Exhibit 5

LDC | Surveying Engineering Planning

Memo

To: Thurston County

From: Tyrell Bradley, PE, LDC Inc.
Kyle Herrera, Design Engineer, LDC Inc.

Date: January 10, 2023

Project: C22-107 – Sienna II

TC Project #: 2007101348

Subject: Sienna II – Stormwater Technical Memorandum

Stormwater Verification

This technical memorandum was prepared for the Sienna II Plats located at 2824 77th Way SW, Olympia WA 98512. The project disturbs approximately 32 acres and includes 130 single family lots, new roadways, new water and sewer systems, and new stormwater facilities. This technical memorandum serves to explain the drainage and storage capacity of the stormwater ponds for the 100-year storm event as they were constructed in the field.

An on-site field verification of the stormwater pond facilities was conducted on December 28, 2022, to determine as-built volumes and infiltration capacity. Per the geotechnical investigation performed by Quality Geo NW, PLLC on January 3-4, 2023, the basin infiltration rates for ponds F & G were lower than the design rate. The basin infiltration rates for ponds A through E were significantly higher than the design. Table 1 below compares the design and field verified infiltration rates. See the geotechnical report attached for the field testing and assessment results.

BASIN	DESIGN INFILTRATION RATE (IN/HR)	VERIFIED INFILTRATION RATE (IN/HR)
ABCE	2	12.4
D	2	16.8
F	4	0.62
G	4	0.92

Ponds ABCE and D achieved higher infiltration rates than used in the design and therefore have an additional safety factor applied. Pond F was constructed with a bottom surface area of 814 SF, well above the minimum 492 SF required by the stormwater modeling. As a result, Pond F will fill to a depth of 3.5′ with 1.5′ of freeboard in the event of a 100-year storm when using the field-verified infiltration rate of 0.62 in/hr. Pond G was constructed as designed with a bottom area of 5210 SF and 10′ effective depth. Using the field-verified infiltration rate of 0.92 in/hr, Pond G will fill to a depth of 4′ with 6′ of freeboard in the event of a 100-year storm. All pond facilities will infiltrate 100% of the stormwater generated on-site as constructed. Please find the WWHM2012 model reports attached for more information on Ponds F & G as-built drainage capacities.

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FIELD REPORT

Project Name: Sienna II Infiltration Verification	**Report Date:** 1/5/2023
Site address: TPN 09090009000, -34000; Tumwater, WA	**QG Project Number:** QG23-001
Client: LDC, Inc.	**Field Date:** 1/3/2023 & 1/4/2023
Consultation Performed: Infiltration Verification	**Report #:** QG23-001 FR#001

Report Status:

Basin ABCE	**PASS**
Basin D	**PASS**
Basin G	**FAIL**
Basin F	**FAIL**

Report Remarks:

QG project geologist arrived on site as requested by the client for a verification of the infiltration conditions for four existing infiltration galleries. While on site, a QG Geotech performed an in-field failing head infiltration test at each location. Plans were provided to QG at the time of exploration test.

QG evaluated existing conditions during our visit. Soils at Basin ABCE and Basin D resemble a brown sand with silt with mottling just below the surface. Soils at Basin F and Basin G resembled a dark brown sand with silt with higher fines content than the previous two locations. In general, soils were found to be in a medium dense and moist condition. Geotech could not test soil conditions in the center of the Basin G due to standing water and saturated conditions; tests were performed along the perimeter of this stormwater pond. All other ponds were tested within the center of the basins.

In-Field Infiltration Testing

The client requested in-field infiltration verification of 4 different infiltration basins within a presently developed site. QG completed in-field infiltration testing in accordance with the modified 1980 EPA Falling Head Test requirements, which is considered appropriate for shallow testing. Testing comprised the installation of 3 stovepipe test (SP) apparatus within relevant and representative soil locations at each site to evaluate the general shallow infiltration potential. Stove pipes were presoaked for one hour prior to commencing the test to adequately saturate sub soils.

Following the prescribed soak period, 3 stove pipe locations were filled with water at each site and allowed to drain over the course of up to an hour. During the test, cumulative head fall was measured at each site.

Corrected Ksat values presented below are a product of the initial Ksat and correction factor CFT. For a generalized site-wide design situation, we have applied a site variability factor of CFv = 0.5 along with typical values of CFt = 0.4 (for the falling head test) and CFm = 0.9 (assuming standard influent control). Referencing the Stormwater Management Manual for Western Washington and utilizing the following Total Correction Formula for a corrected rate:

$CF_T = CF_v \times CF_t \times CF_m$ $\quad 0.5 \times 0.4 \times 0.9 = \underline{0.18}$

Table 1. A summary of the infiltration rates for each site is outlined in the table below:

Site	SP-1	SP-2	SP-3	Average Field Infiltration Rate	Corrected Field Infiltration Rate	**Status**
Basin ABCE	58.9	98.8	48.5	68.7	12.4	**PASS**
Basin D	124.4	4.5	93.3	93.3†	16.8	**PASS**
Basin F	4.75	2.5	3.0	3.42	0.62	**FAIL**
Basin G	NA*	9.25	1.0	5.13	0.92	**FAIL**

**Failed during soak period*
†SP-3 is considered representative of average infiltration conditions
(All infiltration units are in inches/hour)

QG recommends the facility designer review these results and stated assumptions per reference literature to ensure applicability with the proposed development, level of anticipated controls, and long- term maintenance plan. The designer may make reasonable adjustments to correction factors and the resulting design values based on these criteria to ensure design and operational intent is met. We recommend that we be contacted if substantial changes to rate determination are considered.

Prepared by:

Alexander Barnes, G.I.T.
Staff Geologist, Laboratory Supervisor

Approved by:

Luke Preston McCann, L.E.G.
Principal Licensed Engineering Geologist

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	Sienna II Basin F
Site Name:	Sienna Pond G
Site Address:	
City:	
Report Date:	1/10/2023
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
A B, Forest, Flat	0.43
Pervious Total	0.43
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.43

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	0.34
POND	0.09
Impervious Total	0.43
Basin Total	0.43

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	81.40 ft.	
Bottom Width:	10.00 ft.	
Depth:	5 ft.	
Volume at riser head:	0.1543 acre-feet.	
Infiltration On		
Infiltration rate:	0.62	
Infiltration safety factor:	1	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		92.709
Total Volume Through Riser (ac-ft.):		0.113
Total Volume Through Facility (ac-ft.):		92.822
Percent Infiltrated:		99.88
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
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:	3.5 ft.	
Riser Diameter:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	

