

TECHNICAL MEMORANDUM

Infiltration Trench Sizing Worksheet Development

Applicability and Limitations

This worksheet is intended to support single-family residential (SFR) projects that result in 2,000 to 4,999 square feet of new, replaced, or new plus replaced hard surface area, and are required to manage stormwater onsite per Stormwater Minimum Requirement #5.

Property owners or contractors may use this guide to design an infiltration trench system. It is recommended that a Soils Professional assist in identifying suitable trench locations and evaluating site-specific conditions.

A Soils Professional is required to:

- Verify soil type and infiltration capacity,
- Confirm vertical separation from the seasonal high groundwater table,
- Determine the design infiltration rate using either the Soil Textural Classification Method or other Pierce County–approved infiltration rate testing methods (see Appendix III-A of the Pierce County Stormwater Management and Site Development Manual for more details).
- If the measured infiltration rate falls between the rates in the table in the Worksheet, select the closest lower infiltration rate.

In most cases, a Professional Engineer (PE) licensed in the State of Washington is not required, as the trench sizing calculations have been pre-verified and standardized in this worksheet. However, a PE may be needed if:

- The infiltration rate is less than 1 inch/hour,
- The project exceeds the scope of the worksheet,
- Site-specific complexities require custom design or approval.

A Soils Professional is defined as:

- An individual certified by the Soil Science Society of America (or an equivalent national program),
- A locally licensed onsite sewage designer, or
- A qualified person working under the supervision of a Professional Engineer, Geologist, Hydrogeologist, or Engineering Geologist registered in Washington State.

Modeling Assumptions and Simulation Conditions

The trench sizing values in this worksheet were verified using the Western Washington Hydrology Model (WWHM2012), based on the following assumptions:

- Computation Time Step: 15-minute intervals
- Precipitation Gage: 52 IN West
- (Note: Precipitation in Pierce County ranges from approximately 32 to 52 inches annually)
- Predeveloped Condition: Fully forested (default in WWHM)
- Mitigated Condition: 100% road surface (minus the gravel trench area)
- Site Slope: Moderate (5% to 15%)
- Trench Porosity: 30% (i.e., 30% of trench volume is assumed available for storage)
- Topsoil and Gravel Depth: 6" topsoil assumed as part of total depth shown on Table 1.
- Pipe Storage: Perforated pipe void space is not included in storage volume
- Design Infiltration Rate: Calculated by applying a correction factor of 0.5 to the measured infiltration rate (i.e., 50% reduction)

Two example model simulation results are provided in Appendix A.

Sizing Table Development

Multipliers

The multipliers in Tables 1 through 5 have been developed to determine trench width and length based on the trench depth and (measured) initial infiltration rate to size the trench to satisfy LID Performance Standard.

Table 1. Trench Bottom Multipliers for an Initial Infiltration Rate of 30 inches/hour.

Initial Infiltration Rate	Depth (ft)	Trench Bottom Multiplier
30 inches/hour	2	0.024
	2.5	0.022
	3	0.019
	3.5	0.018
	4	0.017
	4.5	0.016
	5	0.015

ft = feet

Table 2. Trench Bottom Multipliers for an Initial Infiltration Rate of 12 inches/hour.

Initial Infiltration Rate	Depth (ft)	Trench Bottom Multiplier
12 inches/hour	2	0.058
	2.5	0.052
	3	0.046
	3.5	0.044
	4	0.040
	4.5	0.038
	5	0.036

ft = feet

Table 3. Trench Bottom Multipliers for an Initial Infiltration Rate of 4 inches/hour.

Initial Infiltration Rate	Depth (ft)	Trench Bottom Multiplier
4 inches/hour	2	0.101
	2.5	0.090
	3	0.080
	3.5	0.076
	4	0.072
	4.5	0.066
	5	0.063

ft = feet

Table 4. Trench Bottom Multipliers for an Initial Infiltration Rate of 2 inches/hour.

Initial Infiltration Rate	Depth (ft)	Trench Bottom Multiplier
2 inches/hour	2	0.144
	2.5	0.130
	3	0.114
	3.5	0.108
	4	0.102
	4.5	0.094
	5	0.090

ft = feet

Table 5. Trench Bottom Multipliers for an Initial Infiltration Rate of 1 inch/hour.

Initial Infiltration Rate	Depth (ft)	Trench Bottom Multiplier
1 inch/hour	2	0.206
	2.5	0.184
	3	0.163
	3.5	0.153
	4	0.146
	4.5	0.135
	5	0.129

ft = feet

Final Infiltration Trench System Design Application Worksheet

See a Separate Infiltration Trench System Worksheet Template Document.

Conclusion

The use of this infiltration trench size worksheet and design template is more conservative and cost-effective approach than other compliance options including meeting LID performance standard or following the List approach. That is due to 1) we developed the infiltration trench size and multiplier using a maximum annual precipitation of 52 inches (within a range of 32-52 inches across the County), 2) a safety factor of 2 was applied to determine design infiltration rate to account for potential clogging over time, and 3) if the measured infiltration rate differs from the infiltration rate options provided in the size table, they are required to use the closet lower value, which is another safety factor.

All of these will result in trench sizing that is more protective than currently required to meet Minimum Requirement #5 On site Stormwater Management. Furthermore, using a standardized worksheet will help ensure compliance and streamline both submittal preparation and the County's review process.

Appendix A

Infiltration Trench System Design Application Example Scenarios Simulation Results



SINGLE FAMILY RESIDENTIAL

Infiltration Trench System Design Application Worksheet

Review and follow the [Infiltration Trench System Design and Maintenance Guide](#) before using this worksheet. Submit this worksheet for your development project review.

Description of Project:

DESIGN

Step A. Calculate the total hard surface areas (in square feet [sq. ft.]) to be routed to the trench:

- Roof area w/overhangs _____ sq. ft.
- Driveway _____ sq. ft.
- Others (sidewalks, patios, etc.) _____ sq. ft.
- Total hard surface area _____ sq. ft.

Total hard surface area must be less than 5,000 sq. ft. to use this worksheet.

Step B. Choose the infiltration rate that applies to your site based on the Soils Professional's site evaluation and Soil Evaluation Report results. If the measured infiltration rate falls between the rates in the table in the Worksheet, select the closest lower infiltration rate. Calculate the total hard surface areas (in square feet [sq. ft.]) to be routed to the trench:

Select the closest lower value from the measured infiltration rate:

- ☐ 30 inches/hour
- ☐ 12 inches/hour
- ☐ 4 inches/hour
- ☐ 2 inches/hour
- ☐ 1 inch/hour
- ☐ Less than 1 inch/hour – A professional engineer must design the stormwater system

Step C. Select a trench depth between 2 and 5 feet. If the trench is deeper, it will be shorter in length. The total depth of the trench must include the depth of topsoil. At least 6 inches of topsoil is needed over the top of the trench. A Soils Professional can help with the trench depth selection.

- Trench depth = _____ feet

Step D. Select the trench bottom multiplier using the Sizing Table on the next page of this worksheet.

- Trench multiplier = _____

Step E. Select a trench width. Typical width ranges between 2 feet to 6 feet.

- Trench width = _____ feet (2 feet minimum – 10 feet maximum)

Step F. Calculate the trench length using the information gathered above (Step A, Step D and Step E). The maximum length is 100 feet from the starting point where the water enters the trench.

- Trench width = _____ feet (2 feet minimum – 10 feet maximum)

$$\textit{Trench length} = \frac{\textit{Total Surface Area} * \textit{Trench Bottom Multiplier}}{\textit{Trench Width}}$$

- (Step A) _____ sq. ft. x (Step D) _____ (trench bottom multiplier) / (Step E) _____ ft. (width) = _____ ft.

Step G. Summarize the trench dimensions:

- Trench _____ ft. deep x _____ ft. wide x _____ ft. long

The above design meets Minimum Requirement #5 – Onsite Stormwater Management LID Performance Standard, in accordance with 2021 Pierce County Stormwater Management and Site Development Manual.

Designer/Owners/Contractor Name (Printed)

Date

Signature

Registration No. (if applicable)

Sign, date, and stamp (if applicable)

Infiltration Trench Sizing Table

Initial Infiltration Rate	Depth (feet)	Trench Bottom Multiplier
30 inches/hour	2	0.024
	2.5	0.022
	3	0.019
	3.5	0.018
	4	0.017
	4.5	0.016
	5	0.015
12 inches/hour	2	0.058
	2.5	0.052
	3	0.046
	3.5	0.044
	4	0.040
	4.5	0.038
	5	0.036
4 inches/hour	2	0.101
	2.5	0.090
	3	0.080
	3.5	0.076
	4	0.072
	4.5	0.066
	5	0.063
2 inches/hour	2	0.144
	2.5	0.130
	3	0.114
	3.5	0.108
	4	0.102
	4.5	0.094
	5	0.090
1 inch/hour	2	0.206
	2.5	0.184
	3	0.163
	3.5	0.153
	4	0.146
	4.5	0.135
	5	0.129

The infiltration trench sizes in this sizing table have been verified in WWHM2012 with the following assumptions:

- The porosity of the gravel layer was assumed as 30 percent.
- The additional void volume of perforated pipe was neglected.
- A correction factor of 0.5 was applied to the infiltration rate to calculate the design infiltration rate.
- Predeveloped condition was set as moderate slope forest.
- All of runoff is delivered to the infiltration trench by a minimum 4-inch diameter perforated pipe.

