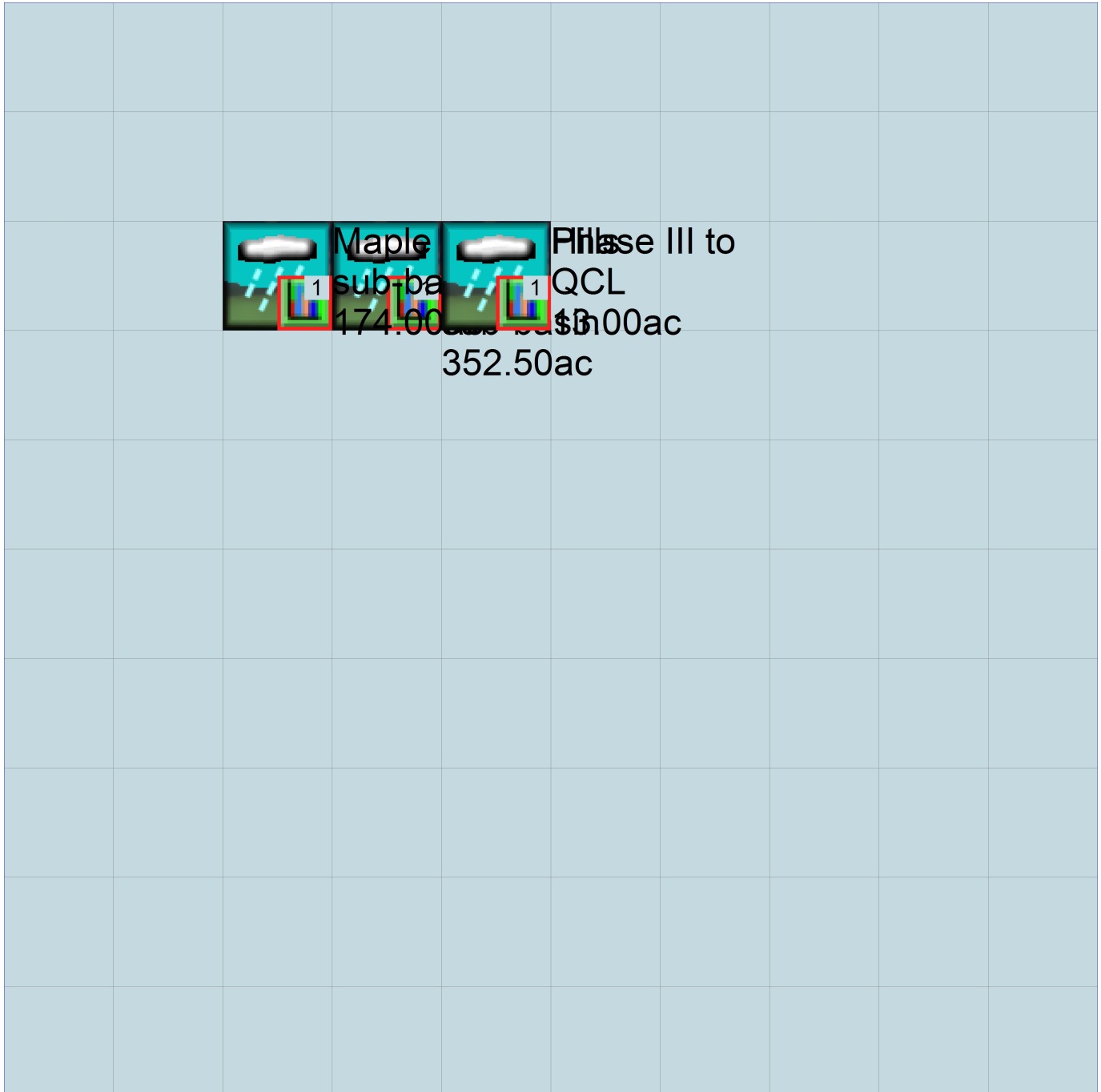
PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

RUN

GLOBAL

```

WVHM4 model simulation
START      1948 10 01      END      2009 09 30
RUN INTERP OUTPUT LEVEL   3      0
RESUME     0 RUN          1
UNIT SYSTEM 1
END GLOBAL