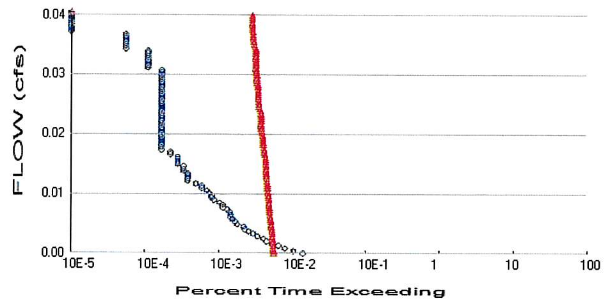
Pond Hydraulic Table

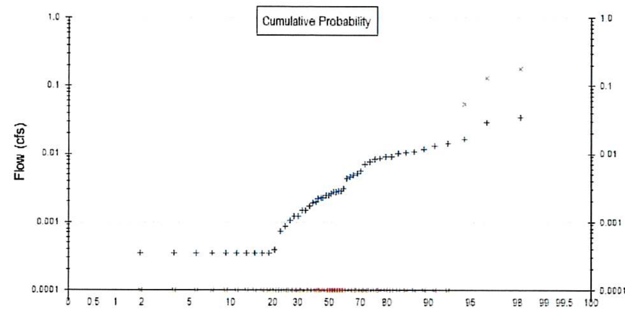
Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
182.00	0.018	0.000	0.000	0.000
182.06	0.019	0.001	0.000	0.012
182.11	0.020	0.002	0.000	0.012
182.17	0.020	0.003	0.000	0.013
182.22	0.021	0.004	0.000	0.013
182.28	0.022	0.005	0.000	0.013
182.33	0.023	0.006	0.000	0.014
182.39	0.023	0.008	0.000	0.014
182.44	0.024	0.009	0.000	0.015
182.50	0.025	0.011	0.000	0.015
182.56	0.025	0.012	0.000	0.016
182.61	0.026	0.013	0.000	0.016
182.67	0.027	0.015	0.000	0.017
182.72	0.028	0.016	0.000	0.017
182.78	0.029	0.018	0.000	0.018
182.83	0.029	0.020	0.000	0.018
182.89	0.030	0.021	0.000	0.019
182.94	0.031	0.023	0.000	0.019
183.00	0.032	0.025	0.000	0.020
183.06	0.032	0.027	0.000	0.020
183.11	0.033	0.028	0.000	0.021
183.17	0.034	0.030	0.000	0.021
183.22	0.035	0.032	0.000	0.022
183.28	0.036	0.034	0.000	0.022
183.33	0.036	0.036	0.000	0.023
183.39	0.037	0.038	0.000	0.023

183.44	0.038	0.041	0.000	0.024
183.50	0.039	0.043	0.000	0.024
183.56	0.040	0.045	0.000	0.025
183.61	0.041	0.047	0.000	0.025
183.67	0.042	0.049	0.000	0.026
183.72	0.042	0.052	0.000	0.026
183.78	0.043	0.054	0.000	0.027
183.83	0.044	0.057	0.000	0.027
183.89	0.045	0.059	0.000	0.028
183.94	0.046	0.062	0.000	0.028
184.00	0.047	0.064	0.000	0.029
184.06	0.048	0.067	0.000	0.030
184.11	0.048	0.070	0.000	0.030
184.17	0.049	0.072	0.000	0.031
184.22	0.050	0.075	0.000	0.031
184.28	0.051	0.078	0.000	0.032
184.33	0.052	0.081	0.000	0.032
184.39	0.053	0.084	0.000	0.033
184.44	0.054	0.087	0.000	0.034
184.50	0.055	0.090	0.000	0.034
184.56	0.056	0.093	0.000	0.035
184.61	0.057	0.096	0.000	0.035
184.67	0.058	0.099	0.000	0.036
184.72	0.059	0.103	0.000	0.036
184.78	0.060	0.106	0.000	0.037
184.83	0.061	0.109	0.000	0.038
184.89	0.062	0.113	0.000	0.038
184.94	0.062	0.116	0.000	0.039
185.00	0.063	0.120	0.000	0.039
185.06	0.064	0.123	0.000	0.040
185.11	0.065	0.127	0.000	0.041
185.17	0.066	0.131	0.000	0.041
185.22	0.067	0.134	0.000	0.042
185.28	0.068	0.138	0.000	0.043
185.33	0.069	0.142	0.000	0.043
185.39	0.070	0.146	0.000	0.044
185.44	0.071	0.150	0.000	0.044
185.50	0.072	0.154	0.000	0.045
185.56	0.073	0.158	0.208	0.046
185.61	0.074	0.162	0.587	0.046
185.67	0.076	0.166	1.074	0.047
185.72	0.077	0.171	1.636	0.048
185.78	0.078	0.175	2.248	0.048
185.83	0.079	0.179	2.882	0.049
185.89	0.080	0.184	3.509	0.050
185.94	0.081	0.188	4.103	0.050
186.00	0.082	0.193	4.639	0.051
186.06	0.083	0.197	5.097	0.052
186.11	0.084	0.202	5.468	0.052
186.17	0.085	0.207	5.754	0.053
186.22	0.086	0.211	5.974	0.054
186.28	0.087	0.216	6.249	0.054
186.33	0.088	0.221	6.469	0.055
186.39	0.089	0.226	6.681	0.056
186.44	0.091	0.231	6.887	0.056
186.50	0.092	0.236	7.086	0.057
186.56	0.093	0.241	7.280	0.058
186.61	0.094	0.247	7.470	0.059

186.67	0.095	0.252	7.654	0.059
186.72	0.096	0.257	7.834	0.060
186.78	0.097	0.263	8.010	0.061
186.83	0.098	0.268	8.183	0.061
186.89	0.100	0.274	8.351	0.062
186.94	0.101	0.279	8.517	0.063
187.00	0.102	0.285	8.679	0.064
187.06	0.103	0.291	8.838	0.064

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.43
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0
Total Impervious Area: 0.43

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.002354
5 year	0.007283
10 year	0.013144
25 year	0.024672
50 year	0.037055
100 year	0.053425

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**
1956	0.005	0.000
1957	0.002	0.000
1958	0.002	0.000
1959	0.002	0.000
1960	0.010	0.000
1961	0.009	0.000
1962	0.000	0.000
1963	0.013	0.000
1964	0.008	0.000
1965	0.008	0.000

1966	0.004	0.000
1967	0.003	0.000
1968	0.002	0.000
1969	0.000	0.000
1970	0.001	0.000
1971	0.003	0.000
1972	0.007	0.000
1973	0.000	0.000
1974	0.005	0.000
1975	0.003	0.000
1976	0.003	0.000
1977	0.000	0.000
1978	0.003	0.000
1979	0.001	0.000
1980	0.002	0.000
1981	0.003	0.000
1982	0.002	0.000
1983	0.001	0.000
1984	0.006	0.000
1985	0.000	0.000
1986	0.005	0.000
1987	0.029	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.017	0.000
1991	0.014	0.130
1992	0.000	0.000
1993	0.001	0.000
1994	0.000	0.000
1995	0.002	0.000
1996	0.009	0.000
1997	0.009	0.000
1998	0.001	0.000
1999	0.010	0.000
2000	0.001	0.000
2001	0.000	0.000
2002	0.002	0.000
2003	0.000	0.000
2004	0.012	0.000
2005	0.000	0.000
2006	0.034	0.000
2007	0.011	0.176
2008	0.001	0.054

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0342	0.1764
2	0.0289	0.1296
3	0.0166	0.0540
4	0.0144	0.0000
5	0.0132	0.0000
6	0.0116	0.0000
7	0.0107	0.0000
8	0.0105	0.0000
9	0.0101	0.0000
10	0.0091	0.0000
11	0.0090	0.0000

12	0.0085	0.0000
13	0.0084	0.0000
14	0.0076	0.0000
15	0.0071	0.0000
16	0.0055	0.0000
17	0.0052	0.0000
18	0.0049	0.0000
19	0.0046	0.0000
20	0.0043	0.0000
21	0.0031	0.0000
22	0.0029	0.0000
23	0.0029	0.0000
24	0.0028	0.0000
25	0.0027	0.0000
26	0.0026	0.0000
27	0.0025	0.0000
28	0.0025	0.0000
29	0.0023	0.0000
30	0.0023	0.0000
31	0.0022	0.0000
32	0.0020	0.0000
33	0.0019	0.0000
34	0.0017	0.0000
35	0.0015	0.0000
36	0.0015	0.0000
37	0.0012	0.0000
38	0.0012	0.0000
39	0.0011	0.0000
40	0.0009	0.0000
41	0.0007	0.0000
42	0.0004	0.0000
43	0.0003	0.0000
44	0.0003	0.0000
45	0.0003	0.0000
46	0.0003	0.0000
47	0.0003	0.0000
48	0.0003	0.0000
49	0.0003	0.0000
50	0.0003	0.0000
51	0.0003	0.0000
52	0.0003	0.0000
53	0.0003	0.0000