WWHM2012
PROJECT REPORT

General Model Information

WWHM2012 Project Name: precip52inWest_infilt4inhr_graveldepth2ft

Site Name:

Site Address:

City:

Report Date: 6/26/2025

Gage: 52 IN WEST

Data Start: 10/01/1901

Data End: 09/30/2059

Timestep: 15 Minute

Precip Scale: 1.000

Version Date: 2023/01/27

Version: 4.2.19

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, Mod	0.1148
Pervious Total	0.1148
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.1148

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	0.103
Impervious Total	0.103
Basin Total	0.103

Routing Elements

Predeveloped Routing

Mitigated Routing

Gravel Trench Bed 1

Bottom Length: 91.82 ft.
 Bottom Width: 5.50 ft.
 Trench bottom slope 1: 0.01 To 1
 Trench Left side slope 0: 0 To 1
 Trench right side slope 2: 0 To 1
 Material thickness of first layer: 2
 Pour Space of material for first layer: 0.3
 Material thickness of second layer: 0
 Pour Space of material for second layer: 0
 Material thickness of third layer: 0
 Pour Space of material for third layer: 0
 Infiltration On
 Infiltration rate: 4
 Infiltration safety factor: 0.5
 Total Volume Infiltrated (ac-ft.): 52.086
 Total Volume Through Riser (ac-ft.): 0.037
 Total Volume Through Facility (ac-ft.): 52.123
 Percent Infiltrated: 99.93
 Total Precip Applied to Facility: 3.526
 Total Evap From Facility: 0.338
 Discharge Structure
 Riser Height: 2 ft.
 Riser Diameter: 10 in.
 Element Flows To:
 Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

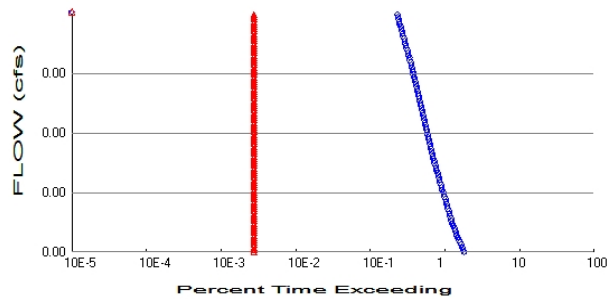
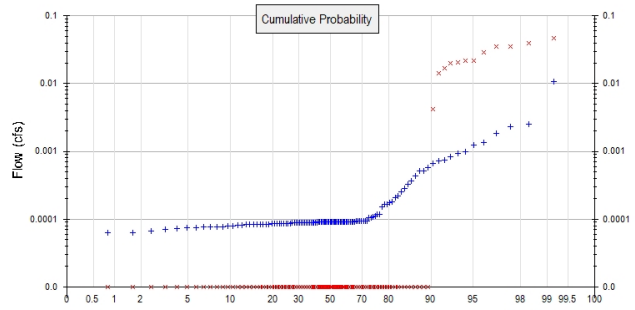
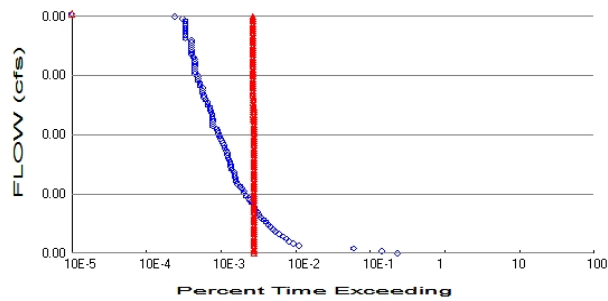
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.011	0.000	0.000	0.000
0.0222	0.011	0.000	0.000	0.023
0.0444	0.011	0.000	0.000	0.023
0.0667	0.011	0.000	0.000	0.023
0.0889	0.011	0.000	0.000	0.023
0.1111	0.011	0.000	0.000	0.023
0.1333	0.011	0.000	0.000	0.023
0.1556	0.011	0.000	0.000	0.023
0.1778	0.011	0.000	0.000	0.023
0.2000	0.011	0.000	0.000	0.023
0.2222	0.011	0.000	0.000	0.023
0.2444	0.011	0.000	0.000	0.023
0.2667	0.011	0.000	0.000	0.023
0.2889	0.011	0.001	0.000	0.023
0.3111	0.011	0.001	0.000	0.023
0.3333	0.011	0.001	0.000	0.023
0.3556	0.011	0.001	0.000	0.023
0.3778	0.011	0.001	0.000	0.023
0.4000	0.011	0.001	0.000	0.023
0.4222	0.011	0.001	0.000	0.023
0.4444	0.011	0.001	0.000	0.023
0.4667	0.011	0.001	0.000	0.023
0.4889	0.011	0.001	0.000	0.023
0.5111	0.011	0.001	0.000	0.023

0.5333	0.011	0.001	0.000	0.023
0.5556	0.011	0.001	0.000	0.023
0.5778	0.011	0.002	0.000	0.023
0.6000	0.011	0.002	0.000	0.023
0.6222	0.011	0.002	0.000	0.023
0.6444	0.011	0.002	0.000	0.023
0.6667	0.011	0.002	0.000	0.023
0.6889	0.011	0.002	0.000	0.023
0.7111	0.011	0.002	0.000	0.023
0.7333	0.011	0.002	0.000	0.023
0.7556	0.011	0.002	0.000	0.023
0.7778	0.011	0.002	0.000	0.023
0.8000	0.011	0.002	0.000	0.023
0.8222	0.011	0.002	0.000	0.023
0.8444	0.011	0.002	0.000	0.023
0.8667	0.011	0.003	0.000	0.023
0.8889	0.011	0.003	0.000	0.023
0.9111	0.011	0.003	0.000	0.023
0.9333	0.011	0.003	0.000	0.023
0.9556	0.011	0.003	0.000	0.023
0.9778	0.011	0.003	0.000	0.023
1.0000	0.011	0.003	0.000	0.023
1.0222	0.011	0.003	0.000	0.023
1.0444	0.011	0.003	0.000	0.023
1.0667	0.011	0.003	0.000	0.023
1.0889	0.011	0.003	0.000	0.023
1.1111	0.011	0.003	0.000	0.023
1.1333	0.011	0.003	0.000	0.023
1.1556	0.011	0.004	0.000	0.023
1.1778	0.011	0.004	0.000	0.023
1.2000	0.011	0.004	0.000	0.023
1.2222	0.011	0.004	0.000	0.023
1.2444	0.011	0.004	0.000	0.023
1.2667	0.011	0.004	0.000	0.023
1.2889	0.011	0.004	0.000	0.023
1.3111	0.011	0.004	0.000	0.023
1.3333	0.011	0.004	0.000	0.023
1.3556	0.011	0.004	0.000	0.023
1.3778	0.011	0.004	0.000	0.023
1.4000	0.011	0.004	0.000	0.023
1.4222	0.011	0.004	0.000	0.023
1.4444	0.011	0.005	0.000	0.023
1.4667	0.011	0.005	0.000	0.023
1.4889	0.011	0.005	0.000	0.023
1.5111	0.011	0.005	0.000	0.023
1.5333	0.011	0.005	0.000	0.023
1.5556	0.011	0.005	0.000	0.023
1.5778	0.011	0.005	0.000	0.023
1.6000	0.011	0.005	0.000	0.023
1.6222	0.011	0.005	0.000	0.023
1.6444	0.011	0.005	0.000	0.023
1.6667	0.011	0.005	0.000	0.023
1.6889	0.011	0.005	0.000	0.023
1.7111	0.011	0.006	0.000	0.023
1.7333	0.011	0.006	0.000	0.023
1.7556	0.011	0.006	0.000	0.023
1.7778	0.011	0.006	0.000	0.023
1.8000	0.011	0.006	0.000	0.023

1.8222	0.011	0.006	0.000	0.023
1.8444	0.011	0.006	0.000	0.023
1.8667	0.011	0.006	0.000	0.023
1.8889	0.011	0.006	0.000	0.023
1.9111	0.011	0.006	0.000	0.023
1.9333	0.011	0.006	0.000	0.023
1.9556	0.011	0.006	0.000	0.023
1.9778	0.011	0.006	0.000	0.023
2.0000	0.011	0.007	0.000	0.023

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 0.1148

Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 0

Total Impervious Area: 0.103

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.000114
5 year	0.000266
10 year	0.000454
25 year	0.000865
50 year	0.001369
100 year	0.002128

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
1902	0.000	0.000
1903	0.000	0.000
1904	0.000	0.000
1905	0.000	0.000
1906	0.000	0.000
1907	0.000	0.000
1908	0.000	0.000
1909	0.000	0.000
1910	0.000	0.000
1911	0.000	0.000
1912	0.011	0.014
1913	0.000	0.000
1914	0.000	0.020
1915	0.000	0.000
1916	0.000	0.000
1917	0.000	0.000
1918	0.000	0.000
1919	0.000	0.000
1920	0.000	0.000
1921	0.000	0.000
1922	0.000	0.000
1923	0.000	0.000
1924	0.000	0.000
1925	0.000	0.000
1926	0.000	0.000
1927	0.000	0.000
1928	0.000	0.000
1929	0.000	0.000
1930	0.000	0.000
1931	0.000	0.000
1932	0.000	0.000
1933	0.000	0.000
1934	0.002	0.000
1935	0.000	0.000
1936	0.000	0.000
1937	0.000	0.000
1938	0.000	0.000
1939	0.000	0.000
1940	0.000	0.000
1941	0.000	0.000
1942	0.000	0.000
1943	0.000	0.000
1944	0.000	0.022
1945	0.000	0.000
1946	0.000	0.000
1947	0.000	0.000
1948	0.000	0.004
1949	0.000	0.000
1950	0.000	0.000
1951	0.000	0.000
1952	0.001	0.035
1953	0.001	0.035
1954	0.000	0.000
1955	0.000	0.000
1956	0.000	0.000
1957	0.000	0.000

1958	0.001	0.000
1959	0.001	0.000
1960	0.000	0.000
1961	0.001	0.017
1962	0.000	0.000
1963	0.000	0.000
1964	0.000	0.000
1965	0.001	0.000
1966	0.000	0.000
1967	0.000	0.000
1968	0.000	0.000
1969	0.000	0.000
1970	0.000	0.000
1971	0.000	0.022
1972	0.000	0.046
1973	0.000	0.000
1974	0.001	0.000
1975	0.000	0.029
1976	0.000	0.000
1977	0.000	0.000
1978	0.001	0.000
1979	0.000	0.000
1980	0.000	0.000
1981	0.000	0.000
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.000	0.000
1987	0.000	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.001	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.002	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000
2011	0.000	0.000
2012	0.000	0.020
2013	0.000	0.000
2014	0.000	0.000
2015	0.000	0.000

2016	0.000	0.000
2017	0.000	0.000
2018	0.003	0.000
2019	0.001	0.039
2020	0.000	0.000
2021	0.001	0.000
2022	0.000	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0108	0.0463
2	0.0025	0.0395
3	0.0023	0.0354
4	0.0018	0.0350
5	0.0013	0.0291
6	0.0012	0.0218
7	0.0010	0.0218
8	0.0009	0.0203
9	0.0008	0.0201
10	0.0007	0.0167
11	0.0007	0.0143
12	0.0007	0.0042
13	0.0006	0.0000
14	0.0005	0.0000
15	0.0005	0.0000
16	0.0004	0.0000
17	0.0004	0.0000
18	0.0003	0.0000
19	0.0003	0.0000
20	0.0003	0.0000
21	0.0002	0.0000
22	0.0002	0.0000
23	0.0002	0.0000
24	0.0002	0.0000
25	0.0002	0.0000
26	0.0002	0.0000
27	0.0002	0.0000
28	0.0001	0.0000
29	0.0001	0.0000
30	0.0001	0.0000
31	0.0001	0.0000
32	0.0001	0.0000
33	0.0001	0.0000
34	0.0001	0.0000
35	0.0001	0.0000
36	0.0001	0.0000
37	0.0001	0.0000
38	0.0001	0.0000
39	0.0001	0.0000
40	0.0001	0.0000
41	0.0001	0.0000
42	0.0001	0.0000
43	0.0001	0.0000
44	0.0001	0.0000
45	0.0001	0.0000
46	0.0001	0.0000
47	0.0001	0.0000

