Arlington East Hill

Preliminary Drainage Report

Presented to: City of Arlington

East Hill

Drainage Report

Prepared for

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April 2025 ***Job No: 24-0016***

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SECTION 1: PROJECT OVERVIEW

The proposed East Hill project is an approximately 208.64-acre site. The proposed project is a Residential Ultra Low Capacity and Master Plan Neighborhood development on 19 parcels addressed at 8904 Tveit Rd Arlington, WA 98223. See parcel table in Appendix 1.4 for more detail. The project proposes to construct 646 single family homes on the site. Emergency and standard access drives along with associated private and public utilities are proposed to serve project development. Road extension from Tveit Rd to Burn Rd is proposed under a separate permit. See the Vicinity Map in Appendix 1 for visual representation of the subject property.

Existing Site

A few of the parcels are currently occupied by single family homes and associated structures. The project parcels are currently zoned RULC (Residential Ultra Low Capacity), MPN (Master Plan Neighborhood). Existing ground cover is a combination of trees, brush, grass, and gravel.

The proposed development will exist within the bounds of 2 stormwater threshold discharge areas (TDAs) as not all site runoff from developed surfaces meets within ¼ mile from the project site downstream. Soundview Consultants LLC has prepared a Wetlands Critical Areas Report dated February of 2024 on the site. Multiple wetlands and five streams were identified by Soundview on the site. See the Critical Areas Report from Soundview for more detail.

A preliminary Geotechnical Report has been prepared by Terra Associates, Inc. dated June, 2024 on the site. Please reference the geotechnical report for detailed soils information. Slopes on the site, as confirmed by the Geotechnical Report, vary by area. Elevation changes of up to 350ft occur on the site, with steep portions largely located on the northern or northwestern portions of the site. Slopes on the site generally descend from south towards the north. Terra Associates lists potential erosion hazards and landslide hazards, especially regarding the steep bluffs on the north end of the site.

Areas of known landslide activity border the northerly end of the site, namely the northern portions of Basins 1, 2 and 7. Terra has recommended development buffers from those steep slope areas unless mitigation is proposed. In the proposed drainage plans, a drainage cutoff trench has been located just upgradient of the landslide hazard areas. The final depths and designs of the cutoff trenches will be further detailed in future submittals as ongoing coordination with geotechnical and hydrogeologic engineers occurs. For the purpose of this report and submittal, the cutoff trenches are approximately 30'-50' in varying depth from finished grade, including perforated PVC pipe at the base of the trench for collection and conveyance of groundwater flow and backfilled with clean gravels. Discharge points are anticipated to be in current groundwater outfall/seepage locations via point discharges with appropriate erosion control devices and/or dispersion devices. See Geotechnical Report for more detail.

Proposed Development

The proposed project will construct 646 single family residential lots and access road network. Emergency and standard access drives along with associated private and public utilities are proposed to serve project development. It is anticipated that phasing out of lot development will occur. These phases will be determined at a later date. It is anticipated that the "Spine Road" (the extension of Tveit Road through the site to Burn Road) will be constructed for the length of roadway that can be constructed upon land legally owned for development before other development begins of the phased lot development. The Spine Road is proposed under a separate permit and project number.

Proposed Drainage System

This project is designed to comply with the 2024 Department of Ecology Stormwater Manual for Western Washington (2024 DOE SWMWW. Stormwater will be mitigated via multiple detention vaults and ponds located on the site.

Onsite development will disturb 107.69 AC of that will be collected to multiple detention vaults and ponds for mitigation and stormwater quality treatment. These include 10 collection basins across 2 different TDAs. TDA 1 contains 9 basins, constituting the majority of onsite area. TDA 1 drains to Eagle Creek via multiple Flowpaths. TDA 2 contains approximately 4.25 AC of onsite area and drains east and north. TDA 2 drains to Eagle Creek offsite, having exceeded the 0.25 mile Flowpath after leaving the site prior to joining Eagle Creek. Separate ponds and stormwater infrastructure are proposed for the Spine Road project to be completed under a separate permit and project number. These basins are shown visually on basins maps included within this report for reference only. They are not calculated or modeled within WWHM for flow control sizing in this report.

Proposed new pollution generating impervious surfaces (PGIS) will exceed the 5,000 SF threshold and thus basic water quality treatment will be provided via a water quality treatment structure that treats stormwater runoff after discharge from the various stormwater detention vaults and ponds. StormFilter water quality treatment units are proposed for this purpose. Design of water quality treatment units will be submitted with a later submittal date.

The proposed detention and water quality treatment systems will discharge to wetland and stream buffers onsite to preserve natural drainage pattern and comply with Minimum Requirement #8. Additional data collection is necessary to accurately model onsite drainage to comply with MR #8. Additional data and modeling will be provided at a later submittal. This report includes modeling that shows compliance with MR #7 to ensure project feasibility. Flow from the majority of the site will be released into TDA 1 where runoff will eventually join the different forks of Eagle Creek, a tributary of the Stillaguamish River.

Erosion/Sedimentation Control
Erosion control measures that will be utilized during construction will include a combination of silt fence, storm drain inlet protection, interceptor swales, and sediment ponds. See Section 2.0 for discussion of how SWPP Elements are addressed.

Minimum Requirements
Per the 2024 DOE Manual, Minimum Requirements 1-9 apply to the proposed development.

Minimum Requirement #1: Preparation of Stormwater Site Plans
This report along with the preliminary plans satisfies the minimum requirement.

Minimum Requirement #2: Construction Stormwater Pollution Prevention
See Section 2 of this Report for the SWPPP BMP Elements, and the SWPP (submitted as a separate document) for a complete discussion of erosion control BMP's and their use specific to the site.

Minimum Requirement #3: Source of Pollution
Permanent source control BMPs are not applicable for the subject site since the associated activities for the new residence do not fall within the types of facilities listed within Volume IV of the DOE Manual (Residential developments are not required to implement source control BMP's). BMPs for erosion and sedimentation control will be specified in the Construction Plans and the CSWPP.

Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls
Flow from the site will preserve it's natural drainage patterns, generally flowing south to north. Two TDAs are identified on site, with TDA 1 encompassing the vast majority of the site. Multiple Flowpaths leave TDA 1 via the various forks of Eagle Creek. All Flowpaths in TDA 1 meet within 0.25 miles of the site before eventually joining the South Fork Stillaguamish. TDA 1 is further subdivided into "basins" for purposes of later Minimum Requirement #8 modeling.

TDA 2 consists of the southwest corner of the site. A small wetland outflows towards the east, with flows going into drainage ditches along 200th St NE and continuing past the 0.25 mile boundary of analysis.

Minimum Requirement #5: On-Site Stormwater Management
The project proposes 4 detention vaults and 3 ponds to provide flow control. All flows will be released to their natural outfall. In addition, BMP T5.13 soils are to be underlain within all pervious areas that are disturbed by development. The geotechnical report notes that infiltration and/or dispersion of stormwater flow upgradient of the landslide hazard areas will not be feasible due to site soils and the potential to cause issues with slope stability.

Minimum Requirement #6: Runoff Treatment
As the project will exceed the 5,000 SF threshold of new/replaced PGIS, the project is required to provide basic water quality treatment per the 2024 DOE Manual. StormFilters will be utilized to provide the required water quality treatment.

Minimum Requirement #7: Flow Control
Multiple detention units will be used on site to provide flow control. 4 detention vaults and 3 ponds are planned to mitigate runoff and release stormwater at historical rate to their natural drainage pattern.

Minimum Requirement #8: Wetlands Protection

Soundview Consultants prepared a Critical Areas report dated February, 2024 identifying multiple wetlands and streams on site. Minimum Requirement #8 stipulates that hydroperiod modeling will be required for this site, however further study by the Geotechnical Consultant is ongoing. Hydroperiod modeling will be completed following the end of this study.

Minimum Requirement #9: Operation and Maintenance
See Operations and Maintenance in Section 6 of this report.

SECTION 2: TEMPORARY EROSION AND SEDIMENT CONTROL DESIGN

SWPPP Design Elements
A Construction Stormwater Pollution Prevention Plan (SWPPP) will be provided prior to construction. The SWPPP report is modeled under the guidelines of the 2024 DOE Manual. Construction SWPPP Elements #1 through #13 are addressed below.

Element #1 – Mark Clearing Limits
All clearing limits will be delineated with high visibility plastic fence and/or silt fence. See sheets ER-01 of the construction plans for locations and details.

Element #2 – Establish Construction Access
Stabilized construction accesses will be installed as shown on the preliminary plans. See sheets ER-01 and ER-02 of the construction plans at a future date for locations and details.

Element #3 – Control Flow Rates
Mitigation of construction period runoff will be provided by level spreaders to facilitate full dispersion. Flow will be slowed by check dams before entering the permanent storm drainage system and being dispersed on site per BMP T5.30. See sheets ER-01 of the construction plans for location and details for flow and sediment control BMP's.

Element #4 – Install Sediment Controls
Silt fence, catch basin protection, and check dams will be utilized to contain sediments within the project's clearing limits. See sheets ER-01 and ER-02 of the construction plans at a future date for locations and details.

Element #5 – Stabilize Soils
Exposed soils will be stabilized as specified in the Grading and Erosion Control Notes with temporary and permanent seeding, mulching, and plastic covering. See sheet ER-02 of the construction plans at a future date for notes.

Element #6 – Protect Slopes
Slopes can be steep on the site. Soils will be stabilized as specified in the Grading and Erosion Control Notes. Slopes shall be protected as specified under Element #5.

Element #7 – Protect Drain Inlets
Storm drain inlet protection will be utilized to contain sediments within the project's clearing limits. See sheets ER-01 and ER-02 of the construction plans at a future date for locations and details.

Element #8 – Stabilize Channels and Outlets
Temporary channels shall be stabilized with check dams. See sheets ER-01 and ER-02 of the construction plans at a future date for locations and details.

Element #9 – Control Pollutants
Pollutants shall be controlled as specified in Volume IV of the 2024 DOE Manual—Source Control BMPs to address potential sources of pollution which may exacerbate possible soil/groundwater contamination identified onsite.

Element #10 – Control De-Watering
There will be no de-watering as a part of this project. See sheet ER-02 of the construction plans at a future date for notes.

Element #11 – Maintain BMPs
Maintenance of the BMPs is specified within the Construction Sequence and Grading and Erosion Control Notes. See sheets ER-01 and ER-02 of the construction plans for the Construction Sequence and notes.

Element #12: Manage the Project
The Grading and Erosion Control Notes specify seasonal work limitations. Maintenance of the BMPs is specified within the Construction Sequence and Grading and Erosion Control Notes. See sheets ER-01 and ER-02 of the construction plans at a future date for the Construction Sequence and notes.

Element #13: Protect on-site stormwater management BMPs
On-site stormwater management BMPs used for runoff from roofs and other hard surfaces are not feasible due to soil conditions and proposed project density.

SECTION 3: DOWNSTREAM ANALYSIS

Task 1. Study Area Definition and Maps

Snohomish County maps, surveying, and aerial photography were the best references to the site's topography. The limits of the downstream analysis extend roughly 0.25 miles beyond the subject property's natural discharge locations.

Task 2. Resource Review

All of the resources below have been reviewed for existing and potential issues near the project site:

Adopted Basin Plans

No Adopted Basin Plans were located that include the project site.

Drainage Basin

This site is in the Stillaguamish Basin, the Lower South Fork Stillaguamish sub-basin, within the South Fork Stillaguamish watershed. Discharge from the proposed development is divided into two TDAs, TDA 1 and TDA 2 respectively. TDA 1 will discharge north into various forks of Eagle Creek, a tributary of the South Fork Stillaguamish. TDA 2 drains east and north, eventually reaching Eagle Creek offsite after passing the 0.25 mile boundary of analysis. Eagle Creek is a tributary of the South Fork Stillaguamish River.

Floodplain / Floodway (FEMA) maps

Per FEMA Floodplain map #53061C0415F the subject property is not within a floodplain.

Critical Areas Map

There are multiple wetlands located across the site. There are steep slopes and a landslide hazard zone. See section 7 for a complete list of reports prepared for the project including a Critical Areas Report and a Geotechnical Report.

Drainage Complaints

No relevant issues were identified near the proposed site.

Road Drainage Problems

No issues were identified near the proposed site.

Soil Survey

Site soils are classified as Alderwood gravelly sandy loam (0 to 8 percent slopes) which is classified as Hydrologic Soil Group B, Norma Loam which is classified as Hydrologic Soil Group B/D, Pastik silt loam (8 to 25 percent slopes) which is classified as Hydrologic Soil Group C, Ragnar fine sandy loam (0 to 8 percent) which is classified as Hydrologic Soil Group A, Tokul gravelly medial loam (0 to 8 percent) which is classified as Hydrologic Soil Group B, Tokul gravelly medial loam (8 to 15 percent) which is classified as Hydrologic Soil Group B, Tokul gravelly medial loam (15 to 30 percent) which is classified as Hydrologic Soil Group B, and Tokul-Winston gravelly loams (25 to 65 percent) which is classified as Hydrologic Soil Group C.

Per the Geotechnical report, the site lies within an area where infiltration is considered infeasible.

Wetland Inventory Maps

Wetlands are identified to be on, or immediately adjacent to, the project site. Reference the critical areas report submitted with this report for additional information regarding the wetland areas onsite.

Migrating River Studies

Migrating River Studies are not considered applicable to the proposed development.

Section 303d List of Polluted Waters

Washington State Department of Ecology's Water Quality Assessment for Washington contains no listings for water sources within the sites ¼ mile boundary.

Water Quality Problems

Washington State Department of Ecology's Water Quality Assessment for Washington contains no listings for water sources within the sites ¼ mile boundary.

Stormwater Compliance Plans
Not applicable to the proposed project.

Task 3. Field Inspection/Downstream Analysis
On April 2nd, 2025, a Downstream Analysis was performed at the site. The weather consisted of 57ºF and partially cloudy skies. The following observations were verified during the visit.

The subject property consists of steep bluffs leading to a more moderately graded plateau bisected by a ravine. Ground cover consisted primarily of forest and brush. Four branches of Eagle Creek flow through the site, with the stream being fed by several wetlands located throughout the site. Three Flowpaths were identified leaving the site.

TDA 1:
Flowpath 1 is further componentized into Flowpaths 1A, 1B, 1C, and 1D and consist of the forks of Eagle Creek. Flowpath 1A runs along the western edge of the site, flowing due north until it is joined by Flowpath 1B and 1C.

Flowpath 1B is a small fork of Eagle creek descending from the western plateau on the site. Flowpath 1B flows due north into the lowlands at the north end of the site before veering west and joining Flowpath 1A on its northerly course.

Flowpath 1C is the middle fork of Eagle Creek, which runs through the ravine at the center of the site and flows due north for much of its length. As it nears the property line, Flowpath 1C turns west and joins Flowpath 1A and 1B before crossing Tveit Rd via a culvert. The combined flow of Flowpaths 1A, 1B, and 1C continues north until it reaches the corner of 215th St NE and 88th Dr NE at which point it turns east and joins with Flowpath 1D.

Flowpath 1D begins off-site and flows through the northeastern corner of the site. Flow is directed northwest through the property and passes under Tveit Rd via a culvert. Flow continues northwest until Flowpath 1D joins Flowpaths 1A, 1B, and at the corner C of 215th St NE and 88th Dr NE. Flowpath 1 then continues on past the 0.25 mile boundary of analysis until it joins the South Fork Stillaguamish River.

TDA 2:
Flowpath 2 begins on the southeastern edge of the site and flows due east until it reaches 95th Ave NE. Flow was observed leaving the site and joining the existing drainage ditch along the road where it is conveyed north and then east along 200th St NE beyond the 0.25 mile boundary of analysis.

Flowpath 3 is specific to the Spine Road, with flow control and water quality handled under a separate permit and drainage report. Flows from Flowpath 3 are carried west from the southwest corner of the site, joining the drainage ditch along the eastern side of Burn Rd. Flow is then conveyed west across the roadway via a culvert, whereupon the flow joins Portage Creek. Portage Creek flows northward, following Burn Rd until the intersection of Old Burn Rd and Stillaguamish Ave where it crosses Burn Rd via a culvert. Flowpath 3 continues north, crossing under 207th St NE before veering west under Stillaguamish Ave and passing the 0.25 mile boundary of analysis.

Task 4. Drainage System Description and Problem Descriptions
Based on the information available and all the resources available including visual inspection of the downstream flow path to the ¼-mile boundary, there is no evidence of existing or anticipated downstream drainage problems. All flows are adequately carried through natural channels to the quarter mile buffer of analysis.

Task 5. Mitigation of Existing or Potential Drainage Problems
No evidence of existing or potential problems with downstream drainage conveyance infrastructure was found. Mitigation is not required.

SECTION 4: DETENTION AND WATER QUALITY TREATMENT DESIGN

4.1 Predeveloped TDAs and Basins

Predeveloped conditions on the site consist of forested area broken into two separate Threshold Discharge Areas (TDAs), designated TDA 1 and 2 respectively. TDA 1 is further subdivided into Basins 1-8. See the TDA Map in the Appendix 4. Table 1 breaks down the areas for the basins and TDAs and includes the detention system each basin will flow to. Basins that share a detention system will be combined for modeling purposes.

Table 1: Predeveloped TDAs and Basins

Drainage Basins			
TDA	Basin	Area (AC)	Detention #
1	1	49.99	Vault A
	2	5.52	Vault B
	3A	14.36	Vault B
	3B	9.42	Vault C
	4	2.51	Pond A
	5	6.01	Vault D
	6	2.99	Pond B
	7	8.97	Vault D
	8	3.68	Vault D
	Total	**103.45**	
2	9	4.24	Pond C

The pre-developed and developed conditions were modeled in WWHM for the purpose of matching predeveloped flow durations. Based on the site location, the WWHM used the Everett Gage with a Precipitation Scale factor of 1.2. For visual representation of the listed basins, see Figure 4.0, “Predeveloped Hydrology Map”. Runoff from some of these basins will be combined in the developed condition, thus these basins have been combined in the predeveloped condition for the sake of modeling.

4.1.1 TDA-1

The following basins are tributary to Eagle Creek. Though each basin is tributary to the same threshold discharge basin with regard to the project site per DOE Manual definitions of a Threshold Discharge Basin, each subbasin has been split out with various flow control facilities to ensure that various critical areas are hydrated and historic downstream flowpaths for onsite streams and wetlands are adequately hydrated.

Basin 1:

The predeveloped condition applied to Basin 1 results in a forested land cover condition. The values as modeled in WWHM are as follows:

Table 2: Predeveloped Conditions for Basin 1

Basin 1	
Ground Cover	Area (acre)
Forest, steep	49.99
Total	**49.99**

Basins 2 & 3A:

The predeveloped condition applied to the combined Basins 2 (5.52 AC) & 3A (14.32 AC) result in a forested land cover condition as they will be combined and routed to Vault B in the developed condition. The values as modeled in WWHM are as follows:

Table 3: Predeveloped Conditions for Basin 2 & 3A

Basin 2 & 3A	
Ground Cover	Area (acre)
Forest, steep	19.88
Total	**19.88**

Basin 3B:
The predeveloped condition applied to Basin 3B results in a forested land cover condition. The values as modeled in WWHM are as follows:

Table 4: Predeveloped Conditions for Basin 3B

Basin 3B	
Ground Cover	Area (acre)
Forest, steep	9.42
Total	**9.42**

Basin 4:
The predeveloped condition applied to Basin 4 results in a forested land cover condition. The values as modeled in WWHM are as follows:

Table 5: Predeveloped Conditions for Basin 4

Basin 4	
Ground Cover	Area (acre)
Forest, steep	2.51
Total	**2.51**

Basins 5, 7, & 8:
The predeveloped condition applied to combined areas of Basins 5 (6.01 AC), 7 (8.97 AC), and 8 (3.68 AC) results in a forested land cover condition as they will be combined and routed to Vault 7 in the developed condition. The values as modeled in WWHM are as follows:

Table 6: Predeveloped Conditions for Basins 5, 7, & 8

Basins 5, 7, & 8	
Ground Cover	Area (acre)
Forest, steep	18.66
Total	**18.66**

Basin 6:
The predeveloped condition applied to Basin 6 results in a forested land cover condition. The values as modeled in WWHM are as follows:

Table 7: Predeveloped Conditions for Basin 6

Basin 6	
Ground Cover	Area (acre)
Forest, steep	2.99
Total	**2.99**

4.1.2 TDA-2

This basin is tributary to Eagle Creek. This basin drains north and east via wetland flow near the corner of 200th St NE and 95th Ave NE. Downstream flow from this basin does not converge within flowpaths from any portion of TDA-1 within 0.25 miles of the site and is thus considered a different TDA. A separate flow control system for this basin has been included in this report and will be detailed more fully in a separate submittal.

Basin 9:

The predeveloped condition applied to TDA 2 results in a forested land cover condition. The values as modeled in WWHM are as follows:

Table 8: Predeveloped Conditions for Basin 9

Basin 9	
Ground Cover	Area (acre)
Forest, steep	4.24
Total	**4.24**

4.2 Developed Site Hydrology

In the developed condition, the proposed development will construct approximately 646 single family homes along with a road network to provide access to the lots. The spine road permit documents and associated modeling for the arterial extension from Tveit Road to Burn Road is proposed under a separate permit.

In compliance with the 2024 DOE Manual, all runoff from onsite developed/disturbed surfaces will be collected, treated, and discharged directly to existing/historic flow paths.

Basin 1 :

The developed Basin 1 is 49.99 acres in total. In the developed condition, Basin 1 drains to Vault A and has been modeled using WWHM with the following areas and ground cover designations:

Table 9: Developed Conditions in Basin 1

Basin 1	
Ground Cover	Area (acre)
Roof, Flat	21.89
Roads, Mod	4.74
Sidewalks, Mod	1.53
Pasture, Mod	21.83
Total	**49.99**

Basins 2 & 3A:

The developed Basins 2 & 3A are 19.88 acres. In the developed condition, Basins 2 and 3A flow to Vault B and have been modeled using WWHM with the following areas and ground cover designations:

Table 10: Developed Conditions in Basin 2 and 3A

Basin 2, 3A	
Ground Cover	Area (acre)
Roof, Flat	7.47
Roads, Mod	3.21
Sidewalks, Mod	0.81
Pasture, Mod	8.39
Total	**19.88**

Basin 3B:

The developed Basin 3B is 9.42 acres in total. In the developed condition, Basin 3B flows to Vault C and has been modeled using WWHM with the following areas and ground cover designations:

Table 11: Developed Conditions in Basin 3B

Basin 3B	
Ground Cover	Area (acre)
Roof, Flat	2.95
Roads, Mod	1.36
Sidewalks, Mod	0.42
Pasture, Mod	4.69
Total	**9.42**

Basin 4:

The developed Basin 4 is 2.51 acres in total. In the developed condition, Basin 4 is conveyed to Pond A and has been modeled using WWHM with the following areas and ground cover designations:

Table 12: Developed Conditions in Basin 4

Basin 4	
Ground Cover	Area (acre)
Roof, Flat	0.86
Roads, Mod	0.27
Sidewalks, Mod	0.10
Pasture, Mod	1.12
Total	**2.51**

Basins 5, 7, & 8:

The developed Basins 5, 7, and 8 are 18.66 acres in total. In the developed condition, Basins 5, 7, and 8 flow to Vault D and have been modeled using WWHM with the following areas and ground cover designations:

Table 13: Developed Conditions in Basins 5, 7, & 8

Basin 5, 7, 8	
Ground Cover	Area (acre)
Roof, Flat	7.10
Roads, Mod	4.28
Sidewalks, Mod	0.54
Pasture, Mod	6.74
Total	**18.66**

Basin 6:

The developed Basin 6 is 2.99 acres in total. In the developed condition, Basin 6 is conveyed to Pond B and has been modeled using WWHM with the following areas and ground cover designations:

Table 14: Developed Conditions in Basins 6

Basin 6	
Ground Cover	Area (acre)
Roof, Flat	1.44
Roads, Mod	0.33
Sidewalks, Mod	0.17
Pasture, Mod	1.06
Total	**2.99**

Basin 9:

The developed Basin 9 is 4.24 acres in total. In the developed condition, Basin 9 flows to Pond C and have been modeled using WWHM with the following areas and ground cover designations:

Table 15: Developed Conditions in Basins 5, 7, & 8

Basin 9	
Ground Cover	Area (acre)
Roof, Flat	1.43
Roads, Mod	0.91
Sidewalks, Mod	0.35
Pasture, Mod	1.55
Total	**4.24**

4.3 Detention Facility Design

The proposed detention vault facilities used for mitigating developed condition flows were designed in compliance with the 2024 DOE requirements to model hydrologic conditions and detention in a continuous runoff model (WWHM2012) where the following evaluation parameters are employed:

> *"Flow duration is computed by counting the number of flow values that exceed a specified flow level. The specified flow levels used by WWHM in the flow duration analysis are listed below.*
>
> 1. *50% of the 2-year predevelopment peak flow.*
> 2. *100% of the 2-year predevelopment peak flow.*
> 3. *100% of the 50-year predevelopment peak flow.*
>
> *There are three criteria by which flow duration values are compared:*
>
> 1. *If the postdevelopment flow duration values exceed any of the predevelopment flow levels between 50% and 100% of the 2-year predevelopment peak flow values (100 Percent Threshold) then the flow duration requirement has not been met.*
> 2. *If the postdevelopment flow duration values exceed any of the predevelopment flow levels between 100% of the 2-year and 100% of the 50-year predevelopment peak flow values more than 10 percent of the time (110 Percent Threshold) then the flow duration requirement has not been met.*
> 3. *If more than 50 percent of the flow duration levels exceed the 100 percent threshold then the flow duration requirement has not been met."*

Detention Vault Facilities

The proposed cast in place concrete detention facility detains, and releases collected storm water runoff from the specified basin. Flows from the onsite basins are collected and conveyed to the detention vaults via a proposed network of catch basins and storm water conveyance pipes. Detailed WWHM outputs are provided in Appendix 4. A summary of the detailed statistics and inputs used for modeling the systems in WWHM2012 can be found below.

Vault A

Table 16: Detention Vault A Design Summary

Detention Vault A	
Live Storage Bottom Area (modeled)	*31,304 SF*
Live Storage Bottom Area (provided)	*31,390 SF*
Number of Cells	*5*
Cell Dimensions	*(5 x 18.25' x 344')*
Begin Live Storage Elevation	264.5
Riser Height	17.00'
Volume (modeled)	563,472 CF
Volume (provided)	565,020 CF
Top of Riser Elevation	281.5
Top Outside of Vault Elevation	284

See table below for the flow rates and water surface elevations by storm event for Detention Vault A.

Table 17: Flow Rates and Water Surface Elevations by Storm Event

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	2.6342	1.4820	271.02
10-Year	5.7021	2.5283	273.76
50-Year	9.8092	3.7953	275.07
100-Year	12.0517	4.4509	276.10

Vault B

Table 18: Detention Vault B Design Summary

Detention Vault B	
Live Storage Bottom Area (modeled)	*20,400 SF*
Live Storage Bottom Area (provided)	*20,400 SF*
Number of Cells	*5*
Cell Dimensions	*(5 x 20' x 204')*
Begin Live Storage Elevation	285.5
Riser Height	10.00'
Volume (modeled)	204,000 CF
Volume (provided)	204,000 CF
Top of Riser Elevation	295.5
Top Outside of Vault Elevation	298

See table below for the flow rates and water surface elevations by storm event for the Detention Vault B.

Table 19: Flow Rates and Water Surface Elevations by Storm Event for Vault B

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	1.0476	0.6750	289.13
10-Year	2.2676	1.1343	291.44
50-Year	3.9009	1.6666	294.76
100-Year	4.7927	1.9352	294.91

Vault C

Table 20: Detention Vault C Design Summary

Detention Vault C	
Live Storage Bottom Area (modeled)	*22,000 SF*
Live Storage Bottom Area (provided)	*22,200 SF*
Number of Cells	*6*
Cell Dimensions	*(6 x 18.5' x 200')*
Begin Live Storage Elevation	401.5
Riser Height	6.00'
Volume (modeled)	132,000 CF
Volume (provided)	133,200 CF
Top of Riser Elevation	407.5
Top Outside of Vault Elevation	410

See table below for the flow rates and water surface elevations by storm event for the Detention Vault C.

Table 21: Flow Rates and Water Surface Elevations by Storm Event for Vault C

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.4964	0.1748	403.67
10-Year	1.0744	0.2673	406.09
50-Year	1.4834	0.3662	406.71
100-Year	2.2710	0.4138	406.97

Vault D

Table 22: Detention Vault D Design Summary

Detention Vault D	
Live Storage Bottom Area (modeled)	*29,216 SF*
Live Storage Bottom Area (provided)	*29,880 SF*
Number of Cells	*6*
Cell Dimensions	*(5 x 18' x 332')*
Begin Live Storage Elevation	336.5
Riser Height	10.00'
Volume (modeled)	292,160 CF
Volume (provided)	298,800 CF
Top of Riser Elevation	346.5
Top Outside of Vault Elevation	349

See table below for the flow rates and water surface elevations by storm event for the Detention Vault D.

Table 23: Flow Rates and Water Surface Elevations by Storm Event for Vault D

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.9833	0.3519	340.82
10-Year	1.6042	0.5770	343.42
50-Year	3.6615	0.8167	346.40
100-Year	4.4986	0.93184	346.53

Detention Pond Facilities

The proposed detention pond facilities detain and release collected storm water runoff from the specified basin. Flows from the onsite basins are collected and conveyed to the detention ponds via a proposed network of catch basins and storm water conveyance pipes. Detailed WWHM outputs are provided in Appendix 4. A summary of the detailed statistics and inputs used for modeling the systems in WWHM2012 can be found below.

Pond A

Table 24: Pond A Design Summary

Pond A	
Live Storage Bottom Area (modeled)	*5,000 SF*
Live Storage Bottom Area (provided)	*5,000 SF*
Side Slopes	*3:1*
Begin Live Storage Elevation	433.00
Riser Height	5.00'
Volume (modeled)	47,500 CF
Volume (provided)	47,500 CF
Top of Riser Elevation	438.00

See table below for the flow rates and water surface elevations by storm event for Pond A.

Table 25: Flow Rates and Water Surface Elevations by Storm Event for Pond A

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.09818	0.04575	435.53
10-Year	0.1542	0.07641	436.54
50-Year	0.3231	0.09612	436.65
100-Year	0.3872	0.1315	436.97

Pond B

Table 26: Pond B Design Summary

Pond B	
Live Storage Bottom Area (modeled)	*5,811 SF*
Live Storage Bottom Area (provided)	*5,811 SF*
Side Slopes	*3:1*
Begin Live Storage Elevation	413.00
Riser Height	5.00’
Volume (modeled)	41,183 CF
Volume (provided)	41,183 CF
Top of Riser Elevation	418.00

See table below for the flow rates and water surface elevations by storm event for Pond B.

Table 27: Flow Rates and Water Surface Elevations by Storm Event for Pond B

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.1109	0.06452	416.02
10-Year	0.2302	0.1225	416.37
50-Year	0.3737	0.1971	417.13
100-Year	0.4470	0.2371	417.60

Pond C

Table 28: Pond C Design Summary

Pond C	
Live Storage Bottom Area (modeled)	*6,475 SF*
Live Storage Bottom Area (provided)	*6,475 SF*
Side Slopes	*0:1*
Begin Live Storage Elevation	436.00
Riser Height	9.50'
Volume (modeled)	61,513 CF
Volume (provided)	61,513 CF
Top of Riser Elevation	445.50

See table below for the flow rates and water surface elevations by storm event for Pond C.