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0012	263	104	39	Pass
0.0015	194	104	53	Pass
0.0019	149	103	69	Pass
0.0023	121	103	85	Pass
0.0026	98	102	104	Pass
0.0030	84	102	121	Fail
0.0034	75	101	134	Fail
0.0037	62	100	161	Fail
0.0041	54	100	185	Fail
0.0044	47	99	210	Fail
0.0048	42	99	235	Fail
0.0052	40	97	242	Fail
0.0055	33	96	290	Fail
0.0059	31	96	309	Fail
0.0063	28	94	335	Fail
0.0066	27	93	344	Fail
0.0070	27	92	340	Fail
0.0073	26	91	350	Fail
0.0077	24	91	379	Fail
0.0081	21	91	433	Fail
0.0084	21	90	428	Fail
0.0088	19	90	473	Fail
0.0091	16	90	562	Fail
0.0095	15	88	586	Fail
0.0099	15	88	586	Fail
0.0102	14	87	621	Fail
0.0106	13	86	661	Fail
0.0110	11	85	772	Fail
0.0113	11	85	772	Fail
0.0117	9	85	944	Fail
0.0120	7	84	1200	Fail
0.0124	7	83	1185	Fail
0.0128	7	82	1171	Fail
0.0131	7	82	1171	Fail
0.0135	6	81	1350	Fail
0.0139	6	81	1350	Fail
0.0142	6	81	1350	Fail
0.0146	5	80	1600	Fail
0.0149	5	80	1600	Fail
0.0153	5	80	1600	Fail
0.0157	5	80	1600	Fail
0.0160	4	78	1950	Fail
0.0164	4	76	1900	Fail
0.0168	3	76	2533	Fail
0.0171	3	75	2500	Fail
0.0175	3	74	2466	Fail
0.0178	3	74	2466	Fail
0.0182	3	73	2433	Fail
0.0186	3	73	2433	Fail
0.0189	3	73	2433	Fail
0.0193	3	71	2366	Fail
0.0197	3	70	2333	Fail
0.0200	3	69	2300	Fail
0.0204	3	69	2300	Fail

0.0207	3	69	2300	Fail
0.0211	3	69	2300	Fail
0.0215	3	69	2300	Fail
0.0218	3	69	2300	Fail
0.0222	3	69	2300	Fail
0.0226	3	68	2266	Fail
0.0229	3	66	2200	Fail
0.0233	3	64	2133	Fail
0.0236	3	64	2133	Fail
0.0240	3	64	2133	Fail
0.0244	3	63	2100	Fail
0.0247	3	63	2100	Fail
0.0251	3	63	2100	Fail
0.0255	3	63	2100	Fail
0.0258	3	63	2100	Fail
0.0262	3	62	2066	Fail
0.0265	3	62	2066	Fail
0.0269	3	60	2000	Fail
0.0273	3	60	2000	Fail
0.0276	3	60	2000	Fail
0.0280	3	60	2000	Fail
0.0284	3	59	1966	Fail
0.0287	3	59	1966	Fail
0.0291	2	58	2900	Fail
0.0294	2	58	2900	Fail
0.0298	2	58	2900	Fail
0.0302	2	58	2900	Fail
0.0305	2	58	2900	Fail
0.0309	2	58	2900	Fail
0.0313	2	58	2900	Fail
0.0316	2	58	2900	Fail
0.0320	1	58	5800	Fail
0.0323	1	57	5700	Fail
0.0327	1	55	5500	Fail
0.0331	1	54	5400	Fail
0.0334	1	53	5300	Fail
0.0338	1	53	5300	Fail
0.0342	1	53	5300	Fail
0.0345	0	53	n/a	Fail
0.0349	0	52	n/a	Fail
0.0352	0	52	n/a	Fail
0.0356	0	52	n/a	Fail
0.0360	0	52	n/a	Fail
0.0363	0	52	n/a	Fail
0.0367	0	52	n/a	Fail
0.0371	0	52	n/a	Fail

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.
The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

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	☐	84.47			☐	99.88			
Total Volume Infiltrated		84.47	0.00	0.00		99.88	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

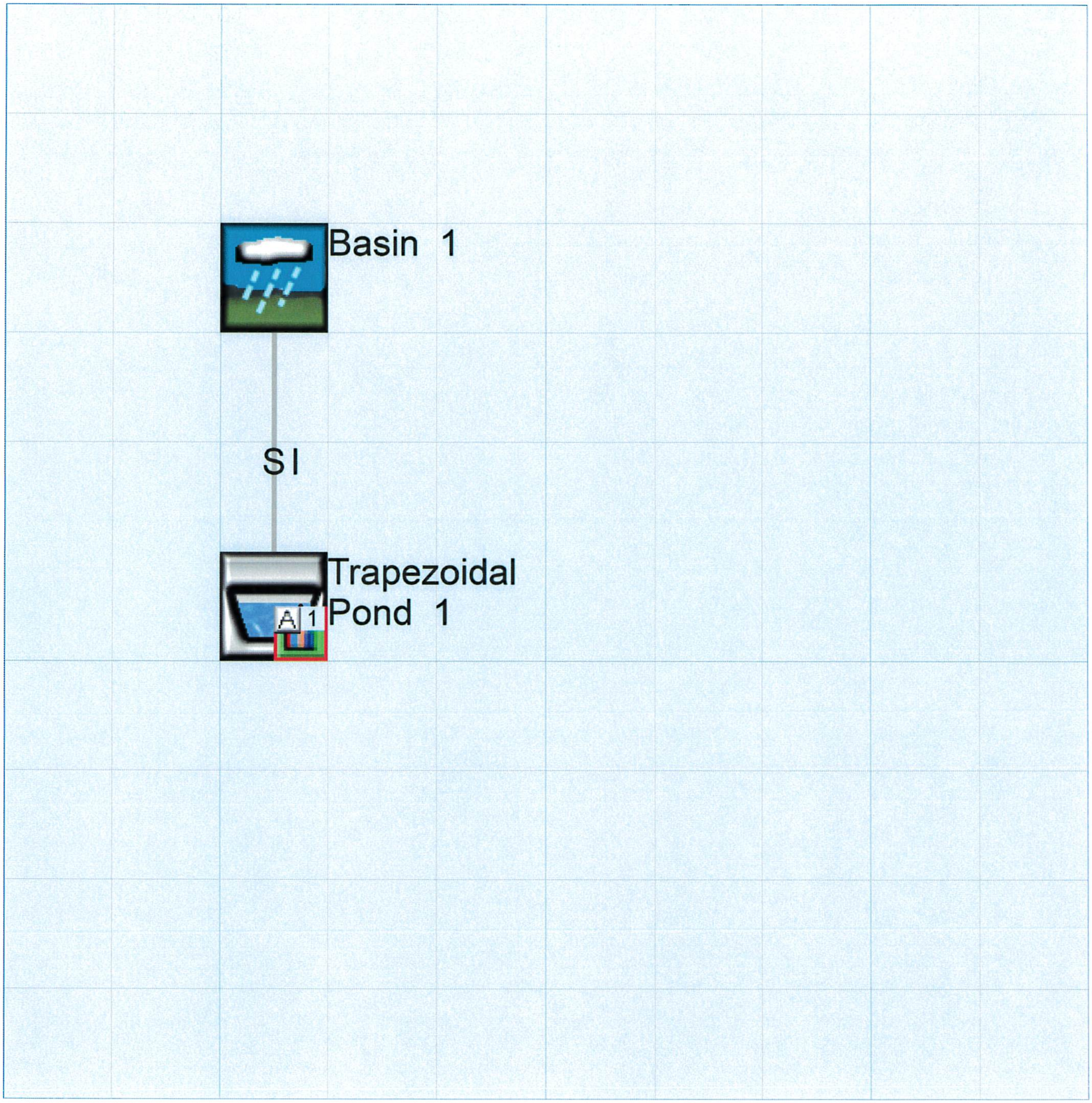
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2008 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   Sienna II Basin F.wdm
MESSU      25   PreSienna II Basin F.MES
           27   PreSienna II Basin F.L61
           28   PreSienna II Basin F.L62
           30   POCSienna II Basin F1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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            ***
    1     A/B, Forest, Flat       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 ***
    1         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  *********
    1         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 ***
    1       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
    1            0         5         2       400      0.05       0.3     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
    1            0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
    1            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
    1            0         0         0         0         3         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
  END GEN-INFO
  *** Section IWATER***