48	0.0001	0.0000
49	0.0001	0.0000
50	0.0001	0.0000
51	0.0001	0.0000
52	0.0001	0.0000
53	0.0001	0.0000
54	0.0001	0.0000
55	0.0001	0.0000
56	0.0001	0.0000
57	0.0001	0.0000
58	0.0001	0.0000
59	0.0001	0.0000
60	0.0001	0.0000
61	0.0001	0.0000
62	0.0001	0.0000
63	0.0001	0.0000
64	0.0001	0.0000
65	0.0001	0.0000
66	0.0001	0.0000
67	0.0001	0.0000
68	0.0001	0.0000
69	0.0001	0.0000
70	0.0001	0.0000
71	0.0001	0.0000
72	0.0001	0.0000
73	0.0001	0.0000
74	0.0001	0.0000
75	0.0001	0.0000
76	0.0001	0.0000
77	0.0001	0.0000
78	0.0001	0.0000
79	0.0001	0.0000
80	0.0001	0.0000
81	0.0001	0.0000
82	0.0001	0.0000
83	0.0001	0.0000
84	0.0001	0.0000
85	0.0001	0.0000
86	0.0001	0.0000
87	0.0001	0.0000
88	0.0001	0.0000
89	0.0001	0.0000
90	0.0001	0.0000
91	0.0001	0.0000
92	0.0001	0.0000
93	0.0001	0.0000
94	0.0001	0.0000
95	0.0001	0.0000
96	0.0001	0.0000
97	0.0001	0.0000
98	0.0001	0.0000
99	0.0001	0.0000
100	0.0001	0.0000
101	0.0001	0.0000
102	0.0001	0.0000
103	0.0001	0.0000
104	0.0001	0.0000
105	0.0001	0.0000

106	0.0001	0.0000
107	0.0001	0.0000
108	0.0001	0.0000
109	0.0001	0.0000
110	0.0001	0.0000
111	0.0001	0.0000
112	0.0001	0.0000
113	0.0001	0.0000
114	0.0001	0.0000
115	0.0001	0.0000
116	0.0001	0.0000
117	0.0001	0.0000
118	0.0001	0.0000
119	0.0001	0.0000
120	0.0001	0.0000
121	0.0001	0.0000

LID Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0000	76450	117	0	Pass
0.0000	73953	117	0	Pass
0.0000	72175	117	0	Pass
0.0000	70185	117	0	Pass
0.0000	68111	117	0	Pass
0.0000	65656	117	0	Pass
0.0000	63497	117	0	Pass
0.0000	61296	117	0	Pass
0.0000	59772	117	0	Pass
0.0000	57951	117	0	Pass
0.0000	56300	117	0	Pass
0.0000	54650	117	0	Pass
0.0000	53083	117	0	Pass
0.0000	51644	117	0	Pass
0.0000	50755	117	0	Pass
0.0000	49485	117	0	Pass
0.0000	48385	117	0	Pass
0.0000	47326	117	0	Pass
0.0000	46310	117	0	Pass
0.0000	45294	117	0	Pass
0.0000	44490	117	0	Pass
0.0000	43601	117	0	Pass
0.0000	42712	117	0	Pass
0.0000	41764	117	0	Pass
0.0000	40744	117	0	Pass
0.0000	39880	117	0	Pass
0.0000	39029	117	0	Pass
0.0000	38208	117	0	Pass
0.0000	37353	117	0	Pass
0.0000	36511	117	0	Pass
0.0000	35685	117	0	Pass
0.0000	34995	117	0	Pass
0.0000	34407	117	0	Pass
0.0000	33713	117	0	Pass
0.0000	32900	117	0	Pass
0.0000	32121	117	0	Pass
0.0000	31389	117	0	Pass
0.0000	30703	117	0	Pass
0.0000	30169	117	0	Pass
0.0000	29598	117	0	Pass
0.0000	28971	117	0	Pass
0.0000	28480	117	0	Pass
0.0000	28019	117	0	Pass
0.0000	27562	117	0	Pass
0.0000	27067	117	0	Pass
0.0000	26698	117	0	Pass
0.0000	26241	117	0	Pass
0.0000	25792	117	0	Pass
0.0000	25301	117	0	Pass
0.0000	24823	117	0	Pass
0.0000	24387	117	0	Pass
0.0000	23947	117	0	Pass
0.0000	23481	117	0	Pass

0.0000	23079	117	0	Pass
0.0000	22698	117	0	Pass
0.0000	22338	117	0	Pass
0.0000	21957	117	0	Pass
0.0000	21652	117	0	Pass
0.0000	21276	117	0	Pass
0.0000	20933	117	0	Pass
0.0000	20573	117	0	Pass
0.0000	20247	117	0	Pass
0.0000	19866	117	0	Pass
0.0000	19587	117	0	Pass
0.0000	19176	117	0	Pass
0.0000	18863	117	0	Pass
0.0000	18499	117	0	Pass
0.0000	18114	117	0	Pass
0.0000	17783	117	0	Pass
0.0000	17563	117	0	Pass
0.0000	17250	117	0	Pass
0.0000	16928	117	0	Pass
0.0000	16607	117	0	Pass
0.0000	16293	117	0	Pass
0.0000	15967	117	0	Pass
0.0000	15781	117	0	Pass
0.0000	15544	117	0	Pass
0.0000	15265	117	0	Pass
0.0000	14960	117	0	Pass
0.0000	14647	117	0	Pass
0.0000	14321	117	0	Pass
0.0000	14109	117	0	Pass
0.0000	13876	117	0	Pass
0.0000	13593	117	0	Pass
0.0000	13288	117	0	Pass
0.0001	13000	117	0	Pass
0.0001	12691	117	0	Pass
0.0001	12433	117	0	Pass
0.0001	12158	117	0	Pass
0.0001	11937	117	0	Pass
0.0001	11666	117	1	Pass
0.0001	11446	117	1	Pass
0.0001	11201	117	1	Pass
0.0001	11002	117	1	Pass
0.0001	10739	117	1	Pass
0.0001	10536	117	1	Pass
0.0001	10303	117	1	Pass
0.0001	10071	117	1	Pass
0.0001	9897	117	1	Pass
0.0001	9690	117	1	Pass

Duration Flows

The Duration Matching **Failed**

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0001	9690	117	1	Pass
0.0001	5948	117	1	Pass
0.0001	2509	117	4	Pass
0.0001	465	117	25	Pass
0.0001	396	117	29	Pass
0.0001	343	117	34	Pass
0.0001	316	117	37	Pass
0.0001	285	117	41	Pass
0.0002	248	117	47	Pass
0.0002	226	117	51	Pass
0.0002	210	117	55	Pass
0.0002	193	117	60	Pass
0.0002	180	117	65	Pass
0.0002	169	117	69	Pass
0.0002	157	117	74	Pass
0.0003	144	117	81	Pass
0.0003	137	117	85	Pass
0.0003	130	117	90	Pass
0.0003	120	117	97	Pass
0.0003	119	117	98	Pass
0.0003	115	117	101	Pass
0.0003	109	117	107	Pass
0.0003	103	117	113	Fail
0.0004	98	117	119	Fail
0.0004	90	117	130	Fail
0.0004	86	117	136	Fail
0.0004	85	117	137	Fail
0.0004	81	117	144	Fail
0.0004	76	117	153	Fail
0.0004	70	117	167	Fail
0.0005	67	117	174	Fail
0.0005	66	117	177	Fail
0.0005	64	117	182	Fail
0.0005	64	117	182	Fail
0.0005	63	117	185	Fail
0.0005	59	117	198	Fail
0.0005	57	117	205	Fail
0.0005	57	117	205	Fail
0.0006	56	117	208	Fail
0.0006	54	117	216	Fail
0.0006	52	117	225	Fail
0.0006	51	117	229	Fail
0.0006	51	117	229	Fail
0.0006	49	117	238	Fail
0.0006	47	117	248	Fail
0.0007	46	117	254	Fail
0.0007	45	117	260	Fail
0.0007	43	117	272	Fail
0.0007	42	117	278	Fail
0.0007	40	117	292	Fail
0.0007	39	117	300	Fail
0.0007	38	117	307	Fail
0.0007	37	117	316	Fail
0.0008	33	117	354	Fail

0.0008	33	117	354	Fail
0.0008	33	117	354	Fail
0.0008	33	115	348	Fail
0.0008	32	115	359	Fail
0.0008	32	115	359	Fail
0.0008	31	115	370	Fail
0.0009	30	115	383	Fail
0.0009	30	115	383	Fail
0.0009	28	114	407	Fail
0.0009	28	114	407	Fail
0.0009	26	114	438	Fail
0.0009	25	114	456	Fail
0.0009	25	113	452	Fail
0.0009	24	113	470	Fail
0.0010	24	113	470	Fail
0.0010	24	113	470	Fail
0.0010	22	113	513	Fail
0.0010	22	113	513	Fail
0.0010	21	113	538	Fail
0.0010	21	113	538	Fail
0.0010	21	113	538	Fail
0.0011	19	113	594	Fail
0.0011	19	113	594	Fail
0.0011	19	113	594	Fail
0.0011	19	113	594	Fail
0.0011	19	113	594	Fail
0.0011	19	113	594	Fail
0.0011	19	113	594	Fail
0.0011	18	113	627	Fail
0.0012	17	113	664	Fail
0.0012	17	113	664	Fail
0.0012	17	113	664	Fail
0.0012	17	113	664	Fail
0.0012	17	113	664	Fail
0.0012	17	113	664	Fail
0.0012	17	112	658	Fail
0.0012	14	112	800	Fail
0.0013	14	112	800	Fail
0.0013	14	112	800	Fail
0.0013	14	112	800	Fail
0.0013	14	112	800	Fail
0.0013	14	112	800	Fail
0.0013	14	112	800	Fail
0.0013	14	112	800	Fail
0.0014	13	112	861	Fail
0.0014	10	112	1120	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
Gravel Trench Bed 1 POC	<input type="checkbox"/>	60.32			<input type="checkbox"/>	99.94			
Total Volume Infiltrated		60.32	0.00	0.00		99.94	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

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

```
WWMH4 model simulation
START      1901 10 01      END      2059 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      precip52inWest_infilt4inhr_graveldepth2ft.wdm
MESSU    25      Preprecip52inWest_infilt4inhr_graveldepth2ft.MES
          27      Preprecip52inWest_infilt4inhr_graveldepth2ft.L61
          28      Preprecip52inWest_infilt4inhr_graveldepth2ft.L62
          30      POCprecip52inWest_infilt4inhr_graveldepth2ft1.dat
```

END FILES

OPN SEQUENCE

```
INGRP              INDELT 00:15
  PERLND           2
  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              ***
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 ***
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 *****
2      0      0      4      0      0      0      0      0      0      0      0      0      1      9
```

END PRINT-INFO

```

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

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARY AGWRC
2 0 5 2 400 0.1 0.3 0.996
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
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
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
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	2	0.1148		COPY	501	12
PERLND	2	0.1148		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	***	ODGTFG for each	FUNCT for each	***
# - #	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	PERLND	1	999	EXTNL
WDM	2	PREC	ENGL	1	IMPLND	1	999	EXTNL

WDM	1	EVAP	ENGL	1	PERLND	1	999	EXTNL	PETINP
WDM	1	EVAP	ENGL	1	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

