

WWHM2012
PROJECT REPORT

General Model Information

Project Name: QCF Phase III - Queen City Lake Outlet 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 acre
C, Pasture, Mod 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

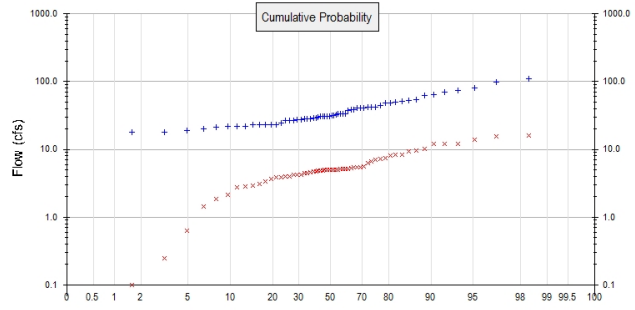
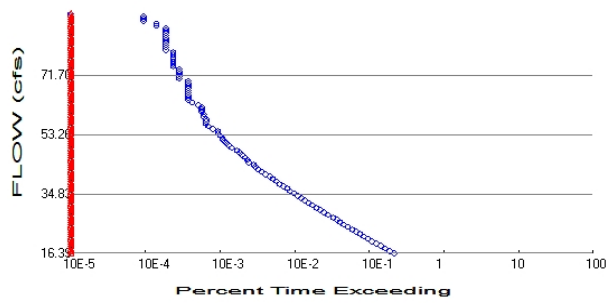
Depth: 10.9 ft.
Discharge Structure: 1
Riser Height: 7.96 ft.
Riser Diameter: 36 in.
Orifice 1 Diameter: 12 in. Elevation: 5 ft.
Element Flows To:
Outlet 1 Outlet 2

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

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	5.179732
5 year	8.281944
10 year	9.998736
25 year	11.764039
50 year	12.820834
100 year	13.693677

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	50.858	3.890
1950	48.944	6.249
1951	40.610	16.199
1952	22.991	3.092
1953	19.226	3.965
1954	26.830	5.092
1955	31.257	5.134
1956	30.418	6.543
1957	37.020	4.814
1958	23.401	5.401

1959	21.848	4.575
1960	41.900	10.124
1961	29.078	4.819
1962	17.999	1.873
1963	28.627	4.970
1964	28.480	4.499
1965	33.299	5.161
1966	23.074	4.242
1967	50.189	5.376
1968	32.405	4.718
1969	28.592	4.177
1970	30.871	3.965
1971	33.688	4.771
1972	41.832	9.656
1973	21.813	4.966
1974	33.485	5.193
1975	40.273	4.507
1976	30.365	5.000
1977	21.235	0.000
1978	27.562	4.886
1979	30.632	2.158
1980	70.258	8.430
1981	29.868	4.221
1982	54.614	5.434
1983	26.534	5.044
1984	22.009	2.904
1985	23.259	0.248
1986	38.988	7.022
1987	39.060	8.275
1988	17.832	2.866
1989	24.169	1.433
1990	111.627	12.012
1991	63.831	12.140
1992	27.125	4.988
1993	19.894	3.349
1994	15.454	0.628
1995	26.805	5.551
1996	63.304	15.479
1997	41.862	12.152
1998	28.411	2.780
1999	73.944	8.036
2000	30.697	3.663
2001	23.447	0.000
2002	40.328	4.981
2003	48.488	3.872
2004	53.182	7.201
2005	33.648	5.023
2006	31.518	5.217
2007	98.549	9.439
2008	79.507	13.868
2009	44.157	7.458

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	111.6270	16.1991
2	98.5492	15.4790
3	79.5073	13.8682