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

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

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

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

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

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

```
END IMPLND

SCHEMATIC
<-Source->                    <--Area-->     <-Target->   MBLK    ***
<Name>   #                    <-factor->     <Name>   #   Tbl#    ***
Basin  1***
PERLND   1                          0.43     COPY   501      12
PERLND   1                          0.43     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
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                         in  out                             ***
  END GEN-INFO
  *** Section RCHRES***

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

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  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
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  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
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
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    1.111          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.111          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

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2008 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   Sienna II Basin F.wdm
MESSU      25   MitSienna II Basin F.MES
           27   MitSienna II Basin F.L61
           28   MitSienna II Basin F.L62
           30   POCSienna II Basin F1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      IMPLND       1
      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        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            ***
  END GEN-INFO
  *** Section PWATER***

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

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
  END PRINT-INFO
```

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

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2          ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  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
  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  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#   ***
Basin  1***
IMPLND   1                       0.34     RCHRES   1     5
IMPLND  14                       0.09     RCHRES   1     5

******Routing******
IMPLND   1                       0.34     COPY     1    15
IMPLND  14                       0.09     COPY     1    15
RCHRES   1                          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  Engl Metr LKFG            ***
                                         in  out                             ***
    1     Trapezoidal Pond-005    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
  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
  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
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1             1      0.02       0.0     182.0       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
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    5
```

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.018687	0.000000	0.000000	0.000000		
0.055556	0.019389	0.001058	0.000000	0.012121		
0.111111	0.020096	0.002154	0.000000	0.012563		
0.166667	0.020808	0.003291	0.000000	0.013009		
0.222222	0.021525	0.004467	0.000000	0.013457		
0.277778	0.022248	0.005683	0.000000	0.013909		
0.333333	0.022975	0.006939	0.000000	0.014363		
0.388889	0.023708	0.008235	0.000000	0.014821		
0.444444	0.024445	0.009573	0.000000	0.015282		
0.500000	0.025188	0.010952	0.000000	0.015747		
0.555556	0.025936	0.012372	0.000000	0.016214		
0.611111	0.026689	0.013834	0.000000	0.016685		
0.666667	0.027447	0.015337	0.000000	0.017159		
0.722222	0.028210	0.016884	0.000000	0.017636		
0.777778	0.028979	0.018472	0.000000	0.018117		
0.833333	0.029752	0.020104	0.000000	0.018600		
0.888889	0.030531	0.021778	0.000000	0.019087		
0.944444	0.031314	0.023496	0.000000	0.019577		
1.000000	0.032103	0.025258	0.000000	0.020070		
1.055556	0.032897	0.027063	0.000000	0.020566		
1.111111	0.033696	0.028913	0.000000	0.021065		
1.166667	0.034500	0.030807	0.000000	0.021568		
1.222222	0.035309	0.032746	0.000000	0.022074		
1.277778	0.036123	0.034730	0.000000	0.022583		
1.333333	0.036942	0.036760	0.000000	0.023095		
1.388889	0.037767	0.038835	0.000000	0.023610		
1.444444	0.038596	0.040957	0.000000	0.024129		
1.500000	0.039431	0.043124	0.000000	0.024651		
1.555556	0.040270	0.045338	0.000000	0.025176		
1.611111	0.041115	0.047599	0.000000	0.025704		
1.666667	0.041965	0.049906	0.000000	0.026235		
1.722222	0.042820	0.052261	0.000000	0.026770		
1.777778	0.043680	0.054664	0.000000	0.027307		
1.833333	0.044545	0.057115	0.000000	0.027848		
1.888889	0.045416	0.059614	0.000000	0.028392		
1.944444	0.046291	0.062161	0.000000	0.028940		
2.000000	0.047172	0.064758	0.000000	0.029490		
2.055556	0.048057	0.067403	0.000000	0.030044		
2.111111	0.048948	0.070097	0.000000	0.030601		
2.166667	0.049844	0.072842	0.000000	0.031161		
2.222222	0.050745	0.075636	0.000000	0.031724		
2.277778	0.051651	0.078480	0.000000	0.032290		
2.333333	0.052562	0.081375	0.000000	0.032860		
2.388889	0.053478	0.084320	0.000000	0.033433		
2.444444	0.054400	0.087317	0.000000	0.034009		
2.500000	0.055326	0.090365	0.000000	0.034588		
2.555556	0.056258	0.093464	0.000000	0.035170		
2.611111	0.057194	0.096616	0.000000	0.035756		
2.666667	0.058136	0.099820	0.000000	0.036345		
2.722222	0.059083	0.103076	0.000000	0.036937		
2.777778	0.060035	0.106384	0.000000	0.037532		
2.833333	0.060992	0.109746	0.000000	0.038130		
2.888889	0.061954	0.113161	0.000000	0.038732		
2.944444	0.062921	0.116630	0.000000	0.039336		
3.000000	0.063893	0.120153	0.000000	0.039944		

```
   3.055556  0.064871  0.123730  0.000000  0.040555
   3.111111  0.065853  0.127361  0.000000  0.041169
   3.166667  0.066841  0.131047  0.000000  0.041787
   3.222222  0.067834  0.134788  0.000000  0.042407
   3.277778  0.068832  0.138584  0.000000  0.043031
   3.333333  0.069835  0.142436  0.000000  0.043658
   3.388889  0.070843  0.146344  0.000000  0.044289
   3.444444  0.071856  0.150307  0.000000  0.044922
   3.500000  0.072874  0.154328  0.000000  0.045559
   3.555556  0.073898  0.158405  0.208271  0.046198
   3.611111  0.074926  0.162539  0.587805  0.046841
   3.666667  0.075960  0.166730  1.074270  0.047487
   3.722222  0.076998  0.170979  1.636945  0.048137
   3.777778  0.078042  0.175285  2.248837  0.048789
   3.833333  0.079091  0.179650  2.882519  0.049445
   3.888889  0.080145  0.184073  3.509920  0.050104
   3.944444  0.081204  0.188555  4.103633  0.050766
   4.000000  0.082268  0.193096  4.639092  0.051431
   4.055556  0.083337  0.197696  5.097354  0.052100
   4.111111  0.084412  0.202356  5.468342  0.052771
   4.166667  0.085491  0.207076  5.754494  0.053446
   4.222222  0.086576  0.211855  5.974760  0.054124
   4.277778  0.087666  0.216695  6.249853  0.054806
   4.333333  0.088760  0.221596  6.469213  0.055490
   4.388889  0.089860  0.226558  6.681374  0.056178
   4.444444  0.090965  0.231581  6.887003  0.056868
   4.500000  0.092075  0.236665  7.086668  0.057562
   4.555556  0.093190  0.241811  7.280859  0.058260
   4.611111  0.094311  0.247020  7.470004  0.058960
   4.666667  0.095436  0.252291  7.654476  0.059664
   4.722222  0.096567  0.257624  7.834606  0.060370
   4.777778  0.097702  0.263020  8.010686  0.061080
   4.833333  0.098843  0.268480  8.182979  0.061793
   4.888889  0.099989  0.274003  8.351718  0.062510
   4.944444  0.101140  0.279590  8.517114  0.063229
   5.000000  0.102296  0.285241  8.679360  0.063952
  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    1.111          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.111          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