```
WWM4 model simulation
START      1901 10 01      END      2059 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      precip52inWest_infilt4inhr_graveldepth2ft.wdm
MESSU    25      Mitprecip52inWest_infilt4inhr_graveldepth2ft.MES
          27      Mitprecip52inWest_infilt4inhr_graveldepth2ft.L61
          28      Mitprecip52inWest_infilt4inhr_graveldepth2ft.L62
          30      POCprecip52inWest_infilt4inhr_graveldepth2ft1.dat
```

END FILES

OPN SEQUENCE

INGRP INDELT 00:15

```
IMPLND      1
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      Gravel Trench Bed 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

```
#      # OPCODE ***
```

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
END GEN-INFO
*** Section IWATER***

ACTIVITY
    <PLS > ***** Active Sections *****
    # - # ATMP SNOW IWAT SLD IWG IQAL ***
    1 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 4 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
END IWAT-PARM1

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

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

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

```

END IMPLND

SCHEMATIC

<-Source->	<--Area-->	<-Target->	MBLK	***
<Name> #	<-factor->	<Name> #	Tbl#	***
Basin 1***				
IMPLND 1	0.103	RCHRES 1	5	

*****Routing*****

IMPLND 1	0.103	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	Gravel Trench	Be-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	***	ODGTFG for each	FUNCT for each	***
# - #	VC A1 A2 A3	ODFVFG for each	***	possible exit	possible exit
	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	0.0	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

92 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.011593	0.000000	0.000000	0.000000		
0.022222	0.011593	0.000077	0.000000	0.023380		
0.044444	0.011594	0.000155	0.000000	0.023380		
0.066667	0.011594	0.000232	0.000000	0.023380		
0.088889	0.011594	0.000309	0.000000	0.023380		
0.111111	0.011594	0.000386	0.000000	0.023380		
0.133333	0.011594	0.000464	0.000000	0.023380		
0.155556	0.011594	0.000541	0.000000	0.023380		
0.177778	0.011594	0.000618	0.000000	0.023380		
0.200000	0.011594	0.000696	0.000000	0.023380		
0.222222	0.011594	0.000773	0.000000	0.023380		
0.244444	0.011594	0.000850	0.000000	0.023380		
0.266667	0.011594	0.000928	0.000000	0.023380		
0.288889	0.011594	0.001005	0.000000	0.023380		
0.311111	0.011594	0.001082	0.000000	0.023380		
0.333333	0.011594	0.001159	0.000000	0.023380		
0.355556	0.011594	0.001237	0.000000	0.023380		
0.377778	0.011594	0.001314	0.000000	0.023380		
0.400000	0.011594	0.001391	0.000000	0.023380		
0.422222	0.011595	0.001469	0.000000	0.023380		
0.444444	0.011595	0.001546	0.000000	0.023380		
0.466667	0.011595	0.001623	0.000000	0.023380		
0.488889	0.011595	0.001700	0.000000	0.023380		
0.511111	0.011595	0.001778	0.000000	0.023380		
0.533333	0.011595	0.001855	0.000000	0.023380		
0.555556	0.011595	0.001932	0.000000	0.023380		
0.577778	0.011595	0.002010	0.000000	0.023380		
0.600000	0.011595	0.002087	0.000000	0.023380		
0.622222	0.011595	0.002164	0.000000	0.023380		
0.644444	0.011595	0.002242	0.000000	0.023380		
0.666667	0.011595	0.002319	0.000000	0.023380		
0.688889	0.011595	0.002396	0.000000	0.023380		
0.711111	0.011595	0.002473	0.000000	0.023380		
0.733333	0.011595	0.002551	0.000000	0.023380		
0.755556	0.011595	0.002628	0.000000	0.023380		
0.777778	0.011595	0.002705	0.000000	0.023380		
0.800000	0.011595	0.002783	0.000000	0.023380		
0.822222	0.011596	0.002860	0.000000	0.023380		
0.844444	0.011596	0.002937	0.000000	0.023380		
0.866667	0.011596	0.003015	0.000000	0.023380		
0.888889	0.011596	0.003092	0.000000	0.023380		
0.911111	0.011596	0.003169	0.000000	0.023380		
0.933333	0.011596	0.003246	0.000000	0.023380		
0.955556	0.011596	0.003324	0.000000	0.023380		
0.977778	0.011596	0.003401	0.000000	0.023380		
1.000000	0.011596	0.003478	0.000000	0.023380		
1.022222	0.011596	0.003556	0.000000	0.023380		
1.044444	0.011596	0.003633	0.000000	0.023380		
1.066667	0.011596	0.003710	0.000000	0.023380		
1.088889	0.011596	0.003788	0.000000	0.023380		
1.111111	0.011596	0.003865	0.000000	0.023380		
1.133333	0.011596	0.003942	0.000000	0.023380		
1.155556	0.011596	0.004020	0.000000	0.023380		
1.177778	0.011596	0.004097	0.000000	0.023380		
1.200000	0.011596	0.004174	0.000000	0.023380		
1.222222	0.011597	0.004251	0.000000	0.023380		
1.244444	0.011597	0.004329	0.000000	0.023380		
1.266667	0.011597	0.004406	0.000000	0.023380		
1.288889	0.011597	0.004483	0.000000	0.023380		
1.311111	0.011597	0.004561	0.000000	0.023380		
1.333333	0.011597	0.004638	0.000000	0.023380		
1.355556	0.011597	0.004715	0.000000	0.023380		
1.377778	0.011597	0.004793	0.000000	0.023380		
1.400000	0.011597	0.004870	0.000000	0.023380		
1.422222	0.011597	0.004947	0.000000	0.023380		

1.444444	0.011597	0.005025	0.000000	0.023380
1.466667	0.011597	0.005102	0.000000	0.023380
1.488889	0.011597	0.005179	0.000000	0.023380
1.511111	0.011597	0.005257	0.000000	0.023380
1.533333	0.011597	0.005334	0.000000	0.023380
1.555556	0.011597	0.005411	0.000000	0.023380
1.577778	0.011597	0.005489	0.000000	0.023380
1.600000	0.011597	0.005566	0.000000	0.023380
1.622222	0.011598	0.005643	0.000000	0.023380
1.644444	0.011598	0.005720	0.000000	0.023380
1.666667	0.011598	0.005798	0.000000	0.023380
1.688889	0.011598	0.005875	0.000000	0.023380
1.711111	0.011598	0.005952	0.000000	0.023380
1.733333	0.011598	0.006030	0.000000	0.023380
1.755556	0.011598	0.006107	0.000000	0.023380
1.777778	0.011598	0.006184	0.000000	0.023380
1.800000	0.011598	0.006262	0.000000	0.023380
1.822222	0.011598	0.006339	0.000000	0.023380
1.844444	0.011598	0.006416	0.000000	0.023380
1.866667	0.011598	0.006494	0.000000	0.023380
1.888889	0.011598	0.006571	0.000000	0.023380
1.911111	0.011598	0.006648	0.000000	0.023380
1.933333	0.011598	0.006726	0.000000	0.023380
1.955556	0.011598	0.006803	0.000000	0.023380
1.977778	0.011598	0.006880	0.000000	0.023380
2.000000	0.011598	0.006958	0.000000	0.023380
2.022222	0.011599	0.007215	0.029284	0.023380

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	PERLND	1	999	EXTNL PREC	
WDM	2	PREC ENGL 1	IMPLND	1	999	EXTNL PREC	
WDM	1	EVAP ENGL 1	PERLND	1	999	EXTNL PETINP	
WDM	1	EVAP ENGL 1	IMPLND	1	999	EXTNL PETINP	
WDM	2	PREC ENGL 1	RCHRES	1		EXTNL PREC	
WDM	1	EVAP ENGL 1	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	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

ERROR/WARNING ID: 341 6

DATE/TIME: 1914/ 6/30 17:30

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition.

Relevant data are:

NROWS	V1	V2	VOL
92 303.09	314.29	316.58	

ERROR/WARNING ID: 341 5

DATE/TIME: 1914/ 6/30 17:30

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT	
4.3518E-02	1010.4	-1.218E+03	1.2054	1.2054	1.2054	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1943/10/ 7 6: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition.

Relevant data are:

NROWS	V1	V2	VOL
92 303.09	314.29	315.24	

ERROR/WARNING ID: 341 5

DATE/TIME: 1943/10/ 7 6: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT	
4.3518E-02	1010.4	-1.096E+03	1.0850	1.0850E+00	1.0850E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/ 1/10 7:30

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	317.37	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/ 1/10 7:30

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.289E+03	1.2754	1.2754E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/ 1/10 7:45

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	315.61	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/ 1/10 7:45

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.130E+03	1.1183	1.1183	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/ 1/10 8:15

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 303.09	314.29	314.67	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/ 1/10 8:15

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT	