4	73.9443	12.1519
5	70.2581	12.1396
6	63.8307	12.0116
7	63.3038	10.1244
8	54.6140	9.6563
9	53.1816	9.4391
10	50.8580	8.4301
11	50.1890	8.2749
12	48.9439	8.0362
13	48.4878	7.4579
14	44.1568	7.2010
15	41.9000	7.0218
16	41.8620	6.5430
17	41.8315	6.2487
18	40.6099	5.5505
19	40.3283	5.4336
20	40.2733	5.4014
21	39.0604	5.3760
22	38.9884	5.2171
23	37.0198	5.1933
24	33.6880	5.1608
25	33.6479	5.1344
26	33.4852	5.0915
27	33.2994	5.0440
28	32.4045	5.0231
29	31.5179	4.9996
30	31.2571	4.9884
31	30.8712	4.9811
32	30.6971	4.9698
33	30.6323	4.9658
34	30.4175	4.8856
35	30.3647	4.8193
36	29.8675	4.8143
37	29.0776	4.7707
38	28.6270	4.7179
39	28.5924	4.5750
40	28.4797	4.5066
41	28.4106	4.4988
42	27.5616	4.2424
43	27.1253	4.2205
44	26.8298	4.1775
45	26.8052	3.9649
46	26.5342	3.9647
47	24.1692	3.8903
48	23.4469	3.8723
49	23.4009	3.6630
50	23.2587	3.3487
51	23.0736	3.0923
52	22.9911	2.9044
53	22.0086	2.8662
54	21.8475	2.7801
55	21.8128	2.1580
56	21.2348	1.8727
57	19.8937	1.4330
58	19.2256	0.6277
59	17.9993	0.2481
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
Queen City Lake POC	<input type="checkbox"/>	29242.24			<input type="checkbox"/>	77.26			
Total Volume Infiltrated		29242.24	0.00	0.00		77.26	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.