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   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      1 1         1     WDM   1001 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      2 1         1     WDM   1002 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       5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK   5

  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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Local (360)943-0304

www.clearcreeksolutions.com

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	Sienna II Basin G
Site Name:	Sienna Pond G
Site Address:	
City:	
Report Date:	1/10/2023
Gage:	Olympia Airport
Data Start:	1955/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.111
Version Date:	2021/08/18
Version:	4.2.18

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

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
A B, Forest, Flat	2.39
Pervious Total	2.39
Impervious Land Use	acre
Impervious Total	0
Basin Total	2.39

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	1.47
POND	0.92
Impervious Total	2.39
Basin Total	2.39

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	100.00 ft.	
Bottom Width:	50.00 ft.	
Depth:	10 ft.	
Volume at riser head:	0.8904 acre-feet.	
Infiltration On		
Infiltration rate:	0.92	
Infiltration safety factor:	1	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		515.757
Total Volume Through Riser (ac-ft.):		0.138
Total Volume Through Facility (ac-ft.):		515.895
Percent Infiltrated:		99.97
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Side slope 1:	6 To 1	
Side slope 2:	7 To 1	
Side slope 3:	6 To 1	
Side slope 4:	7 To 1	
Discharge Structure		
Riser Height:	4 ft.	
Riser Diameter:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

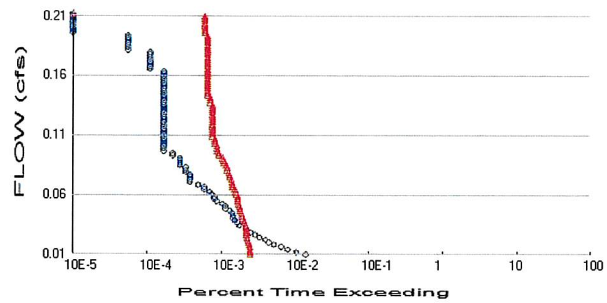
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
182.00	0.114	0.000	0.000	0.000
182.11	0.119	0.013	0.000	0.111
182.22	0.124	0.026	0.000	0.115
182.33	0.129	0.040	0.000	0.120
182.44	0.134	0.055	0.000	0.125
182.56	0.140	0.070	0.000	0.130
182.67	0.145	0.086	0.000	0.135
182.78	0.151	0.103	0.000	0.140
182.89	0.156	0.120	0.000	0.145
183.00	0.162	0.137	0.000	0.150
183.11	0.168	0.156	0.000	0.155
183.22	0.173	0.175	0.000	0.161
183.33	0.179	0.194	0.000	0.166
183.44	0.185	0.215	0.000	0.172
183.56	0.192	0.236	0.000	0.178
183.67	0.198	0.257	0.000	0.183
183.78	0.204	0.280	0.000	0.189
183.89	0.210	0.303	0.000	0.195
184.00	0.217	0.327	0.000	0.201
184.11	0.224	0.351	0.000	0.207
184.22	0.230	0.376	0.000	0.214
184.33	0.237	0.402	0.000	0.220
184.44	0.244	0.429	0.000	0.226
184.56	0.251	0.457	0.000	0.233
184.67	0.258	0.485	0.000	0.239
184.78	0.265	0.514	0.000	0.246

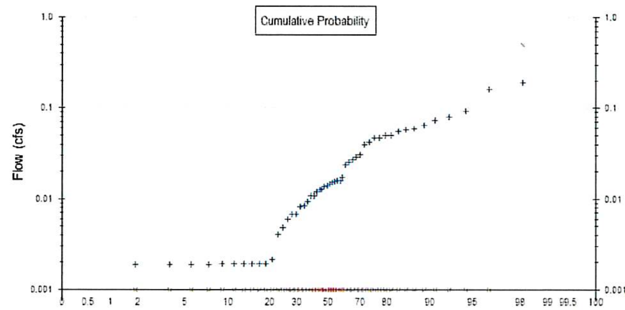
184.89	0.273	0.544	0.000	0.253
185.00	0.280	0.575	0.000	0.260
185.11	0.287	0.606	0.000	0.267
185.22	0.295	0.639	0.000	0.274
185.33	0.303	0.672	0.000	0.281
185.44	0.310	0.706	0.000	0.288
185.56	0.318	0.741	0.000	0.295
185.67	0.326	0.777	0.000	0.302
185.78	0.334	0.814	0.000	0.310
185.89	0.342	0.851	0.000	0.317
186.00	0.351	0.890	0.000	0.325
186.11	0.359	0.929	0.587	0.333
186.22	0.367	0.970	1.636	0.341
186.33	0.376	1.011	2.882	0.349
186.44	0.384	1.053	4.103	0.357
186.56	0.393	1.097	5.097	0.365
186.67	0.402	1.141	5.754	0.373
186.78	0.411	1.186	6.249	0.381
186.89	0.420	1.232	6.681	0.389
187.00	0.429	1.279	7.086	0.398
187.11	0.438	1.328	7.470	0.406
187.22	0.447	1.377	7.834	0.415
187.33	0.457	1.427	8.183	0.424
187.44	0.466	1.478	8.517	0.432
187.56	0.476	1.531	8.838	0.441
187.67	0.485	1.584	9.148	0.450
187.78	0.495	1.639	9.448	0.459
187.89	0.505	1.694	9.739	0.468
188.00	0.515	1.751	10.02	0.478
188.11	0.525	1.809	10.29	0.487
188.22	0.535	1.868	10.56	0.496
188.33	0.545	1.928	10.82	0.506
188.44	0.556	1.989	11.08	0.515
188.56	0.566	2.052	11.32	0.525
188.67	0.577	2.115	11.57	0.535
188.78	0.587	2.180	11.81	0.545
188.89	0.598	2.246	12.04	0.555
189.00	0.609	2.313	12.27	0.565
189.11	0.620	2.381	12.50	0.575
189.22	0.631	2.450	12.72	0.585
189.33	0.642	2.521	12.93	0.595
189.44	0.653	2.593	13.15	0.606
189.56	0.664	2.666	13.36	0.616
189.67	0.675	2.741	13.57	0.627
189.78	0.687	2.817	13.77	0.637
189.89	0.698	2.894	13.97	0.648
190.00	0.710	2.972	14.17	0.659
190.11	0.722	3.051	14.36	0.670
190.22	0.734	3.132	14.56	0.681
190.33	0.746	3.215	14.75	0.692
190.44	0.758	3.298	14.94	0.703
190.56	0.770	3.383	15.12	0.714
190.67	0.782	3.469	15.30	0.725
190.78	0.794	3.557	15.49	0.737
190.89	0.807	3.646	15.66	0.748
191.00	0.819	3.736	15.84	0.760
191.11	0.832	3.828	16.02	0.772
191.22	0.845	3.921	16.19	0.783

191.33	0.857	4.016	16.36	0.795
191.44	0.870	4.112	16.53	0.807
191.56	0.883	4.209	16.70	0.819
191.67	0.896	4.308	16.87	0.831
191.78	0.910	4.409	17.03	0.844
191.89	0.923	4.511	17.19	0.856
192.00	0.936	4.614	17.35	0.868
192.11	0.950	4.719	17.51	0.881

Analysis Results

POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 2.39
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0
Total Impervious Area: 2.39

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.013081
5 year	0.040479
10 year	0.073057
25 year	0.137128
50 year	0.205958
100 year	0.296945

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
1956	0.025	0.000
1957	0.014	0.000
1958	0.011	0.000
1959	0.009	0.000
1960	0.056	0.000
1961	0.050	0.000
1962	0.002	0.000
1963	0.074	0.000
1964	0.042	0.000
1965	0.047	0.000