```

FILES

```

<File> <Un#> <-----File Name----->***
<-ID->                                     ***
WDM      26    QCF Phase III - East Pond Sizing.wdm
MESSU    25    PreQCF Phase III - East Pond Sizing.MES
          27    PreQCF Phase III - East Pond Sizing.L61
          28    PreQCF Phase III - East Pond Sizing.L62
          30    POCQCF Phase III - East Pond Sizing1.dat
END FILES

```

OPN SEQUENCE

```

INGRP          INDELT 00:15
  PERLND       11
  PERLND       14
  IMPLND       14
  PERLND        2
  IMPLND        1
  COPY         501
  DISPLY        1
END INGRP

```

END OPN SEQUENCE

DISPLY

```

DISPLY-INFO1
# - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
1   Cedar Hills dev sub-basin  MAX          1   2   30   9
END DISPLY-INFO1

```

END DISPLY

COPY

```

TIMESERIES
# - # NPT NMN ***
1   1   1
501 1   1
END TIMESERIES

```

END COPY

GENER

```

OPCODE
#   # OPCD ***
END OPCODE
PARM
#   #           K ***
END PARM

```

END GENER

PERLND

```

GEN-INFO
<PLS ><-----Name----->NBLKS  Unit-systems  Printer ***
# - #           User  t-series  Engl Metr ***
           in  out
11    C, Forest, Mod      1   1   1   1   27   0
14    C, Pasture, Mod     1   1   1   1   27   0
2     A/B, Forest, Mod    1   1   1   1   27   0
END GEN-INFO
*** Section PWATER***

```

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL MSTL PEST NITR PHOS TRAC ***
11   0   0   1   0   0   0   0   0   0   0   0   0
14   0   0   1   0   0   0   0   0   0   0   0   0
2    0   0   1   0   0   0   0   0   0   0   0   0

```

END ACTIVITY

PRINT-INFO

```

<PLS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL  MSTL  PEST  NITR  PHOS  TRAC  *****
11      0  0  4  0  0  0  0  0  0  0  0  0  1  9
14      0  0  4  0  0  0  0  0  0  0  0  0  0  1  9
 2      0  0  4  0  0  0  0  0  0  0  0  0  0  1  9
END PRINT-INFO

```

PWAT-PARM1

```

<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG  VCS  VUZ  VNN  VIFW  VIRG  VLE  INFC  HWT  ***
11      0  0  0  0  0  0  0  0  0  0  0  0
14      0  0  0  0  0  0  0  0  0  0  0  0
 2      0  0  0  0  0  0  0  0  0  0  0  0
END PWAT-PARM1

```

PWAT-PARM2

```

<PLS > PWATER input info: Part 2 *****
# - # ***FOREST  LZSN  INFILT  LSUR  SLSUR  KVARY  AGWRC
11      0  4.5  0.08  400  0.1  0.5  0.996
14      0  4.5  0.06  400  0.1  0.5  0.996
 2      0  5  2  400  0.1  0.3  0.996
END PWAT-PARM2

```

PWAT-PARM3

```

<PLS > PWATER input info: Part 3 *****
# - # ***PETMAX  PETMIN  INFEXP  INFILD  DEEPFR  BASETP  AGWETP
11      0  0  2  2  0  0  0
14      0  0  2  2  0  0  0
 2      0  0  2  2  0  0  0
END PWAT-PARM3

```

PWAT-PARM4

```

<PLS > PWATER input info: Part 4 *****
# - # CEPSC  UZSN  NSUR  INTFW  IRC  LZETP  ***
11      0.2  0.5  0.35  6  0.5  0.7
14      0.15  0.4  0.3  6  0.5  0.4
 2      0.2  0.5  0.35  0  0.7  0.7
END PWAT-PARM4

```

PWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS  SURS  UZS  IFWS  LZS  AGWS  GWVS
11      0  0  0  0  2.5  1  0
14      0  0  0  0  2.5  1  0
 2      0  0  0  0  3  1  0
END PWAT-STATE1

```

END PERLND

IMPLND

GEN-INFO

```

<PLS > <-----Name-----> Unit-systems Printer ***
# - # User t-series Engr Metr ***
in out ***
14 POND 1 1 1 27 0
1 ROADS/FLAT 1 1 1 27 0
END GEN-INFO
*** Section IWATER***