Table 29: Flow Rates and Water Surface Elevations by Storm Event for Pond C

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.03441	0.01877	436.34
10-Year	0.06645	0.03846	437.43
50-Year	0.1001	0.06639	440.25
100-Year	0.1160	0.08224	441.97

4.4 Water Quality Treatment

Water Quality Treatment is planned for all basins downstream of detention. Further water quality analysis will be provided at a later submittal date.

4.5 Onsite Stormwater Management

The project does not the LID performance standard and minimum requirements 1-9 are required for the project but choose to implement List #2 to evaluate low impact design. The following BMP's below are assessed for implementation:

<u>Lawn and Landscaped Areas:</u>

1. *Post-Construction Soil Quality and Depth*
    - BMP T5.13 soils will be applied to all permeable and landscaped areas in developed condition.
        i. **Conclusion: Feasible**

<u>Roofs:</u>

1. *Downspout Full Infiltration per BMP T5.10A or Downspout Full Dispersion per BMP T5.30*
    - Infiltration is not feasible on site which has been confirmed by testing found in the geotechnical report and thus BMP T5.10A is infeasible. The site does not meet the requirements for full dispersion as flowpath lengths are inadequate in the developed areas of the site.
        i. **Conclusion: Infeasible**

2. *Bioretention*
    - Due to infiltration infeasibility confirmed by testing in the geotechnical report, a bioretention facility was determined to be infeasible.
        i. **Conclusion: Infeasible**

3. *Downspout Dispersion per BMP T5.10B.*
    - Due to site specific constraints including the proximity of slopes and walls to the developed site improvements, there is inadequate flow path to disperse on site.
        i. **Conclusion: Infeasible**

4. *Perforated Stub-Out Connections per BMP T5.10C.*
    - No stub-out connections will be implemented in the design as soils are not suitable for infiltration as well as the site's proximity to steep slopes.
        i. **Conclusion: Infeasible**

<u>Other Hard Surfaces:</u>

1. *Full Dispersion per BMP T5.30*
    - Due to the lack of native vegetation coverage in the developed condition and proximity to steep slopes, BMP T5.30 is infeasible.
        i. **Conclusion: Infeasible**

2. *BMP T5.15 Permeable Pavement*
    - Infiltration is not feasible on site, which has been confirmed by testing found in the geotechnical report.
        i. **Conclusion: Infeasible**

3. *Bioretention*
    - Due to infiltration infeasibility as confirmed by testing in the geotechnical report, a bioretention facility was determined to be infeasible
        i. **Conclusion: Infeasible**

4. *Sheet Flow Dispersion or Concentrated Flow Dispersion in accordance with BMP T5.12 or BMP T5.11*
    - Due to site specific constraints including the proximity of slopes and walls to the developed site improvements, there is inadequate flow path to disperse on site.
        i. **Conclusion: Infeasible**

SECTION 5: CONVEYANCE DESIGN

The stormwater conveyance system is comprised of a network of open/closed grate catch basins, buried pipe, a concrete detention vaults, detention ponds, two deep cutoff trenches, dispersion trenches, gabion basket outfalls and tees, and StormFilter water quality units. Catch basins have been located such that each section of storm drainage pipe may adequately convey associated tributary area flows.

A fully prepared conveyance capacity analysis of the proposed pipes onsite will be prepared at a future submittal.

SECTION 6: OPERATIONS AND MAINTENANCE MANUAL

The proposed storm drainage system consists of buried pipes, catch basins, detention vaults, detention ponds, two deep cutoff trenches, dispersion trenches, gabion basket outfalls and tees, and StormFilter water quality treatment structures. These facilities will require periodic maintenance and inspection. Inspection and maintenance procedures are contained on the following pages.

SECTION 7: SPECIAL REPORTS AND STUDIES

The following studies were conducted in preparation of this Report:

- Technical Memorandum, Arlington 360 Wetland and Fish & Wildlife Habitat Assessment, Soundview Consultants, Inc, April, 2025

- Geotechnical Report, Arlington 360, Terra Associates, Inc, April 9, 2025

Appendix 1: Project Overview

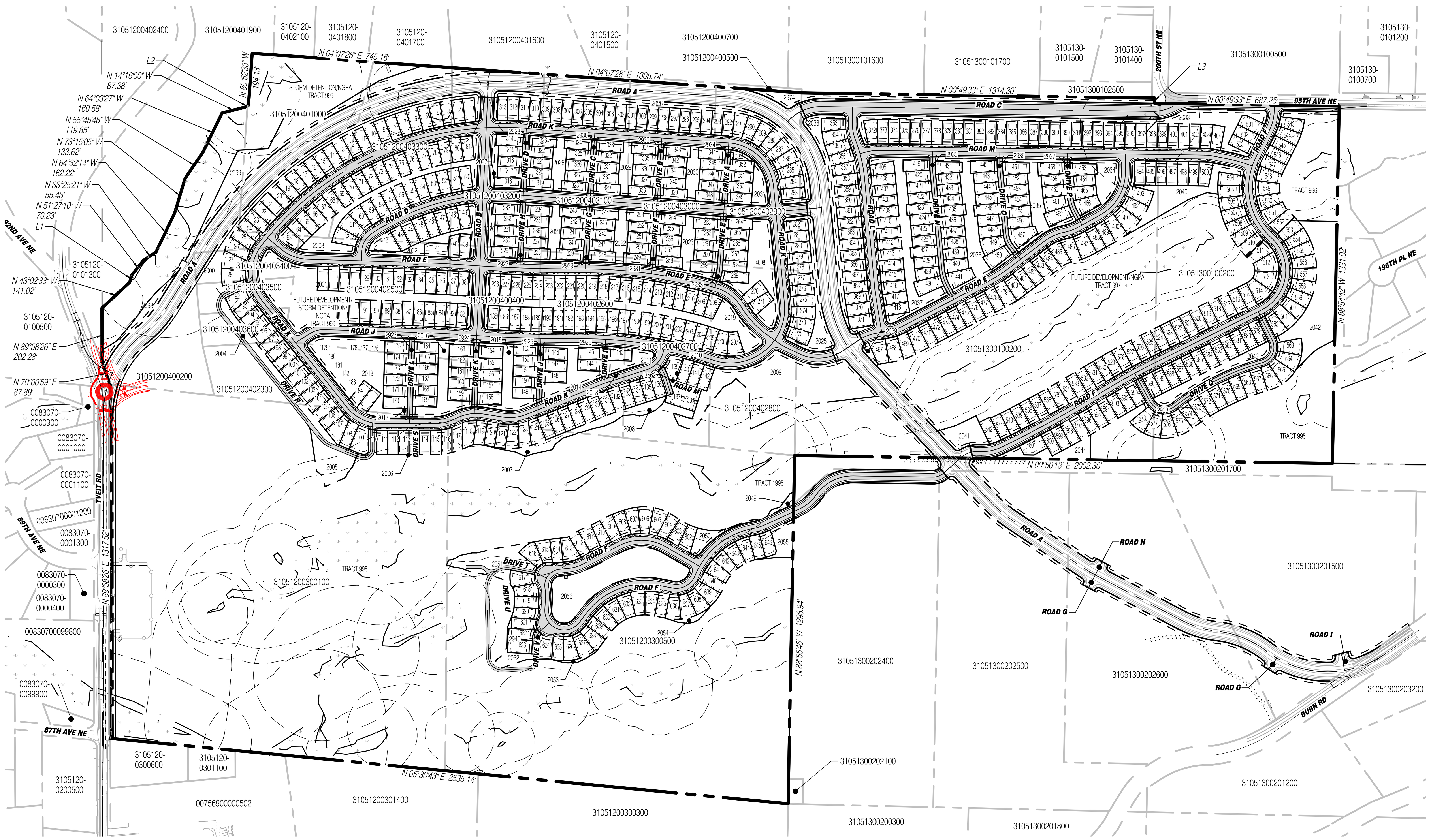
1. Vicinity Map
2. Existing Conditions Map
3. Proposed Development Map
4. Parcel List

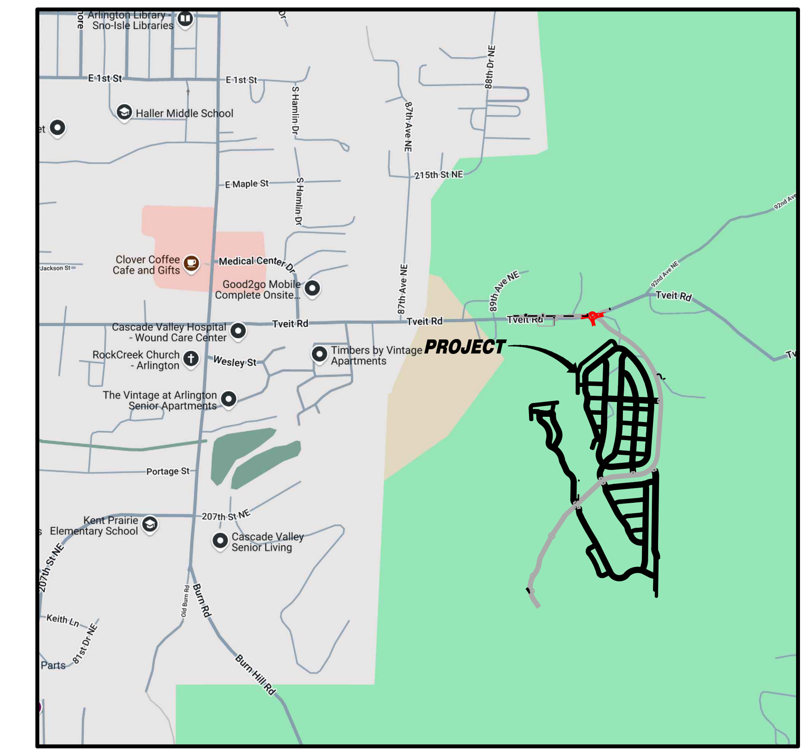
SEC 13, TWP 31 N, RGE 5 E, WM, ARLINGTON, WASHINGTON

ARLINGTON EAST HILL

PRELIMINARY PLANS

ARLINGTON CITY, WA





VICINITY MAP
SCALE: NOT TO SCALE

LEGEND AND ABBREVIATIONS

EXISTING SYMBOLS	DESCRIPTION
	MONUMENT IN CASE
	FOUND REBAR W/ CAP
	EXISTING CORNER MONUMENT AS NOTED
	STORM MANHOLE
	SEWER CLEANOUT
S	SEWER MANHOLE
	CATCH BASIN
	IRRIGATION CONTROL VALVE
	FIRE HYDRANT
PT	POWER TRANSFORMER
	WATER METER
	WATER VALVE
	SIGN POST
	LIGHT POLE
	TELCO RISER
	CONIFEROUS TREE

ABBREVIATIONS

GPM	GAS PAINT MARK
CB	CATCH BASIN
IE	INVERT ELEVATION
SD	STORM DRAIN
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
C	CEDAR
PVC	POLYVINYL CHLORIDE PIPE
CPP	CONCRETE PRESSURE PIPE
PP	POWER POLE
TBR	TO BE REMOVED
EX	EXISTING
R/W	RIGHT-OF-WAY

PROPOSED STORM SYMBOLS

SYMBOL	DESCRIPTION
	SD CAP
	TYPE 1 CATCH BASIN, GRATED LID
	TYPE 1 CATCH BASIN, SOLID LID
	TYPE 2 CATCH BASIN, GRATED LID
	TYPE 2 CATCH BASIN, SOLID LID
	BEEHIVE MANHOLE COVER
	SQUARE YARD DRAIN
	ROUND YARD DRAIN
	STORM CLEAN OUT
	STORM PIPE

PROPOSED SEWER SYMBOLS

SYMBOL	DESCRIPTION
	SEWER CAP
	SEWER CLEANOUT
	SEWER MANHOLE
	SEWER PIPE

PROPOSED WATER SYMBOLS

SYMBOL	DESCRIPTION
	WATER CAP
	CONCRETE BLOCKING
	11.25° BEND
	22.5° BEND
	45° BEND
	90° BEND
	VALVE
	HYDRANT ASSEMBLY
	BLOW-OFF VALVE
	REDUCER
	AIR-VAC ASSEMBLY
	WATER METER
	WATER PIPE

SURVEY INFORMATION

LEGAL DESCRIPTION

HORIZONTAL DATUM

NAD 83/91
WASHINGTON STATE COORDINATES - NORTH ZONE

VERTICAL DATUM

NAVD 88

(NAVD 88 - NVGD 1929 = _.____)

BENCHMARKS

EQUIPMENT & PROCEDURES

SURVEY REFERENCES

NOTES

EARTHWORK QUANTITIES

STRIPPING:	----- CY
CUT:	----- CY
FILL:	----- CY
NET:	----- CY (CUT/FILL)
DISTURBED AREA:	-------- SF (-.-- AC)

THE ABOVE QUANTITIES ARE FOR PERMITTING PURPOSES. CONTRACTOR TO VERIFY.

CONTACT LIST

DEVELOPER:
DMH HOLDINGS, LLC
10515 20TH ST SE, SUITE #202
LAKE STEVENS, WASHINGTON 98258
CONTACT: RYAN LARSEN
PHONE: (425) 231-2718
EMAIL: rlarsen@landprogrp.com

CIVIL ENGINEER:
SOLID GROUND ENGINEERING
8105 166TH AVE NE
REDMOND, WA 98052
CONTACT: TOM ABBOTT, PE
PHONE: (425) 281-8324
EMAIL: tabbott@solidgroundpnw.com

GEOTECHNICAL ENGINEER:
TERRA ASSOCIATES, INC
12220 113TH AVE NE, STE 130
KIRKLAND, WASHINGTON 98034
CONTACT: CAROLYN DECKER, PE
PHONE: (425) 821-7777 EXT 103
EMAIL: cdecker@terra-associates.com

LANDSCAPE ARCHITECT:
ORIGIN DESIGN GROUP
1031 185TH AVENUE NE
SNOHOMISH, WASHINGTON 98290
CONTACT: KRYSTAL LOWE
PHONE: (425) 346-1905
EMAIL: krystal@origindesigngroup.com

SURVEYOR:
PACIFIC COAST SURVEYS, INC.
P.O. BOX 13619
MILL CREEK, WASHINGTON 98082
CONTACT: DARREN RIDDLE, PLS
PHONE: (425) 512-709
FAX: (425) 357-3577
EMAIL: darren@pcsurveys.net

TABLE OF CONTENTS

PROJECT INFORMATION

TAX PARCELS:	VARIOUS
SITE ADDRESS:	8904 TVEIT ROAD, ARLINGTON, WA 98223
SITE AREA:	___,___ SF (__.__ AC)
ZONING:	RULC (RESIDENTIAL ULTRA LOW CAPACITY), MPN (MASTER PLAN NEIGHBORHOOD)
PROPOSED USE:	ACCESS ROAD
WATER:	CITY OF ARLINGTON
SEWER:	CITY OF ARLINGTON
POWER:	SNOHOMISH PUD
GAS:	CASCADE NATURAL GAS
TELEPHONE:	COMCAST
CABLE:	COMCAST
SCHOOL DISTRICT:	ARLINGTON SCHOOL DISTRICT NO 16
FIRE DISTRICT:	NORTH COUNTY REGIONAL FIRE AUTHORITY
AIRPORT PROTECTION DISTRICT:	SUB-DISTRICT C

SURVEY DISCLAIMER

THE TOPOGRAPHIC SURVEY WAS PERFORMED BY PACIFIC COAST SURVEYS. SOLID GROUND ENGINEERING ASSUMES NO LIABILITY AS TO THE ACCURACY AND COMPLETENESS OF THIS DATA. ANY DISCREPANCIES FOUND BETWEEN WHAT IS SHOWN ON THE PLANS AND WHAT IS NOTED IN THE FIELD SHOULD BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER.

UTILITY NOTE

THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. AGENCIES INVOLVED SHALL BE NOTIFIED WITHIN A REASONABLE TIME PRIOR TO THE START OF CONSTRUCTION.

811
SAFETY IS IN YOUR HANDS.
EVERY DIG. EVERY TIME.

THOMAS P. ABBOTT
STATE OF WASHINGTON
56921
REGISTERED
PROFESSIONAL ENGINEER

ENGINEER'S STAMP

REVISIONS

#	DATE	DESCRIPTION

SGE
Solid Ground Engineering
8105 166th Ave NE
Redmond, WA 98052

COVER SHEET

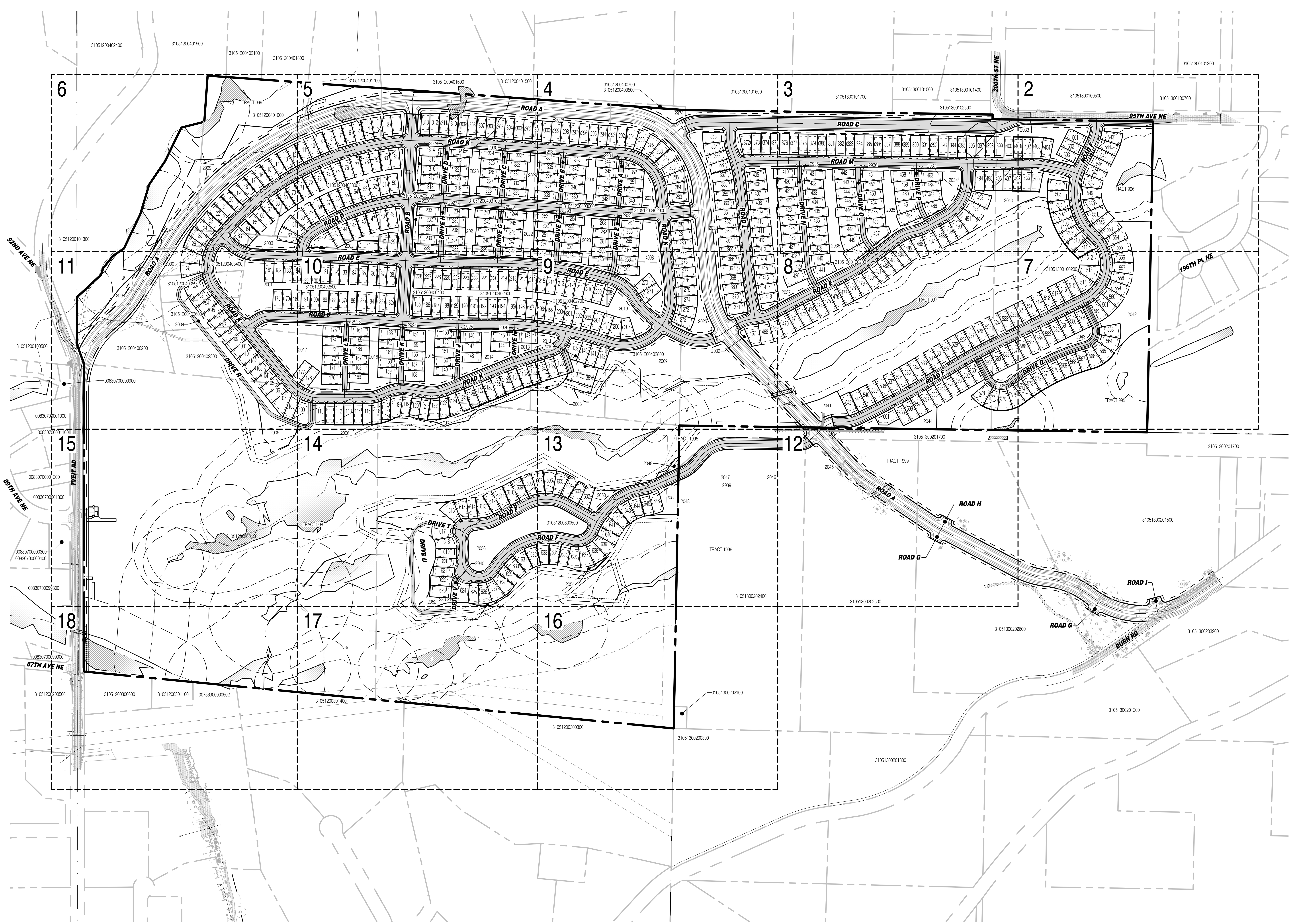
NOR-PAC HOMES
ARLINGTON EAST HILL
ARLINGTON, WA

DRAWN BY:	KMA
CHECKED BY:	TPA
DATE:	11-13-24
JURISDICTION: CITY OF ARLINGTON	
JOB NUMBER:	24-0016

CS-01
1 OF 109

...\Drawings\Preliminary\24-0016P-CS-PL.dwg 4/4/2025 7:33:16 AM

SEC 13, TWP 31 N, RGE 5 E, WM, ARLINGTON, WASHINGTON



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REGISTERED PROFESSIONAL ENGINEER
56921

ENGINEER'S STAMP

REVISIONS

#	DATE	DESCRIPTION

Solid Ground Engineering
8105 166th Ave NE
Redmond, WA 98052

PRELIMINARY STORM DRAINAGE

NOR-PAC HOMES

ARLINGTON EAST HILL - SPINE ROAD

ARLINGTON, WA

DRAWN BY:	KMA
CHECKED BY:	TPA
DATE:	11-13-24
JURISDICTION: CITY OF ARLINGTON	
JOB NUMBER:	24-0016

DR-01

East Hill Parcel List
31051200300100
31051200300500
31051200400200
31051200403600
31051200403500
31051200403400
31051200402500
31051200401000
31051200403300
31051200400400
31051200403200
31051200402600
31051200403100
31051200402700
31051200403000
31051200402800
31051200402900
31051300100200
31051300100300

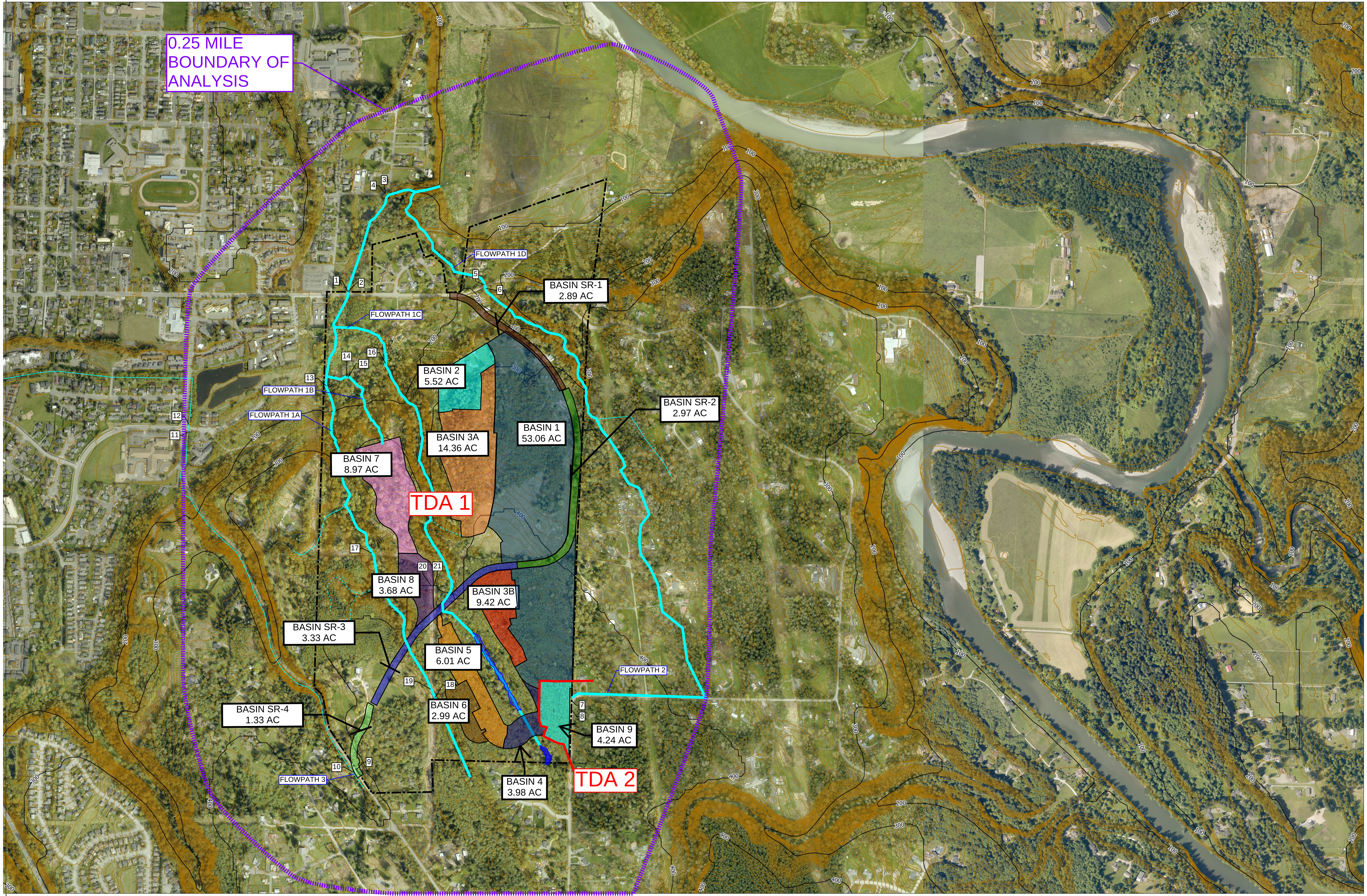
Appendix 2: Downstream Analysis

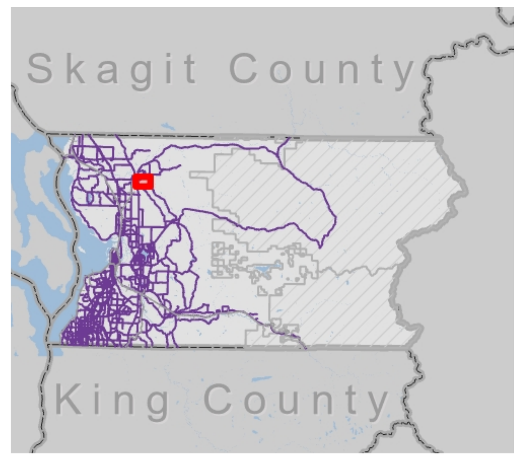
1. Downstream Analysis Map
2. Downstream Analysis Site Visit Pictures
3. USDA Soils Map & Description

PDS Map Portal
Snohomish County Planning & Development Services

Map Title

10/14/2024





Legend

- 100 foot contours
- SW quad
- NW quad
- NE quad
- SE quad
- Airports
- Fire Stations
- Hospitals
- Police Stations
- Schools
- Bus Stops
- Community Transit Park and Ride
- Ferry Terminals
- Buildings
- Ferry Routes
- County Lines 4,800 - 10,000
- Stillaguamish Indian Reservation Boundary
- Tulalip Indian Reservation Boundary
- Cities 4,800 - 10,000
- Streets 4,800 - 10,000
  - Interstate
  - State Route
  - Ramps
  - Major Road; Major Road
  - Minor Road; Minor Road
  - Access Road
- Water Features
- County Parks 4,800 - 10,000
- Cities 4,800 - 10,000
- National Forest 4,800 - 10,000
- County Region
- RELIEF_HILLSHADE

1: 5,020

836.6 0 418.32 836.6 Feet

Projection: NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet
Planning and Development Services, Snohomish County

Notes

This map was automatically generated using Geocortex Essentials.

Downstream Analysis Photographs

Images 1 & 2: Eagle Creek (Flowpaths 1A & 1B) on either side of Tveit Rd.