4.3518E-02	1010.4	-1.045E+03	1.0343	1.0343E+00		2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/ 1/10 8:30

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	315.11	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/ 1/10 8:30

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT	
4.3518E-02	1010.4	-1.085E+03	1.0741	1.0741E+00		2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/ 1/10 8:45

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	315.26	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/ 1/10 8:45

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0).

Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.098E+03	1.0869	1.0869E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/ 1/10 9: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	315.31	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/ 1/10 9: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.103E+03	1.0915	1.0915	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/ 1/10 9:15

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
92 303.09	314.29	314.35	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/ 1/10 9:15

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.016E+03	1.0059	1.0059	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/11/24 9:15

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 303.09	314.29	317.22	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/11/24 9:15

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT	
4.3518E-02	1010.4	-1.275E+03	1.2621	1.2621		2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/11/24 9:30

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 303.09	314.29	316.04	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/11/24 9:30

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT	
4.3518E-02	1010.4	-1.168E+03	1.1564	1.1564E+00		2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/11/24 9:45

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	315.49	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/11/24 9:45

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.119E+03	1.1078	1.1078E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1952/11/24 10: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	315.20	

ERROR/WARNING ID: 341 5

DATE/TIME: 1952/11/24 10: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.093E+03	1.0815	1.0815E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1972/ 6/10 18: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	319.90	

ERROR/WARNING ID: 341 5

DATE/TIME: 1972/ 6/10 18: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT	
4.3518E-02	1010.4	-1.518E+03	1.5020	1.5019E+00		2

ERROR/WARNING ID: 341 6

DATE/TIME: 1972/ 6/10 18:15

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	321.65	

ERROR/WARNING ID: 341 5

DATE/TIME: 1972/ 6/10 18:15

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT	
4.3518E-02	1010.4	-1.675E+03	1.6574	1.6574E+00		2

ERROR/WARNING ID: 341 6

DATE/TIME: 1975/ 1/21 7: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	315.62	

ERROR/WARNING ID: 341 5

DATE/TIME: 1975/ 1/21 7: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT	
4.3518E-02	1010.4	-1.131E+03	1.1193	1.1193E+00		2

ERROR/WARNING ID: 341 6

DATE/TIME: 2018/11/20 10:30

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	320.04	

ERROR/WARNING ID: 341 5

DATE/TIME: 2018/11/20 10:30

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.530E+03	1.5138	1.5137E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 2018/11/20 10:45

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 3.0309E+02	314.29	316.33	

ERROR/WARNING ID: 341 5

DATE/TIME: 2018/11/20 10:45

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.195E+03	1.1831	1.1831	2

ERROR/WARNING ID: 341 6

DATE/TIME: 2024/ 2/ 4 1:45

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the

simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 303.09	314.29	326.24	

ERROR/WARNING ID: 341 5

DATE/TIME: 2024/ 2/ 4 1:45

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-2.089E+03	2.0678	2.0677	2

ERROR/WARNING ID: 341 6

DATE/TIME: 2024/ 2/ 4 2: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 303.09	314.29	318.81	

The count for the WARNING printed above has reached its maximum.

If the condition is encountered again the message will not be repeated.

ERROR/WARNING ID: 341 5

DATE/TIME: 2024/ 2/ 4 2: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
4.3518E-02	1010.4	-1.419E+03	1.4039	1.4038	2

Disclaimer

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com



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Infiltration Trench System Design Application Worksheet

Review and follow the [Infiltration Trench System Design and Maintenance Guide](#) before using this worksheet. Submit this worksheet for your development project review.

Description of Project:

DESIGN

Step A. Calculate the total hard surface areas (in square feet [sq. ft.]) to be routed to the trench:

- Roof area w/overhangs _____ sq. ft.
- Driveway _____ sq. ft.
- Others (sidewalks, patios, etc.) _____ sq. ft.
- Total hard surface area _____ sq. ft.

Total hard surface area must be less than 5,000 sq. ft. to use this worksheet.

Step B. Choose the infiltration rate that applies to your site based on the Soils Professional's site evaluation and Soil Evaluation Report results. If the measured infiltration rate falls between the rates in the table in the Worksheet, select the closest lower infiltration rate. Calculate the total hard surface areas (in square feet [sq. ft.]) to be routed to the trench:

Select the closest lower value from the measured infiltration rate:

- ☐ 30 inches/hour
- ☐ 12 inches/hour
- ☐ 4 inches/hour
- ☐ 2 inches/hour
- ☐ 1 inch/hour
- ☐ Less than 1 inch/hour – A professional engineer must design the stormwater system

Step C. Select a trench depth between 2 and 5 feet. If the trench is deeper, it will be shorter in length. The total depth of the trench must include the depth of topsoil. At least 6 inches of topsoil is needed over the top of the trench. A Soils Professional can help with the trench depth selection.

- Trench depth = _____ feet

Step D. Select the trench bottom multiplier using the Sizing Table on the next page of this worksheet.

- Trench multiplier = _____

Step E. Select a trench width. Typical width ranges between 2 feet to 6 feet.

- Trench width = _____ feet (2 feet minimum – 10 feet maximum)

Step F. Calculate the trench length using the information gathered above (Step A, Step D and Step E). The maximum length is 100 feet from the starting point where the water enters the trench.

- Trench width = _____ feet (2 feet minimum – 10 feet maximum)

$$\text{Trench length} = \frac{\text{Total Surface Area} * \text{Trench Bottom Multiplier}}{\text{Trench Width}}$$

- (Step A) _____ sq. ft. x (Step D) _____ (trench bottom multiplier) / (Step E) _____ ft. (width) = _____ ft.

Step G. Summarize the trench dimensions:

- Trench _____ ft. deep x _____ ft. wide x _____ ft. long

The above design meets Minimum Requirement #5 – Onsite Stormwater Management LID Performance Standard, in accordance with 2021 Pierce County Stormwater Management and Site Development Manual.

Designer/Owners/Contractor Name (Printed)

Date

Signature

Registration No. (if applicable)

Sign, date, and stamp (if applicable)

Infiltration Trench Sizing Table

Initial Infiltration Rate	Depth (feet)	Trench Bottom Multiplier
30 inches/hour	2	0.024
	2.5	0.022
	3	0.019
	3.5	0.018
	4	0.017
	4.5	0.016
	5	0.015
12 inches/hour	2	0.058
	2.5	0.052
	3	0.046
	3.5	0.044
	4	0.040
	4.5	0.038
	5	0.036
4 inches/hour	2	0.101
	2.5	0.090
	3	0.080
	3.5	0.076
	4	0.072
	4.5	0.066
	5	0.063
2 inches/hour	2	0.144
	2.5	0.130
	3	0.114
	3.5	0.108
	4	0.102
	4.5	0.094
	5	0.090
1 inch/hour	2	0.206
	2.5	0.184
	3	0.163