```

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG  IQAL  ***
14      0  0  1  0  0  0
 1      0  0  1  0  0  0
END ACTIVITY

```

PRINT-INFO

```

<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
14      0    0    4    0    0    0    1    9
1        0    0    4    0    0    0    1    9
END PRINT-INFO

```

```

IWAT-PARM1
<PLS >  IWATER variable monthly parameter value flags  ***
# - # CSNO RTOP  VRS  VNN RTLI  ***
14      0    0    0    0    0
1        0    0    0    0    0
END IWAT-PARM1

```

```

IWAT-PARM2
<PLS >      IWATER input info: Part 2      ***
# - # ***  LSUR      SLSUR      NSUR      RETSC
14      400      0.01      0.1      0.1
1        400      0.01      0.1      0.1
END IWAT-PARM2

```

```

IWAT-PARM3
<PLS >      IWATER input info: Part 3      ***
# - # ***PETMAX      PETMIN
14      0          0
1        0          0
END IWAT-PARM3

```

```

IWAT-STATE1
<PLS > *** Initial conditions at start of simulation
# - # ***  RETS      SURS
14      0          0
1        0          0
END IWAT-STATE1

```

END IMPLND

```

SCHEMATIC
<-Source->          <--Area-->          <-Target->  MBLK  ***
<Name> #           <-factor-->          <Name> #    Tbl#  ***
Cedar Hills dev sub-basin***
PERLND  11          333      COPY  501    12
PERLND  11          333      COPY  501    13
PERLND  14          11       COPY  501    12
PERLND  14          11       COPY  501    13
IMPLND  14          8.5      COPY  501    15
Maple Hills sub-basin***
PERLND  2           128      COPY  501    12
PERLND  2           128      COPY  501    13
PERLND  14          8       COPY  501    12
PERLND  14          8       COPY  501    13
IMPLND  1           38      COPY  501    15
Phase III to QCL***
PERLND  14          13      COPY  501    12
PERLND  14          13      COPY  501    13

```

```

*****Routing*****
END SCHEMATIC

```

```

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> #     <Name> # #<-factor->strg <Name> # # <Name> # # ***
COPY  501 OUTPUT MEAN  1 1  48.4      DISPLY  1      INPUT  TIMSER 1

```

```

<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> #     <Name> # #<-factor->strg <Name> # # <Name> # # ***
END NETWORK

```

RCHRES

END MASS-LINK 15

END MASS-LINK

END RUN

Mitigated UCI File

RUN

GLOBAL

WVHM4 model simulation
START 1948 10 01 END 2009 09 30
RUN INTERP OUTPUT LEVEL 3 0
RESUME 0 RUN 1 UNIT SYSTEM 1
END GLOBAL

FILES

```
<File> <Un#> <-----File Name----->***  
<-ID-> ***  
WDM 26 QCF Phase III - East Pond Sizing.wdm  
MESSU 25 MitQCF Phase III - East Pond Sizing.MES  
27 MitQCF Phase III - East Pond Sizing.L61  
28 MitQCF Phase III - East Pond Sizing.L62  
30 POCQCF Phase III - East Pond Sizing1.dat
```

END FILES

OPN SEQUENCE

INGRP INDELT 00:15

PERLND 2
PERLND 14
IMPLND 1
PERLND 11
IMPLND 14
RCHRES 1
RCHRES 2
COPY 1
COPY 501
DISPLY 1

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INFO1

```
# - #<-----Title----->***TRAN PIVL DIG1 FIL1 PYR DIG2 FIL2 YRND  
1 Trapezoidal Pond 1 MAX 1 2 30 9
```

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES

```
# - # NPT NMN ***  
1 1 1  
501 1 1
```

END TIMESERIES

END COPY

GENER

OPCODE

```
# # OPCD ***
```

END OPCODE

PARM

```
# # K ***
```

END PARM

END GENER

PERLND

GEN-INFO

```
<PLS ><-----Name----->NBLKS Unit-systems Printer ***  
# - # User t-series Engl Metr ***  
in out ***
```

```
2 A/B, Forest, Mod 1 1 1 1 27 0  
14 C, Pasture, Mod 1 1 1 1 27 0  
11 C, Forest, Mod 1 1 1 1 27 0
```

END GEN-INFO

*** Section PWATER***

ACTIVITY