Images 3 & 4: Eagle Creek at the boundary of the 0.25 mile analysis, at the corner of 215th St NE and 88th Dr NE

Images 5 & 6: Eagle Creek (Flowpath 1C) on either side of Tveit Rd

Images 7 & 8: Flowpath 2 as it leaves the site and enters the drainage ditch along 95th Ave NE and 200th St NE

Image 9: Drainage ditch and culvert along the east side of Burn Rd, part of Flowpath 3

Image 10: Portage Creek along Burn Rd and outfall of Flowpath 3

Images 11 & 12: Portage Creek (part of Flowpath 3) crossing beneath 207th St NE prior to passing the 0.25 mile boundary of analysis

Image 13: Eagle Creek (Flowpath 1A) on site prior to joining Flowpath 1B

Images 14 & 15: Eagle Creek (Flowpath 1B) onsite prior to joining with Flowpath 1A

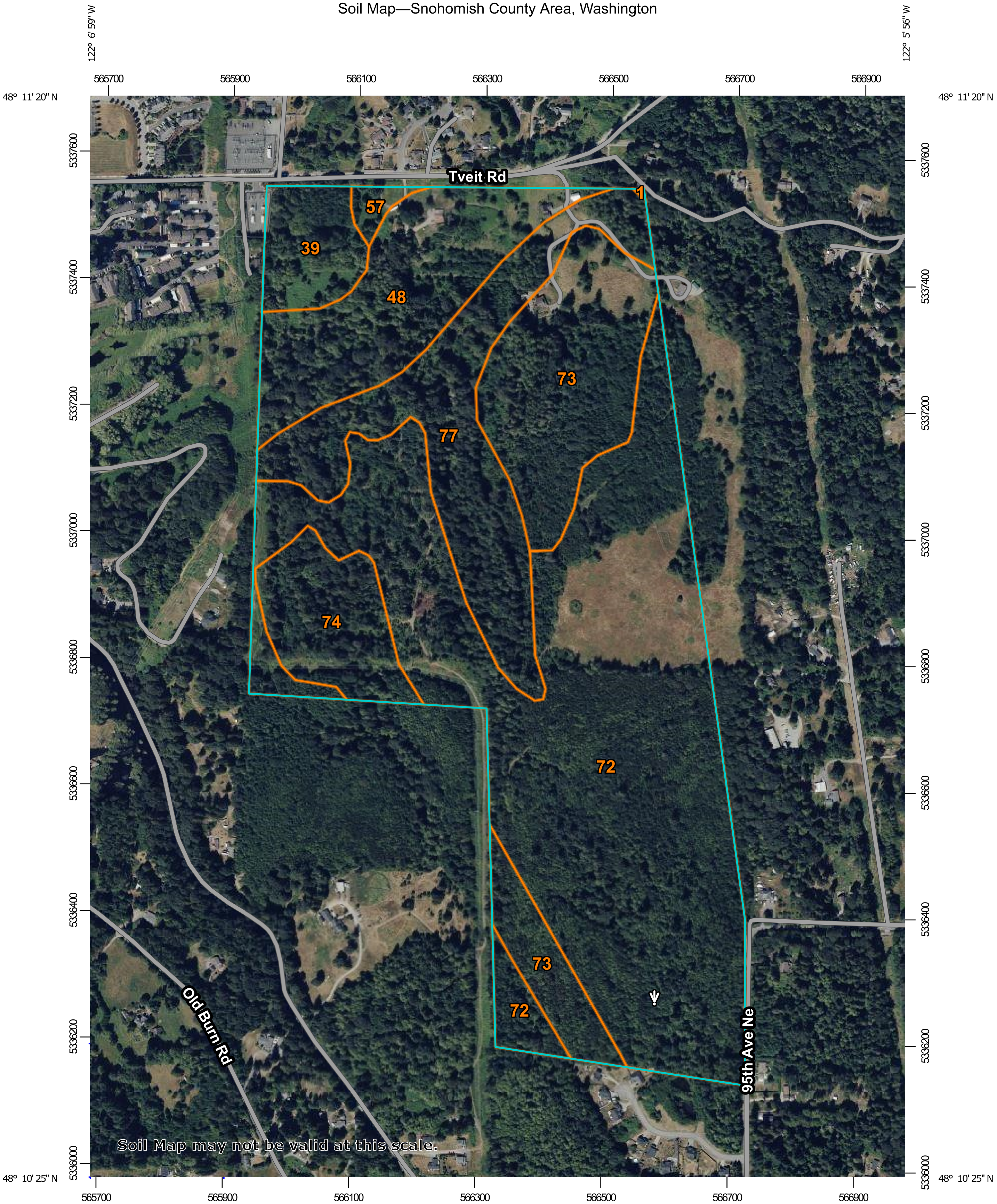
Image 16: Eagle Creek (Flowpath 1C) onsite prior to joining Flowpaths 1A and 1B

Image 17: Eagle Creek (Flowpath 1A) in the ravine along the western edge of the site

Images 18 & 19: Flowpath 1A on either side of PUD access road onsite

Images 20 & 21: Wetland tributary to Eagle Creek (Flowpath 1C)

Soil Map—Snohomish County Area, Washington



Map Scale: 1:8,320 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 100, 200, 400, 600

Feet: 0, 400, 800, 1600, 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Snohomish County Area, Washington
Survey Area Data: Version 26, Aug 27, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 14, 2022—Sep 1, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Alderwood gravelly sandy loam, 0 to 8 percent slopes	0.0	0.0%
39	Norma loam	7.0	3.7%
48	Pastik silt loam, 8 to 25 percent slopes	21.1	11.1%
57	Ragnar fine sandy loam, 0 to 8 percent slopes	1.2	0.7%
72	Tokul gravelly medial loam, 0 to 8 percent slopes	95.3	50.1%
73	Tokul gravelly medial loam, 8 to 15 percent slopes	27.6	14.5%
74	Tokul gravelly medial loam, 15 to 30 percent slopes	11.0	5.8%
77	Tokul-Winston gravelly loams, 25 to 65 percent slopes	26.9	14.1%
Totals for Area of Interest		**190.1**	**100.0%**

Appendix 3: Detention and Water Quality Design Analysis

1. Predeveloped Hydrology Map
2. Developed Hydrology Map
3. WWHM2012 Output – Detention Vault 1
4. WWHM2012 Output – Detention Vault 2, 3A
5. WWHM2012 Output – Detention Vault 3B
6. WWHM2012 Output – Detention Vault 5, 7, 8
7. WWHM2012 Output – Detention Pond 4
8. WWHM2012 Output – Detention Vault 6
9. WWHM2012 Output – TDA 2

Table 1: Predeveloped TDAs and Basins

Drainage Basins			
TDA	Basin	Area (AC)	Detention #
1	1	49.99	Vault 1
	2	5.52	Vault 2
	3A	14.36	Vault 2
	3B	9.42	Vault 3
	4	2.51	Pond 4
	5	6.01	Vault 7
	6	2.99	Pond 6
	7	8.97	Vault 7
	8	3.68	Vault 7
	Total	**103.45**	
2		4.25	Pond 1

Solid Ground Engineering
8105 166th Ave NE
Redmond, WA 98052

EX-02

Table 1: Predeveloped TDAs and Basins

Drainage Basins			
TDA	Basin	Area (AC)	Detention #
1	1	49.99	Vault 1
	2	5.52	Vault 2
	3A	14.36	Vault 2
	3B	9.42	Vault 3
	4	2.51	Pond 4
	5	6.01	Vault 7
	6	2.99	Pond 6
	7	8.97	Vault 7
	8	3.68	Vault 7
	Total	**103.45**	
2		4.25	Pond 1

SGE
Solid Ground Engineering
8105 166th Ave NE
Redmond, WA 98052

EX-02

WWHM2012

PROJECT REPORT

VAULT A MODELING

General Model Information

WWHM2012 Project Name: East Hill Basin 1

Site Name:	
Site Address:	
City:	
Report Date:	4/10/2025
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.200
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
C, Forest, Steep	49.99
Pervious Total	49.99
Impervious Land Use	acre
Impervious Total	0
Basin Total	49.99

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	21.83
Pervious Total	21.83
Impervious Land Use	acre
ROADS MOD	4.74
ROOF TOPS FLAT	21.89
SIDEWALKS MOD	1.53
Impervious Total	28.16
Basin Total	49.99

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault 1

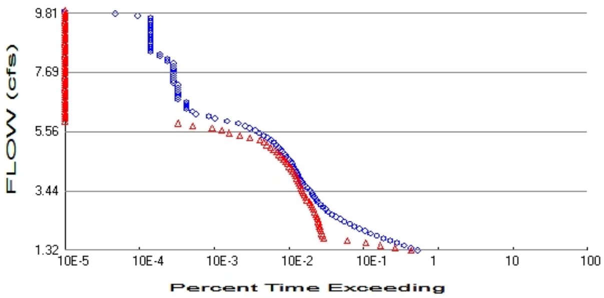
Width:	91 ft.
Length:	344 ft.
Depth:	18 ft.
Discharge Structure	
Riser Height:	17 ft.
Riser Diameter:	36 in.
Orifice 1 Diameter:	4.625 in. Elevation:0 ft.
Orifice 2 Diameter:	7.500 in. Elevation:9 ft.
Orifice 3 Diameter:	11.000 inElevation:16 ft.
Element Flows To:	
Outlet 1	Outlet 2

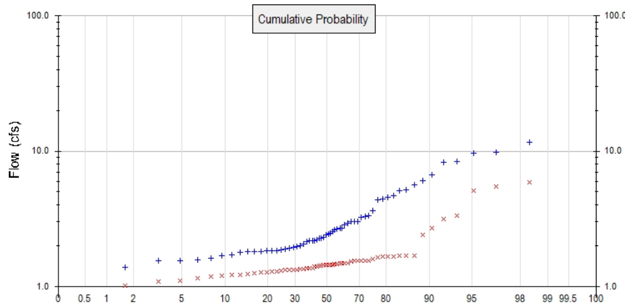
Vault Hydraulic Table

Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
0.0000	0.718	0.000	0.000	0.000
0.2000	0.718	0.143	0.259	0.000
0.4000	0.718	0.287	0.367	0.000
0.6000	0.718	0.431	0.449	0.000
0.8000	0.718	0.574	0.519	0.000
1.0000	0.718	0.718	0.580	0.000
1.2000	0.718	0.862	0.635	0.000
1.4000	0.718	1.006	0.686	0.000
1.6000	0.718	1.149	0.734	0.000
1.8000	0.718	1.293	0.778	0.000
2.0000	0.718	1.437	0.820	0.000
2.2000	0.718	1.581	0.861	0.000
2.4000	0.718	1.724	0.899	0.000
2.6000	0.718	1.868	0.936	0.000
2.8000	0.718	2.012	0.971	0.000
3.0000	0.718	2.155	1.005	0.000
3.2000	0.718	2.299	1.038	0.000
3.4000	0.718	2.443	1.070	0.000
3.6000	0.718	2.587	1.101	0.000
3.8000	0.718	2.730	1.131	0.000
4.0000	0.718	2.874	1.160	0.000
4.2000	0.718	3.018	1.189	0.000
4.4000	0.718	3.162	1.217	0.000
4.6000	0.718	3.305	1.245	0.000
4.8000	0.718	3.449	1.271	0.000
5.0000	0.718	3.593	1.298	0.000
5.2000	0.718	3.736	1.323	0.000
5.4000	0.718	3.880	1.348	0.000
5.6000	0.718	4.024	1.373	0.000
5.8000	0.718	4.168	1.398	0.000
6.0000	0.718	4.311	1.421	0.000
6.2000	0.718	4.455	1.445	0.000
6.4000	0.718	4.599	1.468	0.000
6.6000	0.718	4.743	1.491	0.000
6.8000	0.718	4.886	1.513	0.000
7.0000	0.718	5.030	1.535	0.000
7.2000	0.718	5.174	1.557	0.000
7.4000	0.718	5.317	1.579	0.000

7.6000	0.718	5.461	1.600	0.000
7.8000	0.718	5.605	1.621	0.000
8.0000	0.718	5.749	1.641	0.000
8.2000	0.718	5.892	1.662	0.000
8.4000	0.718	6.036	1.682	0.000
8.6000	0.718	6.180	1.702	0.000
8.8000	0.718	6.324	1.722	0.000
9.0000	0.718	6.467	1.741	0.000
9.2000	0.718	6.611	2.443	0.000
9.4000	0.718	6.755	2.745	0.000
9.6000	0.718	6.899	2.980	0.000
9.8000	0.718	7.042	3.182	0.000
10.000	0.718	7.186	3.362	0.000
10.200	0.718	7.330	3.526	0.000
10.400	0.718	7.473	3.678	0.000
10.600	0.718	7.617	3.820	0.000
10.800	0.718	7.761	3.955	0.000
11.000	0.718	7.905	4.083	0.000
11.200	0.718	8.048	4.206	0.000
11.400	0.718	8.192	4.324	0.000
11.600	0.718	8.336	4.438	0.000
11.800	0.718	8.480	4.548	0.000
12.000	0.718	8.623	4.654	0.000
12.200	0.718	8.767	4.758	0.000
12.400	0.718	8.911	4.858	0.000
12.600	0.718	9.054	4.956	0.000
12.800	0.718	9.198	5.052	0.000
13.000	0.718	9.342	5.145	0.000
13.200	0.718	9.486	5.237	0.000
13.400	0.718	9.629	5.326	0.000
13.600	0.718	9.773	5.414	0.000
13.800	0.718	9.917	5.500	0.000
14.000	0.718	10.06	5.585	0.000
14.200	0.718	10.20	5.668	0.000
14.400	0.718	10.34	5.749	0.000
14.600	0.718	10.49	5.830	0.000
14.800	0.718	10.63	5.909	0.000
15.000	0.718	10.78	5.987	0.000
15.200	0.718	10.92	6.063	0.000
15.400	0.718	11.06	6.139	0.000
15.600	0.718	11.21	6.214	0.000
15.800	0.718	11.35	6.287	0.000
16.000	0.718	11.49	6.360	0.000
16.200	0.718	11.64	7.900	0.000
16.400	0.718	11.78	8.579	0.000
16.600	0.718	11.92	9.116	0.000
16.800	0.718	12.07	9.579	0.000
17.000	0.718	12.21	9.994	0.000
17.200	0.718	12.36	13.21	0.000
17.400	0.718	12.50	18.67	0.000
17.600	0.718	12.64	25.21	0.000
17.800	0.718	12.79	31.92	0.000
18.000	0.718	12.93	37.92	0.000
18.200	0.718	13.07	42.53	0.000
18.400	0.000	0.000	45.59	0.000

Analysis Results
POC 1





\+ Predeveloped   x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 49.99
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 21.83
Total Impervious Area: 28.16

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	2.634185
5 year	4.297765
10 year	5.702081
25 year	7.871842
50 year	9.809182
100 year	12.051737

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	1.481996
5 year	2.064945
10 year	2.52834
25 year	3.210613
50 year	3.795265
100 year	4.450878

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	2.838	1.357
1950	3.245	1.413
1951	2.262	1.297
1952	2.155	1.097
1953	1.941	1.155
1954	9.739	1.462
1955	3.282	1.529
1956	2.695	1.672
1957	3.612	1.690
1958	9.660	1.328

1959	2.403	1.476
1960	2.557	1.558
1961	11.554	1.488
1962	2.673	1.408
1963	4.375	1.298
1964	3.031	1.287
1965	1.883	1.442
1966	1.378	1.195
1967	2.705	1.354
1968	3.355	1.693
1969	8.384	1.262
1970	1.698	1.248
1971	3.033	1.543
1972	2.182	1.440
1973	1.828	1.349
1974	5.115	1.354
1975	2.303	1.234
1976	1.913	1.478
1977	1.713	1.275
1978	1.818	1.094
1979	5.152	1.550
1980	2.433	1.213
1981	1.800	1.326
1982	2.478	2.407
1983	4.394	1.326
1984	2.193	1.640
1985	3.011	1.592
1986	6.717	5.090
1987	2.931	3.317
1988	1.823	1.492
1989	2.268	0.965
1990	2.009	1.553
1991	2.163	1.552
1992	1.848	1.399
1993	1.830	1.211
1994	1.555	1.436
1995	2.189	1.679
1996	4.687	1.666
1997	8.203	5.914
1998	1.574	1.184
1999	1.781	1.443
2000	1.556	1.663
2001	0.700	1.018
2002	2.047	1.473
2003	1.617	1.329
2004	2.633	3.131
2005	1.977	1.448
2006	5.659	2.693
2007	4.584	1.421
2008	6.046	5.477
2009	1.872	1.369

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	11.5536	5.9138
2	9.7392	5.4766
3	9.6600	5.0895

4	8.3837	3.3175
5	8.2031	3.1305
6	6.7171	2.6927
7	6.0463	2.4068
8	5.6594	1.6928
9	5.1520	1.6903
10	5.1149	1.6792
11	4.6869	1.6721
12	4.5841	1.6656
13	4.3942	1.6631
14	4.3748	1.6402
15	3.6119	1.5919
16	3.3551	1.5575
17	3.2820	1.5531
18	3.2448	1.5520
19	3.0333	1.5504
20	3.0305	1.5432
21	3.0114	1.5293
22	2.9309	1.4924
23	2.8384	1.4880
24	2.7053	1.4785
25	2.6953	1.4765
26	2.6727	1.4731
27	2.6330	1.4621
28	2.5567	1.4476
29	2.4784	1.4426
30	2.4328	1.4417
31	2.4025	1.4403
32	2.3033	1.4362
33	2.2683	1.4208
34	2.2622	1.4134
35	2.1931	1.4076
36	2.1891	1.3993
37	2.1820	1.3686
38	2.1630	1.3573
39	2.1547	1.3542
40	2.0470	1.3536
41	2.0087	1.3492
42	1.9773	1.3288
43	1.9411	1.3281
44	1.9131	1.3263
45	1.8834	1.3260
46	1.8719	1.2983
47	1.8481	1.2971
48	1.8298	1.2869
49	1.8283	1.2753
50	1.8234	1.2622
51	1.8176	1.2479
52	1.8003	1.2340
53	1.7812	1.2133
54	1.7132	1.2106
55	1.6984	1.1950
56	1.6168	1.1835
57	1.5744	1.1555
58	1.5560	1.0972
59	1.5554	1.0942
60	1.3776	1.0178
61	0.6999	0.9654

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
1.3171	11186	9263	82	Pass
1.4029	9109	5630	61	Pass
1.4886	7394	3604	48	Pass
1.5744	5942	2291	38	Pass
1.6602	4830	1293	26	Pass
1.7460	3927	626	15	Pass
1.8318	3210	606	18	Pass
1.9175	2644	587	22	Pass
2.0033	2212	573	25	Pass
2.0891	1861	559	30	Pass
2.1749	1597	548	34	Pass
2.2607	1389	540	38	Pass
2.3464	1176	529	44	Pass
2.4322	1030	519	50	Pass
2.5180	897	507	56	Pass
2.6038	806	490	60	Pass
2.6896	718	474	66	Pass
2.7753	661	456	68	Pass
2.8611	608	442	72	Pass
2.9469	570	426	74	Pass
3.0327	526	406	77	Pass
3.1184	499	377	75	Pass
3.2042	472	359	76	Pass
3.2900	448	342	76	Pass
3.3758	430	331	76	Pass
3.4616	408	321	78	Pass
3.5473	379	311	82	Pass
3.6331	343	301	87	Pass
3.7189	329	291	88	Pass
3.8047	312	282	90	Pass
3.8905	300	274	91	Pass
3.9762	285	265	92	Pass
4.0620	275	254	92	Pass
4.1478	265	239	90	Pass
4.2336	255	228	89	Pass
4.3193	244	216	88	Pass
4.4051	236	205	86	Pass
4.4909	226	194	85	Pass
4.5767	213	182	85	Pass
4.6625	200	169	84	Pass
4.7482	191	156	81	Pass
4.8340	174	146	83	Pass
4.9198	166	134	80	Pass
5.0056	155	122	78	Pass
5.0914	144	109	75	Pass
5.1771	134	99	73	Pass
5.2629	122	87	71	Pass
5.3487	111	64	57	Pass
5.4345	98	47	47	Pass
5.5202	85	34	40	Pass
5.6060	76	27	35	Pass
5.6918	64	20	31	Pass
5.7776	55	11	20	Pass

5.8634	45	7	15	Pass
5.9491	32	0	0	Pass
6.0349	22	0	0	Pass
6.1207	18	0	0	Pass
6.2065	12	0	0	Pass
6.2923	11	0	0	Pass
6.3780	9	0	0	Pass
6.4638	9	0	0	Pass
6.5496	9	0	0	Pass
6.6354	9	0	0	Pass
6.7211	7	0	0	Pass
6.8069	7	0	0	Pass
6.8927	7	0	0	Pass
6.9785	7	0	0	Pass
7.0643	7	0	0	Pass
7.1500	7	0	0	Pass
7.2358	7	0	0	Pass
7.3216	6	0	0	Pass
7.4074	6	0	0	Pass
7.4932	6	0	0	Pass
7.5789	6	0	0	Pass
7.6647	6	0	0	Pass
7.7505	6	0	0	Pass
7.8363	6	0	0	Pass
7.9221	6	0	0	Pass
8.0078	6	0	0	Pass
8.0936	5	0	0	Pass
8.1794	5	0	0	Pass
8.2652	4	0	0	Pass
8.3509	4	0	0	Pass
8.4367	3	0	0	Pass
8.5225	3	0	0	Pass
8.6083	3	0	0	Pass
8.6941	3	0	0	Pass
8.7798	3	0	0	Pass
8.8656	3	0	0	Pass
8.9514	3	0	0	Pass
9.0372	3	0	0	Pass
9.1230	3	0	0	Pass
9.2087	3	0	0	Pass
9.2945	3	0	0	Pass
9.3803	3	0	0	Pass
9.4661	3	0	0	Pass
9.5518	3	0	0	Pass
9.6376	3	0	0	Pass
9.7234	2	0	0	Pass
9.8092	1	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Vault 1 POC	☐	6480.94			☐	0.00			
Total Volume Infiltrated		6480.94	0.00	0.00		0.00	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.

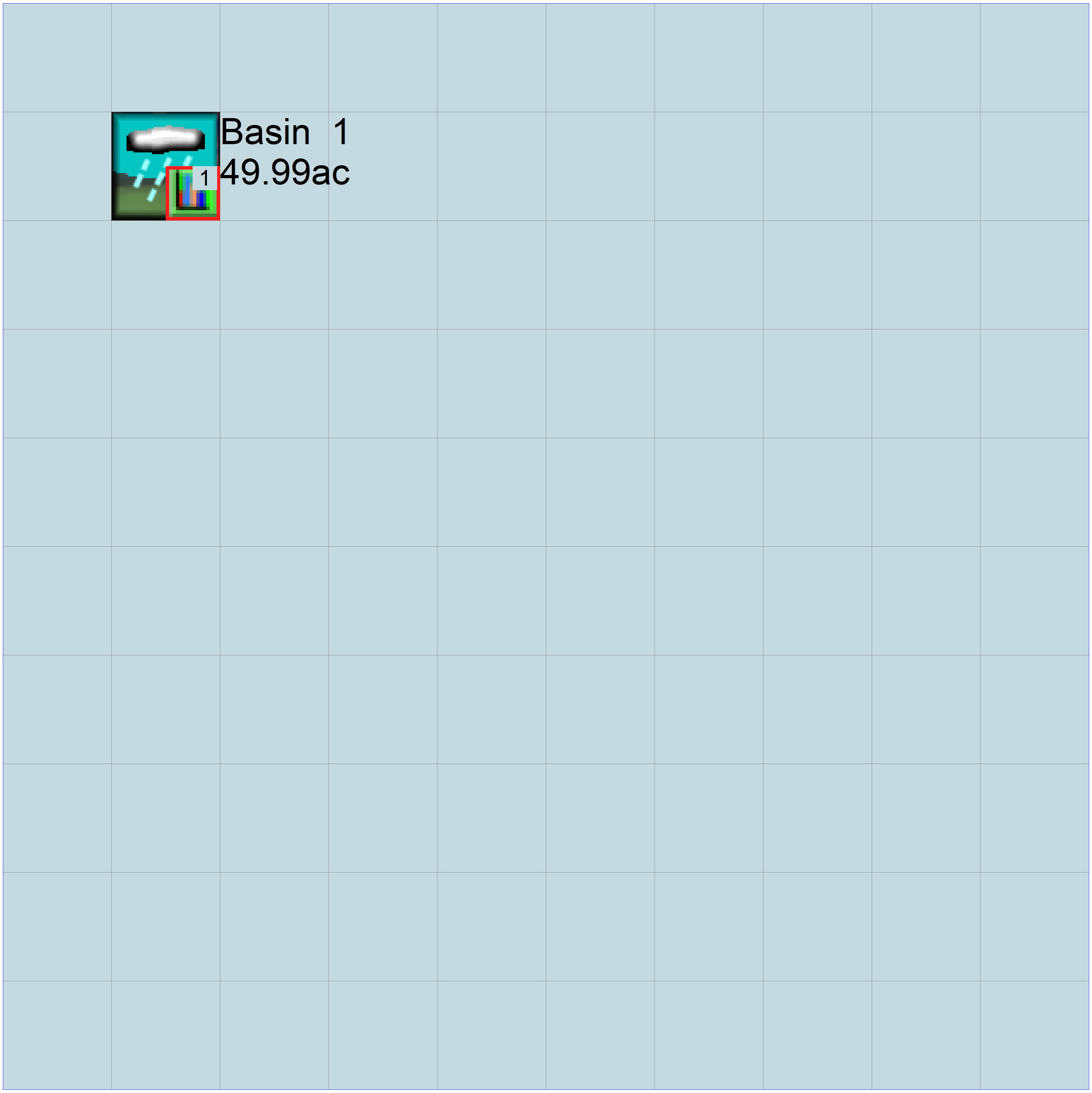
PERLND Changes

No PERLND changes have been made.

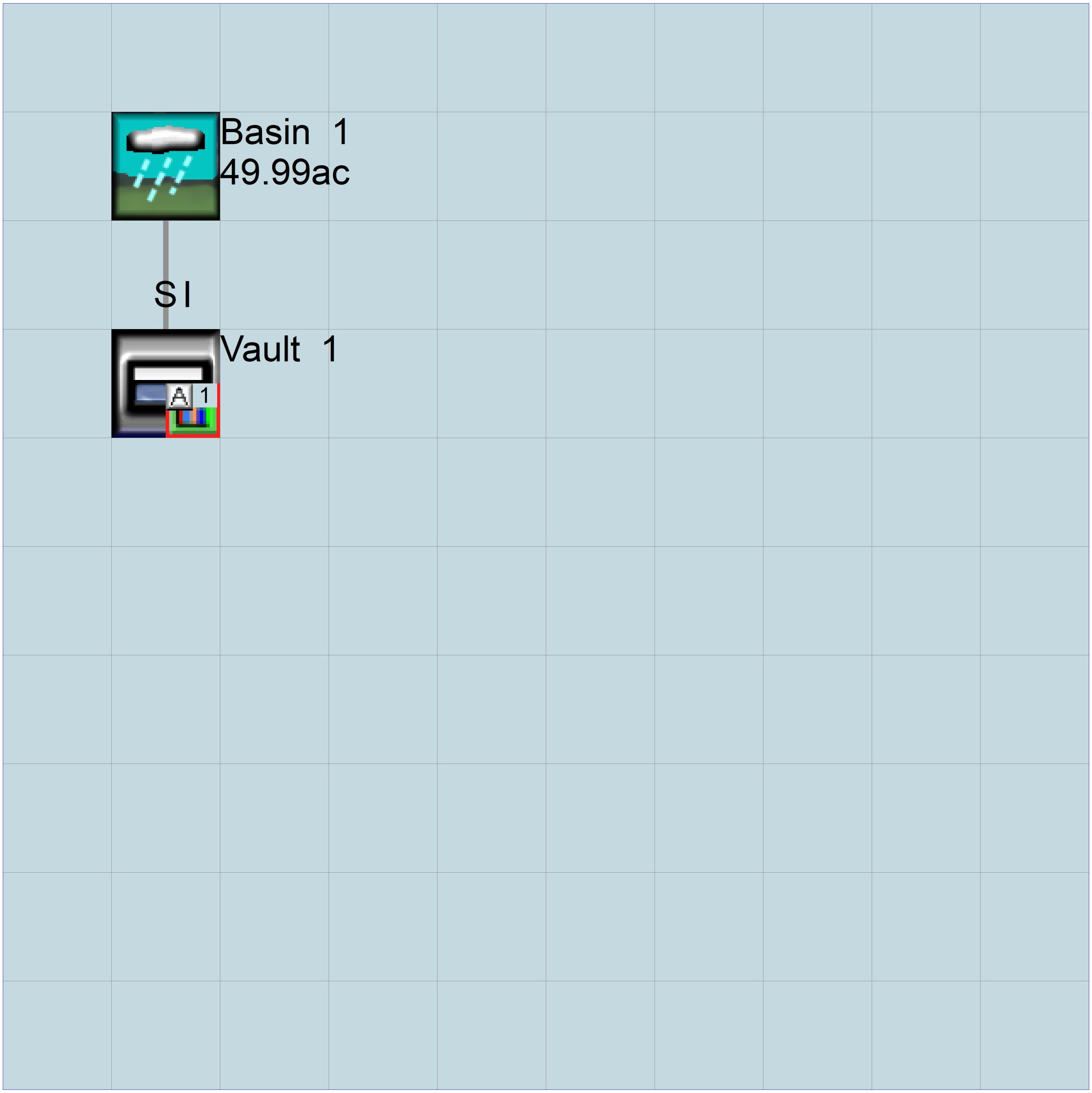
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File


```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   East Hill Basin 1.wdm
MESSU      25   PreEast Hill Basin 1.MES
           27   PreEast Hill Basin 1.L61
           28   PreEast Hill Basin 1.L62
           30   POCEast Hill Basin 11.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      12
      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           ***
   12     C, Forest, Steep        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 ***
   12         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  *********
   12         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 ***
   12         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
   12              0       4.5      0.08       400      0.15       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   12              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                   ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   12            0.2       0.3      0.35         6       0.3       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
   12              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                    User  t-series Engl Metr ***
                                     in  out           ***
  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  12                       49.99     COPY   501     12
PERLND  12                       49.99     COPY   501     13

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

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



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
```

```
WDM       1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM       1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

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

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                             ***
WDM        26   East Hill Basin 1.wdm
MESSU      25   MitEast Hill Basin 1.MES
           27   MitEast Hill Basin 1.L61
           28   MitEast Hill Basin 1.L62
           30   POCEast Hill Basin 11.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      14
      IMPLND       2
      IMPLND       4
      IMPLND       9
      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        Vault  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           ***
   14     C, Pasture, 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 ***
   14         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  *********
   14         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 ***
   14         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
   14              0       4.5      0.06       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   14              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   14           0.15       0.4       0.3         6       0.5       0.4
  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
   14              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
    2      ROADS/MOD              1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
    9      SIDEWALKS/MOD          1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
    4         0    0    1    0    0    0
    9         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         0    0    4    0    0    4    1    9
    4         0    0    4    0    0    0    1    9
    9         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    2         0    0    0    0    0
    4         0    0    0    0    0
    9         0    0    0    0    0
```

```
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            400      0.05       0.1      0.08
    4            400      0.01       0.1       0.1
    9            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
    4              0         0
    9              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
    4              0         0
    9              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  14                       21.83     RCHRES   1      2
PERLND  14                       21.83     RCHRES   1      3
IMPLND   2                        4.74     RCHRES   1      5
IMPLND   4                       21.89     RCHRES   1      5
IMPLND   9                        1.53     RCHRES   1      5

******Routing******
PERLND  14                       21.83     COPY     1     12
IMPLND   2                        4.74     COPY     1     15
IMPLND   4                       21.89     COPY     1     15
IMPLND   9                        1.53     COPY     1     15
PERLND  14                       21.83     COPY     1     13
RCHRES   1                           1     COPY   501     16
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     Vault  1                1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

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

```
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

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

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                        ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *        *  *  *  *  *        ***
    1        0  1  0  0    4  0  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      0.07       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  0.0  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    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.718641  0.000000  0.000000
  0.200000  0.718641  0.143728  0.259596
  0.400000  0.718641  0.287456  0.367124
  0.600000  0.718641  0.431185  0.449633
  0.800000  0.718641  0.574913  0.519191
  1.000000  0.718641  0.718641  0.580473
  1.200000  0.718641  0.862369  0.635877
  1.400000  0.718641  1.006097  0.686825
  1.600000  0.718641  1.149826  0.734247
  1.800000  0.718641  1.293554  0.778787
  2.000000  0.718641  1.437282  0.820913
  2.200000  0.718641  1.581010  0.860981
  2.400000  0.718641  1.724738  0.899265
  2.600000  0.718641  1.868466  0.935985
  2.800000  0.718641  2.012195  0.971317
  3.000000  0.718641  2.155923  1.005409
  3.200000  0.718641  2.299651  1.038382
  3.400000  0.718641  2.443379  1.070340
  3.600000  0.718641  2.587107  1.101371
  3.800000  0.718641  2.730836  1.131551
  4.000000  0.718641  2.874564  1.160946
  4.200000  0.718641  3.018292  1.189616
  4.400000  0.718641  3.162020  1.217611
  4.600000  0.718641  3.305748  1.244976
  4.800000  0.718641  3.449477  1.271753
  5.000000  0.718641  3.593205  1.297978
  5.200000  0.718641  3.736933  1.323683
  5.400000  0.718641  3.880661  1.348898
  5.600000  0.718641  4.024389  1.373650
  5.800000  0.718641  4.168118  1.397965
  6.000000  0.718641  4.311846  1.421863
  6.200000  0.718641  4.455574  1.445367
```

```
  6.400000  0.718641  4.599302  1.468494
  6.600000  0.718641  4.743030  1.491263
  6.800000  0.718641  4.886758  1.513689
  7.000000  0.718641  5.030487  1.535788
  7.200000  0.718641  5.174215  1.557573
  7.400000  0.718641  5.317943  1.579058
  7.600000  0.718641  5.461671  1.600254
  7.800000  0.718641  5.605399  1.621174
  8.000000  0.718641  5.749128  1.641826
  8.200000  0.718641  5.892856  1.662222
  8.400000  0.718641  6.036584  1.682371
  8.600000  0.718641  6.180312  1.702282
  8.800000  0.718641  6.324040  1.721962
  9.000000  0.718641  6.467769  1.741420
  9.200000  0.718641  6.611497  2.443310
  9.400000  0.718641  6.755225  2.745106
  9.600000  0.718641  6.898953  2.980910
  9.800000  0.718641  7.042681  3.182463
  10.00000  0.718641  7.186410  3.362063
  10.20000  0.718641  7.330138  3.526020
  10.40000  0.718641  7.473866  3.678084
  10.60000  0.718641  7.617594  3.820701
  10.80000  0.718641  7.761322  3.955571
  11.00000  0.718641  7.905051  4.083932
  11.20000  0.718641  8.048779  4.206719
  11.40000  0.718641  8.192507  4.324662
  11.60000  0.718641  8.336235  4.438340
  11.80000  0.718641  8.479963  4.548223
  12.00000  0.718641  8.623691  4.654699
  12.20000  0.718641  8.767420  4.758094
  12.40000  0.718641  8.911148  4.858683
  12.60000  0.718641  9.054876  4.956702
  12.80000  0.718641  9.198604  5.052354
  13.00000  0.718641  9.342332  5.145817
  13.20000  0.718641  9.486061  5.237246
  13.40000  0.718641  9.629789  5.326780
  13.60000  0.718641  9.773517  5.414540
  13.80000  0.718641  9.917245  5.500636
  14.00000  0.718641  10.06097  5.585167
  14.20000  0.718641  10.20470  5.668222
  14.40000  0.718641  10.34843  5.749879
  14.60000  0.718641  10.49216  5.830214
  14.80000  0.718641  10.63589  5.909292
  15.00000  0.718641  10.77961  5.987175
  15.20000  0.718641  10.92334  6.063919
  15.40000  0.718641  11.06707  6.139577
  15.60000  0.718641  11.21080  6.214195
  15.80000  0.718641  11.35453  6.287818
  16.00000  0.718641  11.49826  6.360488
  16.20000  0.718641  11.64198  7.900692
  16.40000  0.718641  11.78571  8.579819
  16.60000  0.718641  11.92944  9.116577
  16.80000  0.718641  12.07317  9.579262
  17.00000  0.718641  12.21690  9.994345
  17.20000  0.718641  12.36062  13.21616
  17.40000  0.718641  12.50435  18.67541
  17.60000  0.718641  12.64808  25.21431
  17.80000  0.718641  12.79181  31.92937
  18.00000  0.718641  12.93554  37.92839
  18.20000  0.718641  13.07927  42.53054
  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    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
```