1966	0.024	0.000
1967	0.016	0.000
1968	0.011	0.000
1969	0.002	0.000
1970	0.008	0.000
1971	0.016	0.000
1972	0.039	0.000
1973	0.002	0.000
1974	0.029	0.000
1975	0.017	0.000
1976	0.015	0.000
1977	0.002	0.000
1978	0.015	0.000
1979	0.006	0.000
1980	0.012	0.000
1981	0.015	0.000
1982	0.013	0.000
1983	0.007	0.000
1984	0.031	0.000
1985	0.002	0.000
1986	0.027	0.000
1987	0.160	0.000
1988	0.002	0.000
1989	0.002	0.000
1990	0.092	0.000
1991	0.080	0.000
1992	0.002	0.000
1993	0.004	0.000
1994	0.002	0.000
1995	0.013	0.000
1996	0.047	0.000
1997	0.050	0.000
1998	0.008	0.000
1999	0.058	0.000
2000	0.007	0.000
2001	0.002	0.000
2002	0.014	0.000
2003	0.002	0.000
2004	0.065	0.000
2005	0.002	0.000
2006	0.190	0.000
2007	0.060	0.498
2008	0.005	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	0.1900	0.4984
2	0.1604	0.0000
3	0.0922	0.0000
4	0.0802	0.0000
5	0.0736	0.0000
6	0.0647	0.0000
7	0.0597	0.0000
8	0.0582	0.0000
9	0.0561	0.0000
10	0.0505	0.0000
11	0.0498	0.0000

12	0.0473	0.0000
13	0.0469	0.0000
14	0.0423	0.0000
15	0.0394	0.0000
16	0.0307	0.0000
17	0.0288	0.0000
18	0.0272	0.0000
19	0.0253	0.0000
20	0.0238	0.0000
21	0.0171	0.0000
22	0.0159	0.0000
23	0.0159	0.0000
24	0.0155	0.0000
25	0.0151	0.0000
26	0.0146	0.0000
27	0.0138	0.0000
28	0.0137	0.0000
29	0.0127	0.0000
30	0.0126	0.0000
31	0.0120	0.0000
32	0.0109	0.0000
33	0.0107	0.0000
34	0.0094	0.0000
35	0.0083	0.0000
36	0.0081	0.0000
37	0.0068	0.0000
38	0.0067	0.0000
39	0.0059	0.0000
40	0.0048	0.0000
41	0.0040	0.0000
42	0.0021	0.0000
43	0.0019	0.0000
44	0.0019	0.0000
45	0.0019	0.0000
46	0.0019	0.0000
47	0.0019	0.0000
48	0.0019	0.0000
49	0.0019	0.0000
50	0.0019	0.0000
51	0.0019	0.0000
52	0.0019	0.0000
53	0.0019	0.0000

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0065	263	46	17	Pass
0.0086	194	46	23	Pass
0.0106	149	46	30	Pass
0.0126	121	46	38	Pass
0.0146	98	45	45	Pass
0.0166	84	44	52	Pass
0.0186	75	43	57	Pass
0.0206	62	42	67	Pass
0.0227	54	41	75	Pass
0.0247	47	41	87	Pass
0.0267	42	41	97	Pass
0.0287	40	41	102	Pass
0.0307	33	40	121	Fail
0.0327	31	39	125	Fail
0.0347	28	38	135	Fail
0.0368	27	36	133	Fail
0.0388	27	36	133	Fail
0.0408	26	35	134	Fail
0.0428	24	33	137	Fail
0.0448	21	33	157	Fail
0.0468	21	33	157	Fail
0.0488	19	32	168	Fail
0.0509	16	31	193	Fail
0.0529	15	31	206	Fail
0.0549	15	31	206	Fail
0.0569	14	30	214	Fail
0.0589	13	29	223	Fail
0.0609	11	28	254	Fail
0.0629	11	26	236	Fail
0.0650	9	26	288	Fail
0.0670	7	26	371	Fail
0.0690	7	25	357	Fail
0.0710	7	24	342	Fail
0.0730	7	24	342	Fail
0.0750	6	23	383	Fail
0.0770	6	22	366	Fail
0.0791	6	22	366	Fail
0.0811	5	21	419	Fail
0.0831	5	20	400	Fail
0.0851	5	20	400	Fail
0.0871	5	19	380	Fail
0.0891	4	17	425	Fail
0.0911	4	17	425	Fail
0.0932	3	16	533	Fail
0.0952	3	16	533	Fail
0.0972	3	16	533	Fail
0.0992	3	15	500	Fail
0.1012	3	15	500	Fail
0.1032	3	15	500	Fail
0.1052	3	14	466	Fail
0.1073	3	14	466	Fail
0.1093	3	14	466	Fail
0.1113	3	14	466	Fail
0.1133	3	14	466	Fail

0.1153	3	14	466	Fail
0.1173	3	14	466	Fail
0.1193	3	14	466	Fail
0.1214	3	14	466	Fail
0.1234	3	14	466	Fail
0.1254	3	14	466	Fail
0.1274	3	14	466	Fail
0.1294	3	14	466	Fail
0.1314	3	14	466	Fail
0.1334	3	13	433	Fail
0.1355	3	13	433	Fail
0.1375	3	13	433	Fail
0.1395	3	12	400	Fail
0.1415	3	12	400	Fail
0.1435	3	12	400	Fail
0.1455	3	12	400	Fail
0.1475	3	12	400	Fail
0.1496	3	12	400	Fail
0.1516	3	12	400	Fail
0.1536	3	12	400	Fail
0.1556	3	12	400	Fail
0.1576	3	12	400	Fail
0.1596	3	12	400	Fail
0.1616	2	12	600	Fail
0.1637	2	12	600	Fail
0.1657	2	12	600	Fail
0.1677	2	12	600	Fail
0.1697	2	12	600	Fail
0.1717	2	12	600	Fail
0.1737	2	12	600	Fail
0.1757	2	12	600	Fail
0.1778	1	12	1200	Fail
0.1798	1	12	1200	Fail
0.1818	1	12	1200	Fail
0.1838	1	12	1200	Fail
0.1858	1	12	1200	Fail
0.1878	1	12	1200	Fail
0.1898	1	12	1200	Fail
0.1919	0	11	n/a	Fail
0.1939	0	11	n/a	Fail
0.1959	0	11	n/a	Fail
0.1979	0	11	n/a	Fail
0.1999	0	11	n/a	Fail
0.2019	0	11	n/a	Fail
0.2039	0	11	n/a	Fail
0.2060	0	11	n/a	Fail

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.
The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

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	☐	469.46			☐	99.97			
Total Volume Infiltrated		469.46	0.00	0.00		99.97	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