```
<PLS > ***** Active Sections *****  
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ***
```

```

  2      0  0  1  0  0  0  0  0  0  0  0  0
 14      0  0  1  0  0  0  0  0  0  0  0  0
 11      0  0  1  0  0  0  0  0  0  0  0  0
END ACTIVITY

```

PRINT-INFO

```

<PLS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL MSTL PEST NITR PHOS TRAC  *****
  2      0  0  4  0  0  0  0  0  0  0  0  0  1  9
 14      0  0  4  0  0  0  0  0  0  0  0  0  1  9
 11      0  0  4  0  0  0  0  0  0  0  0  0  1  9
END PRINT-INFO

```

PWAT-PARM1

```

<PLS >  PWATER variable monthly parameter value flags  ***
# - # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT  ***
  2      0  0  0  0  0  0  0  0  0  0  0  0
 14      0  0  0  0  0  0  0  0  0  0  0  0
 11      0  0  0  0  0  0  0  0  0  0  0  0
END PWAT-PARM1

```

PWAT-PARM2

```

<PLS >  PWATER input info: Part 2          ***
# - # ***FOREST  LZSN  INFILT  LSUR  SLSUR  KVARY  AGWRC
  2      0          5          2      400    0.1    0.3    0.996
 14      0      4.5    0.06    400    0.1    0.5    0.996
 11      0      4.5    0.08    400    0.1    0.5    0.996
END PWAT-PARM2

```

PWAT-PARM3

```

<PLS >  PWATER input info: Part 3          ***
# - # ***PETMAX  PETMIN  INFEXP  INFILD  DEEPFR  BASETP  AGWETP
  2      0          0          2          2          0          0          0
 14      0          0          2          2          0          0          0
 11      0          0          2          2          0          0          0
END PWAT-PARM3

```

PWAT-PARM4

```

<PLS >  PWATER input info: Part 4          ***
# - # CEPSC  UZSN  NSUR  INTFW  IRC  LZETP  ***
  2      0.2    0.5    0.35    0      0.7    0.7
 14      0.15  0.4    0.3      6      0.5    0.4
 11      0.2    0.5    0.35    6      0.5    0.7
END PWAT-PARM4

```

PWAT-STATE1

```

<PLS >  *** Initial conditions at start of simulation
          ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS  SURS  UZS  IFWS  LZS  AGWS  GWVS
  2      0          0          0          0          3          1          0
 14      0          0          0          0          2.5      1          0
 11      0          0          0          0          2.5      1          0
END PWAT-STATE1

```

END PERLND

IMPLND

GEN-INFO

```

<PLS ><-----Name----->  Unit-systems  Printer  ***
# - #                          User  t-series  Engl Metr  ***
                          in  out      ***
  1      ROADS/FLAT          1  1  1  27  0
 14      POND                1  1  1  27  0
END GEN-INFO
*** Section IWATER***

```

ACTIVITY

```

<PLS >  ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
  1      0  0  1  0  0  0
 14      0  0  1  0  0  0

```


END ACTIVITY

PRINT-INFO

```

<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
1   0   0   4   0   0   0   1   9
14  0   0   4   0   0   0   1   9

```

END PRINT-INFO

IWAT-PARM1

```

<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP  VRS  VMN RTLI  ***
1   0   0   0   0   0
14  0   0   0   0   0

```

END IWAT-PARM1

IWAT-PARM2

```

<PLS > IWATER input info: Part 2          ***
# - # ***  LSUR  SLSUR  NSUR  RETSC
1   400  0.01  0.1   0.1
14  400  0.01  0.1   0.1

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS > IWATER input info: Part 3          ***
# - # ***PETMAX  PETMIN
1   0   0
14  0   0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # ***  RETS  SURS
1   0   0
14  0   0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

```

<-Source->          <--Area-->          <-Target->          MBLK          ***
<Name> #            <-factor-->          <Name> #          Tbl#          ***
Maple Hills sub-basin***
PERLND  2            128          RCHRES  1          2
PERLND  2            128          RCHRES  1          3
PERLND  14           8           RCHRES  1          2
PERLND  14           8           RCHRES  1          3
IMPLND  1            38          RCHRES  1          5
Cedar Hills sub-basin***
PERLND  11           333          RCHRES  1          2
PERLND  11           333          RCHRES  1          3
PERLND  14           11          RCHRES  1          2
PERLND  14           11          RCHRES  1          3
IMPLND  14           8.5         RCHRES  1          5
Phase III Refill to QCL***
PERLND  14           13          RCHRES  1          2
PERLND  14           13          RCHRES  1          3

*****Routing*****
RCHRES  1            1           RCHRES  2          7
RCHRES  1            1           COPY    1          17
RCHRES  2            1           COPY    501         17