```
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1         1     WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1         1     WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1      48.4     WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1      48.4     WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

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

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK    12

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

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

  MASS-LINK        16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK    16

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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WWHM2012

PROJECT REPORT

VAULT B MODELING

General Model Information

WWHM2012 Project Name: East Hill Basin 2 & 3A

Site Name:

Site Address:

City:

Report Date:	4/11/2025
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.200
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
C, Forest, Steep	19.88
Pervious Total	19.88
Impervious Land Use	acre
Impervious Total	0
Basin Total	19.88

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	8.39
Pervious Total	8.39
Impervious Land Use	acre
ROADS MOD	3.21
ROOF TOPS FLAT	7.47
SIDEWALKS MOD	0.81
Impervious Total	11.49
Basin Total	19.88

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault 1

Width:	100 ft.
Length:	204 ft.
Depth:	11 ft.
Discharge Structure	
Riser Height:	10 ft.
Riser Diameter:	36 in.
Orifice 1 Diameter:	3.375 in. Elevation:0 ft.
Orifice 2 Diameter:	3.000 in. Elevation:3.5 ft.
Orifice 3 Diameter:	6.000 in. Elevation:9.25 ft.
Element Flows To:	
Outlet 1	Outlet 2

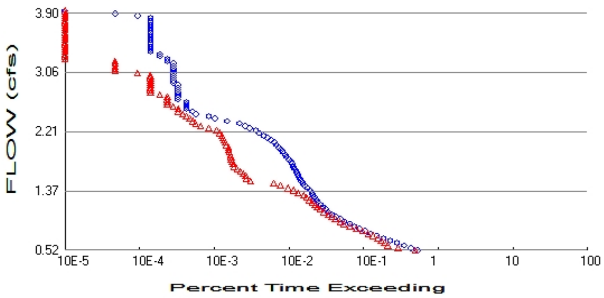
Vault Hydraulic Table

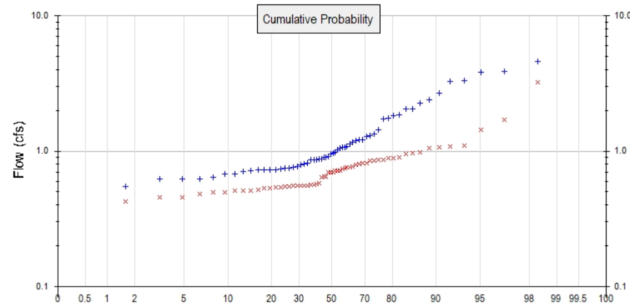
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.468	0.000	0.000	0.000
0.1222	0.468	0.057	0.108	0.000
0.2444	0.468	0.114	0.152	0.000
0.3667	0.468	0.171	0.187	0.000
0.4889	0.468	0.229	0.216	0.000
0.6111	0.468	0.286	0.241	0.000
0.7333	0.468	0.343	0.264	0.000
0.8556	0.468	0.400	0.285	0.000
0.9778	0.468	0.457	0.305	0.000
1.1000	0.468	0.515	0.324	0.000
1.2222	0.468	0.572	0.341	0.000
1.3444	0.468	0.629	0.358	0.000
1.4667	0.468	0.686	0.374	0.000
1.5889	0.468	0.744	0.389	0.000
1.7111	0.468	0.801	0.404	0.000
1.8333	0.468	0.858	0.418	0.000
1.9556	0.468	0.915	0.432	0.000
2.0778	0.468	0.973	0.445	0.000
2.2000	0.468	1.030	0.458	0.000
2.3222	0.468	1.087	0.471	0.000
2.4444	0.468	1.144	0.483	0.000
2.5667	0.468	1.202	0.495	0.000
2.6889	0.468	1.259	0.506	0.000
2.8111	0.468	1.316	0.518	0.000
2.9333	0.468	1.373	0.529	0.000
3.0556	0.468	1.431	0.540	0.000
3.1778	0.468	1.488	0.551	0.000
3.3000	0.468	1.545	0.561	0.000
3.4222	0.468	1.602	0.571	0.000
3.5444	0.468	1.659	0.633	0.000
3.6667	0.468	1.717	0.691	0.000
3.7889	0.468	1.774	0.732	0.000
3.9111	0.468	1.831	0.767	0.000
4.0333	0.468	1.888	0.799	0.000
4.1556	0.468	1.946	0.827	0.000
4.2778	0.468	2.003	0.854	0.000
4.4000	0.468	2.060	0.880	0.000
4.5222	0.468	2.117	0.904	0.000

4.6444	0.468	2.175	0.927	0.000
4.7667	0.468	2.232	0.949	0.000
4.8889	0.468	2.289	0.971	0.000
5.0111	0.468	2.346	0.992	0.000
5.1333	0.468	2.404	1.012	0.000
5.2556	0.468	2.461	1.032	0.000
5.3778	0.468	2.518	1.051	0.000
5.5000	0.468	2.575	1.070	0.000
5.6222	0.468	2.633	1.088	0.000
5.7444	0.468	2.690	1.106	0.000
5.8667	0.468	2.747	1.124	0.000
5.9889	0.468	2.804	1.141	0.000
6.1111	0.468	2.862	1.158	0.000
6.2333	0.468	2.919	1.175	0.000
6.3556	0.468	2.976	1.192	0.000
6.4778	0.468	3.033	1.208	0.000
6.6000	0.468	3.090	1.224	0.000
6.7222	0.468	3.148	1.239	0.000
6.8444	0.468	3.205	1.255	0.000
6.9667	0.468	3.262	1.270	0.000
7.0889	0.468	3.319	1.285	0.000
7.2111	0.468	3.377	1.300	0.000
7.3333	0.468	3.434	1.315	0.000
7.4556	0.468	3.491	1.329	0.000
7.5778	0.468	3.548	1.344	0.000
7.7000	0.468	3.606	1.358	0.000
7.8222	0.468	3.663	1.372	0.000
7.9444	0.468	3.720	1.386	0.000
8.0667	0.468	3.777	1.399	0.000
8.1889	0.468	3.835	1.413	0.000
8.3111	0.468	3.892	1.426	0.000
8.4333	0.468	3.949	1.440	0.000
8.5556	0.468	4.006	1.453	0.000
8.6778	0.468	4.064	1.466	0.000
8.8000	0.468	4.121	1.479	0.000
8.9222	0.468	4.178	1.492	0.000
9.0444	0.468	4.235	1.504	0.000
9.1667	0.468	4.292	1.517	0.000
9.2889	0.468	4.350	1.722	0.000
9.4111	0.468	4.407	1.934	0.000
9.5333	0.468	4.464	2.074	0.000
9.6556	0.468	4.521	2.188	0.000
9.7778	0.468	4.579	2.288	0.000
9.9000	0.468	4.636	2.378	0.000
10.022	0.468	4.693	2.566	0.000
10.144	0.468	4.750	4.283	0.000
10.267	0.468	4.808	6.974	0.000
10.389	0.468	4.865	10.30	0.000
10.511	0.468	4.922	14.05	0.000
10.633	0.468	4.979	18.03	0.000
10.756	0.468	5.037	22.02	0.000
10.878	0.468	5.094	25.82	0.000
11.000	0.468	5.151	29.22	0.000
11.122	0.468	5.208	32.10	0.000
11.244	0.000	0.000	34.39	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 19.88
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 8.39
Total Impervious Area: 11.49

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.047561
5 year	1.709132
10 year	2.267599
25 year	3.130468
50 year	3.900907
100 year	4.792724

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.674958
5 year	0.933773
10 year	1.134313
25 year	1.423462
50 year	1.666619
100 year	1.93515

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	1.129	0.565
1950	1.290	0.642
1951	0.900	0.542
1952	0.857	0.456
1953	0.772	0.480
1954	3.873	0.716
1955	1.305	0.813
1956	1.072	0.850
1957	1.436	0.981
1958	3.842	0.557

1959	0.955	0.747
1960	1.017	0.852
1961	4.595	0.770
1962	1.063	0.652
1963	1.740	0.544
1964	1.205	0.538
1965	0.749	0.694
1966	0.548	0.495
1967	1.076	0.566
1968	1.334	0.971
1969	3.334	0.529
1970	0.675	0.516
1971	1.206	0.790
1972	0.868	0.718
1973	0.727	0.556
1974	2.034	0.556
1975	0.916	0.512
1976	0.761	0.762
1977	0.681	0.535
1978	0.723	0.453
1979	2.049	0.865
1980	0.967	0.508
1981	0.716	0.552
1982	0.986	1.045
1983	1.747	0.555
1984	0.872	0.886
1985	1.198	0.896
1986	2.671	1.446
1987	1.166	1.103
1988	0.725	0.754
1989	0.902	0.403
1990	0.799	0.806
1991	0.860	0.817
1992	0.735	0.578
1993	0.728	0.507
1994	0.619	0.698
1995	0.871	0.867
1996	1.864	0.954
1997	3.262	3.226
1998	0.626	0.493
1999	0.708	0.700
2000	0.619	0.884
2001	0.278	0.426
2002	0.814	0.737
2003	0.643	0.548
2004	1.047	1.076
2005	0.786	0.713
2006	2.251	1.061
2007	1.823	0.650
2008	2.404	1.695
2009	0.744	0.568

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	4.5946	3.2262
2	3.8731	1.6950
3	3.8416	1.4457

4	3.3340	1.1029
5	3.2622	1.0758
6	2.6713	1.0612
7	2.4045	1.0446
8	2.2506	0.9808
9	2.0488	0.9712
10	2.0341	0.9539
11	1.8639	0.8963
12	1.8230	0.8858
13	1.7475	0.8836
14	1.7398	0.8668
15	1.4364	0.8654
16	1.3343	0.8522
17	1.3052	0.8496
18	1.2904	0.8168
19	1.2063	0.8131
20	1.2052	0.8058
21	1.1976	0.7900
22	1.1656	0.7702
23	1.1288	0.7622
24	1.0758	0.7535
25	1.0719	0.7468
26	1.0629	0.7371
27	1.0471	0.7181
28	1.0168	0.7158
29	0.9856	0.7132
30	0.9675	0.7002
31	0.9554	0.6982
32	0.9160	0.6944
33	0.9020	0.6516
34	0.8996	0.6497
35	0.8722	0.6422
36	0.8706	0.5779
37	0.8677	0.5677
38	0.8602	0.5660
39	0.8569	0.5655
40	0.8141	0.5569
41	0.7988	0.5563
42	0.7863	0.5562
43	0.7719	0.5554
44	0.7608	0.5524
45	0.7490	0.5478
46	0.7444	0.5441
47	0.7349	0.5418
48	0.7277	0.5384
49	0.7271	0.5350
50	0.7251	0.5292
51	0.7228	0.5164
52	0.7160	0.5116
53	0.7083	0.5078
54	0.6813	0.5070
55	0.6754	0.4952
56	0.6430	0.4932
57	0.6261	0.4800
58	0.6188	0.4562
59	0.6185	0.4525
60	0.5479	0.4260
61	0.2784	0.4030

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.5238	11231	10478	93	Pass
0.5579	9135	6175	67	Pass
0.5920	7383	4498	60	Pass
0.6261	5938	4062	68	Pass
0.6602	4834	3668	75	Pass
0.6943	3927	3311	84	Pass
0.7285	3210	2860	89	Pass
0.7626	2648	2464	93	Pass
0.7967	2216	2066	93	Pass
0.8308	1874	1705	90	Pass
0.8649	1600	1396	87	Pass
0.8990	1389	1160	83	Pass
0.9331	1175	1040	88	Pass
0.9672	1030	895	86	Pass
1.0014	897	797	88	Pass
1.0355	806	718	89	Pass
1.0696	718	628	87	Pass
1.1037	662	559	84	Pass
1.1378	609	506	83	Pass
1.1719	572	472	82	Pass
1.2060	526	435	82	Pass
1.2401	499	404	80	Pass
1.2743	472	368	77	Pass
1.3084	449	334	74	Pass
1.3425	430	283	65	Pass
1.3766	408	248	60	Pass
1.4107	380	208	54	Pass
1.4448	344	165	47	Pass
1.4789	329	133	40	Pass
1.5130	312	65	20	Pass
1.5472	300	57	19	Pass
1.5813	285	56	19	Pass
1.6154	275	52	18	Pass
1.6495	265	48	18	Pass
1.6836	255	43	16	Pass
1.7177	245	39	15	Pass
1.7518	236	38	16	Pass
1.7859	226	37	16	Pass
1.8201	213	36	16	Pass
1.8542	200	36	18	Pass
1.8883	191	35	18	Pass
1.9224	175	34	19	Pass
1.9565	166	33	19	Pass
1.9906	155	33	21	Pass
2.0247	145	31	21	Pass
2.0588	135	30	22	Pass
2.0930	122	29	23	Pass
2.1271	111	28	25	Pass
2.1612	98	27	27	Pass
2.1953	85	25	29	Pass
2.2294	77	23	29	Pass
2.2635	64	18	28	Pass
2.2976	55	14	25	Pass

2.3317	46	12	26	Pass
2.3658	32	11	34	Pass
2.4000	22	10	45	Pass
2.4341	18	9	50	Pass
2.4682	12	8	66	Pass
2.5023	11	7	63	Pass
2.5364	9	7	77	Pass
2.5705	9	6	66	Pass
2.6046	9	5	55	Pass
2.6387	9	5	55	Pass
2.6729	7	5	71	Pass
2.7070	7	5	71	Pass
2.7411	7	4	57	Pass
2.7752	7	3	42	Pass
2.8093	7	3	42	Pass
2.8434	7	3	42	Pass
2.8775	7	3	42	Pass
2.9116	6	3	50	Pass
2.9458	6	3	50	Pass
2.9799	6	3	50	Pass
3.0140	6	3	50	Pass
3.0481	6	2	33	Pass
3.0822	6	1	16	Pass
3.1163	6	1	16	Pass
3.1504	6	1	16	Pass
3.1845	6	1	16	Pass
3.2187	5	1	20	Pass
3.2528	5	0	0	Pass
3.2869	4	0	0	Pass
3.3210	4	0	0	Pass
3.3551	3	0	0	Pass
3.3892	3	0	0	Pass
3.4233	3	0	0	Pass
3.4574	3	0	0	Pass
3.4916	3	0	0	Pass
3.5257	3	0	0	Pass
3.5598	3	0	0	Pass
3.5939	3	0	0	Pass
3.6280	3	0	0	Pass
3.6621	3	0	0	Pass
3.6962	3	0	0	Pass
3.7303	3	0	0	Pass
3.7645	3	0	0	Pass
3.7986	3	0	0	Pass
3.8327	3	0	0	Pass
3.8668	2	0	0	Pass
3.9009	1	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Vault 1 POC	☐	2612.78			☐	0.00			
Total Volume Infiltrated		2612.78	0.00	0.00		0.00	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.

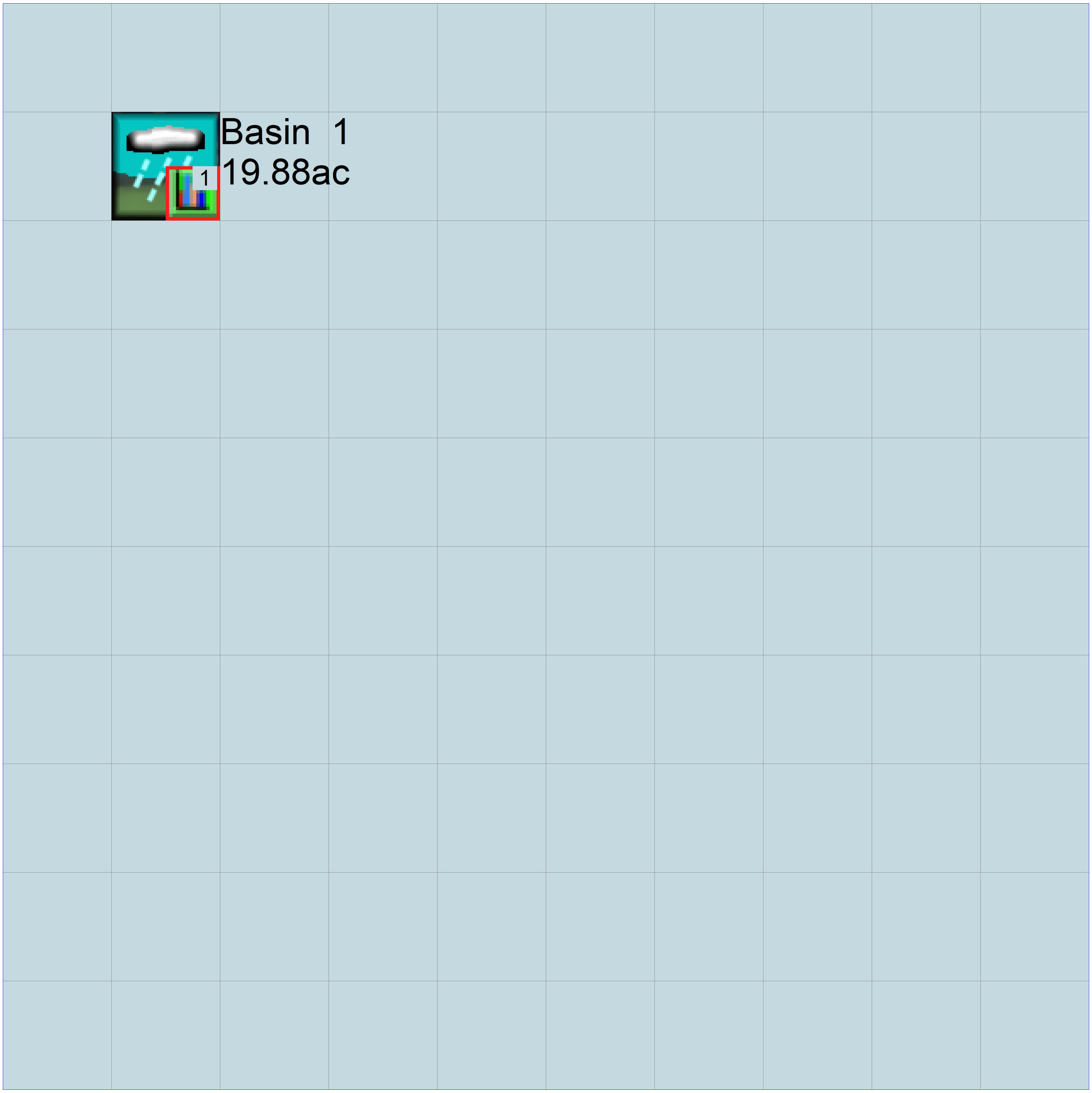
PERLND Changes

No PERLND changes have been made.

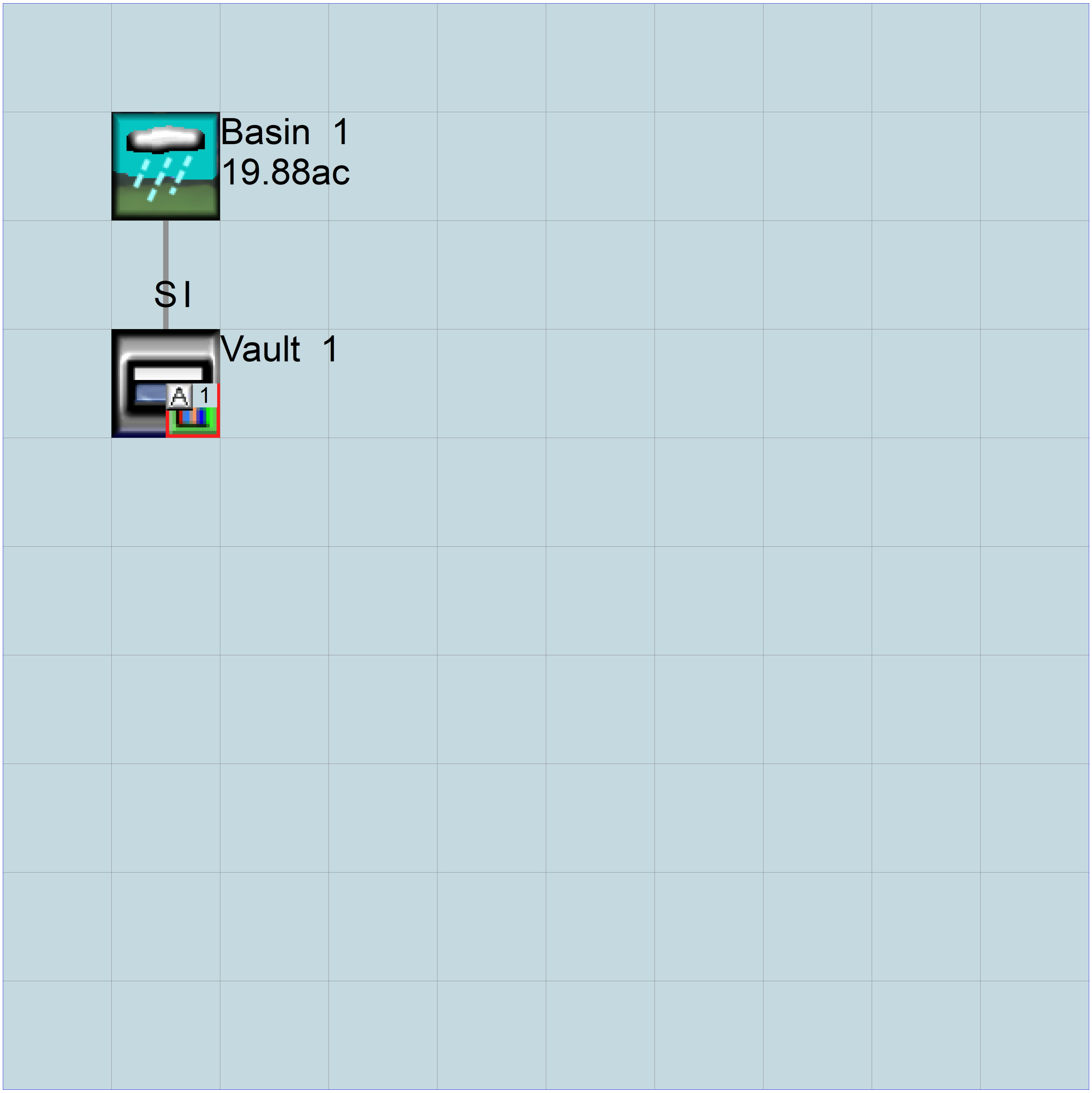
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   East Hill Basin 2 & 3A.wdm
MESSU      25   PreEast Hill Basin 2 & 3A.MES
           27   PreEast Hill Basin 2 & 3A.L61
           28   PreEast Hill Basin 2 & 3A.L62
           30   POCEast Hill Basin 2 & 3A1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      12
      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           ***
   12     C, Forest, Steep        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 ***
   12         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  *********
   12         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 ***
   12         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
   12              0       4.5      0.08       400      0.15       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   12              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                    ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   12            0.2       0.3      0.35         6       0.3       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
   12              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                   User  t-series Engl Metr ***
                                    in  out           ***
  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  12                       19.88     COPY   501     12
PERLND  12                       19.88     COPY   501     13

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

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



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                          in  out                            ***
  END GEN-INFO
  *** Section RCHRES***

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
```

```
WDM       1 EVAP      ENGL     0.76           PERLND   1 999 EXTNL  PETINP
WDM       1 EVAP      ENGL     0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

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

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                             ***
WDM        26   East Hill Basin 2 & 3A.wdm
MESSU      25   MitEast Hill Basin 2 & 3A.MES
           27   MitEast Hill Basin 2 & 3A.L61
           28   MitEast Hill Basin 2 & 3A.L62
           30   POCEast Hill Basin 2 & 3A1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      14
      IMPLND       2
      IMPLND       4
      IMPLND       9
      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        Vault  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           ***
   14     C, Pasture, 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 ***
   14         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  *********
   14         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 ***
   14         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
   14              0       4.5      0.06       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   14              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                    ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   14           0.15       0.4       0.3         6       0.5       0.4
  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
   14              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                       in  out           ***
    2      ROADS/MOD              1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
    9      SIDEWALKS/MOD          1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
    4         0    0    1    0    0    0
    9         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         0    0    4    0    0    4    1    9
    4         0    0    4    0    0    0    1    9
    9         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    2         0    0    0    0    0
    4         0    0    0    0    0
    9         0    0    0    0    0
```

```
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            400      0.05       0.1      0.08
    4            400      0.01       0.1       0.1
    9            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
    4              0         0
    9              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
    4              0         0
    9              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  14                        8.39     RCHRES   1      2
PERLND  14                        8.39     RCHRES   1      3
IMPLND   2                        3.21     RCHRES   1      5
IMPLND   4                        7.47     RCHRES   1      5
IMPLND   9                        0.81     RCHRES   1      5

******Routing******
PERLND  14                        8.39     COPY     1     12
IMPLND   2                        3.21     COPY     1     15
IMPLND   4                        7.47     COPY     1     15
IMPLND   9                        0.81     COPY     1     15
PERLND  14                        8.39     COPY     1     13
RCHRES   1                           1     COPY   501     16
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     Vault  1               1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