	3.5	0.153
	4	0.146
	4.5	0.135
	5	0.129

The infiltration trench sizes in this sizing table have been verified in WWHM2012 with the following assumptions:

- The porosity of the gravel layer was assumed as 30 percent.
- The additional void volume of perforated pipe was neglected.
- A correction factor of 0.5 was applied to the infiltration rate to calculate the design infiltration rate.
- Predeveloped condition was set as moderate slope forest.
- All of runoff is delivered to the infiltration trench by a minimum 4-inch diameter perforated pipe.

WWHM2012
PROJECT REPORT

General Model Information

WWHM2012 Project Name: precip52inWest_infilt12inhr_graveldepth2ft

Site Name:

Site Address:

City:

Report Date: 6/27/2025

Gage: 52 IN WEST

Data Start: 10/01/1901

Data End: 09/30/2059

Timestep: 15 Minute

Precip Scale: 1.000

Version Date: 2023/01/27

Version: 4.2.19

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, Mod	0.1148
Pervious Total	0.1148
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.1148

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	0.108
Impervious Total	0.108
Basin Total	0.108

Routing Elements

Predeveloped Routing

Mitigated Routing

Gravel Trench Bed 1

Bottom Length: 52.72 ft.
 Bottom Width: 5.50 ft.
 Trench bottom slope 1: 0.01 To 1
 Trench Left side slope 0: 0 To 1
 Trench right side slope 2: 0 To 1
 Material thickness of first layer: 2
 Pour Space of material for first layer: 0.3
 Material thickness of second layer: 0
 Pour Space of material for second layer: 0
 Material thickness of third layer: 0
 Pour Space of material for third layer: 0
 Infiltration On
 Infiltration rate: 12
 Infiltration safety factor: 0.5
 Total Volume Infiltrated (ac-ft.): 66.37
 Total Volume Through Riser (ac-ft.): 0.013
 Total Volume Through Facility (ac-ft.): 66.383
 Percent Infiltrated: 99.98
 Total Precip Applied to Facility: 4.261
 Total Evap From Facility: 0.39
 Discharge Structure
 Riser Height: 2 ft.
 Riser Diameter: 10 in.
 Element Flows To:
 Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

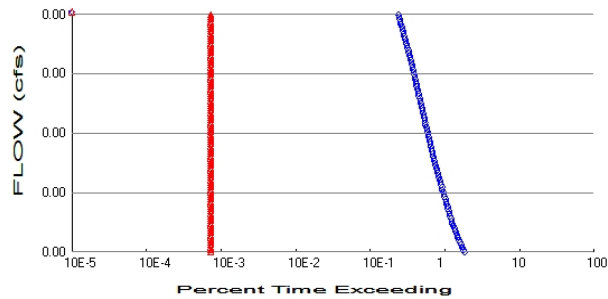
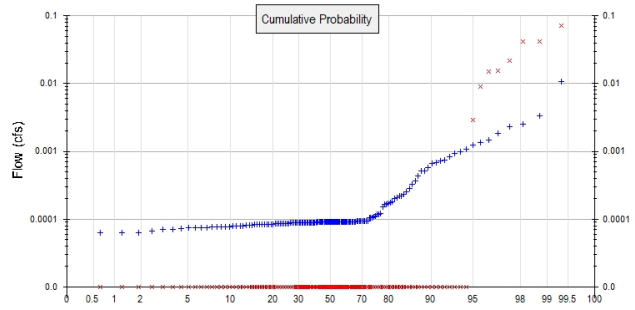
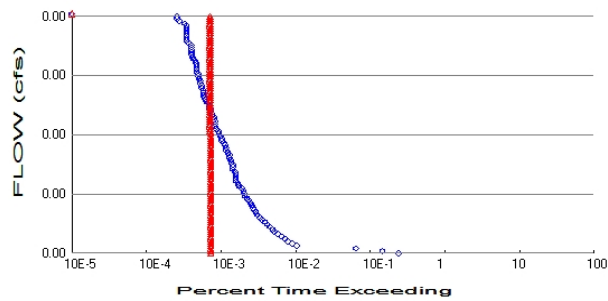
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.006	0.000	0.000	0.000
0.0222	0.006	0.000	0.000	0.040
0.0444	0.006	0.000	0.000	0.040
0.0667	0.006	0.000	0.000	0.040
0.0889	0.006	0.000	0.000	0.040
0.1111	0.006	0.000	0.000	0.040
0.1333	0.006	0.000	0.000	0.040
0.1556	0.006	0.000	0.000	0.040
0.1778	0.006	0.000	0.000	0.040
0.2000	0.006	0.000	0.000	0.040
0.2222	0.006	0.000	0.000	0.040
0.2444	0.006	0.000	0.000	0.040
0.2667	0.006	0.000	0.000	0.040
0.2889	0.006	0.000	0.000	0.040
0.3111	0.006	0.000	0.000	0.040
0.3333	0.006	0.000	0.000	0.040
0.3556	0.006	0.000	0.000	0.040
0.3778	0.006	0.000	0.000	0.040
0.4000	0.006	0.000	0.000	0.040
0.4222	0.006	0.000	0.000	0.040
0.4444	0.006	0.000	0.000	0.040
0.4667	0.006	0.000	0.000	0.040
0.4889	0.006	0.001	0.000	0.040
0.5111	0.006	0.001	0.000	0.040

0.5333	0.006	0.001	0.000	0.040
0.5556	0.006	0.001	0.000	0.040
0.5778	0.006	0.001	0.000	0.040
0.6000	0.006	0.001	0.000	0.040
0.6222	0.006	0.001	0.000	0.040
0.6444	0.006	0.001	0.000	0.040
0.6667	0.006	0.001	0.000	0.040
0.6889	0.006	0.001	0.000	0.040
0.7111	0.006	0.001	0.000	0.040
0.7333	0.006	0.001	0.000	0.040
0.7556	0.006	0.001	0.000	0.040
0.7778	0.006	0.001	0.000	0.040
0.8000	0.006	0.001	0.000	0.040
0.8222	0.006	0.001	0.000	0.040
0.8444	0.006	0.001	0.000	0.040
0.8667	0.006	0.001	0.000	0.040
0.8889	0.006	0.001	0.000	0.040
0.9111	0.006	0.001	0.000	0.040
0.9333	0.006	0.001	0.000	0.040
0.9556	0.006	0.001	0.000	0.040
0.9778	0.006	0.002	0.000	0.040
1.0000	0.006	0.002	0.000	0.040
1.0222	0.006	0.002	0.000	0.040
1.0444	0.006	0.002	0.000	0.040
1.0667	0.006	0.002	0.000	0.040
1.0889	0.006	0.002	0.000	0.040
1.1111	0.006	0.002	0.000	0.040
1.1333	0.006	0.002	0.000	0.040
1.1556	0.006	0.002	0.000	0.040
1.1778	0.006	0.002	0.000	0.040
1.2000	0.006	0.002	0.000	0.040
1.2222	0.006	0.002	0.000	0.040
1.2444	0.006	0.002	0.000	0.040
1.2667	0.006	0.002	0.000	0.040
1.2889	0.006	0.002	0.000	0.040
1.3111	0.006	0.002	0.000	0.040
1.3333	0.006	0.002	0.000	0.040
1.3556	0.006	0.002	0.000	0.040
1.3778	0.006	0.002	0.000	0.040
1.4000	0.006	0.002	0.000	0.040
1.4222	0.006	0.002	0.000	0.040
1.4444	0.006	0.002	0.000	0.040
1.4667	0.006	0.002	0.000	0.040
1.4889	0.006	0.003	0.000	0.040
1.5111	0.006	0.003	0.000	0.040
1.5333	0.006	0.003	0.000	0.040
1.5556	0.006	0.003	0.000	0.040
1.5778	0.006	0.003	0.000	0.040
1.6000	0.006	0.003	0.000	0.040
1.6222	0.006	0.003	0.000	0.040
1.6444	0.006	0.003	0.000	0.040
1.6667	0.006	0.003	0.000	0.040
1.6889	0.006	0.003	0.000	0.040
1.7111	0.006	0.003	0.000	0.040
1.7333	0.006	0.003	0.000	0.040
1.7556	0.006	0.003	0.000	0.040
1.7778	0.006	0.003	0.000	0.040
1.8000	0.006	0.003	0.000	0.040

1.8222	0.006	0.003	0.000	0.040
1.8444	0.006	0.003	0.000	0.040
1.8667	0.006	0.003	0.000	0.040
1.8889	0.006	0.003	0.000	0.040
1.9111	0.006	0.003	0.000	0.040
1.9333	0.006	0.003	0.000	0.040
1.9556	0.006	0.003	0.000	0.040
1.9778	0.006	0.004	0.000	0.040
2.0000	0.006	0.004	0.000	0.040

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 0.1148

Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 0

Total Impervious Area: 0.108

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.000112
5 year	0.00026
10 year	0.000447
25 year	0.000867
50 year	0.001392
100 year	0.002201

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
1902	0.000	0.000
1903	0.000	0.000
1904	0.000	0.000
1905	0.000	0.000
1906	0.000	0.000
1907	0.000	0.000
1908	0.000	0.000
1909	0.000	0.000
1910	0.000	0.000
1911	0.000	0.000
1912	0.011	0.016
1913	0.000	0.000
1914	0.000	0.042
1915	0.000	0.000
1916	0.000	0.000
1917	0.000	0.000
1918	0.000	0.000
1919	0.000	0.000
1920	0.000	0.000
1921	0.000	0.000
1922	0.000	0.000
1923	0.000	0.000
1924	0.000	0.000
1925	0.000	0.000
1926	0.000	0.000
1927	0.000	0.000
1928	0.000	0.000
1929	0.000	0.000
1930	0.000	0.000
1931	0.000	0.000
1932	0.000	0.000
1933	0.000	0.000
1934	0.002	0.000
1935	0.000	0.000
1936	0.000	0.000
1937	0.000	0.000
1938	0.000	0.000
1939	0.000	0.000
1940	0.000	0.000
1941	0.000	0.000
1942	0.000	0.000
1943	0.000	0.000
1944	0.000	0.000
1945	0.000	0.000
1946	0.000	0.000
1947	0.000	0.000
1948	0.000	0.000
1949	0.000	0.000
1950	0.000	0.000
1951	0.000	0.000
1952	0.001	0.015
1953	0.001	0.009
1954	0.000	0.000
1955	0.000	0.000
1956	0.000	0.000
1957	0.000	0.000

1958	0.001	0.000
1959	0.001	0.000
1960	0.000	0.000
1961	0.001	0.022
1962	0.000	0.000
1963	0.000	0.000
1964	0.000	0.000
1965	0.001	0.000
1966	0.000	0.000
1967	0.000	0.000
1968	0.000	0.000
1969	0.000	0.000
1970	0.000	0.000
1971	0.000	0.000
1972	0.000	0.072
1973	0.000	0.000
1974	0.001	0.000
1975	0.000	0.000
1976	0.000	0.000
1977	0.000	0.000
1978	0.001	0.000
1979	0.000	0.000
1980	0.000	0.000
1981	0.000	0.000
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.000	0.000
1987	0.000	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.001	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.002	0.003
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000
2011	0.000	0.000
2012	0.000	0.000
2013	0.000	0.000
2014	0.000	0.000
2015	0.000	0.000

2016	0.000	0.000
2017	0.000	0.000
2018	0.003	0.000
2019	0.001	0.000
2020	0.000	0.000
2021	0.001	0.000
2022	0.000	0.000
2023	0.000	0.000
2024	0.001	0.041
2025	0.000	0.000
2026	0.000	0.000
2027	0.000	0.000
2028	0.000	0.000
2029	0.000	0.000
2030	0.001	0.000
2031	0.000	0.000
2032	0.000	0.000
2033	0.000	0.000
2034	0.000	0.000
2035	0.000	0.000
2036	0.000	0.000
2037	0.000	0.000
2038	0.000	0.000
2039	0.000	0.000
2040	0.000	0.000
2041	0.000	0.000
2042	0.000	0.000
2043	0.000	0.000
2044	0.001	0.000
2045	0.000	0.000
2046	0.000	0.000
2047	0.000	0.000
2048	0.000	0.000
2049	0.000	0.000
2050	0.000	0.000
2051	0.000	0.000
2052	0.000	0.000
2053	0.000	0.000
2054	0.000	0.000
2055	0.000	0.000
2056	0.000	0.000
2057	0.000	0.000
2058	0.000	0.000