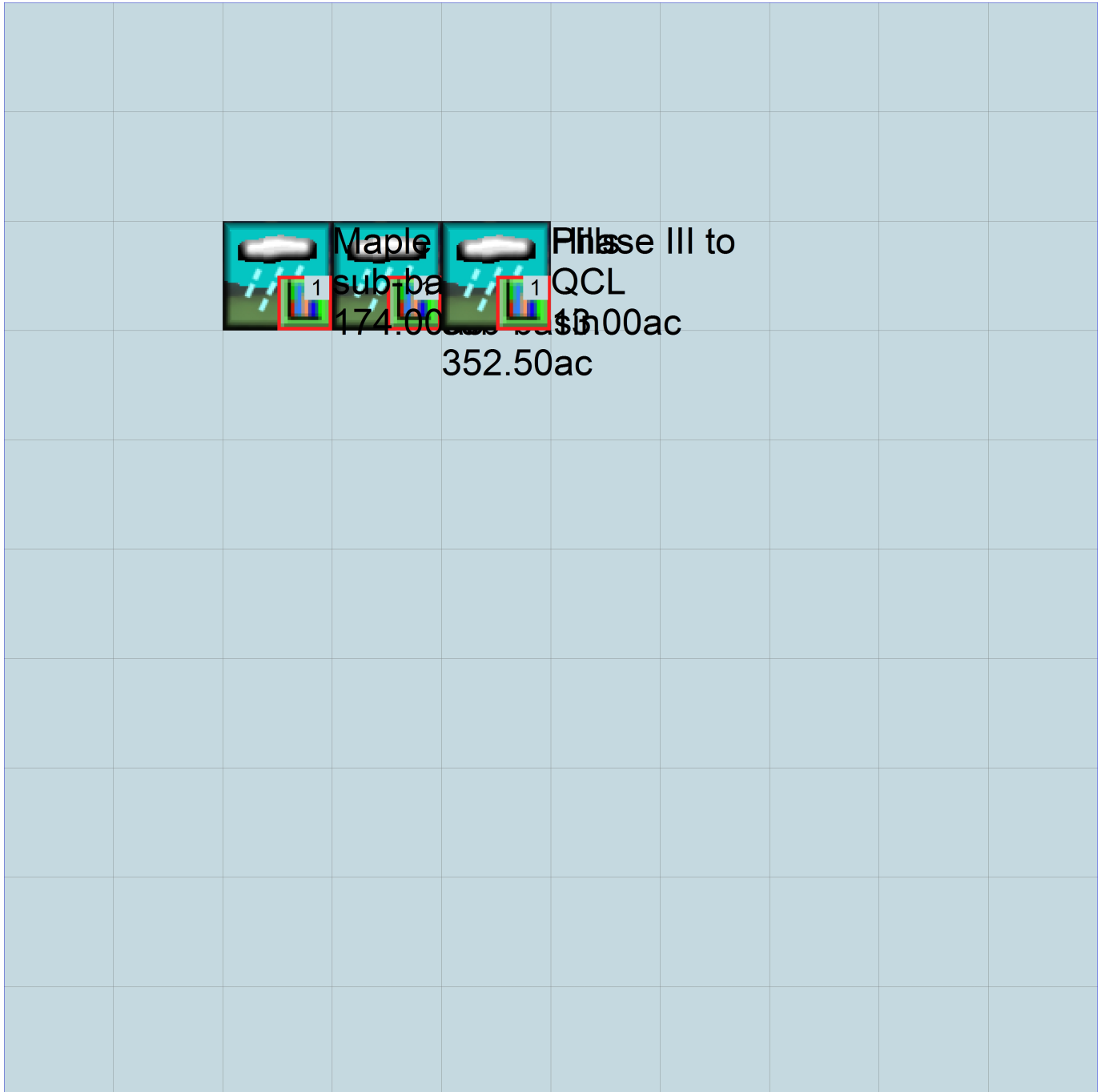
PERLND Changes

No PERLND changes have been made.