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

```
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

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

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                     ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1        0  1  0  0    4  0  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      0.04       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  0.0  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    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)    (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.468320  0.000000  0.000000
  0.122222  0.468320  0.057239  0.108064
  0.244444  0.468320  0.114478  0.152826
  0.366667  0.468320  0.171717  0.187172
  0.488889  0.468320  0.228956  0.216128
  0.611111  0.468320  0.286195  0.241639
  0.733333  0.468320  0.343434  0.264702
  0.855556  0.468320  0.400673  0.285911
  0.977778  0.468320  0.457912  0.305651
  1.100000  0.468320  0.515152  0.324192
  1.222222  0.468320  0.572391  0.341729
  1.344444  0.468320  0.629630  0.358408
  1.466667  0.468320  0.686869  0.374345
  1.588889  0.468320  0.744108  0.389631
  1.711111  0.468320  0.801347  0.404339
  1.833333  0.468320  0.858586  0.418530
  1.955556  0.468320  0.915825  0.432256
  2.077778  0.468320  0.973064  0.445560
  2.200000  0.468320  1.030303  0.458477
  2.322222  0.468320  1.087542  0.471040
  2.444444  0.468320  1.144781  0.483277
  2.566667  0.468320  1.202020  0.495212
  2.688889  0.468320  1.259259  0.506865
  2.811111  0.468320  1.316498  0.518257
  2.933333  0.468320  1.373737  0.529404
  3.055556  0.468320  1.430976  0.540320
  3.177778  0.468320  1.488215  0.551021
  3.300000  0.468320  1.545455  0.561517
  3.422222  0.468320  1.602694  0.571821
  3.544444  0.468320  1.659933  0.633431
  3.666667  0.468320  1.717172  0.691598
  3.788889  0.468320  1.774411  0.732946
```

```
  3.911111  0.468320  1.831650  0.767899
  4.033333  0.468320  1.888889  0.799142
  4.155556  0.468320  1.946128  0.827862
  4.277778  0.468320  2.003367  0.854707
  4.400000  0.468320  2.060606  0.880083
  4.522222  0.468320  2.117845  0.904258
  4.644444  0.468320  2.175084  0.927427
  4.766667  0.468320  2.232323  0.949733
  4.888889  0.468320  2.289562  0.971287
  5.011111  0.468320  2.346801  0.992175
  5.133333  0.468320  2.404040  1.012468
  5.255556  0.468320  2.461279  1.032224
  5.377778  0.468320  2.518519  1.051491
  5.500000  0.468320  2.575758  1.070311
  5.622222  0.468320  2.632997  1.088719
  5.744444  0.468320  2.690236  1.106744
  5.866667  0.468320  2.747475  1.124415
  5.988889  0.468320  2.804714  1.141753
  6.111111  0.468320  2.861953  1.158780
  6.233333  0.468320  2.919192  1.175514
  6.355556  0.468320  2.976431  1.191973
  6.477778  0.468320  3.033670  1.208170
  6.600000  0.468320  3.090909  1.224119
  6.722222  0.468320  3.148148  1.239833
  6.844444  0.468320  3.205387  1.255323
  6.966667  0.468320  3.262626  1.270600
  7.088889  0.468320  3.319865  1.285672
  7.211111  0.468320  3.377104  1.300549
  7.333333  0.468320  3.434343  1.315239
  7.455556  0.468320  3.491582  1.329749
  7.577778  0.468320  3.548822  1.344086
  7.700000  0.468320  3.606061  1.358257
  7.822222  0.468320  3.663300  1.372268
  7.944444  0.468320  3.720539  1.386125
  8.066667  0.468320  3.777778  1.399833
  8.188889  0.468320  3.835017  1.413397
  8.311111  0.468320  3.892256  1.426822
  8.433333  0.468320  3.949495  1.440112
  8.555556  0.468320  4.006734  1.453272
  8.677778  0.468320  4.063973  1.466306
  8.800000  0.468320  4.121212  1.479217
  8.922222  0.468320  4.178451  1.492009
  9.044444  0.468320  4.235690  1.504685
  9.166667  0.468320  4.292929  1.517249
  9.288889  0.468320  4.350168  1.722356
  9.411111  0.468320  4.407407  1.934177
  9.533333  0.468320  4.464646  2.074306
  9.655556  0.468320  4.521886  2.188579
  9.777778  0.468320  4.579125  2.288208
  9.900000  0.468320  4.636364  2.378060
  10.02222  0.468320  4.693603  2.566294
  10.14444  0.468320  4.750842  4.283459
  10.26667  0.468320  4.808081  6.974835
  10.38889  0.468320  4.865320  10.30407
  10.51111  0.468320  4.922559  14.05910
  10.63333  0.468320  4.979798  18.03635
  10.75556  0.468320  5.037037  22.02601
  10.87778  0.468320  5.094276  25.81979
  11.00000  0.468320  5.151515  29.22906
  11.12222  0.468320  5.208754  32.10933
  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    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
```

```
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO      1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE   1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN    1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN    1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

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

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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

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

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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WWHM2012

PROJECT REPORT

VAULT C MODELING

General Model Information

WWHM2012 Project Name: East Hill MR8 Basin 3B

Site Name:

Site Address:

City:

Report Date:	4/11/2025
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.200
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
C, Forest, Steep	9.42
Pervious Total	9.42
Impervious Land Use	acre
Impervious Total	0
Basin Total	9.42

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	4.69
Pervious Total	4.69
Impervious Land Use	acre
ROADS MOD	1.36
ROOF TOPS FLAT	2.95
SIDEWALKS MOD	0.42
Impervious Total	4.73
Basin Total	9.42

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault 1

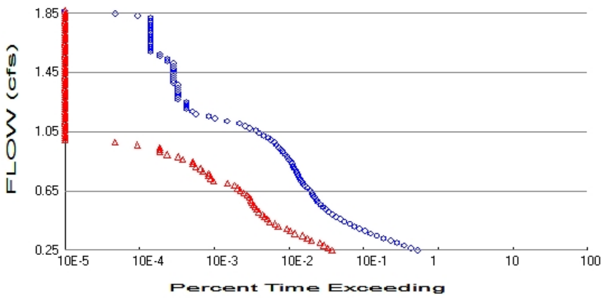
Width:	110 ft.
Length:	200 ft.
Depth:	7 ft.
Discharge Structure	
Riser Height:	6 ft.
Riser Diameter:	24 in.
Notch Type:	Rectangular
Notch Width:	0.040 ft.
Notch Height:	1.700 ft.
Orifice 1 Diameter:	2.094 in. Elevation:0 ft.
Orifice 3 Diameter:	2.719 in. Elevation:5.6 ft.
Element Flows To:	
Outlet 1	Outlet 2

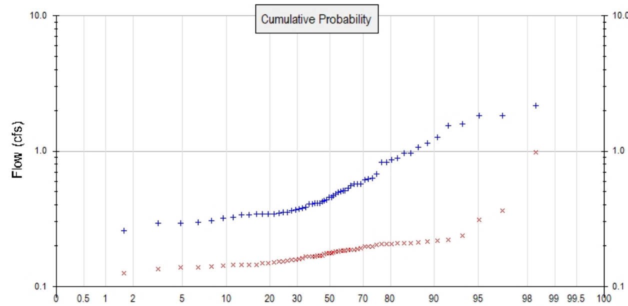
Vault Hydraulic Table

Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
0.0000	0.505	0.000	0.000	0.000
0.0778	0.505	0.039	0.033	0.000
0.1556	0.505	0.078	0.046	0.000
0.2333	0.505	0.117	0.057	0.000
0.3111	0.505	0.157	0.066	0.000
0.3889	0.505	0.196	0.074	0.000
0.4667	0.505	0.235	0.081	0.000
0.5444	0.505	0.275	0.087	0.000
0.6222	0.505	0.314	0.093	0.000
0.7000	0.505	0.353	0.099	0.000
0.7778	0.505	0.392	0.104	0.000
0.8556	0.505	0.432	0.110	0.000
0.9333	0.505	0.471	0.114	0.000
1.0111	0.505	0.510	0.119	0.000
1.0889	0.505	0.549	0.124	0.000
1.1667	0.505	0.589	0.128	0.000
1.2444	0.505	0.628	0.132	0.000
1.3222	0.505	0.667	0.136	0.000
1.4000	0.505	0.707	0.140	0.000
1.4778	0.505	0.746	0.144	0.000
1.5556	0.505	0.785	0.148	0.000
1.6333	0.505	0.824	0.152	0.000
1.7111	0.505	0.864	0.155	0.000
1.7889	0.505	0.903	0.159	0.000
1.8667	0.505	0.942	0.162	0.000
1.9444	0.505	0.982	0.165	0.000
2.0222	0.505	1.021	0.169	0.000
2.1000	0.505	1.060	0.172	0.000
2.1778	0.505	1.099	0.175	0.000
2.2556	0.505	1.139	0.178	0.000
2.3333	0.505	1.178	0.181	0.000
2.4111	0.505	1.217	0.184	0.000
2.4889	0.505	1.257	0.187	0.000
2.5667	0.505	1.296	0.190	0.000
2.6444	0.505	1.335	0.193	0.000
2.7222	0.505	1.374	0.196	0.000

2.8000	0.505	1.414	0.199	0.000
2.8778	0.505	1.453	0.201	0.000
2.9556	0.505	1.492	0.204	0.000
3.0333	0.505	1.532	0.207	0.000
3.1111	0.505	1.571	0.209	0.000
3.1889	0.505	1.610	0.212	0.000
3.2667	0.505	1.649	0.215	0.000
3.3444	0.505	1.689	0.217	0.000
3.4222	0.505	1.728	0.220	0.000
3.5000	0.505	1.767	0.222	0.000
3.5778	0.505	1.807	0.225	0.000
3.6556	0.505	1.846	0.227	0.000
3.7333	0.505	1.885	0.229	0.000
3.8111	0.505	1.924	0.232	0.000
3.8889	0.505	1.964	0.234	0.000
3.9667	0.505	2.003	0.236	0.000
4.0444	0.505	2.042	0.239	0.000
4.1222	0.505	2.081	0.241	0.000
4.2000	0.505	2.121	0.243	0.000
4.2778	0.505	2.160	0.246	0.000
4.3556	0.505	2.199	0.250	0.000
4.4333	0.505	2.239	0.256	0.000
4.5111	0.505	2.278	0.265	0.000
4.5889	0.505	2.317	0.274	0.000
4.6667	0.505	2.356	0.284	0.000
4.7444	0.505	2.396	0.295	0.000
4.8222	0.505	2.435	0.306	0.000
4.9000	0.505	2.474	0.317	0.000
4.9778	0.505	2.514	0.329	0.000
5.0556	0.505	2.553	0.341	0.000
5.1333	0.505	2.592	0.354	0.000
5.2111	0.505	2.631	0.366	0.000
5.2889	0.505	2.671	0.378	0.000
5.3667	0.505	2.710	0.393	0.000
5.4444	0.505	2.749	0.408	0.000
5.5222	0.505	2.789	0.423	0.000
5.6000	0.505	2.828	0.439	0.000
5.6778	0.505	2.867	0.511	0.000
5.7556	0.505	2.906	0.611	0.000
5.8333	0.505	2.946	0.651	0.000
5.9111	0.505	2.985	0.688	0.000
5.9889	0.505	3.024	0.725	0.000
6.0667	0.505	3.064	1.107	0.000
6.1444	0.505	3.103	1.916	0.000
6.2222	0.505	3.142	2.972	0.000
6.3000	0.505	3.181	4.199	0.000
6.3778	0.505	3.221	5.534	0.000
6.4556	0.505	3.260	6.912	0.000
6.5333	0.505	3.299	8.265	0.000
6.6111	0.505	3.338	9.531	0.000
6.6889	0.505	3.378	10.65	0.000
6.7667	0.505	3.417	11.58	0.000
6.8444	0.505	3.456	12.32	0.000
6.9222	0.505	3.496	12.88	0.000
7.0000	0.505	3.535	13.32	0.000
7.0778	0.505	3.574	13.95	0.000
7.1556	0.000	0.000	14.42	0.000

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 9.42
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 4.69
Total Impervious Area: 4.73

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.496379
5 year	0.80986
10 year	1.074486
25 year	1.483351
50 year	1.848418
100 year	2.271

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.174843
5 year	0.228005
10 year	0.267331
25 year	0.321888
50 year	0.366203
100 year	0.413796

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.535	0.157
1950	0.611	0.179
1951	0.426	0.156
1952	0.406	0.142
1953	0.366	0.138
1954	1.835	0.177
1955	0.618	0.204
1956	0.508	0.220
1957	0.681	0.206
1958	1.820	0.165

1959	0.453	0.182
1960	0.482	0.184
1961	2.177	0.192
1962	0.504	0.158
1963	0.824	0.149
1964	0.571	0.139
1965	0.355	0.183
1966	0.260	0.148
1967	0.510	0.157
1968	0.632	0.198
1969	1.580	0.161
1970	0.320	0.152
1971	0.572	0.209
1972	0.411	0.167
1973	0.345	0.168
1974	0.964	0.172
1975	0.434	0.145
1976	0.361	0.168
1977	0.323	0.144
1978	0.342	0.143
1979	0.971	0.166
1980	0.458	0.138
1981	0.339	0.150
1982	0.467	0.198
1983	0.828	0.153
1984	0.413	0.219
1985	0.567	0.205
1986	1.266	0.308
1987	0.552	0.237
1988	0.344	0.187
1989	0.427	0.125
1990	0.379	0.197
1991	0.408	0.185
1992	0.348	0.188
1993	0.345	0.135
1994	0.293	0.175
1995	0.413	0.213
1996	0.883	0.209
1997	1.546	0.976
1998	0.297	0.145
1999	0.336	0.181
2000	0.293	0.209
2001	0.132	0.119
2002	0.386	0.185
2003	0.305	0.168
2004	0.496	0.214
2005	0.373	0.176
2006	1.066	0.205
2007	0.864	0.183
2008	1.139	0.363
2009	0.353	0.167

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	2.1771	0.9759
2	1.8352	0.3633
3	1.8203	0.3084

4	1.5798	0.2374
5	1.5458	0.2198
6	1.2658	0.2188
7	1.1394	0.2135
8	1.0665	0.2127
9	0.9708	0.2093
10	0.9638	0.2090
11	0.8832	0.2086
12	0.8638	0.2063
13	0.8280	0.2050
14	0.8244	0.2045
15	0.6806	0.2036
16	0.6322	0.1979
17	0.6184	0.1978
18	0.6114	0.1973
19	0.5716	0.1918
20	0.5711	0.1882
21	0.5675	0.1869
22	0.5523	0.1852
23	0.5349	0.1852
24	0.5098	0.1836
25	0.5079	0.1831
26	0.5036	0.1826
27	0.4962	0.1817
28	0.4818	0.1813
29	0.4670	0.1790
30	0.4584	0.1773
31	0.4527	0.1761
32	0.4340	0.1749
33	0.4274	0.1723
34	0.4263	0.1682
35	0.4133	0.1682
36	0.4125	0.1679
37	0.4112	0.1670
38	0.4076	0.1668
39	0.4060	0.1664
40	0.3857	0.1652
41	0.3785	0.1608
42	0.3726	0.1584
43	0.3658	0.1574
44	0.3605	0.1566
45	0.3549	0.1555
46	0.3527	0.1532
47	0.3482	0.1523
48	0.3448	0.1504
49	0.3445	0.1487
50	0.3436	0.1476
51	0.3425	0.1452
52	0.3393	0.1450
53	0.3356	0.1444
54	0.3228	0.1434
55	0.3200	0.1417
56	0.3047	0.1393
57	0.2967	0.1380
58	0.2932	0.1378
59	0.2931	0.1353
60	0.2596	0.1254
61	0.1319	0.1190

DRAFT

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2482	11203	808	7	Pass
0.2644	9129	707	7	Pass
0.2805	7435	633	8	Pass
0.2967	5989	557	9	Pass
0.3128	4881	427	8	Pass
0.3290	3921	374	9	Pass
0.3452	3210	329	10	Pass
0.3613	2648	256	9	Pass
0.3775	2220	222	10	Pass
0.3937	1880	199	10	Pass
0.4098	1602	153	9	Pass
0.4260	1396	140	10	Pass
0.4422	1176	117	9	Pass
0.4583	1031	110	10	Pass
0.4745	898	100	11	Pass
0.4906	811	94	11	Pass
0.5068	722	84	11	Pass
0.5230	664	79	11	Pass
0.5391	608	75	12	Pass
0.5553	571	72	12	Pass
0.5715	527	68	12	Pass
0.5876	500	66	13	Pass
0.6038	473	63	13	Pass
0.6200	449	59	13	Pass
0.6361	430	53	12	Pass
0.6523	408	48	11	Pass
0.6685	380	44	11	Pass
0.6846	344	40	11	Pass
0.7008	329	32	9	Pass
0.7169	312	21	6	Pass
0.7331	300	19	6	Pass
0.7493	285	18	6	Pass
0.7654	275	18	6	Pass
0.7816	266	15	5	Pass
0.7978	255	14	5	Pass
0.8139	245	12	4	Pass
0.8301	236	11	4	Pass
0.8463	226	11	4	Pass
0.8624	213	8	3	Pass
0.8786	201	7	3	Pass
0.8947	192	5	2	Pass
0.9109	175	4	2	Pass
0.9271	166	4	2	Pass
0.9432	155	4	2	Pass
0.9594	145	2	1	Pass
0.9756	135	1	0	Pass
0.9917	123	0	0	Pass
1.0079	112	0	0	Pass
1.0241	98	0	0	Pass
1.0402	85	0	0	Pass
1.0564	77	0	0	Pass
1.0725	64	0	0	Pass
1.0887	55	0	0	Pass

1.1049	46	0	0	Pass
1.1210	32	0	0	Pass
1.1372	22	0	0	Pass
1.1534	18	0	0	Pass
1.1695	12	0	0	Pass
1.1857	11	0	0	Pass
1.2019	9	0	0	Pass
1.2180	9	0	0	Pass
1.2342	9	0	0	Pass
1.2504	9	0	0	Pass
1.2665	7	0	0	Pass
1.2827	7	0	0	Pass
1.2988	7	0	0	Pass
1.3150	7	0	0	Pass
1.3312	7	0	0	Pass
1.3473	7	0	0	Pass
1.3635	7	0	0	Pass
1.3797	6	0	0	Pass
1.3958	6	0	0	Pass
1.4120	6	0	0	Pass
1.4282	6	0	0	Pass
1.4443	6	0	0	Pass
1.4605	6	0	0	Pass
1.4766	6	0	0	Pass
1.4928	6	0	0	Pass
1.5090	6	0	0	Pass
1.5251	5	0	0	Pass
1.5413	5	0	0	Pass
1.5575	4	0	0	Pass
1.5736	4	0	0	Pass
1.5898	3	0	0	Pass
1.6060	3	0	0	Pass
1.6221	3	0	0	Pass
1.6383	3	0	0	Pass
1.6545	3	0	0	Pass
1.6706	3	0	0	Pass
1.6868	3	0	0	Pass
1.7029	3	0	0	Pass
1.7191	3	0	0	Pass
1.7353	3	0	0	Pass
1.7514	3	0	0	Pass
1.7676	3	0	0	Pass
1.7838	3	0	0	Pass
1.7999	3	0	0	Pass
1.8161	3	0	0	Pass
1.8323	2	0	0	Pass
1.8484	1	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Vault 1 POC	☐	1160.80			☐	0.00			
Total Volume Infiltrated		1160.80	0.00	0.00		0.00	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.

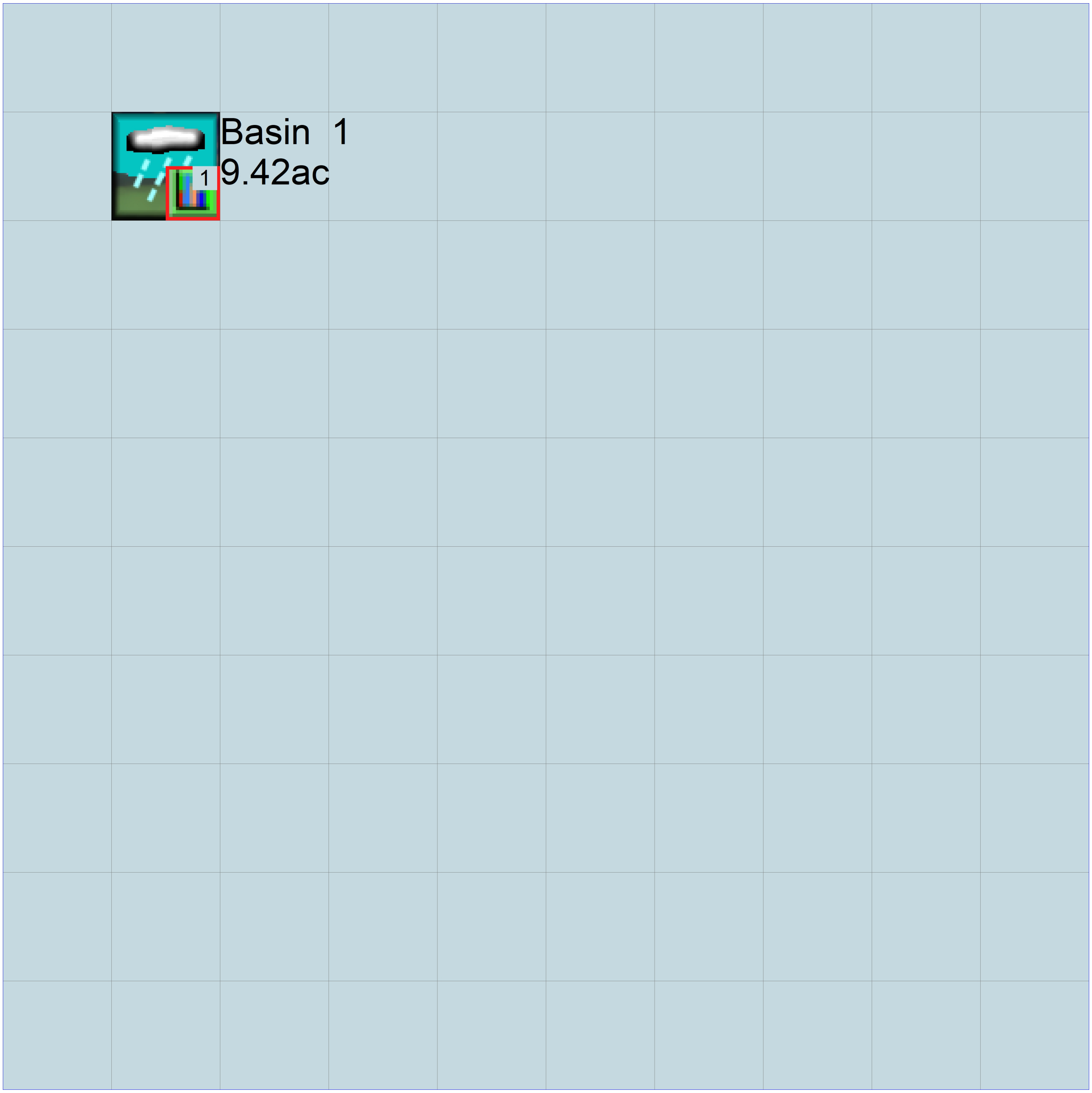
PERLND Changes

No PERLND changes have been made.

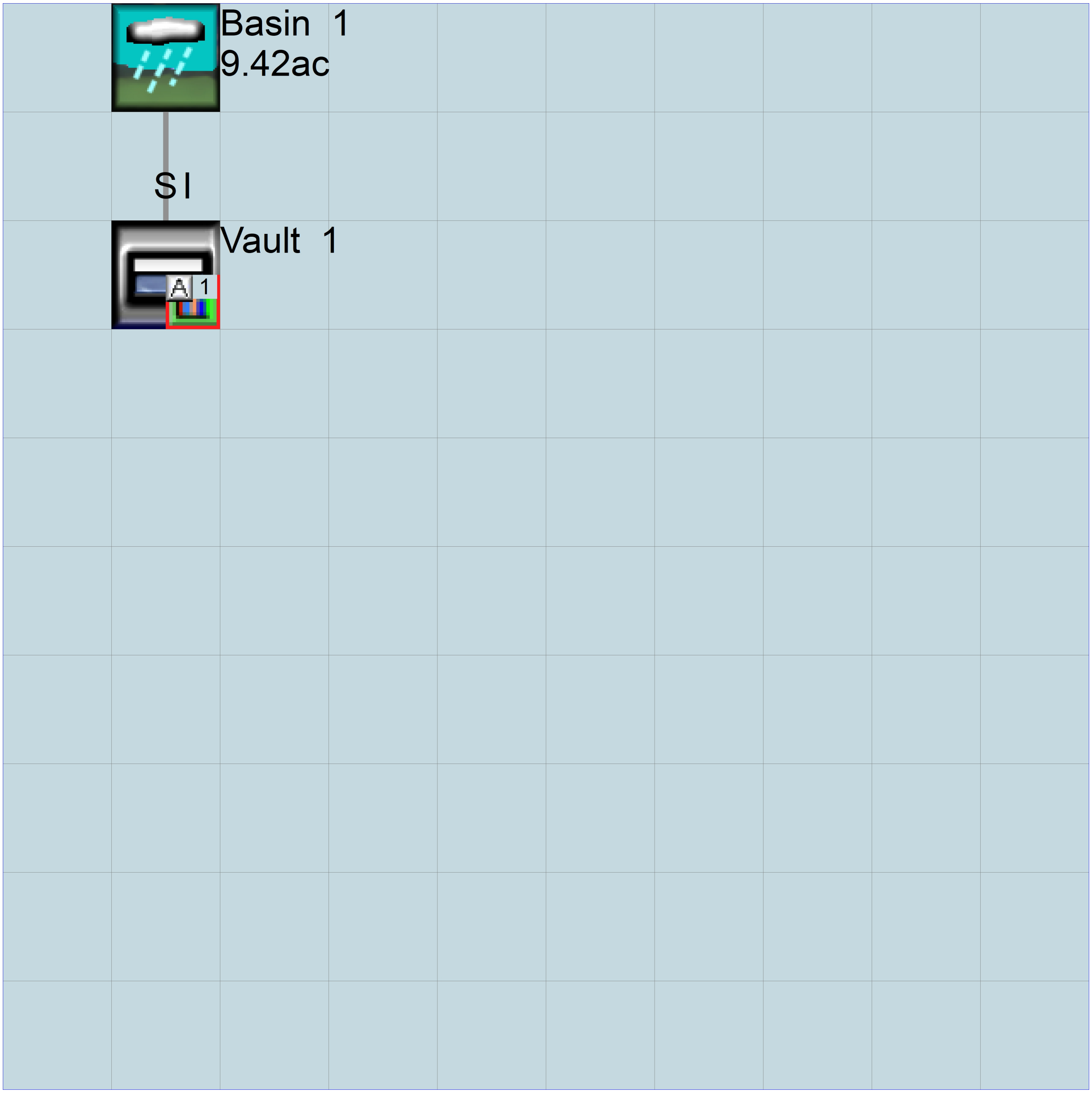
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                             ***
WDM        26   East Hill MR8 Basin 3B.wdm
MESSU      25   PreEast Hill MR8 Basin 3B.MES
           27   PreEast Hill MR8 Basin 3B.L61
           28   PreEast Hill MR8 Basin 3B.L62
           30   POCEast Hill MR8 Basin 3B1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      12
      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           ***
   12      C, Forest, Steep        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 ***
   12         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  *********
   12         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 ***
   12         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
   12             0        4.5      0.08       400      0.15       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   12             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                     ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   12            0.2       0.3      0.35         6       0.3       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
   12             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                   User  t-series Engl Metr ***
                                    in  out           ***
  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  12                        9.42     COPY   501     12
PERLND  12                        9.42     COPY   501     13

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

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



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                          in  out                            ***
  END GEN-INFO
  *** Section RCHRES***

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

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

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                             ***
WDM        26   East Hill MR8 Basin 3B.wdm
MESSU      25   MitEast Hill MR8 Basin 3B.MES
           27   MitEast Hill MR8 Basin 3B.L61
           28   MitEast Hill MR8 Basin 3B.L62
           30   POCEast Hill MR8 Basin 3B1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      14
      IMPLND       2
      IMPLND       4
      IMPLND       9
      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        Vault  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           ***
   14     C, Pasture, 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 ***
   14         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  *********
   14         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 ***
   14         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
   14              0       4.5      0.06       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   14              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                   ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   14           0.15       0.4       0.3         6       0.5       0.4
  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
   14              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    2      ROADS/MOD             1    1    1   27    0
    4      ROOF TOPS/FLAT        1    1    1   27    0
    9      SIDEWALKS/MOD         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
    4         0    0    1    0    0    0
    9         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   *********
    2         0    0    4    0    0    4    1    9
    4         0    0    4    0    0    0    1    9
    9         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI    ***
    2         0    0    0    0    0
    4         0    0    0    0    0
    9         0    0    0    0    0
```

```
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            400      0.05       0.1      0.08
    4            400      0.01       0.1       0.1
    9            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
    4              0         0
    9              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
    4              0         0
    9              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>    #  Tbl#   ***
Basin  1***
PERLND  14                        4.69     RCHRES    1     2
PERLND  14                        4.69     RCHRES    1     3
IMPLND   2                        1.36     RCHRES    1     5
IMPLND   4                        2.95     RCHRES    1     5
IMPLND   9                        0.42     RCHRES    1     5

******Routing******
PERLND  14                        4.69     COPY      1    12
IMPLND   2                        1.36     COPY      1    15
IMPLND   4                        2.95     COPY      1    15
IMPLND   9                        0.42     COPY      1    15
PERLND  14                        4.69     COPY      1    13
RCHRES   1                           1     COPY    501    16
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     Vault  1                1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

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

```
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

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

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                         ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  0  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      0.04       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  0.0  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    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.505051  0.000000  0.000000
  0.077778  0.505051  0.039282  0.033177
  0.155556  0.505051  0.078563  0.046919
  0.233333  0.505051  0.117845  0.057464
  0.311111  0.505051  0.157127  0.066354
  0.388889  0.505051  0.196409  0.074186
  0.466667  0.505051  0.235690  0.081267
  0.544444  0.505051  0.274972  0.087778
  0.622222  0.505051  0.314254  0.093839
  0.700000  0.505051  0.353535  0.099531
  0.777778  0.505051  0.392817  0.104915
  0.855556  0.505051  0.432099  0.110035
  0.933333  0.505051  0.471380  0.114928
  1.011111  0.505051  0.510662  0.119621
  1.088889  0.505051  0.549944  0.124137
  1.166667  0.505051  0.589226  0.128494
  1.244444  0.505051  0.628507  0.132708
  1.322222  0.505051  0.667789  0.136792
  1.400000  0.505051  0.707071  0.140758
  1.477778  0.505051  0.746352  0.144615
  1.555556  0.505051  0.785634  0.148372
  1.633333  0.505051  0.824916  0.152036
  1.711111  0.505051  0.864198  0.155614
  1.788889  0.505051  0.903479  0.159111
  1.866667  0.505051  0.942761  0.162533
  1.944444  0.505051  0.982043  0.165885
  2.022222  0.505051  1.021324  0.169170
  2.100000  0.505051  1.060606  0.172392
  2.177778  0.505051  1.099888  0.175556
  2.255556  0.505051  1.139169  0.178663
  2.333333  0.505051  1.178451  0.181718
  2.411111  0.505051  1.217733  0.184721
```

```
  2.488889  0.505051  1.257015  0.187677
  2.566667  0.505051  1.296296  0.190587
  2.644444  0.505051  1.335578  0.193453
  2.722222  0.505051  1.374860  0.196277
  2.800000  0.505051  1.414141  0.199062
  2.877778  0.505051  1.453423  0.201807
  2.955556  0.505051  1.492705  0.204516
  3.033333  0.505051  1.531987  0.207190
  3.111111  0.505051  1.571268  0.209829
  3.188889  0.505051  1.610550  0.212436
  3.266667  0.505051  1.649832  0.215011
  3.344444  0.505051  1.689113  0.217556
  3.422222  0.505051  1.728395  0.220071
  3.500000  0.505051  1.767677  0.222558
  3.577778  0.505051  1.806958  0.225017
  3.655556  0.505051  1.846240  0.227450
  3.733333  0.505051  1.885522  0.229856
  3.811111  0.505051  1.924804  0.232238
  3.888889  0.505051  1.964085  0.234596
  3.966667  0.505051  2.003367  0.236931
  4.044444  0.505051  2.042649  0.239242
  4.122222  0.505051  2.081930  0.241532
  4.200000  0.505051  2.121212  0.243800
  4.277778  0.505051  2.160494  0.246047
  4.355556  0.505051  2.199776  0.249998
  4.433333  0.505051  2.239057  0.256792
  4.511111  0.505051  2.278339  0.265043
  4.588889  0.505051  2.317621  0.274324
  4.666667  0.505051  2.356902  0.284393
  4.744444  0.505051  2.396184  0.295079
  4.822222  0.505051  2.435466  0.306253
  4.900000  0.505051  2.474747  0.317811
  4.977778  0.505051  2.514029  0.329665
  5.055556  0.505051  2.553311  0.341741
  5.133333  0.505051  2.592593  0.353971
  5.211111  0.505051  2.631874  0.366297
  5.288889  0.505051  2.671156  0.378664
  5.366667  0.505051  2.710438  0.392980
  5.444444  0.505051  2.749719  0.408041
  5.522222  0.505051  2.789001  0.423539
  5.600000  0.505051  2.828283  0.439462
  5.677778  0.505051  2.867565  0.511735
  5.755556  0.505051  2.906846  0.611562
  5.833333  0.505051  2.946128  0.651328
  5.911111  0.505051  2.985410  0.688806
  5.988889  0.505051  3.024691  0.724991
  6.066667  0.505051  3.063973  1.106959
  6.144444  0.505051  3.103255  1.916586
  6.222222  0.505051  3.142536  2.972058
  6.300000  0.505051  3.181818  4.199431
  6.377778  0.505051  3.221100  5.534588
  6.455556  0.505051  3.260382  6.912278
  6.533333  0.505051  3.299663  8.265870
  6.611111  0.505051  3.338945  9.531116
  6.688889  0.505051  3.378227  10.65215
  6.766667  0.505051  3.417508  11.58908
  6.844444  0.505051  3.456790  12.32677
  6.922222  0.505051  3.496072  12.88472
  7.000000  0.505051  3.535354  13.32785
  7.077778  0.505051  3.574635  13.95145
  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    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
```

```
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1004 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1005 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

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

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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

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

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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WWHM2012

PROJECT REPORT

VAULT D MODELING

General Model Information

WWHM2012 Project Name: East Hill Basin 5, 7, 8

Site Name:	
Site Address:	
City:	
Report Date:	4/11/2025
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.200
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
C, Forest, Steep	18.66
Pervious Total	18.66
Impervious Land Use	acre
Impervious Total	0
Basin Total	18.66

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	6.74
Pervious Total	6.74
Impervious Land Use	acre
ROADS MOD	4.28
ROOF TOPS FLAT	7.1
SIDEWALKS MOD	0.54
Impervious Total	11.92
Basin Total	18.66

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault 1

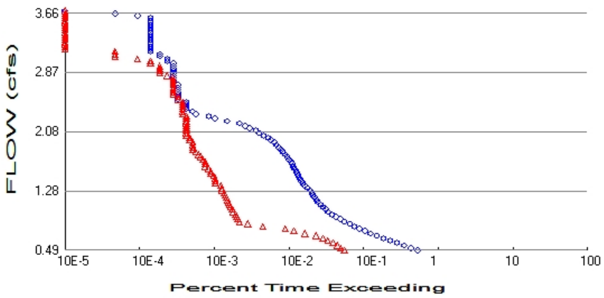
Width: 88 ft.
Length: 332 ft.
Depth: 11 ft.
Discharge Structure
Riser Height: 10 ft.
Riser Diameter: 18 in.
Orifice 2 Diameter: 2.500 in. Elevation:0 ft.
Orifice 3 Diameter: 2.250 in. Elevation:6 ft.
Element Flows To:
Outlet 1 Outlet 2