```

END SCHEMATIC

NETWORK

```

<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> #    <Name> # #<-factor-->strg <Name> # # <Name> # # ***
COPY  501 OUTPUT MEAN  1 1  48.4  DISPLY  1  INPUT TIMSER 1

```

```

<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # #<-factor-->strg <Name> # # <Name> # # ***
END NETWORK

```

RCHRES

```

GEN-INFO
RCHRES      Name      Nexits      Unit Systems      Printer      ***
# - #<-----><----> User T-series  Engr Metr LKFG      ***
              in out
1      Queen City Lake      2      1      1      1      28      0      1
2      Trapezoidal Pond-019  2      1      1      1      28      0      1
END GEN-INFO
*** Section RCHRES***

```

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
1      1      0      0      0      0      0      0      0      0      0
2      1      0      0      0      0      0      0      0      0
END ACTIVITY

```

PRINT-INFO

```

<PLS > ***** Print-flags ***** PIVL  PYR
# - # HYDR ADCA CONS HEAT SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *****
1      4      0      0      0      0      0      0      0      0      0      1      9
2      4      0      0      0      0      0      0      0      0      0      1      9
END PRINT-INFO

```

HYDR-PARM1

```

RCHRES      Flags for each HYDR Section      ***
# - # VC A1 A2 A3 ODFVFG for each *** ODGTFG for each      FUNCT for each
      FG FG FG FG possible exit *** possible exit      possible exit
      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
1      0 1 0 0      4 5 0 0 0      0 0 0 0 0      2 2 2 2 2
2      0 1 0 0      4 5 0 0 0      0 0 0 0 0      2 2 2 2 2
END HYDR-PARM1

```

HYDR-PARM2

```

# - # FTABNO      LEN      DELTH      STCOR      KS      DB50      ***
<-----><-----><-----><-----><-----><----->      ***
1      1      0.01      0.0      0.0      0.5      0.0
2      2      0.06      0.0      386.0      0.5      0.0
END HYDR-PARM2

```

HYDR-INIT

```

RCHRES      Initial conditions for each HYDR section      ***
# - # *** VOL      Initial value of COLIND      Initial value of OUTDGT
      *** ac-ft      for each possible exit      for each possible exit
<-----><----->      <-----><-----><-----><----->      *** <-----><-----><-----><----->
1      0      4.0 5.0 0.0 0.0 0.0      0.0 0.0 0.0 0.0 0.0
2      0      4.0 5.0 0.0 0.0 0.0      0.0 0.0 0.0 0.0 0.0
END HYDR-INIT

```

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