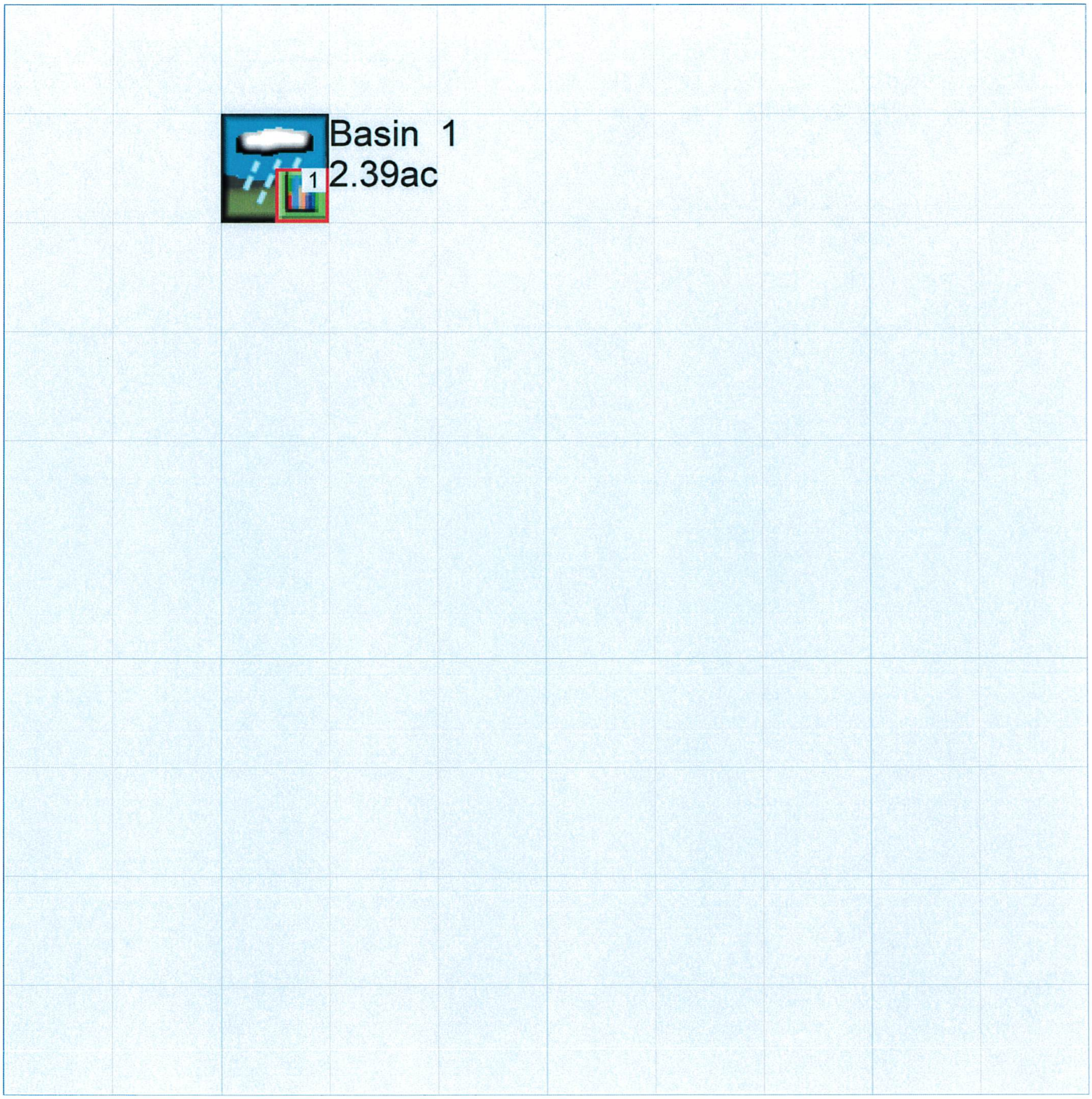
PERLND Changes

No PERLND changes have been made.

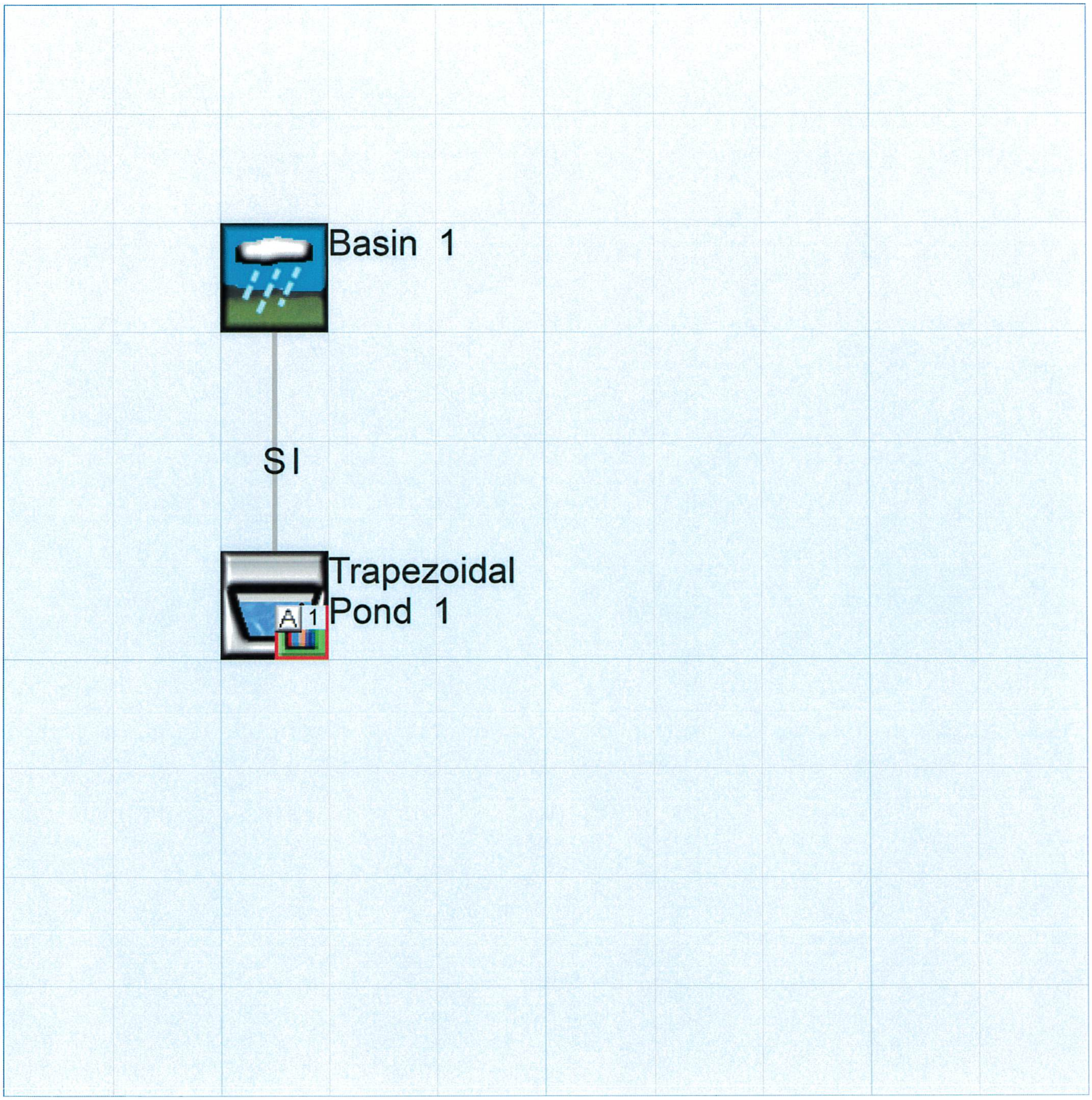
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2008 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   Sienna II Basin G.wdm
MESSU      25   PreSienna II Basin G.MES
           27   PreSienna II Basin G.L61
           28   PreSienna II Basin G.L62
           30   POCSienna II Basin G1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND       1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
    1      A/B, Forest, Flat       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 ***
    1         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  *********
    1         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 ***
   1       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
   1            0         5         2       400      0.05       0.3     0.996
 END PWAT-PARM2

 PWAT-PARM3
   <PLS >      PWATER input info: Part 3          ***
   # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   1            0         0         2         2         0         0         0
 END PWAT-PARM3
 PWAT-PARM4
   <PLS >     PWATER input info: Part 4                               ***
   # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   1            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
   1            0         0         0         0         3         1         0
 END PWAT-STATE1

END PERLND

IMPLND
 GEN-INFO
   <PLS ><-------Name-------> Unit-systems  Printer ***
   # -  #                    User t-series Engl Metr ***
                                   in  out           ***
 END GEN-INFO
 *** Section IWATER***

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

 PRINT-INFO
   <ILS > ******** Print-flags ******** PIVL  PYR
   # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
 END PRINT-INFO