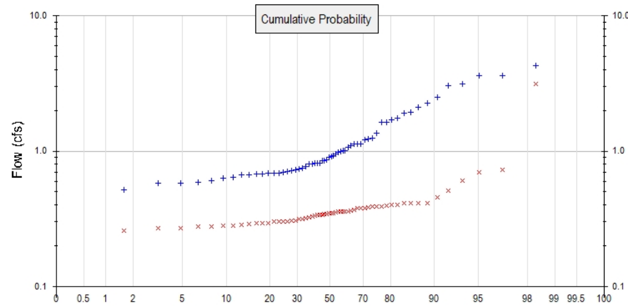
Vault Hydraulic Table

Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
0.0000	0.670	0.000	0.000	0.000
0.1222	0.670	0.082	0.059	0.000
0.2444	0.670	0.164	0.083	0.000
0.3667	0.670	0.245	0.102	0.000
0.4889	0.670	0.327	0.118	0.000
0.6111	0.670	0.409	0.132	0.000
0.7333	0.670	0.491	0.145	0.000
0.8556	0.670	0.573	0.156	0.000
0.9778	0.670	0.655	0.167	0.000
1.1000	0.670	0.737	0.177	0.000
1.2222	0.670	0.819	0.187	0.000
1.3444	0.670	0.901	0.196	0.000
1.4667	0.670	0.983	0.205	0.000
1.5889	0.670	1.065	0.213	0.000
1.7111	0.670	1.147	0.221	0.000
1.8333	0.670	1.229	0.229	0.000
1.9556	0.670	1.311	0.237	0.000
2.0778	0.670	1.393	0.244	0.000
2.2000	0.670	1.475	0.251	0.000
2.3222	0.670	1.557	0.258	0.000
2.4444	0.670	1.639	0.265	0.000
2.5667	0.670	1.721	0.271	0.000
2.6889	0.670	1.803	0.278	0.000
2.8111	0.670	1.885	0.284	0.000
2.9333	0.670	1.967	0.290	0.000
3.0556	0.670	2.049	0.296	0.000
3.1778	0.670	2.131	0.302	0.000
3.3000	0.670	2.213	0.308	0.000
3.4222	0.670	2.295	0.313	0.000
3.5444	0.670	2.377	0.319	0.000
3.6667	0.670	2.459	0.324	0.000
3.7889	0.670	2.541	0.330	0.000
3.9111	0.670	2.623	0.335	0.000
4.0333	0.670	2.705	0.340	0.000
4.1556	0.670	2.787	0.345	0.000
4.2778	0.670	2.869	0.350	0.000
4.4000	0.670	2.951	0.355	0.000
4.5222	0.670	3.033	0.360	0.000
4.6444	0.670	3.115	0.365	0.000

4.7667	0.670	3.197	0.370	0.000
4.8889	0.670	3.279	0.375	0.000
5.0111	0.670	3.361	0.379	0.000
5.1333	0.670	3.443	0.384	0.000
5.2556	0.670	3.524	0.388	0.000
5.3778	0.670	3.606	0.393	0.000
5.5000	0.670	3.688	0.397	0.000
5.6222	0.670	3.770	0.402	0.000
5.7444	0.670	3.852	0.406	0.000
5.8667	0.670	3.934	0.410	0.000
5.9889	0.670	4.016	0.415	0.000
6.1111	0.670	4.098	0.465	0.000
6.2333	0.670	4.180	0.489	0.000
6.3556	0.670	4.262	0.509	0.000
6.4778	0.670	4.344	0.526	0.000
6.6000	0.670	4.426	0.542	0.000
6.7222	0.670	4.508	0.556	0.000
6.8444	0.670	4.590	0.570	0.000
6.9667	0.670	4.672	0.582	0.000
7.0889	0.670	4.754	0.594	0.000
7.2111	0.670	4.836	0.606	0.000
7.3333	0.670	4.918	0.617	0.000
7.4556	0.670	5.000	0.628	0.000
7.5778	0.670	5.082	0.639	0.000
7.7000	0.670	5.164	0.649	0.000
7.8222	0.670	5.246	0.659	0.000
7.9444	0.670	5.328	0.669	0.000
8.0667	0.670	5.410	0.679	0.000
8.1889	0.670	5.492	0.688	0.000
8.3111	0.670	5.574	0.697	0.000
8.4333	0.670	5.656	0.706	0.000
8.5556	0.670	5.738	0.715	0.000
8.6778	0.670	5.820	0.724	0.000
8.8000	0.670	5.902	0.733	0.000
8.9222	0.670	5.984	0.741	0.000
9.0444	0.670	6.066	0.749	0.000
9.1667	0.670	6.148	0.758	0.000
9.2889	0.670	6.230	0.766	0.000
9.4111	0.670	6.312	0.774	0.000
9.5333	0.670	6.394	0.781	0.000
9.6556	0.670	6.476	0.789	0.000
9.7778	0.670	6.558	0.797	0.000
9.9000	0.670	6.640	0.805	0.000
10.022	0.670	6.722	0.865	0.000
10.144	0.670	6.804	1.688	0.000
10.267	0.670	6.885	2.951	0.000
10.389	0.670	6.967	4.344	0.000
10.511	0.670	7.049	5.579	0.000
10.633	0.670	7.131	6.441	0.000
10.756	0.670	7.213	7.015	0.000
10.878	0.670	7.295	7.502	0.000
11.000	0.670	7.377	7.956	0.000
11.122	0.670	7.459	8.383	0.000
11.244	0.000	0.000	8.788	0.000

Analysis Results
POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 18.66
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 6.74
Total Impervious Area: 11.92

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.983274
5 year	1.604246
10 year	2.128442
25 year	2.938358
50 year	3.661517
100 year	4.498606

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.351903
5 year	0.48147
10 year	0.577037
25 year	0.709393
50 year	0.816734
100 year	0.931843

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	1.060	0.315
1950	1.211	0.350
1951	0.844	0.302
1952	0.804	0.281
1953	0.725	0.277
1954	3.635	0.342
1955	1.225	0.399
1956	1.006	0.454
1957	1.348	0.392
1958	3.606	0.319

1959	0.897	0.349
1960	0.954	0.358
1961	4.313	0.381
1962	0.998	0.306
1963	1.633	0.301
1964	1.131	0.270
1965	0.703	0.356
1966	0.514	0.294
1967	1.010	0.304
1968	1.252	0.377
1969	3.129	0.317
1970	0.634	0.303
1971	1.132	0.414
1972	0.814	0.329
1973	0.682	0.340
1974	1.909	0.337
1975	0.860	0.280
1976	0.714	0.332
1977	0.640	0.295
1978	0.678	0.284
1979	1.923	0.322
1980	0.908	0.275
1981	0.672	0.294
1982	0.925	0.388
1983	1.640	0.300
1984	0.819	0.510
1985	1.124	0.397
1986	2.507	0.699
1987	1.094	0.602
1988	0.681	0.380
1989	0.847	0.260
1990	0.750	0.382
1991	0.807	0.358
1992	0.690	0.366
1993	0.683	0.271
1994	0.581	0.348
1995	0.817	0.410
1996	1.750	0.399
1997	3.062	3.153
1998	0.588	0.291
1999	0.665	0.360
2000	0.581	0.411
2001	0.261	0.238
2002	0.764	0.364
2003	0.604	0.339
2004	0.983	0.410
2005	0.738	0.347
2006	2.113	0.389
2007	1.711	0.359
2008	2.257	0.727
2009	0.699	0.341

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	4.3127	3.1527
2	3.6354	0.7267
3	3.6059	0.6985

4	3.1294	0.6025
5	3.0620	0.5101
6	2.5073	0.4536
7	2.2569	0.4143
8	2.1125	0.4107
9	1.9231	0.4103
10	1.9093	0.4102
11	1.7495	0.3995
12	1.7111	0.3990
13	1.6402	0.3969
14	1.6330	0.3916
15	1.3482	0.3887
16	1.2524	0.3878
17	1.2251	0.3823
18	1.2112	0.3812
19	1.1322	0.3797
20	1.1312	0.3767
21	1.1241	0.3662
22	1.0941	0.3637
23	1.0595	0.3598
24	1.0098	0.3593
25	1.0061	0.3580
26	0.9976	0.3575
27	0.9828	0.3556
28	0.9544	0.3502
29	0.9251	0.3487
30	0.9081	0.3482
31	0.8968	0.3473
32	0.8598	0.3416
33	0.8467	0.3409
34	0.8444	0.3397
35	0.8186	0.3394
36	0.8171	0.3370
37	0.8145	0.3320
38	0.8074	0.3291
39	0.8043	0.3223
40	0.7641	0.3191
41	0.7498	0.3166
42	0.7381	0.3147
43	0.7245	0.3062
44	0.7141	0.3040
45	0.7030	0.3028
46	0.6987	0.3015
47	0.6898	0.3011
48	0.6830	0.3005
49	0.6824	0.2950
50	0.6806	0.2941
51	0.6785	0.2936
52	0.6720	0.2906
53	0.6649	0.2838
54	0.6395	0.2812
55	0.6340	0.2801
56	0.6035	0.2769
57	0.5877	0.2752
58	0.5808	0.2706
59	0.5806	0.2702
60	0.5142	0.2596
61	0.2613	0.2378

Duration Flows
The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.4916	11227	1174	10	Pass
0.5237	9127	1051	11	Pass
0.5557	7418	950	12	Pass
0.5877	5959	833	13	Pass
0.6197	4849	708	14	Pass
0.6517	3931	612	15	Pass
0.6838	3217	493	15	Pass
0.7158	2650	351	13	Pass
0.7478	2216	249	11	Pass
0.7798	1874	190	10	Pass
0.8118	1600	95	5	Pass
0.8438	1390	60	4	Pass
0.8759	1179	46	3	Pass
0.9079	1031	44	4	Pass
0.9399	898	42	4	Pass
0.9719	808	41	5	Pass
1.0039	719	38	5	Pass
1.0360	663	37	5	Pass
1.0680	609	35	5	Pass
1.1000	572	34	5	Pass
1.1320	526	33	6	Pass
1.1640	499	32	6	Pass
1.1961	472	31	6	Pass
1.2281	448	30	6	Pass
1.2601	430	29	6	Pass
1.2921	408	27	6	Pass
1.3241	379	27	7	Pass
1.3561	343	26	7	Pass
1.3882	329	22	6	Pass
1.4202	312	22	7	Pass
1.4522	300	22	7	Pass
1.4842	285	21	7	Pass
1.5162	275	19	6	Pass
1.5483	265	19	7	Pass
1.5803	255	18	7	Pass
1.6123	244	16	6	Pass
1.6443	236	16	6	Pass
1.6763	226	16	7	Pass
1.7084	213	15	7	Pass
1.7404	201	14	6	Pass
1.7724	191	13	6	Pass
1.8044	175	12	6	Pass
1.8364	166	11	6	Pass
1.8685	155	11	7	Pass
1.9005	145	11	7	Pass
1.9325	135	11	8	Pass
1.9645	122	10	8	Pass
1.9965	112	10	8	Pass
2.0285	98	9	9	Pass
2.0606	85	9	10	Pass
2.0926	77	9	11	Pass
2.1246	64	9	14	Pass
2.1566	55	9	16	Pass

2.1886	46	9	19	Pass
2.2207	32	9	28	Pass
2.2527	22	9	40	Pass
2.2847	18	9	50	Pass
2.3167	12	8	66	Pass
2.3487	11	8	72	Pass
2.3808	9	8	88	Pass
2.4128	9	8	88	Pass
2.4448	9	8	88	Pass
2.4768	9	8	88	Pass
2.5088	7	7	100	Pass
2.5409	7	7	100	Pass
2.5729	7	6	85	Pass
2.6049	7	6	85	Pass
2.6369	7	6	85	Pass
2.6689	7	6	85	Pass
2.7009	7	6	85	Pass
2.7330	6	6	100	Pass
2.7650	6	6	100	Pass
2.7970	6	6	100	Pass
2.8290	6	5	83	Pass
2.8610	6	4	66	Pass
2.8931	6	4	66	Pass
2.9251	6	4	66	Pass
2.9571	6	4	66	Pass
2.9891	6	3	50	Pass
3.0211	5	3	60	Pass
3.0532	5	2	40	Pass
3.0852	4	1	25	Pass
3.1172	4	1	25	Pass
3.1492	3	1	33	Pass
3.1812	3	0	0	Pass
3.2133	3	0	0	Pass
3.2453	3	0	0	Pass
3.2773	3	0	0	Pass
3.3093	3	0	0	Pass
3.3413	3	0	0	Pass
3.3733	3	0	0	Pass
3.4054	3	0	0	Pass
3.4374	3	0	0	Pass
3.4694	3	0	0	Pass
3.5014	3	0	0	Pass
3.5334	3	0	0	Pass
3.5655	3	0	0	Pass
3.5975	3	0	0	Pass
3.6295	2	0	0	Pass
3.6615	1	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Vault 1 POC	☐	2577.42			☐	0.00			
Total Volume Infiltrated		2577.42	0.00	0.00		0.00	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.

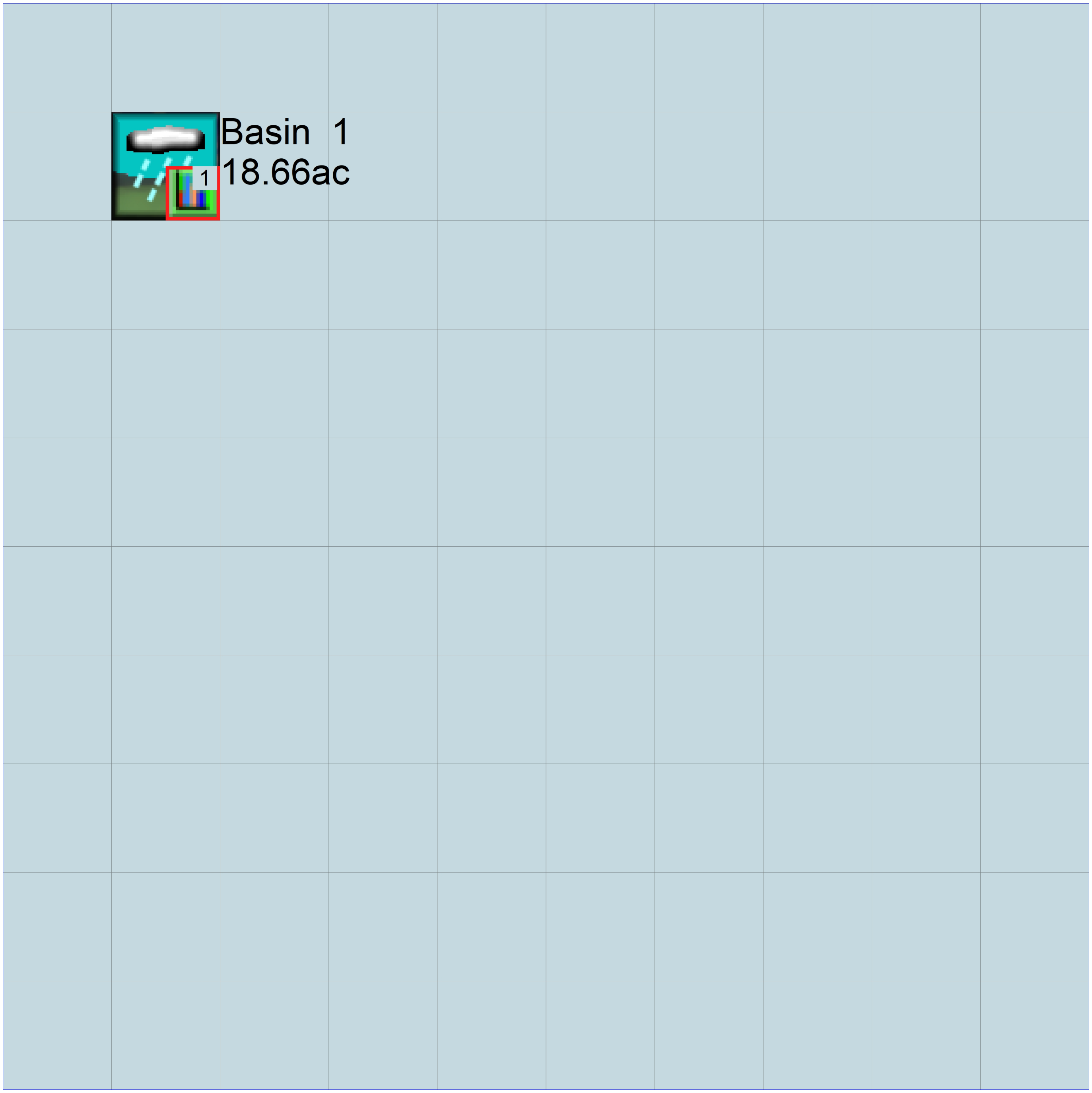
PERLND Changes

No PERLND changes have been made.

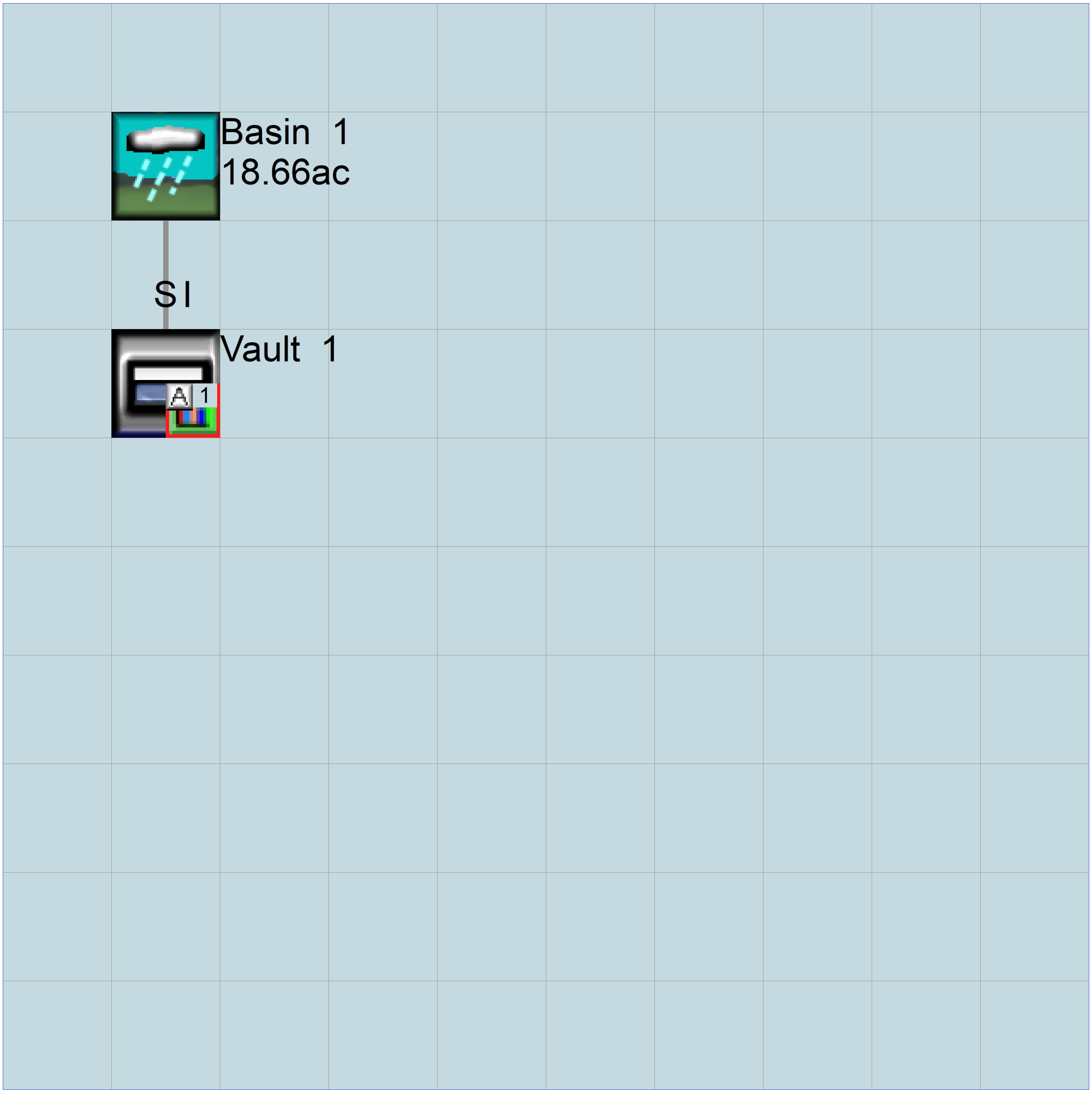
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   East Hill Basin 5, 7, 8.wdm
MESSU      25   PreEast Hill Basin 5, 7, 8.MES
           27   PreEast Hill Basin 5, 7, 8.L61
           28   PreEast Hill Basin 5, 7, 8.L62
           30   POCEast Hill Basin 5, 7, 81.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      12
      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           ***
   12     C, Forest, Steep        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 ***
   12         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  *********
   12         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 ***
   12         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
   12             0       4.5      0.08       400      0.15       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   12             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   12           0.2       0.3      0.35         6       0.3       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
   12             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
  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  12                       18.66     COPY   501     12
PERLND  12                       18.66     COPY   501     13

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

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



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
```

```
WDM       1 EVAP      ENGL     0.76             PERLND   1 999 EXTNL  PETINP
WDM       1 EVAP      ENGL     0.76             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

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

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                             ***
WDM        26   East Hill Basin 5, 7, 8.wdm
MESSU      25   MitEast Hill Basin 5, 7, 8.MES
           27   MitEast Hill Basin 5, 7, 8.L61
           28   MitEast Hill Basin 5, 7, 8.L62
           30   POCEast Hill Basin 5, 7, 81.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      14
      IMPLND       2
      IMPLND       4
      IMPLND       9
      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         Vault  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             ***
   14     C, Pasture, 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 ***
   14         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  *********
   14         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 ***
   14         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
   14              0       4.5      0.06       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   14              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   14           0.15       0.4       0.3         6       0.5       0.4
  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
   14              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                       in  out           ***
    2      ROADS/MOD              1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
    9      SIDEWALKS/MOD          1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
    4         0    0    1    0    0    0
    9         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   *********
    2         0    0    4    0    0    4    1    9
    4         0    0    4    0    0    0    1    9
    9         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI    ***
    2         0    0    0    0    0
    4         0    0    0    0    0
    9         0    0    0    0    0
```

```
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            400      0.05       0.1      0.08
    4            400      0.01       0.1       0.1
    9            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
    4              0         0
    9              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
    4              0         0
    9              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  14                        6.74     RCHRES   1      2
PERLND  14                        6.74     RCHRES   1      3
IMPLND   2                        4.28     RCHRES   1      5
IMPLND   4                         7.1     RCHRES   1      5
IMPLND   9                        0.54     RCHRES   1      5

******Routing******
PERLND  14                        6.74     COPY     1     12
IMPLND   2                        4.28     COPY     1     15
IMPLND   4                         7.1     COPY     1     15
IMPLND   9                        0.54     COPY     1     15
PERLND  14                        6.74     COPY     1     13
RCHRES   1                           1     COPY   501     16
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     Vault  1                1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