```

FTABLE      1
12      5
      Depth      Area      Volume      Outflow1      Outflow2      Velocity      Travel Time***
      (ft)      (acres)      (acre-ft)      (cfs)      (cfs)      (ft/sec)      (Minutes)***
0.000000  0.000000  0.000000  0.000000  0.000000
0.400000  0.006300  0.000800  0.000000  0.300000
1.400000  1.870300  0.662700  0.000000  0.800000
2.400000  4.091600  3.572100  0.000000  1.200000
3.400000  5.584100  8.390600  0.000000  1.600000
4.400000  7.107000  14.72080  0.000000  1.800000
5.400000  8.532900  22.53000  2.471446  2.000000
6.400000  9.937100  31.75610  4.623653  3.000000
7.400000  11.73030  42.57740  6.053783  7.000000

```

8.400000 13.12080 54.99650 16.33172 15.70000
 9.400000 14.53770 68.81970 41.95013 15.70000
 10.90000 15.18870 91.11270 58.09619 15.70000

END FTABLE 1
 FTABLE 2

91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.688705	0.000000	0.000000	0.000000		
0.044444	0.691156	0.030664	0.000000	13.88889		
0.088889	0.693609	0.061436	0.000000	13.88889		
0.133333	0.696066	0.092318	0.000000	13.88889		
0.177778	0.698526	0.123309	0.000000	13.88889		
0.222222	0.700990	0.154409	0.000000	13.88889		
0.266667	0.703456	0.185619	0.000000	13.88889		
0.311111	0.705926	0.216939	0.000000	13.88889		
0.355556	0.708400	0.248368	0.000000	13.88889		
0.400000	0.710876	0.279908	0.000000	13.88889		
0.444444	0.713356	0.311557	0.000000	13.88889		
0.488889	0.715839	0.343317	0.000000	13.88889		
0.533333	0.718325	0.375187	0.000000	13.88889		
0.577778	0.720815	0.407168	0.000000	13.88889		
0.622222	0.723307	0.439260	0.000000	13.88889		
0.666667	0.725803	0.471462	0.000000	13.88889		
0.711111	0.728303	0.503776	0.000000	13.88889		
0.755556	0.730805	0.536200	0.000000	13.88889		
0.800000	0.733311	0.568736	0.000000	13.88889		
0.844444	0.735820	0.601384	0.000000	13.88889		
0.888889	0.738333	0.634143	0.000000	13.88889		
0.933333	0.740848	0.667013	0.000000	13.88889		
0.977778	0.743367	0.699996	0.000000	13.88889		
1.022222	0.745890	0.733091	0.000000	13.88889		
1.066667	0.748415	0.766297	0.000000	13.88889		
1.111111	0.750944	0.799616	0.000000	13.88889		
1.155556	0.753476	0.833048	0.000000	13.88889		
1.200000	0.756011	0.866592	0.000000	13.88889		
1.244444	0.758550	0.900249	0.000000	13.88889		
1.288889	0.761091	0.934019	0.000000	13.88889		
1.333333	0.763636	0.967902	0.000000	13.88889		
1.377778	0.766185	1.001898	0.000000	13.88889		
1.422222	0.768736	1.036007	0.000000	13.88889		
1.466667	0.771291	1.070230	0.000000	13.88889		
1.511111	0.773849	1.104566	0.000000	13.88889		
1.555556	0.776411	1.139016	0.000000	13.88889		
1.600000	0.778975	1.173581	0.000000	13.88889		
1.644444	0.781543	1.208259	0.000000	13.88889		
1.688889	0.784114	1.243051	0.000000	13.88889		
1.733333	0.786689	1.277958	0.000000	13.88889		
1.777778	0.789266	1.312979	0.000000	13.88889		
1.822222	0.791847	1.348115	0.000000	13.88889		
1.866667	0.794432	1.383366	0.000000	13.88889		
1.911111	0.797019	1.418731	0.000000	13.88889		
1.955556	0.799610	1.454212	0.000000	13.88889		
2.000000	0.802204	1.489808	0.000000	13.88889		
2.044444	0.804801	1.525519	0.000000	13.88889		
2.088889	0.807402	1.561346	0.000000	13.88889		
2.133333	0.810006	1.597288	0.000000	13.88889		
2.177778	0.812613	1.633346	0.000000	13.88889		
2.222222	0.815223	1.669520	0.000000	13.88889		
2.266667	0.817837	1.705811	0.000000	13.88889		
2.311111	0.820453	1.742217	0.000000	13.88889		
2.355556	0.823074	1.778740	0.000000	13.88889		