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

 IWAT-PARM2
   <PLS >      IWATER input info: Part 2          ***
   # -  # ***  LSUR     SLSUR      NSUR     RETSC
 END IWAT-PARM2

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

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

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND   1                        2.39     COPY   501     12
PERLND   1                        2.39     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
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                          in  out                            ***
  END GEN-INFO
  *** Section RCHRES***

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

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR   *********
  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
             *  *  *  *    *  *  *  *  *        *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH      STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  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
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
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    1.111          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.111          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

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1955 10 01        END    2008 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   Sienna II Basin G.wdm
MESSU      25   MitSienna II Basin G.MES
           27   MitSienna II Basin G.L61
           28   MitSienna II Basin G.L62
           30   POCSienna II Basin G1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      IMPLND       1
      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        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           ***
  END GEN-INFO
  *** Section PWATER***

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

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
  END PRINT-INFO
```

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

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2          ***
    # -   # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -   # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -   #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  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
  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  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#   ***
Basin  1***
IMPLND   1                        1.47     RCHRES   1      5
IMPLND  14                        0.92     RCHRES   1      5

******Routing******
IMPLND   1                        1.47     COPY     1     15
IMPLND  14                        0.92     COPY     1     15
RCHRES   1                           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  Engl Metr LKFG            ***
                                           in  out                           ***
    1     Trapezoidal Pond-005    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
  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
  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
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH      STCOR         KS      DB50         ***
  <------><--------><--------><--------><--------><--------><-------->         ***
    1             1      0.02       0.0      182.0        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
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    5
     Depth      Area     Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)     (cfs)     (cfs)  (ft/sec)     (Minutes)***
  0.000000  0.114784  0.000000  0.000000  0.000000
  0.111111  0.119678  0.013026  0.000000  0.111022
  0.222222  0.124668  0.026600  0.000000  0.115650
  0.333333  0.129752  0.040735  0.000000  0.120367
  0.444444  0.134932  0.055440  0.000000  0.125172
  0.555556  0.140207  0.070725  0.000000  0.130065
  0.666667  0.145577  0.086602  0.000000  0.135047
  0.777778  0.151042  0.103081  0.000000  0.140117
  0.888889  0.156603  0.120172  0.000000  0.145275
  1.000000  0.162259  0.137887  0.000000  0.150522
  1.111111  0.168010  0.156235  0.000000  0.155857
  1.222222  0.173856  0.175228  0.000000  0.161281
  1.333333  0.179798  0.194875  0.000000  0.166793
  1.444444  0.185835  0.215188  0.000000  0.172393
  1.555556  0.191967  0.236177  0.000000  0.178081
  1.666667  0.198194  0.257853  0.000000  0.183858
  1.777778  0.204517  0.280225  0.000000  0.189723
  1.888889  0.210934  0.303306  0.000000  0.195677
  2.000000  0.217447  0.327105  0.000000  0.201719
  2.111111  0.224055  0.351633  0.000000  0.207849
  2.222222  0.230759  0.376900  0.000000  0.214067
  2.333333  0.237557  0.402918  0.000000  0.220374
  2.444444  0.244451  0.429696  0.000000  0.226769
  2.555556  0.251440  0.457246  0.000000  0.233253
  2.666667  0.258525  0.485577  0.000000  0.239825
  2.777778  0.265704  0.514701  0.000000  0.246485
  2.888889  0.272979  0.544628  0.000000  0.253233
  3.000000  0.280349  0.575368  0.000000  0.260070
  3.111111  0.287814  0.606933  0.000000  0.266996
  3.222222  0.295375  0.639332  0.000000  0.274009
  3.333333  0.303030  0.672577  0.000000  0.281111
  3.444444  0.310781  0.706678  0.000000  0.288301
  3.555556  0.318627  0.741645  0.000000  0.295580
  3.666667  0.326569  0.777489  0.000000  0.302947
  3.777778  0.334605  0.814221  0.000000  0.310402
  3.888889  0.342737  0.851851  0.000000  0.317946
  4.000000  0.350964  0.890390  0.000000  0.325578
  4.111111  0.359286  0.929848  0.587805  0.333298
  4.222222  0.367704  0.970237  1.636945  0.341107
  4.333333  0.376217  1.011566  2.882519  0.349004
  4.444444  0.384825  1.053846  4.103633  0.356989
  4.555556  0.393528  1.097087  5.097354  0.365063
  4.666667  0.402326  1.141302  5.754494  0.373225
  4.777778  0.411220  1.186499  6.249853  0.381475
  4.888889  0.420209  1.232689  6.681374  0.389814
  5.000000  0.429293  1.279884  7.086668  0.398241
  5.111111  0.438472  1.328093  7.470004  0.406756
  5.222222  0.447747  1.377327  7.834606  0.415360
  5.333333  0.457117  1.427597  8.182979  0.424052
  5.444444  0.466582  1.478914  8.517114  0.432832
  5.555556  0.476142  1.531287  8.838627  0.441701
  5.666667  0.485797  1.584729  9.148849  0.450658
  5.777778  0.495548  1.639248  9.448890  0.459703
  5.888889  0.505394  1.694856  9.739693  0.468837
  6.000000  0.515335  1.751563  10.02206  0.478059
```

```
   6.111111  0.525372  1.809380  10.29669  0.487370
   6.222222  0.535503  1.868317  10.56418  0.496768
   6.333333  0.545730  1.928386  10.82506  0.506256
   6.444444  0.556052  1.989596  11.07981  0.515831
   6.555556  0.566469  2.051958  11.32882  0.525495
   6.666667  0.576982  2.115483  11.57248  0.535247
   6.777778  0.587590  2.180182  11.81111  0.545087
   6.888889  0.598293  2.246064  12.04502  0.555016
   7.000000  0.609091  2.313141  12.27447  0.565033
   7.111111  0.619984  2.381423  12.49971  0.575139
   7.222222  0.630973  2.450921  12.72096  0.585333
   7.333333  0.642057  2.521644  12.93843  0.595615
   7.444444  0.653236  2.593605  13.15230  0.605985
   7.555556  0.664510  2.666813  13.36275  0.616444
   7.666667  0.675880  2.741279  13.56994  0.626991
   7.777778  0.687345  2.817014  13.77401  0.637627
   7.888889  0.698905  2.894028  13.97510  0.648351
   8.000000  0.710560  2.972332  14.17334  0.659163
   8.111111  0.722311  3.051936  14.36884  0.670064
   8.222222  0.734156  3.132850  14.56172  0.681052
   8.333333  0.746097  3.215087  14.75207  0.692130
   8.444444  0.758134  3.298655  14.94001  0.703295
   8.555556  0.770265  3.383566  15.12560  0.714549
   8.666667  0.782492  3.469830  15.30895  0.725891
   8.777778  0.794813  3.557458  15.49013  0.737322
   8.888889  0.807231  3.646461  15.66921  0.748841
   9.000000  0.819743  3.736848  15.84627  0.760448
   9.111111  0.832350  3.828631  16.02137  0.772144
   9.222222  0.845053  3.921820  16.19458  0.783928
   9.333333  0.857851  4.016426  16.36596  0.795800
   9.444444  0.870744  4.112459  16.53556  0.807761
   9.555556  0.883733  4.209930  16.70344  0.819810
   9.666667  0.896817  4.308850  16.86964  0.831947
   9.777778  0.909996  4.409228  17.03423  0.844173
   9.888889  0.923270  4.511076  17.19724  0.856487
  10.00000   0.936639  4.614404  17.35872  0.868889
  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    1.111          PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.111          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

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   1000 FLOW      ENGL      REPL
RCHRES   1 HYDR   O      1 1         1     WDM   1001 FLOW      ENGL      REPL
RCHRES   1 HYDR   O      2 1         1     WDM   1002 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        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  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

Disclaimer

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