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

```
  1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

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

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                       ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *     *  *  *  *  *       *  *  *  *  *       ***
    1        0  1  0  0     4  0  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      0.06       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  0.0  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    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)    (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.670707  0.000000  0.000000
  0.122222  0.670707  0.081975  0.059294
  0.244444  0.670707  0.163951  0.083855
  0.366667  0.670707  0.245926  0.102701
  0.488889  0.670707  0.327901  0.118589
  0.611111  0.670707  0.409877  0.132586
  0.733333  0.670707  0.491852  0.145241
  0.855556  0.670707  0.573827  0.156878
  0.977778  0.670707  0.655802  0.167710
  1.100000  0.670707  0.737778  0.177883
  1.222222  0.670707  0.819753  0.187505
  1.344444  0.670707  0.901728  0.196657
  1.466667  0.670707  0.983704  0.205402
  1.588889  0.670707  1.065679  0.213789
  1.711111  0.670707  1.147654  0.221859
  1.833333  0.670707  1.229630  0.229646
  1.955556  0.670707  1.311605  0.237178
  2.077778  0.670707  1.393580  0.244477
  2.200000  0.670707  1.475556  0.251565
  2.322222  0.670707  1.557531  0.258458
  2.444444  0.670707  1.639506  0.265173
  2.566667  0.670707  1.721481  0.271721
  2.688889  0.670707  1.803457  0.278115
  2.811111  0.670707  1.885432  0.284366
  2.933333  0.670707  1.967407  0.290482
  3.055556  0.670707  2.049383  0.296472
  3.177778  0.670707  2.131358  0.302343
  3.300000  0.670707  2.213333  0.308103
  3.422222  0.670707  2.295309  0.313757
  3.544444  0.670707  2.377284  0.319310
  3.666667  0.670707  2.459259  0.324769
  3.788889  0.670707  2.541235  0.330137
```

```
  3.911111  0.670707  2.623210  0.335420
  4.033333  0.670707  2.705185  0.340621
  4.155556  0.670707  2.787160  0.345743
  4.277778  0.670707  2.869136  0.350791
  4.400000  0.670707  2.951111  0.355767
  4.522222  0.670707  3.033086  0.360674
  4.644444  0.670707  3.115062  0.365515
  4.766667  0.670707  3.197037  0.370294
  4.888889  0.670707  3.279012  0.375011
  5.011111  0.670707  3.360988  0.379670
  5.133333  0.670707  3.442963  0.384272
  5.255556  0.670707  3.524938  0.388820
  5.377778  0.670707  3.606914  0.393315
  5.500000  0.670707  3.688889  0.397759
  5.622222  0.670707  3.770864  0.402154
  5.744444  0.670707  3.852840  0.406502
  5.866667  0.670707  3.934815  0.410804
  5.988889  0.670707  4.016790  0.415061
  6.111111  0.670707  4.098765  0.465068
  6.233333  0.670707  4.180741  0.489808
  6.355556  0.670707  4.262716  0.509496
  6.477778  0.670707  4.344691  0.526629
  6.600000  0.670707  4.426667  0.542137
  6.722222  0.670707  4.508642  0.556490
  6.844444  0.670707  4.590617  0.569962
  6.966667  0.670707  4.672593  0.582734
  7.088889  0.670707  4.754568  0.594929
  7.211111  0.670707  4.836543  0.606637
  7.333333  0.670707  4.918519  0.617925
  7.455556  0.670707  5.000494  0.628848
  7.577778  0.670707  5.082469  0.639447
  7.700000  0.670707  5.164444  0.649757
  7.822222  0.670707  5.246420  0.659804
  7.944444  0.670707  5.328395  0.669614
  8.066667  0.670707  5.410370  0.679206
  8.188889  0.670707  5.492346  0.688598
  8.311111  0.670707  5.574321  0.697804
  8.433333  0.670707  5.656296  0.706838
  8.555556  0.670707  5.738272  0.715710
  8.677778  0.670707  5.820247  0.724431
  8.800000  0.670707  5.902222  0.733011
  8.922222  0.670707  5.984198  0.741456
  9.044444  0.670707  6.066173  0.749775
  9.166667  0.670707  6.148148  0.757974
  9.288889  0.670707  6.230123  0.766060
  9.411111  0.670707  6.312099  0.774036
  9.533333  0.670707  6.394074  0.781910
  9.655556  0.670707  6.476049  0.789684
  9.777778  0.670707  6.558025  0.797364
  9.900000  0.670707  6.640000  0.804954
  10.02222  0.670707  6.721975  0.865193
  10.14444  0.670707  6.803951  1.688866
  10.26667  0.670707  6.885926  2.951037
  10.38889  0.670707  6.967901  4.344395
  10.51111  0.670707  7.049877  5.579053
  10.63333  0.670707  7.131852  6.441111
  10.75556  0.670707  7.213827  7.015742
  10.87778  0.670707  7.295802  7.502280
  11.00000  0.670707  7.377778  7.956375
  11.12222  0.670707  7.459753  8.383816
  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    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
```

```
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

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

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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

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

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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WWHM2012

PROJECT REPORT

POND A MODELING

General Model Information

WWHM2012 Project Name: East Hill Basin 4 Pond

Site Name:	
Site Address:	
City:	
Report Date:	4/10/2025
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	0.000 (adjusted)
Version Date:	2024/06/28
Version:	4.3.1

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 4

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	2.51
Pervious Total	2.51
Impervious Land Use	acre
Impervious Total	0
Basin Total	2.51

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
POC 1	POC 1	POC 1

Mitigated Land Use

Basin 4

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	1.12
Pervious Total	1.12
Impervious Land Use	acre
ROADS FLAT	0.27
ROOF TOPS FLAT	0.86
DRIVEWAYS FLAT	0.16
SIDEWALKS FLAT	0.1
Impervious Total	1.39
Basin Total	2.51

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
Trapezoidal Pond 1	Trapezoidal Pond 1	Trapezoidal Pond 1

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	100.00 ft.
Bottom Width:	50.00 ft.
Depth:	6 ft.
Volume at riser head:	0.8666 acre-feet.
Side slope 1:	3 To 1
Side slope 2:	3 To 1
Side slope 3:	3 To 1
Side slope 4:	3 To 1
Discharge Structure	
Riser Height:	5 ft.
Riser Diameter:	18 in.
Orifice 1 Diameter:	1.031 in. Elevation:0 ft.
Orifice 2 Diameter:	2.000 in. Elevation:3.5 ft.
Orifice 3 Diameter:	2.000 in. Elevation:4.5 ft.
Element Outlets:	
Outlet 1	Outlet 2
Outlet Flows To:	

Pond Hydraulic Table

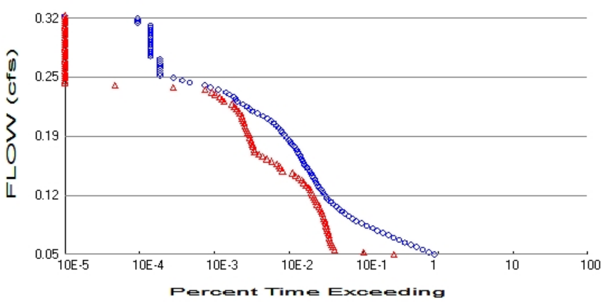
Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
433.00	0.114	0.000	0.000	0.000
433.07	0.116	0.007	0.007	0.000
433.13	0.117	0.015	0.010	0.000
433.20	0.118	0.023	0.012	0.000
433.27	0.120	0.031	0.014	0.000
433.33	0.121	0.039	0.016	0.000
433.40	0.123	0.047	0.018	0.000
433.47	0.124	0.055	0.019	0.000
433.53	0.126	0.064	0.021	0.000
433.60	0.127	0.072	0.022	0.000
433.67	0.128	0.081	0.023	0.000
433.73	0.130	0.089	0.024	0.000
433.80	0.131	0.098	0.025	0.000
433.87	0.133	0.107	0.026	0.000
433.93	0.134	0.116	0.027	0.000
434.00	0.136	0.125	0.028	0.000
434.07	0.137	0.134	0.029	0.000
434.13	0.139	0.143	0.030	0.000
434.20	0.140	0.153	0.031	0.000
434.27	0.142	0.162	0.032	0.000
434.33	0.143	0.172	0.033	0.000
434.40	0.145	0.181	0.034	0.000
434.47	0.146	0.191	0.035	0.000
434.53	0.148	0.201	0.035	0.000
434.60	0.150	0.211	0.036	0.000
434.67	0.151	0.221	0.037	0.000
434.73	0.153	0.231	0.038	0.000
434.80	0.154	0.241	0.038	0.000
434.87	0.156	0.252	0.039	0.000
434.93	0.157	0.262	0.040	0.000
435.00	0.159	0.273	0.040	0.000
435.07	0.161	0.283	0.041	0.000

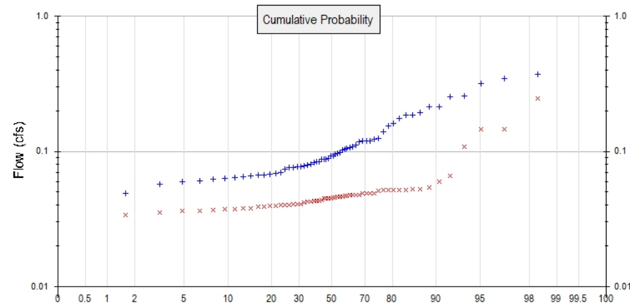
435.13	0.162	0.294	0.042	0.000
435.20	0.164	0.305	0.042	0.000
435.27	0.165	0.316	0.043	0.000
435.33	0.167	0.327	0.044	0.000
435.40	0.169	0.338	0.044	0.000
435.47	0.170	0.350	0.045	0.000
435.53	0.172	0.361	0.045	0.000
435.60	0.174	0.373	0.046	0.000
435.67	0.175	0.384	0.047	0.000
435.73	0.177	0.396	0.047	0.000
435.80	0.179	0.408	0.048	0.000
435.87	0.180	0.420	0.048	0.000
435.93	0.182	0.432	0.049	0.000
436.00	0.184	0.444	0.050	0.000
436.07	0.185	0.457	0.050	0.000
436.13	0.187	0.469	0.051	0.000
436.20	0.189	0.482	0.051	0.000
436.27	0.191	0.494	0.052	0.000
436.33	0.192	0.507	0.052	0.000
436.40	0.194	0.520	0.053	0.000
436.47	0.196	0.533	0.053	0.000
436.53	0.198	0.546	0.074	0.000
436.60	0.199	0.560	0.089	0.000
436.67	0.201	0.573	0.099	0.000
436.73	0.203	0.586	0.108	0.000
436.80	0.205	0.600	0.115	0.000
436.87	0.207	0.614	0.122	0.000
436.93	0.208	0.628	0.128	0.000
437.00	0.210	0.642	0.134	0.000
437.07	0.212	0.656	0.139	0.000
437.13	0.214	0.670	0.145	0.000
437.20	0.216	0.684	0.150	0.000
437.27	0.218	0.699	0.154	0.000
437.33	0.219	0.713	0.159	0.000
437.40	0.221	0.728	0.163	0.000
437.47	0.223	0.743	0.167	0.000
437.53	0.225	0.758	0.191	0.000
437.60	0.227	0.773	0.210	0.000
437.67	0.229	0.788	0.223	0.000
437.73	0.231	0.804	0.235	0.000
437.80	0.233	0.819	0.246	0.000
437.87	0.234	0.835	0.256	0.000
437.93	0.236	0.850	0.265	0.000
438.00	0.238	0.866	0.274	0.000
438.07	0.240	0.882	0.556	0.000
438.13	0.242	0.898	1.062	0.000
438.20	0.244	0.915	1.702	0.000
438.27	0.246	0.931	2.429	0.000
438.33	0.248	0.947	3.195	0.000
438.40	0.250	0.964	3.951	0.000
438.47	0.252	0.981	4.652	0.000
438.53	0.254	0.998	5.257	0.000
438.60	0.256	1.015	5.740	0.000
438.67	0.258	1.032	6.100	0.000
438.73	0.260	1.049	6.365	0.000
438.80	0.262	1.067	6.696	0.000
438.87	0.264	1.084	6.961	0.000
438.93	0.266	1.102	7.215	0.000

439.00	0.268	1.120	7.461	0.000
439.07	0.270	1.138	7.699	0.000

Analysis Results

POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area:	2.51
Total Impervious Area:	0

Mitigated Landuse Totals for POC #1

Total Pervious Area:	1.12
Total Impervious Area:	1.39

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.098177
5 year	0.154241
10 year	0.199241
25 year	0.265849
50 year	0.32306
100 year	0.387222

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.045751
5 year	0.062913
10 year	0.076413
25 year	0.096117
50 year	0.112866
100 year	0.131528

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.105	0.040
1950	0.109	0.046
1951	0.096	0.041
1952	0.077	0.038
1953	0.062	0.036
1954	0.374	0.045
1955	0.119	0.052
1956	0.107	0.066
1957	0.141	0.051
1958	0.120	0.043

1959	0.098	0.046
1960	0.092	0.046
1961	0.186	0.049
1962	0.093	0.040
1963	0.154	0.040
1964	0.124	0.036
1965	0.082	0.047
1966	0.049	0.039
1967	0.095	0.041
1968	0.112	0.049
1969	0.347	0.042
1970	0.067	0.040
1971	0.122	0.054
1972	0.077	0.043
1973	0.074	0.045
1974	0.194	0.045
1975	0.076	0.038
1976	0.080	0.043
1977	0.057	0.037
1978	0.068	0.038
1979	0.215	0.042
1980	0.102	0.037
1981	0.067	0.039
1982	0.083	0.049
1983	0.175	0.040
1984	0.088	0.060
1985	0.119	0.051
1986	0.255	0.146
1987	0.117	0.108
1988	0.064	0.047
1989	0.080	0.034
1990	0.084	0.049
1991	0.088	0.047
1992	0.068	0.048
1993	0.063	0.035
1994	0.061	0.045
1995	0.089	0.052
1996	0.161	0.052
1997	0.317	0.246
1998	0.060	0.039
1999	0.078	0.046
2000	0.065	0.052
2001	0.023	0.032
2002	0.087	0.048
2003	0.066	0.043
2004	0.104	0.052
2005	0.076	0.045
2006	0.253	0.052
2007	0.186	0.047
2008	0.213	0.146
2009	0.070	0.044

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.3735	0.2455
2	0.3469	0.1464
3	0.3169	0.1456

4	0.2554	0.1077
5	0.2529	0.0662
6	0.2150	0.0596
7	0.2126	0.0536
8	0.1936	0.0523
9	0.1859	0.0522
10	0.1856	0.0517
11	0.1746	0.0517
12	0.1610	0.0515
13	0.1535	0.0515
14	0.1405	0.0515
15	0.1241	0.0507
16	0.1225	0.0492
17	0.1203	0.0491
18	0.1191	0.0488
19	0.1189	0.0487
20	0.1171	0.0478
21	0.1116	0.0477
22	0.1086	0.0474
23	0.1066	0.0474
24	0.1054	0.0470
25	0.1044	0.0469
26	0.1017	0.0465
27	0.0984	0.0464
28	0.0962	0.0461
29	0.0949	0.0458
30	0.0927	0.0452
31	0.0924	0.0451
32	0.0887	0.0449
33	0.0876	0.0448
34	0.0875	0.0448
35	0.0869	0.0438
36	0.0843	0.0432
37	0.0834	0.0431
38	0.0820	0.0429
39	0.0801	0.0426
40	0.0796	0.0423
41	0.0776	0.0418
42	0.0770	0.0409
43	0.0768	0.0408
44	0.0761	0.0404
45	0.0759	0.0402
46	0.0740	0.0400
47	0.0699	0.0399
48	0.0682	0.0396
49	0.0681	0.0393
50	0.0668	0.0389
51	0.0667	0.0387
52	0.0662	0.0378
53	0.0648	0.0378
54	0.0641	0.0375
55	0.0633	0.0374
56	0.0623	0.0368
57	0.0606	0.0364
58	0.0595	0.0361
59	0.0574	0.0353
60	0.0486	0.0338
61	0.0233	0.0317

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0491	18985	5461	28	Pass
0.0519	15847	2128	13	Pass
0.0546	13216	868	6	Pass
0.0574	10996	836	7	Pass
0.0602	9148	801	8	Pass
0.0629	7614	777	10	Pass
0.0657	6361	758	11	Pass
0.0685	5369	741	13	Pass
0.0712	4622	729	15	Pass
0.0740	3886	714	18	Pass
0.0768	3283	701	21	Pass
0.0795	2836	687	24	Pass
0.0823	2344	674	28	Pass
0.0851	1991	661	33	Pass
0.0878	1705	648	38	Pass
0.0906	1525	633	41	Pass
0.0934	1352	617	45	Pass
0.0961	1207	599	49	Pass
0.0989	1101	584	53	Pass
0.1017	1003	564	56	Pass
0.1044	918	545	59	Pass
0.1072	851	512	60	Pass
0.1100	780	492	63	Pass
0.1127	714	479	67	Pass
0.1155	674	463	68	Pass
0.1183	644	447	69	Pass
0.1210	608	432	71	Pass
0.1238	579	414	71	Pass
0.1266	545	393	72	Pass
0.1293	522	359	68	Pass
0.1321	498	336	67	Pass
0.1349	477	315	66	Pass
0.1376	455	290	63	Pass
0.1404	435	261	60	Pass
0.1432	420	237	56	Pass
0.1459	401	176	43	Pass
0.1487	376	165	43	Pass
0.1515	359	159	44	Pass
0.1542	340	147	43	Pass
0.1570	329	126	38	Pass
0.1598	317	108	34	Pass
0.1626	305	94	30	Pass
0.1653	290	84	28	Pass
0.1681	281	74	26	Pass
0.1709	270	73	27	Pass
0.1736	251	70	27	Pass
0.1764	234	69	29	Pass
0.1792	223	68	30	Pass
0.1819	215	66	30	Pass
0.1847	199	64	32	Pass
0.1875	184	63	34	Pass
0.1902	172	60	34	Pass
0.1930	166	59	35	Pass

0.1958	157	57	36	Pass
0.1985	144	55	38	Pass
0.2013	134	54	40	Pass
0.2041	123	52	42	Pass
0.2068	110	51	46	Pass
0.2096	97	50	51	Pass
0.2124	81	47	58	Pass
0.2151	69	45	65	Pass
0.2179	63	42	66	Pass
0.2207	58	40	68	Pass
0.2234	52	37	71	Pass
0.2262	43	29	67	Pass
0.2290	41	27	65	Pass
0.2317	39	25	64	Pass
0.2345	34	22	64	Pass
0.2373	31	20	64	Pass
0.2400	24	16	66	Pass
0.2428	19	6	31	Pass
0.2456	16	1	6	Pass
0.2483	10	0	0	Pass
0.2511	8	0	0	Pass
0.2539	6	0	0	Pass
0.2566	4	0	0	Pass
0.2594	4	0	0	Pass
0.2622	4	0	0	Pass
0.2649	4	0	0	Pass
0.2677	4	0	0	Pass
0.2705	4	0	0	Pass
0.2732	4	0	0	Pass
0.2760	4	0	0	Pass
0.2788	3	0	0	Pass
0.2815	3	0	0	Pass
0.2843	3	0	0	Pass
0.2871	3	0	0	Pass
0.2899	3	0	0	Pass
0.2926	3	0	0	Pass
0.2954	3	0	0	Pass
0.2982	3	0	0	Pass
0.3009	3	0	0	Pass
0.3037	3	0	0	Pass
0.3065	3	0	0	Pass
0.3092	3	0	0	Pass
0.3120	3	0	0	Pass
0.3148	3	0	0	Pass
0.3175	2	0	0	Pass
0.3203	2	0	0	Pass
0.3231	2	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

Model Default Modifications

Total of 0 changes have been made.

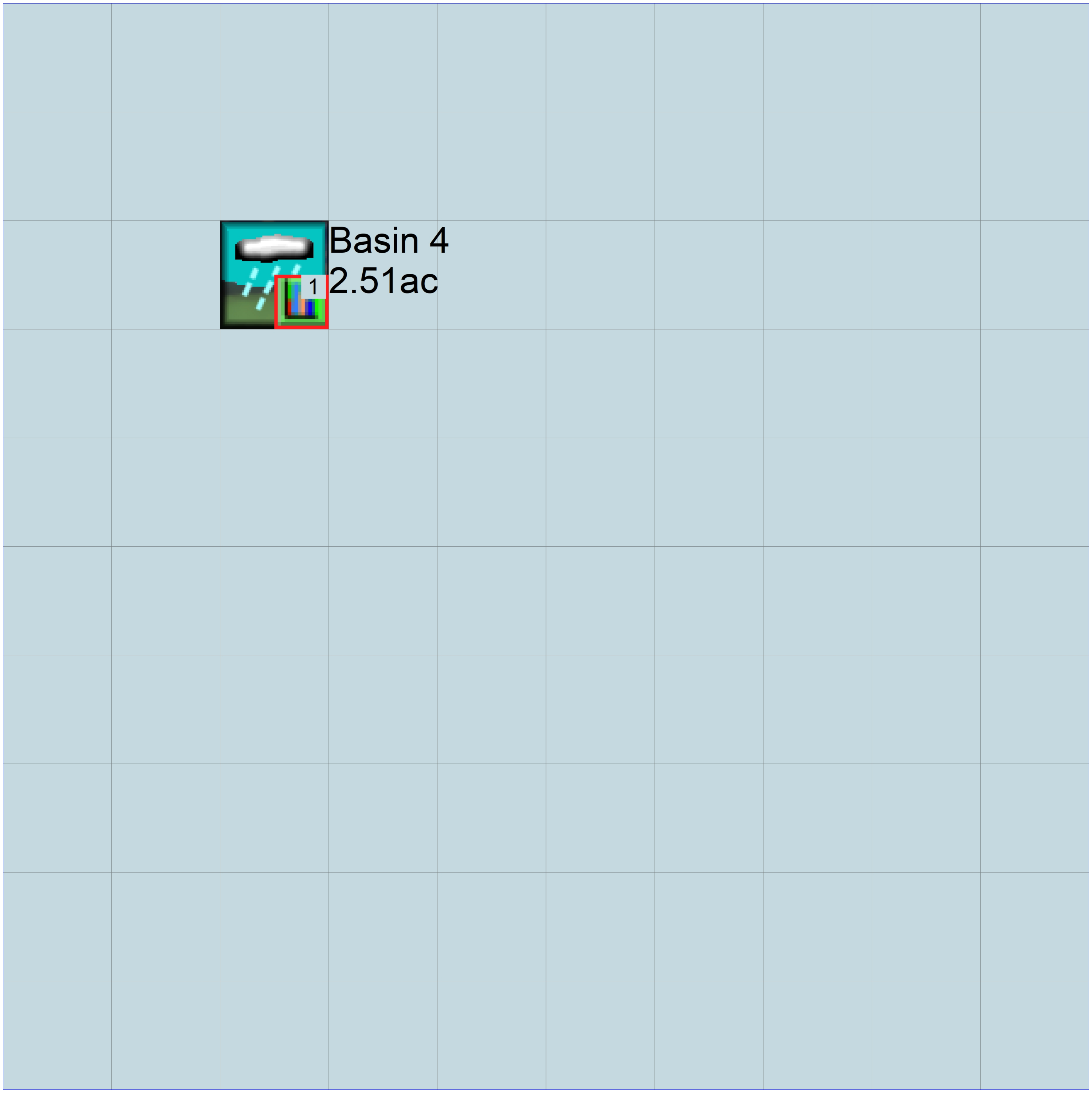
PERLND Changes

No PERLND changes have been made.

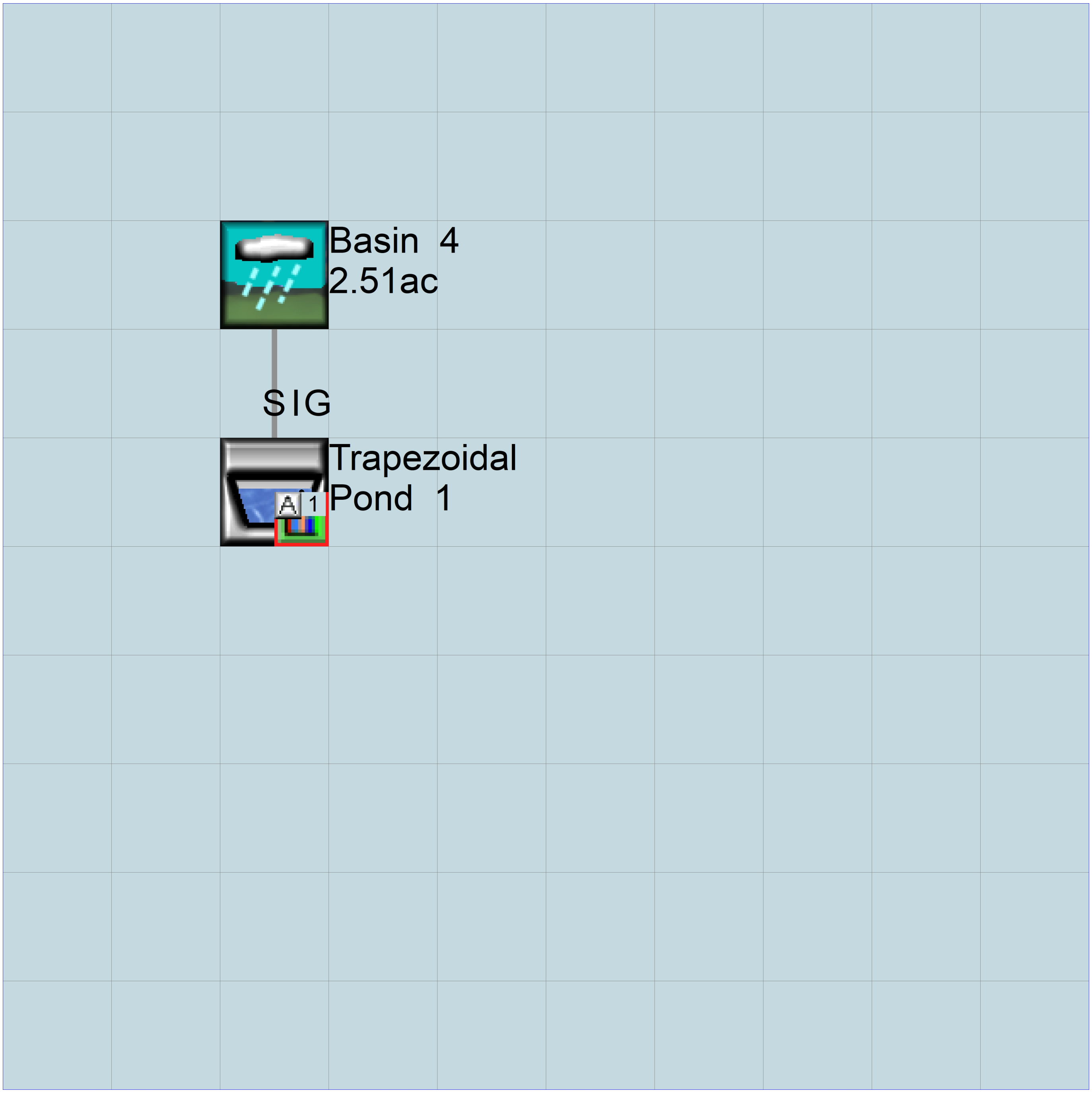
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   East Hill Basin 4 Pond.wdm
MESSU      25   PreEast Hill Basin 4 Pond.MES
           27   PreEast Hill Basin 4 Pond.L61
           28   PreEast Hill Basin 4 Pond.L62
           30   POCEast Hill Basin 4 Pond1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      11
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin 4                     MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                            User  t-series Engl Metr ***
                                             in  out          ***
   11     C, Forest, Mod          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

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

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

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

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

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   11             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   11           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   11             0         0         0         0       2.5         1         0
  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 4***
PERLND  11                        2.51     COPY   501     12
PERLND  11                        2.51     COPY   501     13
PERLND  11                        2.51     COPY   501     14

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

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



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                          in  out                            ***
  END GEN-INFO
  *** Section RCHRES***

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
```

```
WDM       2 PREC      ENGL    1.2            IMPLND   1 999 EXTNL  PREC
WDM       1 EVAP      ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM       1 EVAP      ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

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

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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

  MASS-LINK       14
PERLND     PWATER AGWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   14


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   East Hill Basin 4 Pond.wdm
MESSU      25   MitEast Hill Basin 4 Pond.MES
           27   MitEast Hill Basin 4 Pond.L61
           28   MitEast Hill Basin 4 Pond.L62
           30   POCEast Hill Basin 4 Pond1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      14
      IMPLND       1
      IMPLND       4
      IMPLND       5
      IMPLND       8
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                            User  t-series Engl Metr ***
                                            in  out           ***
   14      C, Pasture, 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 ***
   14         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  *********
   14         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 ***
   14         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
   14              0       4.5      0.06       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   14              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                     ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   14           0.15       0.4       0.3         6       0.5       0.4
  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
   14              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      ROADS/FLAT            1    1    1   27    0
    4      ROOF TOPS/FLAT        1    1    1   27    0
    5      DRIVEWAYS/FLAT        1    1    1   27    0
    8      SIDEWALKS/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
    4         0    0    1    0    0    0
    5         0    0    1    0    0    0
    8         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
    4         0    0    4    0    0    0    1    9
    5         0    0    4    0    0    0    1    9
    8         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
```

```
    # -  # CSNO RTOP  VRS  VNN RTLI      ***
    1         0    0    0    0    0
    4         0    0    0    0    0
    5         0    0    0    0    0
    8         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
    4            400      0.01       0.1       0.1
    5            400      0.01       0.1       0.1
    8            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    4              0         0
    5              0         0
    8              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    4              0         0
    5              0         0
    8              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Basin  4***
PERLND  14                       1.12     RCHRES   1      2
PERLND  14                       1.12     RCHRES   1      3
PERLND  14                       1.12     RCHRES   1      4
IMPLND   1                       0.27     RCHRES   1      5
IMPLND   4                       0.86     RCHRES   1      5
IMPLND   5                       0.16     RCHRES   1      5
IMPLND   8                        0.1     RCHRES   1      5

******Routing******
PERLND  14                       1.12     COPY     1     12
IMPLND   1                       0.27     COPY     1     15
IMPLND   4                       0.86     COPY     1     15
IMPLND   5                       0.16     COPY     1     15
IMPLND   8                        0.1     COPY     1     15
PERLND  14                       1.12     COPY     1     13
PERLND  14                       1.12     COPY     1     14
RCHRES   1                          1     COPY   501     16
END SCHEMATIC

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



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

```
RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                          in  out                             ***
    1     Trapezoidal Pond-008    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

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

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

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1        0  1  0  0    4  0  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     433.0       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  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)    (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.114784  0.000000  0.000000
  0.066667  0.116165  0.007698  0.007451
  0.133333  0.117554  0.015489  0.010538
  0.200000  0.118949  0.023372  0.012906
  0.266667  0.120353  0.031349  0.014903
  0.333333  0.121763  0.039420  0.016662
  0.400000  0.123181  0.047584  0.018252
  0.466667  0.124606  0.055844  0.019715
  0.533333  0.126039  0.064199  0.021076
  0.600000  0.127478  0.072649  0.022354
  0.666667  0.128926  0.081196  0.023564
  0.733333  0.130380  0.089840  0.024714
  0.800000  0.131842  0.098580  0.025813
  0.866667  0.133311  0.107419  0.026867
  0.933333  0.134788  0.116356  0.027881
  1.000000  0.136272  0.125391  0.028859
  1.066667  0.137763  0.134525  0.029806
  1.133333  0.139262  0.143760  0.030723
  1.200000  0.140768  0.153094  0.031614
  1.266667  0.142281  0.162529  0.032480
```

1.333333	0.143802	0.172065	0.033324
1.400000	0.145330	0.181703	0.034147
1.466667	0.146865	0.191442	0.034950
1.533333	0.148408	0.201285	0.035736
1.600000	0.149958	0.211230	0.036505
1.666667	0.151515	0.221279	0.037257
1.733333	0.153080	0.231433	0.037995
1.800000	0.154652	0.241690	0.038719
1.866667	0.156231	0.252053	0.039429
1.933333	0.157818	0.262521	0.040127
2.000000	0.159412	0.273096	0.040813
2.066667	0.161014	0.283777	0.041488
2.133333	0.162623	0.294565	0.042152
2.200000	0.164239	0.305460	0.042805
2.266667	0.165862	0.316463	0.043449
2.333333	0.167493	0.327575	0.044083
2.400000	0.169131	0.338796	0.044709
2.466667	0.170777	0.350126	0.045325
2.533333	0.172430	0.361566	0.045934
2.600000	0.174090	0.373117	0.046534
2.666667	0.175758	0.384779	0.047127
2.733333	0.177433	0.396552	0.047713
2.800000	0.179115	0.408437	0.048291
2.866667	0.180804	0.420434	0.048862
2.933333	0.182501	0.432544	0.049427
3.000000	0.184206	0.444768	0.049986
3.066667	0.185917	0.457105	0.050538
3.133333	0.187636	0.469557	0.051085
3.200000	0.189363	0.482124	0.051625
3.266667	0.191096	0.494806	0.052160
3.333333	0.192837	0.507603	0.052690
3.400000	0.194586	0.520517	0.053214
3.466667	0.196342	0.533548	0.053733
3.533333	0.198105	0.546697	0.074065
3.600000	0.199875	0.559963	0.089082
3.666667	0.201653	0.573347	0.099576
3.733333	0.203438	0.586850	0.108195
3.800000	0.205230	0.600472	0.115711
3.866667	0.207030	0.614214	0.122477
3.933333	0.208837	0.628076	0.128690
4.000000	0.210652	0.642059	0.134473
4.066667	0.212474	0.656164	0.139909
4.133333	0.214303	0.670389	0.145057
4.200000	0.216140	0.684738	0.149961
4.266667	0.217983	0.699208	0.154655
4.333333	0.219835	0.713802	0.159165
4.400000	0.221693	0.728520	0.163513
4.466667	0.223559	0.743362	0.167716
4.533333	0.225433	0.758328	0.191606
4.600000	0.227313	0.773420	0.210067
4.666667	0.229201	0.788637	0.223902
4.733333	0.231096	0.803980	0.235768
4.800000	0.232999	0.819450	0.246444
4.866667	0.234909	0.835047	0.256290
4.933333	0.236826	0.850771	0.265509
5.000000	0.238751	0.866624	0.274229
5.066667	0.240683	0.882605	0.556232
5.133333	0.242623	0.898715	1.061961
5.200000	0.244569	0.914955	1.702619
5.266667	0.246523	0.931325	2.429374
5.333333	0.248485	0.947825	3.195230
5.400000	0.250454	0.964456	3.951863
5.466667	0.252430	0.981219	4.652449
5.533333	0.254413	0.998114	5.257207
5.600000	0.256404	1.015141	5.740659
5.666667	0.258402	1.032301	6.100215
5.733333	0.260408	1.049595	6.365856
5.800000	0.262421	1.067022	6.696394
5.866667	0.264441	1.084585	6.961115
5.933333	0.266468	1.102281	7.215947

```
  6.000000  0.268503  1.120114  7.461929
  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    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO      1 1        1     WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE   1 1        1     WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN    1 1     48.4     WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN    1 1     48.4     WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

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

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        4
PERLND     PWATER AGWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    4

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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

  MASS-LINK       14
PERLND     PWATER AGWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   14

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

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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WWHM2012

PROJECT REPORT

POND B MODELING

General Model Information

WWHM2012 Project Name: Basin 6 Pond

Site Name:	Basin 6 Pond
Site Address:	
City:	
Report Date:	4/11/2025
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.200
Version Date:	2024/06/28
Version:	4.3.1

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
C, Forest, Mod	3
Pervious Total	3
Impervious Land Use	acre
Impervious Total	0
Basin Total	3

Element Flow Componants:

Surface	Interflow	Groundwater

Componant Flows To:

POC 1	POC 1	

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	1.06
Pervious Total	1.06
Impervious Land Use	acre
ROADS MOD	0.33
ROOF TOPS FLAT	1.44
SIDEWALKS MOD	0.17
Impervious Total	1.94
Basin Total	3

Element Flow Componants:

Surface	Interflow	Groundwater
Componant Flows To:		
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length:	53.90 ft.
Bottom Width:	107.81 ft.
Depth:	6 ft.
Volume at riser head:	0.9799 acre-feet.
Side slope 1:	3 To 1
Side slope 2:	3 To 1
Side slope 3:	3 To 1
Side slope 4:	3 To 1
Discharge Structure	
Riser Height:	5 ft.
Riser Diameter:	18 in.
Orifice 1 Diameter:	1.140 in. Elevation:0 ft.
Orifice 2 Diameter:	1.970 in. Elevation:3.055 ft.
Orifice 3 Diameter:	1.190 in. Elevation:3.95375000000003 ft.