2059	0.003	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0108	0.0715
2	0.0033	0.0417
3	0.0025	0.0414
4	0.0023	0.0215
5	0.0018	0.0157
6	0.0015	0.0150
7	0.0013	0.0089
8	0.0012	0.0029
9	0.0011	0.0000
10	0.0010	0.0000

11	0.0009	0.0000
12	0.0008	0.0000
13	0.0007	0.0000
14	0.0007	0.0000
15	0.0007	0.0000
16	0.0007	0.0000
17	0.0006	0.0000
18	0.0005	0.0000
19	0.0005	0.0000
20	0.0004	0.0000
21	0.0004	0.0000
22	0.0003	0.0000
23	0.0003	0.0000
24	0.0003	0.0000
25	0.0002	0.0000
26	0.0002	0.0000
27	0.0002	0.0000
28	0.0002	0.0000
29	0.0002	0.0000
30	0.0002	0.0000
31	0.0002	0.0000
32	0.0002	0.0000
33	0.0002	0.0000
34	0.0002	0.0000
35	0.0002	0.0000
36	0.0001	0.0000
37	0.0001	0.0000
38	0.0001	0.0000
39	0.0001	0.0000
40	0.0001	0.0000
41	0.0001	0.0000
42	0.0001	0.0000
43	0.0001	0.0000
44	0.0001	0.0000
45	0.0001	0.0000
46	0.0001	0.0000
47	0.0001	0.0000
48	0.0001	0.0000
49	0.0001	0.0000
50	0.0001	0.0000
51	0.0001	0.0000
52	0.0001	0.0000
53	0.0001	0.0000
54	0.0001	0.0000
55	0.0001	0.0000
56	0.0001	0.0000
57	0.0001	0.0000
58	0.0001	0.0000
59	0.0001	0.0000
60	0.0001	0.0000
61	0.0001	0.0000
62	0.0001	0.0000
63	0.0001	0.0000
64	0.0001	0.0000
65	0.0001	0.0000
66	0.0001	0.0000
67	0.0001	0.0000
68	0.0001	0.0000

69	0.0001	0.0000
70	0.0001	0.0000
71	0.0001	0.0000
72	0.0001	0.0000
73	0.0001	0.0000
74	0.0001	0.0000
75	0.0001	0.0000
76	0.0001	0.0000
77	0.0001	0.0000
78	0.0001	0.0000
79	0.0001	0.0000
80	0.0001	0.0000
81	0.0001	0.0000
82	0.0001	0.0000
83	0.0001	0.0000
84	0.0001	0.0000
85	0.0001	0.0000
86	0.0001	0.0000
87	0.0001	0.0000
88	0.0001	0.0000
89	0.0001	0.0000
90	0.0001	0.0000
91	0.0001	0.0000
92	0.0001	0.0000
93	0.0001	0.0000
94	0.0001	0.0000
95	0.0001	0.0000
96	0.0001	0.0000
97	0.0001	0.0000
98	0.0001	0.0000
99	0.0001	0.0000
100	0.0001	0.0000
101	0.0001	0.0000
102	0.0001	0.0000
103	0.0001	0.0000
104	0.0001	0.0000
105	0.0001	0.0000
106	0.0001	0.0000
107	0.0001	0.0000
108	0.0001	0.0000
109	0.0001	0.0000
110	0.0001	0.0000
111	0.0001	0.0000
112	0.0001	0.0000
113	0.0001	0.0000
114	0.0001	0.0000
115	0.0001	0.0000
116	0.0001	0.0000
117	0.0001	0.0000
118	0.0001	0.0000
119	0.0001	0.0000
120	0.0001	0.0000
121	0.0001	0.0000
122	0.0001	0.0000
123	0.0001	0.0000
124	0.0001	0.0000
125	0.0001	0.0000
126	0.0001	0.0000

127	0.0001	0.0000
128	0.0001	0.0000
129	0.0001	0.0000
130	0.0001	0.0000
131	0.0001	0.0000
132	0.0001	0.0000
133	0.0001	0.0000
134	0.0001	0.0000
135	0.0001	0.0000
136	0.0001	0.0000
137	0.0001	0.0000
138	0.0001	0.0000
139	0.0001	0.0000
140	0.0001	0.0000
141	0.0001	0.0000
142	0.0001	0.0000
143	0.0001	0.0000
144	0.0001	0.0000
145	0.0001	0.0000
146	0.0001	0.0000
147	0.0001	0.0000
148	0.0001	0.0000
149	0.0001	0.0000
150	0.0001	0.0000
151	0.0001	0.0000
152	0.0001	0.0000
153	0.0001	0.0000
154	0.0001	0.0000
155	0.0001	0.0000
156	0.0001	0.0000
157	0.0001	0.0000
158	0.0001	0.0000

LID Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0000	100663	40	0	Pass
0.0000	97284	40	0	Pass
0.0000	93959	40	0	Pass
0.0000	91799	40	0	Pass
0.0000	88973	40	0	Pass
0.0000	85760	40	0	Pass
0.0000	82879	40	0	Pass
0.0000	80774	40	0	Pass
0.0000	78170	40	0	Pass
0.0000	75843	40	0	Pass
0.0000	73683	40	0	Pass
0.0000	71965	40	0	Pass
0.0000	69971	40	0	Pass
0.0000	68087	40	0	Pass
0.0000	66315	40	0	Pass
0.0000	65262	40	0	Pass
0.0000	63600	40	0	Pass
0.0000	62160	40	0	Pass
0.0000	60885	40	0	Pass
0.0000	59722	40	0	Pass
0.0000	58448	40	0	Pass
0.0000	57173	40	0	Pass
0.0000	55899	40	0	Pass
0.0000	54952	40	0	Pass
0.0000	53678	40	0	Pass
0.0000	52453	40	0	Pass
0.0000	51223	40	0	Pass
0.0000	50237	40	0	Pass
0.0000	49135	40	0	Pass
0.0000	48066	40	0	Pass
0.0000	46969	40	0	Pass
0.0000	46143	40	0	Pass
0.0000	45257	40	0	Pass
0.0000	44337	40	0	Pass
0.0000	43451	40	0	Pass
0.0000	42586	40	0	Pass
0.0000	41656	40	0	Pass
0.0000	40692	40	0	Pass
0.0000	39877	40	0	Pass
0.0000	39207	40	0	Pass
0.0000	38476	40	0	Pass
0.0000	37672	40	0	Pass
0.0000	37035	40	0	Pass
0.0000	36553	40	0	Pass
0.0000	35872	40	0	Pass
0.0000	35263	40	0	Pass
0.0000	34653	40	0	Pass
0.0000	34210	40	0	Pass
0.0000	33645	40	0	Pass
0.0000	33024	40	0	Pass
0.0000	32404	40	0	Pass
0.0000	31839	40	0	Pass
0.0000	31146	40	0	Pass

0.0000	30526	40	0	Pass
0.0000	30005	40	0	Pass
0.0000	29589	40	0	Pass
0.0000	29096	40	0	Pass
0.0000	28603	40	0	Pass
0.0000	28033	40	0	Pass
0.0000	27656	40	0	Pass
0.0000	27185	40	0	Pass
0.0000	26703	40	0	Pass
0.0000	26238	40	0	Pass
0.0000	25889	40	0	Pass
0.0000	25407	40	0	Pass
0.0000	24880	40	0	Pass
0.0000	24526	40	0	Pass
0.0000	24171	40	0	Pass
0.0000	23689	40	0	Pass
0.0000	23207	40	0	Pass
0.0000	22836	40	0	Pass
0.0000	22504	40	0	Pass
0.0000	22149	40	0	Pass
0.0000	21728	40	0	Pass
0.0000	21324	40	0	Pass
0.0000	21025	40	0	Pass
0.0000	20637	40	0	Pass
0.0000	20299	40	0	Pass
0.0000	19983	40	0	Pass
0.0000	19706	40	0	Pass
0.0000	19324	40	0	Pass
0.0000	18941	40	0	Pass
0.0000	18543	40	0	Pass
0.0000	18216	40	0	Pass
0.0000	17867	40	0	Pass
0.0000	17501	40	0	Pass
0.0000	17108	40	0	Pass
0.0001	16820	40	0	Pass
0.0001	16454	40	0	Pass
0.0001	16044	40	0	Pass
0.0001	15717	40	0	Pass
0.0001	15507	40	0	Pass
0.0001	15152	40	0	Pass
0.0001	14847	40	0	Pass
0.0001	14532	40	0	Pass
0.0001	14266	40	0	Pass
0.0001	13950	40	0	Pass
0.0001	13695	40	0	Pass
0.0001	13385	40	0	Pass
0.0001	13113	40	0	Pass

Duration Flows

The Duration Matching **Failed**

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0001	13113	40	0	Pass
0.0001	7978	40	0	Pass
0.0001	3559	40	1	Pass
0.0001	576	40	6	Pass
0.0001	493	40	8	Pass
0.0001	434	40	9	Pass
0.0001	397	40	10	Pass
0.0002	357	40	11	Pass
0.0002	318	40	12	Pass
0.0002	288	40	13	Pass
0.0002	271	40	14	Pass
0.0002	251	40	15	Pass
0.0002	232	40	17	Pass
0.0002	213	40	18	Pass
0.0002	197	40	20	Pass
0.0003	181	40	22	Pass
0.0003	170	40	23	Pass
0.0003	162	40	24	Pass
0.0003	153	40	26	Pass
0.0003	149	40	26	Pass
0.0003	143	40	27	Pass
0.0003	137	40	29	Pass
0.0004	130	40	30	Pass
0.0004	122	40	32	Pass
0.0004	115	40	34	Pass
0.0004	112	40	35	Pass
0.0004	110	40	36	Pass
0.0004	104	40	38	Pass
0.0004	96	40	41	Pass
0.0004	93	40	43	Pass
0.0005	89	40	44	Pass
0.0005	87	40	45	Pass
0.0005	87	40	45	Pass
0.0005	87	40	45	Pass
0.0005	85	40	47	Pass
0.0005	80	40	50	Pass
0.0005	80	40	50	Pass
0.0006	79	40	50	Pass
0.0006	76	40	52	Pass
0.0006	74	40	54	Pass
0.0006	72	40	55	Pass
0.0006	71	40	56	Pass
0.0006	68	40	58	Pass
0.0006	65	40	61	Pass
0.0006	64	40	62	Pass
0.0007	63	40	63	Pass
0.0007	60	40	66	Pass
0.0007	57	40	70	Pass
0.0007	56	40	71	Pass
0.0007	54	40	74	Pass
0.0007	52	40	76	Pass
0.0007	51	39	76	Pass
0.0008	47	39	82	Pass
0.0008	46	39	84	Pass

0.0008	46	39	84	Pass
0.0008	46	39	84	Pass
0.0008	44	39	88	Pass
0.0008	44	39	88	Pass
0.0008	42	39	92	Pass
0.0009	40	39	97	Pass
0.0009	40	39	97	Pass
0.0009	38	39	102	Pass
0.0009	38	39	102	Pass
0.0009	36	39	108	Pass
0.0009	34	39	114	Fail
0.0009	33	39	118	Fail
0.0009	32	39	121	Fail
0.0010	32	39	121	Fail
0.0010	32	39	121	Fail
0.0010	30	39	130	Fail
0.0010	30	39	130	Fail
0.0010	29	39	134	Fail
0.0010	29	39	134	Fail
0.0010	28	39	139	Fail
0.0011	27	39	144	Fail
0.0011	27	39	144	Fail
0.0011	26	39	150	Fail
0.0011	26	39	150	Fail
0.0011	26	39	150	Fail
0.0011	26	39	150	Fail
0.0011	25	39	156	Fail
0.0011	24	39	162	Fail
0.0012	23	39	169	Fail
0.0012	22	39	177	Fail
0.0012	22	39	177	Fail
0.0012	22	39	177	Fail
0.0012	22	39	177	Fail
0.0012	22	39	177	Fail
0.0012	20	39	195	Fail
0.0013	19	39	205	Fail
0.0013	19	39	205	Fail
0.0013	19	39	205	Fail
0.0013	19	39	205	Fail
0.0013	19	39	205	Fail
0.0013	19	39	205	Fail
0.0013	19	39	205	Fail
0.0014	18	39	216	Fail
0.0014	15	39	260	Fail
0.0014	14	39	278	Fail
0.0014	14	39	278	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.

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
Gravel Trench Bed 1 POC	<input type="checkbox"/>	60.41			<input type="checkbox"/>	99.98			
Total Volume Infiltrated		60.41	0.00	0.00		99.98	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

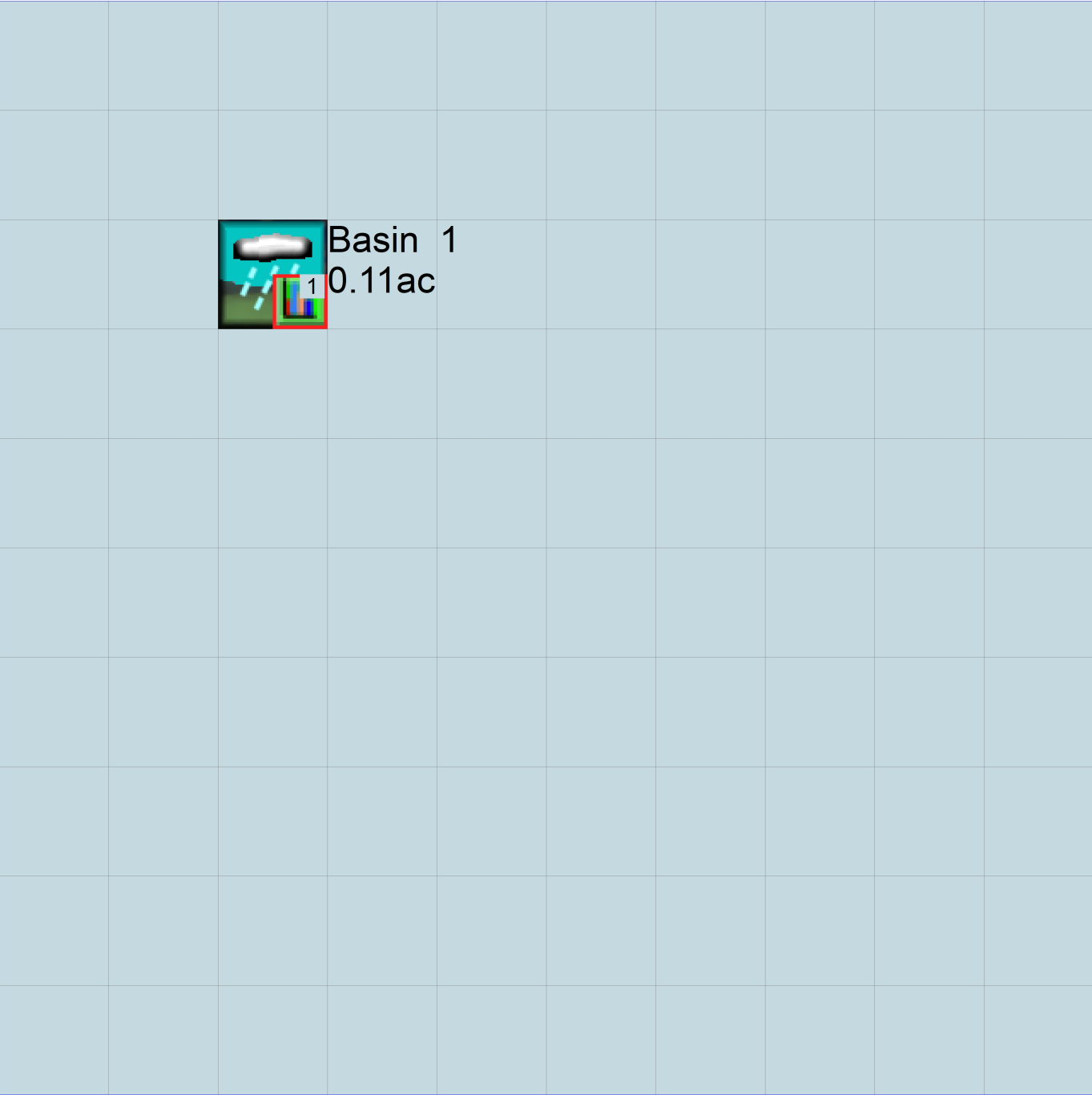
PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

RUN

GLOBAL