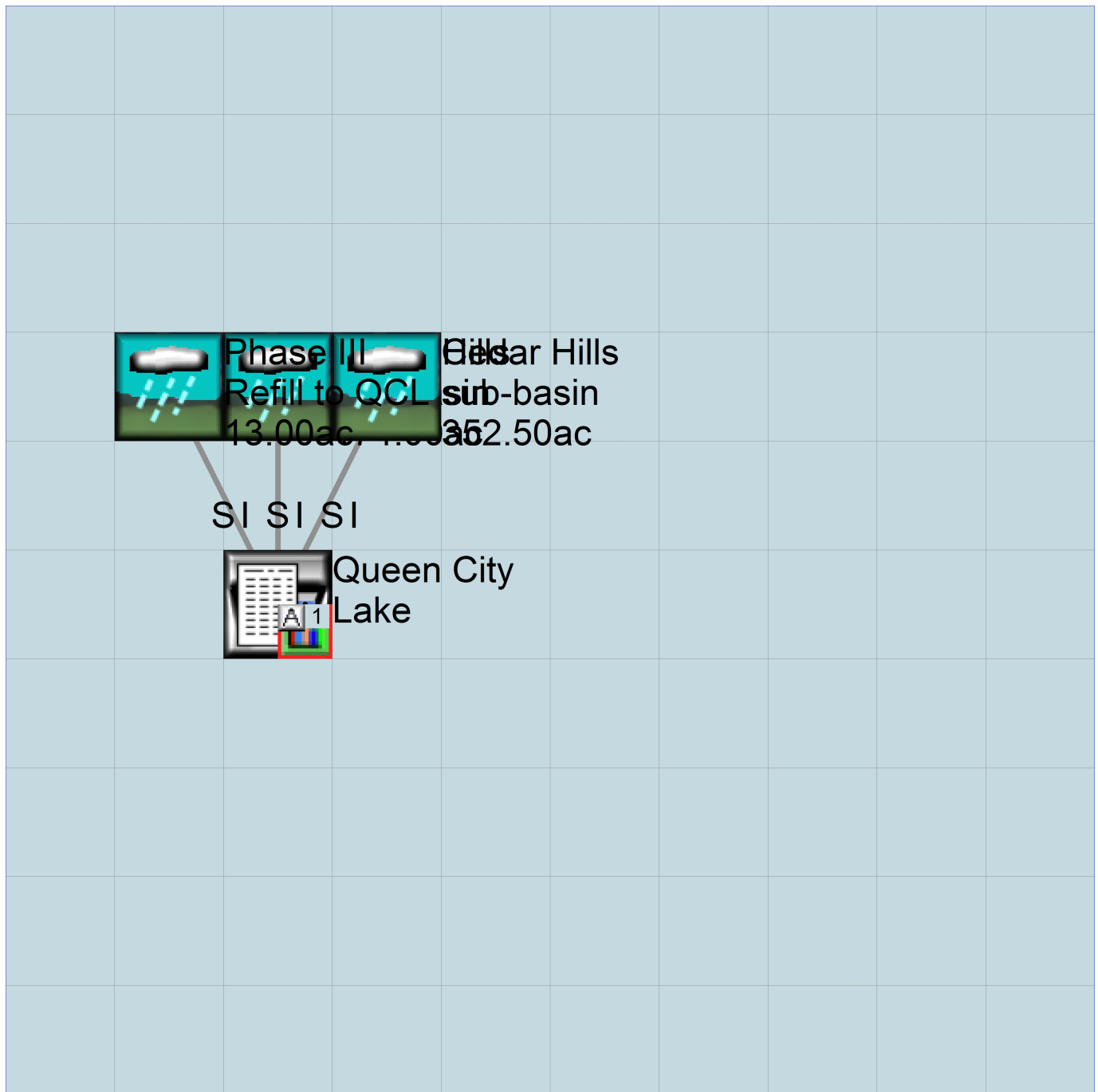
IMPLND Changes

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 - Queen City Lake Outlet Sizing.wdm
MESSU    25    PreQCF Phase III - Queen City Lake Outlet Sizing.MES
          27    PreQCF Phase III - Queen City Lake Outlet Sizing.L61
          28    PreQCF Phase III - Queen City Lake Outlet Sizing.L62
          30    POCQCF Phase III - Queen City Lake Outlet 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  VIRC  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  DISPLAY  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 - Queen City Lake Outlet Sizing.wdm
MESSU    25    MitQCF Phase III - Queen City Lake Outlet Sizing.MES
          27    MitQCF Phase III - Queen City Lake Outlet Sizing.L61
          28    MitQCF Phase III - Queen City Lake Outlet Sizing.L62
          30    POCQCF Phase III - Queen City Lake Outlet Sizing1.dat
  
```

END FILES

OPN SEQUENCE

```

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

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INFO1

```

# - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
1      Queen City Lake          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  VNM  VIFW VIRC  VLE INFC  HWT ***
2      0  0  0  0  0  0  0  0  0  0  0
14     0  0  0  0  0  0  0  0  0  0  0
11     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  LRSUR  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  Engr Metr ***
          in out ***
1      ROADS/FLAT  1  1  1  27  0
14     POND  1  1  1  27  0
END GEN-INFO

```

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  VNN 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*****
PERLND  2           128          COPY    1           12
PERLND  14          8           COPY    1           12
IMPLND  1           38          COPY    1           15
PERLND  2           128          COPY    1           13
PERLND  14          8           COPY    1           13
PERLND  11          333          COPY    1           12
PERLND  14          11          COPY    1           12
IMPLND  14          8.5          COPY    1           15
PERLND  11          333          COPY    1           13
PERLND  14          11          COPY    1           13
PERLND  14          13          COPY    1           12
PERLND  14          13          COPY    1           13

```



```

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
END FTABLES

```

EXT SOURCES

```

<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # tem strg<-factor-->strg <Name> # # <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 1 EVAP ENGL 0.76 RCHRES 1 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 1 HYDR RO 1 1 1 WDM 1002 FLOW ENGL REPL
RCHRES 1 HYDR O 1 1 1 WDM 1004 FLOW ENGL REPL
RCHRES 1 HYDR O 2 1 1 WDM 1005 FLOW ENGL REPL
RCHRES 1 HYDR STAGE 1 1 1 WDM 1003 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 12
PERLND PWATER SURO 0.083333 COPY INPUT MEAN
END MASS-LINK 12

MASS-LINK 13
PERLND PWATER IFWO 0.083333 COPY INPUT MEAN
END MASS-LINK 13

MASS-LINK 15
IMPLND IWATER SURO 0.083333 COPY INPUT MEAN
END MASS-LINK 15

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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