2.400000	0.825697	1.815379	0.000000	13.88889		
2.444444	0.828324	1.852135	0.000000	13.88889		
2.488889	0.830954	1.889008	0.000000	13.88889		
2.533333	0.833587	1.925998	0.000000	13.88889		
2.577778	0.836223	1.963105	0.000000	13.88889		
2.622222	0.838863	2.000329	0.000000	13.88889		
2.666667	0.841506	2.037670	0.000000	13.88889		
2.711111	0.844152	2.075129	0.000000	13.88889		

2.755556	0.846802	2.112706	0.000000	13.88889
2.800000	0.849455	2.150401	0.000000	13.88889
2.844444	0.852111	2.188213	0.000000	13.88889
2.888889	0.854770	2.226144	0.000000	13.88889
2.933333	0.857433	2.264193	0.000000	13.88889
2.977778	0.860098	2.302360	0.000000	13.88889
3.022222	0.862767	2.340646	0.000000	13.88889
3.066667	0.865440	2.379051	0.000000	13.88889
3.111111	0.868115	2.417574	0.000000	13.88889
3.155556	0.870794	2.456217	0.000000	13.88889
3.200000	0.873477	2.494978	0.000000	13.88889
3.244444	0.876162	2.533859	0.000000	13.88889
3.288889	0.878851	2.572859	0.000000	13.88889
3.333333	0.881543	2.611979	0.000000	13.88889
3.377778	0.884238	2.651219	0.000000	13.88889
3.422222	0.886936	2.690578	0.000000	13.88889
3.466667	0.889638	2.730058	0.000000	13.88889
3.511111	0.892343	2.769657	0.000000	13.88889
3.555556	0.895052	2.809377	0.000000	13.88889
3.600000	0.897763	2.849218	0.000000	13.88889
3.644444	0.900478	2.889178	0.000000	13.88889
3.688889	0.903196	2.929260	0.000000	13.88889
3.733333	0.905917	2.969463	0.000000	13.88889
3.777778	0.908642	3.009786	0.000000	13.88889
3.822222	0.911370	3.050231	0.000000	13.88889
3.866667	0.914101	3.090797	0.000000	13.88889
3.911111	0.916835	3.131484	0.000000	13.88889
3.955556	0.919573	3.172293	0.000000	13.88889
4.000000	0.922314	3.213224	0.000000	13.88889

END FTABLE 2

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***	
<Name>	#	<Name>	#	tem strg<-factor->	strg	<Name>	# #	***
WDM	2	PREC	ENGL	1.167	PERLND	1 999 EXTNL	PREC	
WDM	2	PREC	ENGL	1.167	IMPLND	1 999 EXTNL	PREC	
WDM	1	EVAP	ENGL	0.76	PERLND	1 999 EXTNL	PETINP	
WDM	1	EVAP	ENGL	0.76	IMPLND	1 999 EXTNL	PETINP	
WDM	2	PREC	ENGL	1.167	RCHRES	1	EXTNL	PREC
WDM	2	PREC	ENGL	1.167	RCHRES	2	EXTNL	PREC
WDM	1	EVAP	ENGL	0.76	RCHRES	1	EXTNL	POTEV
WDM	1	EVAP	ENGL	0.76	RCHRES	2	EXTNL	POTEV

END EXT SOURCES

EXT TARGETS

<-Volume->	<-Grp>	<-Member->	<--Mult-->	Tran	<-Volume->	<Member>	Tsys	Tgap	Amd	***	
<Name>	#	<Name>	#	#<-factor->	strg	<Name>	#	<Name>	tem strg	strg***	
RCHRES	2	HYDR	RO	1	1	1	WDM	1006	FLOW	ENGL	REPL
RCHRES	2	HYDR	O	1	1	1	WDM	1007	FLOW	ENGL	REPL
RCHRES	2	HYDR	O	2	1	1	WDM	1008	FLOW	ENGL	REPL
RCHRES	2	HYDR	STAGE	1	1	1	WDM	1009	STAG	ENGL	REPL
COPY	1	OUTPUT	MEAN	1	1	48.4	WDM	701	FLOW	ENGL	REPL
COPY	501	OUTPUT	MEAN	1	1	48.4	WDM	801	FLOW	ENGL	REPL

END EXT TARGETS

MASS-LINK

<Volume>	<-Grp>	<-Member->	<--Mult-->	<Target>	<-Grp>	<-Member->	***	
<Name>		<Name>	#	#<-factor->	<Name>	<Name>	# #	***
MASS-LINK			2					
PERLND	PWATER	SURO		0.083333	RCHRES	INFLOW	IVOL	
END MASS-LINK			2					
MASS-LINK			3					
PERLND	PWATER	IFWO		0.083333	RCHRES	INFLOW	IVOL	
END MASS-LINK			3					
MASS-LINK			5					
IMPLND	IWATER	SURO		0.083333	RCHRES	INFLOW	IVOL	

```
END MASS-LINK      5

MASS-LINK          7
RCHRES      OFLOW OVOL   1      RCHRES      INFLOW IVOL
END MASS-LINK      7

MASS-LINK          17
RCHRES      OFLOW OVOL   1      COPY          INPUT  MEAN
END MASS-LINK      17

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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