```
WWMH4 model simulation
START      1901 10 01      END      2059 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      precip52inWest_infilt12inhr_graveldepth2ft.wdm
MESSU    25      Preprecip52inWest_infilt12inhr_graveldepth2ft.MES
          27      Preprecip52inWest_infilt12inhr_graveldepth2ft.L61
          28      Preprecip52inWest_infilt12inhr_graveldepth2ft.L62
          30      POCprecip52inWest_infilt12inhr_graveldepth2ft1.dat
END FILES
```

OPN SEQUENCE

```
INGRP              INDELT 00:15
  PERLND           2
  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      ***
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 ***
2      0      0      1      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      1      9
```

END PRINT-INFO

```

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

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARV AGWRC
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
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 ***
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
2 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	2	0.1148		COPY	501	12
PERLND	2	0.1148		COPY	501	13

*****Routing*****

END SCHEMATIC

NETWORK

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

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	***	ODGTFG for each	FUNCT for each	***
# - #	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>	#	#
WDM	2	PREC	ENGL	1	PERLND	1 999	EXTNL	PREC
WDM	2	PREC	ENGL	1	IMPLND	1 999	EXTNL	PREC

```

WDM      1 EVAP      ENGL      1          PERLND  1 999 EXTNL  PETINP
WDM      1 EVAP      ENGL      1          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

```
WWM4 model simulation
START      1901 10 01      END      2059 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      precip52inWest_infilt12inhr_graveldepth2ft.wdm
MESSU    25      Mitprecip52inWest_infilt12inhr_graveldepth2ft.MES
          27      Mitprecip52inWest_infilt12inhr_graveldepth2ft.L61
          28      Mitprecip52inWest_infilt12inhr_graveldepth2ft.L62
          30      POCprecip52inWest_infilt12inhr_graveldepth2ft1.dat
END FILES
```

OPN SEQUENCE

INGRP INDELT 00:15

```
IMPLND      1
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      Gravel Trench Bed 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

```
#      # OPCODE ***
```

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 VIRG 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
END GEN-INFO
*** Section IWATER***

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT SLD IWG IQAL ***
1 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 4 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
END IWAT-PARM1

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

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

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

```

END IMPLND

SCHEMATIC

<-Source->	<--Area-->	<-Target->	MBLK	***
<Name> #	<-factor->	<Name> #	Tbl#	***
Basin 1***				
IMPLND 1	0.108	RCHRES 1	5	

*****Routing*****

IMPLND 1	0.108	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	Gravel Trench	Be-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	***	ODGTFG for each	FUNCT for each	***
# - #	VC A1 A2 A3	ODFVFG for each	***	possible exit	***
	FG FG FG FG	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	0.01	0.0	0.0	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

92 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.006657	0.000000	0.000000	0.000000		
0.022222	0.006657	0.000044	0.000000	0.040272		
0.044444	0.006657	0.000089	0.000000	0.040272		
0.066667	0.006657	0.000133	0.000000	0.040272		
0.088889	0.006657	0.000178	0.000000	0.040272		
0.111111	0.006657	0.000222	0.000000	0.040272		
0.133333	0.006657	0.000266	0.000000	0.040272		
0.155556	0.006657	0.000311	0.000000	0.040272		
0.177778	0.006657	0.000355	0.000000	0.040272		
0.200000	0.006657	0.000399	0.000000	0.040272		
0.222222	0.006657	0.000444	0.000000	0.040272		
0.244444	0.006657	0.000488	0.000000	0.040272		
0.266667	0.006657	0.000533	0.000000	0.040272		
0.288889	0.006657	0.000577	0.000000	0.040272		
0.311111	0.006657	0.000621	0.000000	0.040272		
0.333333	0.006657	0.000666	0.000000	0.040272		
0.355556	0.006657	0.000710	0.000000	0.040272		
0.377778	0.006658	0.000754	0.000000	0.040272		
0.400000	0.006658	0.000799	0.000000	0.040272		
0.422222	0.006658	0.000843	0.000000	0.040272		
0.444444	0.006658	0.000888	0.000000	0.040272		
0.466667	0.006658	0.000932	0.000000	0.040272		
0.488889	0.006658	0.000976	0.000000	0.040272		
0.511111	0.006658	0.001021	0.000000	0.040272		
0.533333	0.006658	0.001065	0.000000	0.040272		
0.555556	0.006658	0.001110	0.000000	0.040272		
0.577778	0.006658	0.001154	0.000000	0.040272		
0.600000	0.006658	0.001198	0.000000	0.040272		
0.622222	0.006658	0.001243	0.000000	0.040272		
0.644444	0.006658	0.001287	0.000000	0.040272		
0.666667	0.006658	0.001331	0.000000	0.040272		
0.688889	0.006658	0.001376	0.000000	0.040272		
0.711111	0.006658	0.001420	0.000000	0.040272		
0.733333	0.006658	0.001465	0.000000	0.040272		
0.755556	0.006658	0.001509	0.000000	0.040272		
0.777778	0.006659	0.001553	0.000000	0.040272		
0.800000	0.006659	0.001598	0.000000	0.040272		
0.822222	0.006659	0.001642	0.000000	0.040272		
0.844444	0.006659	0.001687	0.000000	0.040272		
0.866667	0.006659	0.001731	0.000000	0.040272		
0.888889	0.006659	0.001775	0.000000	0.040272		
0.911111	0.006659	0.001820	0.000000	0.040272		
0.933333	0.006659	0.001864	0.000000	0.040272		
0.955556	0.006659	0.001909	0.000000	0.040272		
0.977778	0.006659	0.001953	0.000000	0.040272		
1.000000	0.006659	0.001997	0.000000	0.040272		
1.022222	0.006659	0.002042	0.000000	0.040272		
1.044444	0.006659	0.002086	0.000000	0.040272		
1.066667	0.006659	0.002131	0.000000	0.040272		
1.088889	0.006659	0.002175	0.000000	0.040272		
1.111111	0.006659	0.002219	0.000000	0.040272		
1.133333	0.006659	0.002264	0.000000	0.040272		
1.155556	0.006659	0.002308	0.000000	0.040272		
1.177778	0.006660	0.002353	0.000000	0.040272		
1.200000	0.006660	0.002397	0.000000	0.040272		
1.222222	0.006660	0.002441	0.000000	0.040272		
1.244444	0.006660	0.002486	0.000000	0.040272		
1.266667	0.006660	0.002530	0.000000	0.040272		
1.288889	0.006660	0.002575	0.000000	0.040272		
1.311111	0.006660	0.002619	0.000000	0.040272		
1.333333	0.006660	0.002663	0.000000	0.040272		
1.355556	0.006660	0.002708	0.000000	0.040272		
1.377778	0.006660	0.002752	0.000000	0.040272		
1.400000	0.006660	0.002797	0.000000	0.040272		
1.422222	0.006660	0.002841	0.000000	0.040272		

1.444444	0.006660	0.002885	0.000000	0.040272
1.466667	0.006660	0.002930	0.000000	0.040272
1.488889	0.006660	0.002974	0.000000	0.040272
1.511111	0.006660	0.003019	0.000000	0.040272
1.533333	0.006660	0.003063	0.000000	0.040272
1.555556	0.006660	0.003107	0.000000	0.040272
1.577778	0.006661	0.003152	0.000000	0.040272
1.600000	0.006661	0.003196	0.000000	0.040272
1.622222	0.006661	0.003241	0.000000	0.040272
1.644444	0.006661	0.003285	0.000000	0.040272
1.666667	0.006661	0.003329	0.000000	0.040272
1.688889	0.006661	0.003374	0.000000	0.040272
1.711111	0.006661	0.003418	0.000000	0.040272
1.733333	0.006661	0.003463	0.000000	0.040272
1.755556	0.006661	0.003507	0.000000	0.040272
1.777778	0.006661	0.003551	0.000000	0.040272
1.800000	0.006661	0.003596	0.000000	0.040272
1.822222	0.006661	0.003640	0.000000	0.040272
1.844444	0.006661	0.003685	0.000000	0.040272
1.866667	0.006661	0.003729	0.000000	0.040272
1.888889	0.006661	0.003773	0.000000	0.040272
1.911111	0.006661	0.003818	0.000000	0.040272
1.933333	0.006661	0.003862	0.000000	0.040272
1.955556	0.006662	0.003907	0.000000	0.040272
1.977778	0.006662	0.003951	0.000000	0.040272
2.000000	0.006662	0.003995	0.000000	0.040272
2.022222	0.006662	0.004143	0.029284	0.040272

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	PERLND	1	999	EXTNL PREC	
WDM	2	PREC ENGL 1	IMPLND	1	999	EXTNL PREC	
WDM	1	EVAP ENGL 1	PERLND	1	999	EXTNL PETINP	
WDM	1	EVAP ENGL 1	IMPLND	1	999	EXTNL PETINP	
WDM	2	PREC ENGL 1	RCHRES	1		EXTNL PREC	
WDM	1	EVAP ENGL 1	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	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

Mitigated HSPF Message File

ERROR/WARNING ID: 341 6

DATE/TIME: 1914/ 6/30 16:45

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 174.02	180.47	187.17	

ERROR/WARNING ID: 341 5

DATE/TIME: 1914/ 6/30 16:45

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	580.39	-1.184E+03	2.0396	2.0396E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1960/11/ 4 20: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 1.7402E+02	180.47	183.50	

ERROR/WARNING ID: 341 5

DATE/TIME: 1960/11/ 4 20: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	580.39	-853.59	1.4707	1.4707E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1972/ 6/10 17:45

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 1.7402E+02	180.47	184.07	

ERROR/WARNING ID: 341 5

DATE/TIME: 1972/ 6/10 17:45

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	580.39	-904.86	1.5590	1.5590E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1972/ 6/10 18: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 1.7402E+02	180.47	195.47	

ERROR/WARNING ID: 341 5

DATE/TIME: 1972/ 6/10 18: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	580.39	-1.931E+03	3.3268	3.3268E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 2024/ 2/ 4 1:30

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92 1.7402E+02	180.47	184.01	

ERROR/WARNING ID: 341 5

DATE/TIME: 2024/ 2/ 4 1:30

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	580.39	-899.44	1.5497	1.5497E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 2024/ 2/ 4 1:45

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
92	1.7402E+02	180.47	182.26

ERROR/WARNING ID: 341 5

DATE/TIME: 2024/ 2/ 4 1:45

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	580.39	-742.01	1.2785	1.2785E+00	2

Disclaimer

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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com