Element Outlets:
Outlet 1 Outlet 2
Outlet Flows To:

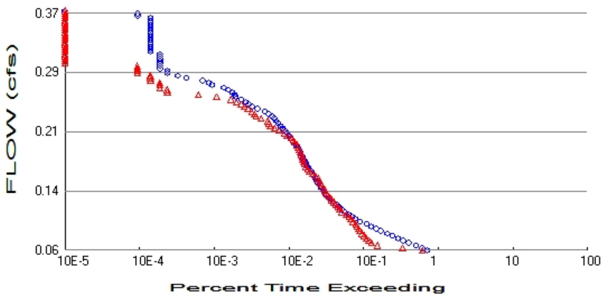
Pond Hydraulic Table

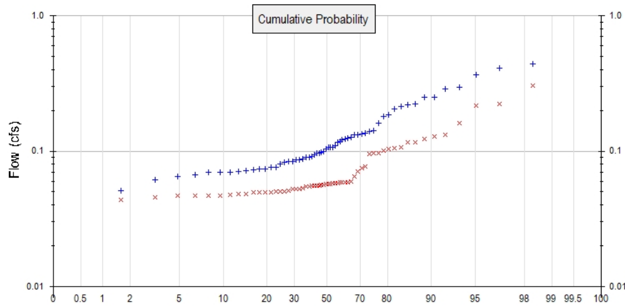
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.133	0.000	0.000	0.000
0.0667	0.134	0.008	0.009	0.000
0.1333	0.136	0.018	0.012	0.000
0.2000	0.137	0.027	0.015	0.000
0.2667	0.139	0.036	0.018	0.000
0.3333	0.140	0.045	0.020	0.000
0.4000	0.142	0.055	0.022	0.000
0.4667	0.144	0.064	0.024	0.000
0.5333	0.145	0.074	0.025	0.000
0.6000	0.147	0.084	0.027	0.000
0.6667	0.148	0.094	0.028	0.000
0.7333	0.150	0.103	0.030	0.000
0.8000	0.151	0.114	0.031	0.000
0.8667	0.153	0.124	0.032	0.000
0.9333	0.154	0.134	0.034	0.000
1.0000	0.156	0.144	0.035	0.000
1.0667	0.158	0.155	0.036	0.000
1.1333	0.159	0.165	0.037	0.000
1.2000	0.161	0.176	0.038	0.000
1.2667	0.162	0.187	0.039	0.000
1.3333	0.164	0.198	0.040	0.000
1.4000	0.166	0.209	0.041	0.000
1.4667	0.167	0.220	0.042	0.000
1.5333	0.169	0.231	0.043	0.000
1.6000	0.171	0.243	0.044	0.000
1.6667	0.172	0.254	0.045	0.000
1.7333	0.174	0.266	0.046	0.000
1.8000	0.176	0.277	0.047	0.000
1.8667	0.177	0.289	0.048	0.000
1.9333	0.179	0.301	0.049	0.000
2.0000	0.181	0.313	0.049	0.000
2.0667	0.183	0.325	0.050	0.000

2.1333	0.184	0.338	0.051	0.000
2.2000	0.186	0.350	0.052	0.000
2.2667	0.188	0.362	0.053	0.000
2.3333	0.189	0.375	0.053	0.000
2.4000	0.191	0.388	0.054	0.000
2.4667	0.193	0.401	0.055	0.000
2.5333	0.195	0.413	0.056	0.000
2.6000	0.196	0.427	0.056	0.000
2.6667	0.198	0.440	0.057	0.000
2.7333	0.200	0.453	0.058	0.000
2.8000	0.202	0.466	0.059	0.000
2.8667	0.204	0.480	0.059	0.000
2.9333	0.205	0.494	0.060	0.000
3.0000	0.207	0.507	0.061	0.000
3.0667	0.209	0.521	0.073	0.000
3.1333	0.211	0.535	0.091	0.000
3.2000	0.213	0.550	0.103	0.000
3.2667	0.215	0.564	0.112	0.000
3.3333	0.216	0.578	0.119	0.000
3.4000	0.218	0.593	0.126	0.000
3.4667	0.220	0.607	0.133	0.000
3.5333	0.222	0.622	0.139	0.000
3.6000	0.224	0.637	0.144	0.000
3.6667	0.226	0.652	0.149	0.000
3.7333	0.228	0.667	0.154	0.000
3.8000	0.230	0.682	0.159	0.000
3.8667	0.231	0.698	0.164	0.000
3.9333	0.233	0.713	0.168	0.000
4.0000	0.235	0.729	0.181	0.000
4.0667	0.237	0.745	0.190	0.000
4.1333	0.239	0.761	0.197	0.000
4.2000	0.241	0.777	0.204	0.000
4.2667	0.243	0.793	0.210	0.000
4.3333	0.245	0.809	0.216	0.000
4.4000	0.247	0.826	0.221	0.000
4.4667	0.249	0.842	0.227	0.000
4.5333	0.251	0.859	0.232	0.000
4.6000	0.253	0.876	0.237	0.000
4.6667	0.255	0.893	0.242	0.000
4.7333	0.257	0.910	0.247	0.000
4.8000	0.259	0.927	0.251	0.000
4.8667	0.261	0.944	0.256	0.000
4.9333	0.263	0.962	0.260	0.000
5.0000	0.265	0.979	0.265	0.000
5.0667	0.267	0.997	0.543	0.000
5.1333	0.269	1.015	1.044	0.000
5.2000	0.271	1.033	1.682	0.000
5.2667	0.273	1.051	2.405	0.000
5.3333	0.275	1.070	3.168	0.000
5.4000	0.277	1.088	3.921	0.000
5.4667	0.279	1.107	4.619	0.000
5.5333	0.282	1.125	5.221	0.000
5.6000	0.284	1.144	5.702	0.000
5.6667	0.286	1.163	6.058	0.000
5.7333	0.288	1.182	6.322	0.000
5.8000	0.290	1.202	6.650	0.000
5.8667	0.292	1.221	6.912	0.000
5.9333	0.294	1.241	7.165	0.000

6.0000	0.296	1.260	7.408	0.000
6.0667	0.298	1.280	7.644	0.000

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 3
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.06
Total Impervious Area: 1.94

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.110898
5 year	0.177343
10 year	0.230215
25 year	0.307738
50 year	0.373681
100 year	0.446997

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.06452
5 year	0.096351
10 year	0.122531
25 year	0.162211
50 year	0.197106
100 year	0.237059

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.123	0.053
1950	0.125	0.057
1951	0.106	0.051
1952	0.086	0.047
1953	0.070	0.047
1954	0.439	0.056
1955	0.133	0.096
1956	0.116	0.105
1957	0.161	0.095
1958	0.140	0.053

1959	0.109	0.058
1960	0.106	0.059
1961	0.220	0.065
1962	0.106	0.052
1963	0.180	0.050
1964	0.142	0.047
1965	0.087	0.058
1966	0.051	0.050
1967	0.104	0.051
1968	0.127	0.075
1969	0.411	0.052
1970	0.072	0.050
1971	0.137	0.116
1972	0.084	0.055
1973	0.083	0.055
1974	0.224	0.056
1975	0.086	0.048
1976	0.090	0.055
1977	0.065	0.050
1978	0.076	0.047
1979	0.251	0.055
1980	0.118	0.046
1981	0.074	0.050
1982	0.096	0.096
1983	0.204	0.050
1984	0.099	0.133
1985	0.132	0.104
1986	0.297	0.217
1987	0.134	0.160
1988	0.069	0.071
1989	0.089	0.043
1990	0.094	0.077
1991	0.097	0.059
1992	0.074	0.060
1993	0.071	0.047
1994	0.067	0.057
1995	0.098	0.116
1996	0.185	0.107
1997	0.368	0.304
1998	0.061	0.048
1999	0.080	0.059
2000	0.070	0.122
2001	0.024	0.041
2002	0.091	0.059
2003	0.072	0.056
2004	0.121	0.129
2005	0.084	0.057
2006	0.289	0.101
2007	0.214	0.058
2008	0.248	0.222
2009	0.076	0.056

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	0.4387	0.3042
2	0.4105	0.2218
3	0.3680	0.2174

4	0.2967	0.1602
5	0.2895	0.1327
6	0.2512	0.1291
7	0.2482	0.1224
8	0.2244	0.1163
9	0.2200	0.1162
10	0.2138	0.1071
11	0.2037	0.1046
12	0.1855	0.1041
13	0.1795	0.1005
14	0.1610	0.0963
15	0.1415	0.0961
16	0.1400	0.0954
17	0.1365	0.0771
18	0.1342	0.0750
19	0.1329	0.0710
20	0.1321	0.0646
21	0.1268	0.0597
22	0.1253	0.0591
23	0.1234	0.0588
24	0.1205	0.0588
25	0.1177	0.0588
26	0.1162	0.0582
27	0.1094	0.0581
28	0.1065	0.0578
29	0.1060	0.0572
30	0.1060	0.0572
31	0.1040	0.0569
32	0.0990	0.0565
33	0.0984	0.0561
34	0.0967	0.0557
35	0.0960	0.0555
36	0.0939	0.0553
37	0.0915	0.0552
38	0.0901	0.0549
39	0.0893	0.0546
40	0.0875	0.0529
41	0.0863	0.0526
42	0.0858	0.0523
43	0.0843	0.0521
44	0.0839	0.0508
45	0.0830	0.0505
46	0.0802	0.0504
47	0.0758	0.0501
48	0.0756	0.0499
49	0.0740	0.0498
50	0.0737	0.0498
51	0.0724	0.0497
52	0.0717	0.0481
53	0.0706	0.0479
54	0.0700	0.0474
55	0.0698	0.0471
56	0.0695	0.0469
57	0.0671	0.0468
58	0.0650	0.0468
59	0.0614	0.0458
60	0.0513	0.0435
61	0.0242	0.0413

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0554	15150	13066	86	Pass
0.0587	12831	7099	55	Pass
0.0619	10746	3270	30	Pass
0.0651	8590	2716	31	Pass
0.0683	7261	2513	34	Pass
0.0715	6141	2308	37	Pass
0.0747	5202	2165	41	Pass
0.0780	4477	2051	45	Pass
0.0812	3628	1901	52	Pass
0.0844	3125	1812	57	Pass
0.0876	2704	1745	64	Pass
0.0908	2344	1684	71	Pass
0.0940	1917	1555	81	Pass
0.0972	1662	1454	87	Pass
0.1005	1491	1361	91	Pass
0.1037	1343	1245	92	Pass
0.1069	1206	1101	91	Pass
0.1101	1078	1019	94	Pass
0.1133	1005	972	96	Pass
0.1165	937	900	96	Pass
0.1197	855	852	99	Pass
0.1230	794	808	101	Pass
0.1262	721	759	105	Pass
0.1294	675	712	105	Pass
0.1326	639	677	105	Pass
0.1358	616	648	105	Pass
0.1390	582	620	106	Pass
0.1422	553	596	107	Pass
0.1455	522	572	109	Pass
0.1487	501	550	109	Pass
0.1519	485	528	108	Pass
0.1551	456	486	106	Pass
0.1583	437	440	100	Pass
0.1615	420	404	96	Pass
0.1647	399	380	95	Pass
0.1680	385	357	92	Pass
0.1712	363	341	93	Pass
0.1744	350	337	96	Pass
0.1776	337	328	97	Pass
0.1808	326	323	99	Pass
0.1840	312	311	99	Pass
0.1872	299	304	101	Pass
0.1905	288	294	102	Pass
0.1937	279	281	100	Pass
0.1969	269	271	100	Pass
0.2001	245	255	104	Pass
0.2033	236	243	102	Pass
0.2065	223	226	101	Pass
0.2097	212	203	95	Pass
0.2130	201	185	92	Pass
0.2162	187	156	83	Pass
0.2194	175	136	77	Pass
0.2226	164	120	73	Pass

0.2258	154	116	75	Pass
0.2290	146	111	76	Pass
0.2322	136	90	66	Pass
0.2355	126	78	61	Pass
0.2387	115	73	63	Pass
0.2419	101	68	67	Pass
0.2451	80	60	75	Pass
0.2483	68	54	79	Pass
0.2515	62	49	79	Pass
0.2547	56	42	75	Pass
0.2580	49	36	73	Pass
0.2612	41	23	56	Pass
0.2644	40	13	32	Pass
0.2676	37	5	13	Pass
0.2708	33	5	15	Pass
0.2740	29	4	13	Pass
0.2772	20	4	20	Pass
0.2805	18	4	22	Pass
0.2837	15	3	20	Pass
0.2869	9	3	33	Pass
0.2901	7	3	42	Pass
0.2933	5	2	40	Pass
0.2965	5	2	40	Pass
0.2997	4	2	50	Pass
0.3030	4	2	50	Pass
0.3062	4	0	0	Pass
0.3094	4	0	0	Pass
0.3126	4	0	0	Pass
0.3158	4	0	0	Pass
0.3190	4	0	0	Pass
0.3222	3	0	0	Pass
0.3255	3	0	0	Pass
0.3287	3	0	0	Pass
0.3319	3	0	0	Pass
0.3351	3	0	0	Pass
0.3383	3	0	0	Pass
0.3415	3	0	0	Pass
0.3448	3	0	0	Pass
0.3480	3	0	0	Pass
0.3512	3	0	0	Pass
0.3544	3	0	0	Pass
0.3576	3	0	0	Pass
0.3608	3	0	0	Pass
0.3640	3	0	0	Pass
0.3673	3	0	0	Pass
0.3705	2	0	0	Pass
0.3737	2	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.0952 acre-feet
On-line facility target flow:	0.0485 cfs.
Adjusted for 15 min:	0.0485 cfs.
Off-line facility target flow:	0.032 cfs.
Adjusted for 15 min:	0.032 cfs.

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                             ***
WDM        26   Basin 6 Pond.wdm
MESSU      25   PreBasin 6 Pond.MES
           27   PreBasin 6 Pond.L61
           28   PreBasin 6 Pond.L62
           30   POCBasin 6 Pond1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      11
      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            ***
   11      C, Forest, Mod          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

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

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

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

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

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   11              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                    ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   11            0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

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

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
  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  11                         3     COPY   501     12
PERLND  11                         3     COPY   501     13

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

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



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                         in  out                             ***
  END GEN-INFO
  *** Section RCHRES***

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76            PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76            IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

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

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   Basin 6 Pond.wdm
MESSU      25   MitBasin 6 Pond.MES
           27   MitBasin 6 Pond.L61
           28   MitBasin 6 Pond.L62
           30   POCBasin 6 Pond1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      14
      IMPLND       2
      IMPLND       4
      IMPLND       9
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                      1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   14      C, Pasture, 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 ***
   14         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  *********
   14         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 ***
   14         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
   14              0       4.5      0.06       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   14              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                   ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   14           0.15       0.4       0.3         6       0.5       0.4
  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
   14              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
    2      ROADS/MOD             1    1    1   27    0
    4      ROOF TOPS/FLAT        1    1    1   27    0
    9      SIDEWALKS/MOD         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
    4         0    0    1    0    0    0
    9         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   *********
    2         0    0    4    0    0    4    1    9
    4         0    0    4    0    0    0    1    9
    9         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI    ***
    2         0    0    0    0    0
    4         0    0    0    0    0
    9         0    0    0    0    0
```

```
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            400      0.05       0.1      0.08
    4            400      0.01       0.1       0.1
    9            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
    4              0         0
    9              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2              0         0
    4              0         0
    9              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  14                        1.06     RCHRES   1      2
PERLND  14                        1.06     RCHRES   1      3
IMPLND   2                        0.33     RCHRES   1      5
IMPLND   4                        1.44     RCHRES   1      5
IMPLND   9                        0.17     RCHRES   1      5

******Routing******
PERLND  14                        1.06     COPY     1     12
IMPLND   2                        0.33     COPY     1     15
IMPLND   4                        1.44     COPY     1     15
IMPLND   9                        0.17     COPY     1     15
PERLND  14                        1.06     COPY     1     13
RCHRES   1                           1     COPY   501     16
END SCHEMATIC

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



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
    1     Trapezoidal Pond-005    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

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

```
    1          1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

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

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                        ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  0  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  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    4
      Depth      Area    Volume  Outflow1 Velocity  Travel Time***
       (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.133402  0.000000  0.000000
  0.066667  0.134890  0.008943  0.009106
  0.133333  0.136386  0.017986  0.012878
  0.200000  0.137889  0.027128  0.015772
  0.266667  0.139400  0.036371  0.018212
  0.333333  0.140918  0.045715  0.020361
  0.400000  0.142443  0.055160  0.022305
  0.466667  0.143976  0.064708  0.024092
  0.533333  0.145516  0.074358  0.025755
  0.600000  0.147063  0.084110  0.027318
  0.666667  0.148618  0.093966  0.028795
  0.733333  0.150180  0.103926  0.030201
  0.800000  0.151750  0.113990  0.031544
  0.866667  0.153326  0.124160  0.032832
  0.933333  0.154910  0.134434  0.034071
  1.000000  0.156502  0.144815  0.035267
  1.066667  0.158101  0.155301  0.036424
  1.133333  0.159707  0.165895  0.037545
  1.200000  0.161320  0.176596  0.038633
  1.266667  0.162941  0.187405  0.039692
  1.333333  0.164569  0.198322  0.040723
  1.400000  0.166205  0.209347  0.041728
  1.466667  0.167848  0.220483  0.042710
  1.533333  0.169498  0.231727  0.043670
  1.600000  0.171155  0.243082  0.044610
  1.666667  0.172820  0.254548  0.045529
  1.733333  0.174493  0.266125  0.046431
  1.800000  0.176172  0.277814  0.047316
  1.866667  0.177859  0.289615  0.048184
  1.933333  0.179553  0.301529  0.049037
  2.000000  0.181255  0.313556  0.049875
  2.066667  0.182964  0.325697  0.050699
```

```
  2.133333  0.184680  0.337951  0.051511
  2.200000  0.186404  0.350321  0.052309
  2.266667  0.188135  0.362806  0.053096
  2.333333  0.189873  0.375406  0.053871
  2.400000  0.191619  0.388122  0.054635
  2.466667  0.193372  0.400955  0.055389
  2.533333  0.195133  0.413905  0.056133
  2.600000  0.196900  0.426973  0.056866
  2.666667  0.198675  0.440159  0.057591
  2.733333  0.200458  0.453464  0.058306
  2.800000  0.202248  0.466887  0.059013
  2.866667  0.204045  0.480430  0.059711
  2.933333  0.205849  0.494093  0.060402
  3.000000  0.207661  0.507877  0.061084
  3.066667  0.209480  0.521782  0.073135
  3.133333  0.211307  0.535808  0.091903
  3.200000  0.213141  0.549956  0.103190
  3.266667  0.214982  0.564227  0.112194
  3.333333  0.216830  0.578621  0.119950
  3.400000  0.218686  0.593138  0.126888
  3.466667  0.220550  0.607779  0.133235
  3.533333  0.222420  0.622545  0.139130
  3.600000  0.224298  0.637435  0.144662
  3.666667  0.226183  0.652451  0.149897
  3.733333  0.228076  0.667593  0.154881
  3.800000  0.229976  0.682862  0.159649
  3.866667  0.231883  0.698257  0.164230
  3.933333  0.233798  0.713780  0.168645
  4.000000  0.235720  0.729430  0.181176
  4.066667  0.237649  0.745209  0.189960
  4.133333  0.239586  0.761117  0.197347
  4.200000  0.241530  0.777154  0.204038
  4.266667  0.243482  0.793321  0.210270
  4.333333  0.245440  0.809619  0.216163
  4.400000  0.247406  0.826047  0.221786
  4.466667  0.249380  0.842607  0.227186
  4.533333  0.251361  0.859298  0.232394
  4.600000  0.253349  0.876122  0.237437
  4.666667  0.255344  0.893078  0.242331
  4.733333  0.257347  0.910168  0.247094
  4.800000  0.259357  0.927391  0.251737
  4.866667  0.261375  0.944749  0.256270
  4.933333  0.263400  0.962241  0.260703
  5.000000  0.265432  0.979869  0.265042
  5.066667  0.267471  0.997633  0.542991
  5.133333  0.269518  1.015532  1.044932
  5.200000  0.271573  1.033569  1.682028
  5.266667  0.273634  1.051742  2.405412
  5.333333  0.275703  1.070053  3.168066
  5.400000  0.277779  1.088503  3.921642
  5.466667  0.279863  1.107091  4.619301
  5.533333  0.281954  1.125818  5.221248
  5.600000  0.284052  1.144685  5.701993
  5.666667  0.286158  1.163692  6.058937
  5.733333  0.288271  1.182840  6.322053
  5.800000  0.290391  1.202128  6.650144
  5.866667  0.292519  1.221559  6.912492
  5.933333  0.294654  1.241131  7.165018
  6.000000  0.296797  1.260846  7.408756
  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    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
```

```
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

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

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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

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

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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Local (360)943-0304

www.clearcreeksolutions.com

WWHM2012

PROJECT REPORT

POND C MODELING

General Model Information

WWHM2012 Project Name: East Hill TDA 2

Site Name:	
Site Address:	
City:	
Report Date:	4/11/2025
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.200
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
C, Forest, Mod	4.24
Pervious Total	4.24
Impervious Land Use	acre
Impervious Total	0
Basin Total	4.24

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Flat	1.55
Pervious Total	1.55
Impervious Land Use	acre
ROADS FLAT	0.91
ROOF TOPS FLAT	1.43
SIDEWALKS FLAT	0.35
Impervious Total	2.69
Basin Total	4.24

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length: 185.00 ft.
Bottom Width: 35.00 ft.
Depth: 10.5 ft.
Volume at riser head: 1.4220 acre-feet.
Side slope 1: 0 To 1
Side slope 2: 0 To 1
Side slope 3: 0 To 1
Side slope 4: 0 To 1
Discharge Structure
Riser Height: 9.5 ft.
Riser Diameter: 18 in.
Orifice 1 Diameter: 1.094 in. Elevation:0 ft.
Orifice 2 Diameter: 1.938 in. Elevation:6.04 ft.
Orifice 3 Diameter: 1.094 in. Elevation:7.27 ft.
Element Flows To:
Outlet 1 Outlet 2

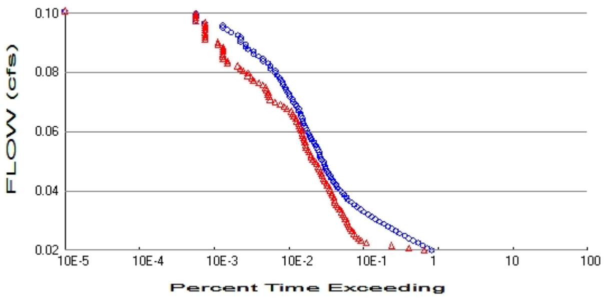
Pond Hydraulic Table

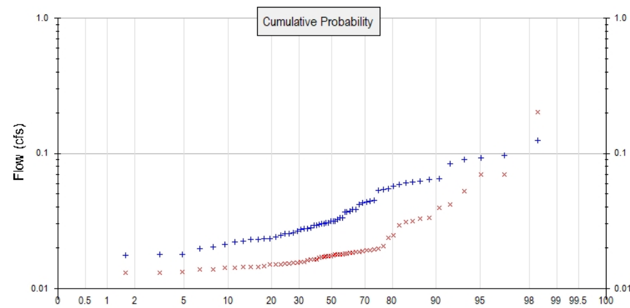
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.148	0.000	0.000	0.000
0.1167	0.148	0.017	0.011	0.000
0.2333	0.148	0.034	0.015	0.000
0.3500	0.148	0.052	0.019	0.000
0.4667	0.148	0.069	0.022	0.000
0.5833	0.148	0.086	0.024	0.000
0.7000	0.148	0.104	0.027	0.000
0.8167	0.148	0.121	0.029	0.000
0.9333	0.148	0.138	0.031	0.000
1.0500	0.148	0.156	0.033	0.000
1.1667	0.148	0.173	0.035	0.000
1.2833	0.148	0.190	0.036	0.000
1.4000	0.148	0.208	0.038	0.000
1.5167	0.148	0.225	0.040	0.000
1.6333	0.148	0.242	0.041	0.000
1.7500	0.148	0.260	0.042	0.000
1.8667	0.148	0.277	0.044	0.000
1.9833	0.148	0.294	0.045	0.000
2.1000	0.148	0.312	0.047	0.000
2.2167	0.148	0.329	0.048	0.000
2.3333	0.148	0.346	0.049	0.000
2.4500	0.148	0.364	0.050	0.000
2.5667	0.148	0.381	0.052	0.000
2.6833	0.148	0.398	0.053	0.000
2.8000	0.148	0.416	0.054	0.000
2.9167	0.148	0.433	0.055	0.000
3.0333	0.148	0.450	0.056	0.000
3.1500	0.148	0.468	0.057	0.000
3.2667	0.148	0.485	0.058	0.000
3.3833	0.148	0.502	0.059	0.000
3.5000	0.148	0.520	0.060	0.000
3.6167	0.148	0.537	0.061	0.000
3.7333	0.148	0.554	0.062	0.000

3.8500	0.148	0.572	0.063	0.000
3.9667	0.148	0.589	0.064	0.000
4.0833	0.148	0.607	0.065	0.000
4.2000	0.148	0.624	0.066	0.000
4.3167	0.148	0.641	0.067	0.000
4.4333	0.148	0.659	0.068	0.000
4.5500	0.148	0.676	0.069	0.000
4.6667	0.148	0.693	0.070	0.000
4.7833	0.148	0.711	0.071	0.000
4.9000	0.148	0.728	0.071	0.000
5.0167	0.148	0.745	0.072	0.000
5.1333	0.148	0.763	0.073	0.000
5.2500	0.148	0.780	0.074	0.000
5.3667	0.148	0.797	0.075	0.000
5.4833	0.148	0.815	0.076	0.000
5.6000	0.148	0.832	0.076	0.000
5.7167	0.148	0.849	0.077	0.000
5.8333	0.148	0.867	0.078	0.000
5.9500	0.148	0.884	0.079	0.000
6.0667	0.148	0.901	0.096	0.000
6.1833	0.148	0.919	0.119	0.000
6.3000	0.148	0.936	0.133	0.000
6.4167	0.148	0.953	0.144	0.000
6.5333	0.148	0.971	0.154	0.000
6.6500	0.148	0.988	0.163	0.000
6.7667	0.148	1.005	0.171	0.000
6.8833	0.148	1.023	0.178	0.000
7.0000	0.148	1.040	0.185	0.000
7.1167	0.148	1.057	0.192	0.000
7.2333	0.148	1.075	0.198	0.000
7.3500	0.148	1.092	0.213	0.000
7.4667	0.148	1.109	0.224	0.000
7.5833	0.148	1.127	0.234	0.000
7.7000	0.148	1.144	0.242	0.000
7.8167	0.148	1.161	0.250	0.000
7.9333	0.148	1.179	0.258	0.000
8.0500	0.148	1.196	0.265	0.000
8.1667	0.148	1.213	0.272	0.000
8.2833	0.148	1.231	0.278	0.000
8.4000	0.148	1.248	0.285	0.000
8.5167	0.148	1.266	0.291	0.000
8.6333	0.148	1.283	0.297	0.000
8.7500	0.148	1.300	0.303	0.000
8.8667	0.148	1.318	0.309	0.000
8.9833	0.148	1.335	0.314	0.000
9.1000	0.148	1.352	0.320	0.000
9.2167	0.148	1.370	0.325	0.000
9.3333	0.148	1.387	0.330	0.000
9.4500	0.148	1.404	0.335	0.000
9.5667	0.148	1.422	0.614	0.000
9.6833	0.148	1.439	1.582	0.000
9.8000	0.148	1.456	2.852	0.000
9.9167	0.148	1.474	4.168	0.000
10.033	0.148	1.491	5.284	0.000
10.150	0.148	1.508	6.041	0.000
10.267	0.148	1.526	6.574	0.000
10.383	0.148	1.543	7.034	0.000
10.500	0.148	1.560	7.465	0.000

10.617	0.148	1.578	7.871	0.000

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area:	4.24
Total Impervious Area:	0

Mitigated Landuse Totals for POC #1

Total Pervious Area:	1.55
Total Impervious Area:	2.69

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.034413
5 year	0.052847
10 year	0.066448
25 year	0.085136
50 year	0.100119
100 year	0.115992

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.018765
5 year	0.029303
10 year	0.038463
25 year	0.053022
50 year	0.066386
100 year	0.082236

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.023	0.016
1950	0.064	0.018
1951	0.023	0.015
1952	0.028	0.014
1953	0.037	0.014
1954	0.061	0.017
1955	0.057	0.033
1956	0.038	0.033
1957	0.061	0.020
1958	0.059	0.016

1959	0.033	0.017
1960	0.030	0.018
1961	0.042	0.020
1962	0.053	0.015
1963	0.084	0.016
1964	0.030	0.013
1965	0.029	0.018
1966	0.018	0.015
1967	0.038	0.015
1968	0.043	0.019
1969	0.065	0.016
1970	0.023	0.015
1971	0.037	0.040
1972	0.028	0.016
1973	0.024	0.018
1974	0.031	0.017
1975	0.026	0.014
1976	0.022	0.016
1977	0.020	0.015
1978	0.025	0.014
1979	0.096	0.016
1980	0.026	0.014
1981	0.032	0.014
1982	0.028	0.019
1983	0.033	0.015
1984	0.032	0.042
1985	0.044	0.030
1986	0.093	0.070
1987	0.045	0.053
1988	0.022	0.019
1989	0.044	0.013
1990	0.030	0.019
1991	0.031	0.018
1992	0.029	0.018
1993	0.018	0.013
1994	0.020	0.018
1995	0.030	0.031
1996	0.054	0.024
1997	0.125	0.203
1998	0.021	0.015
1999	0.027	0.018
2000	0.018	0.032
2001	0.007	0.012
2002	0.031	0.018
2003	0.023	0.017
2004	0.037	0.025
2005	0.027	0.017
2006	0.062	0.021
2007	0.055	0.019
2008	0.089	0.069
2009	0.025	0.017

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	0.1250	0.2028
2	0.0965	0.0695
3	0.0928	0.0692

4	0.0893	0.0528
5	0.0844	0.0421
6	0.0652	0.0396
7	0.0643	0.0335
8	0.0624	0.0327
9	0.0613	0.0317
10	0.0607	0.0309
11	0.0588	0.0295
12	0.0567	0.0249
13	0.0550	0.0237
14	0.0541	0.0206
15	0.0533	0.0197
16	0.0447	0.0195
17	0.0443	0.0191
18	0.0435	0.0191
19	0.0431	0.0189
20	0.0415	0.0186
21	0.0382	0.0185
22	0.0382	0.0185
23	0.0372	0.0184
24	0.0370	0.0181
25	0.0367	0.0180
26	0.0332	0.0179
27	0.0331	0.0179
28	0.0322	0.0179
29	0.0316	0.0178
30	0.0314	0.0177
31	0.0313	0.0174
32	0.0307	0.0173
33	0.0304	0.0173
34	0.0301	0.0171
35	0.0301	0.0170
36	0.0298	0.0169
37	0.0294	0.0165
38	0.0291	0.0163
39	0.0282	0.0163
40	0.0277	0.0161
41	0.0276	0.0158
42	0.0274	0.0157
43	0.0266	0.0155
44	0.0257	0.0154
45	0.0255	0.0154
46	0.0253	0.0153
47	0.0247	0.0152
48	0.0239	0.0150
49	0.0234	0.0150
50	0.0233	0.0147
51	0.0232	0.0145
52	0.0231	0.0145
53	0.0224	0.0145
54	0.0222	0.0143
55	0.0213	0.0142
56	0.0204	0.0139
57	0.0198	0.0138
58	0.0179	0.0132
59	0.0178	0.0132
60	0.0177	0.0131
61	0.0072	0.0117

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0172	17396	13800	79	Pass
0.0180	15077	8573	56	Pass
0.0189	13176	5061	38	Pass
0.0197	11441	2316	20	Pass
0.0206	9892	1964	19	Pass
0.0214	8660	1828	21	Pass
0.0222	7548	1688	22	Pass
0.0231	6547	1600	24	Pass
0.0239	5741	1500	26	Pass
0.0247	5108	1412	27	Pass
0.0256	4541	1364	30	Pass
0.0264	4017	1316	32	Pass
0.0273	3525	1284	36	Pass
0.0281	3048	1216	39	Pass
0.0289	2757	1188	43	Pass
0.0298	2460	1140	46	Pass
0.0306	2175	1088	50	Pass
0.0314	1940	1028	52	Pass
0.0323	1768	964	54	Pass
0.0331	1612	928	57	Pass
0.0340	1468	896	61	Pass
0.0348	1336	872	65	Pass
0.0356	1256	848	67	Pass
0.0365	1176	816	69	Pass
0.0373	1104	792	71	Pass
0.0381	1040	764	73	Pass
0.0390	976	740	75	Pass
0.0398	920	704	76	Pass
0.0407	880	684	77	Pass
0.0415	832	640	76	Pass
0.0423	796	616	77	Pass
0.0432	756	596	78	Pass
0.0440	724	580	80	Pass
0.0448	696	560	80	Pass
0.0457	672	544	80	Pass
0.0465	656	532	81	Pass
0.0474	632	504	79	Pass
0.0482	616	480	77	Pass
0.0490	576	440	76	Pass
0.0499	560	424	75	Pass
0.0507	548	420	76	Pass
0.0515	536	400	74	Pass
0.0524	520	384	73	Pass
0.0532	504	364	72	Pass
0.0541	484	356	73	Pass
0.0549	460	352	76	Pass
0.0557	432	344	79	Pass
0.0566	416	336	80	Pass
0.0574	404	328	81	Pass
0.0582	388	320	82	Pass
0.0591	372	316	84	Pass
0.0599	360	304	84	Pass
0.0608	348	292	83	Pass

0.0616	336	288	85	Pass
0.0624	328	268	81	Pass
0.0633	320	264	82	Pass
0.0641	312	248	79	Pass
0.0649	304	240	78	Pass
0.0658	288	228	79	Pass
0.0666	288	200	69	Pass
0.0675	268	184	68	Pass
0.0683	260	164	63	Pass
0.0691	244	140	57	Pass
0.0700	240	120	50	Pass
0.0708	220	116	52	Pass
0.0716	216	112	51	Pass
0.0725	204	112	54	Pass
0.0733	196	108	55	Pass
0.0742	192	104	54	Pass
0.0750	180	96	53	Pass
0.0758	176	84	47	Pass
0.0767	168	72	42	Pass
0.0775	160	68	42	Pass
0.0783	152	60	39	Pass
0.0792	140	60	42	Pass
0.0800	140	52	37	Pass
0.0809	120	48	40	Pass
0.0817	120	44	36	Pass
0.0825	112	32	28	Pass
0.0834	96	32	33	Pass
0.0842	96	28	29	Pass
0.0850	84	28	33	Pass
0.0859	72	28	38	Pass
0.0867	72	28	38	Pass
0.0876	60	28	46	Pass
0.0884	56	28	50	Pass
0.0892	56	24	42	Pass
0.0901	48	24	50	Pass
0.0909	48	16	33	Pass
0.0917	48	16	33	Pass
0.0926	44	16	36	Pass
0.0934	36	16	44	Pass
0.0943	32	16	50	Pass
0.0951	28	16	57	Pass
0.0959	28	16	57	Pass
0.0968	16	16	100	Pass
0.0976	12	12	100	Pass
0.0984	12	12	100	Pass
0.0993	12	12	100	Pass
0.1001	12	12	100	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	570.07			☐	0.00			
Total Volume Infiltrated		570.07	0.00	0.00		0.00	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

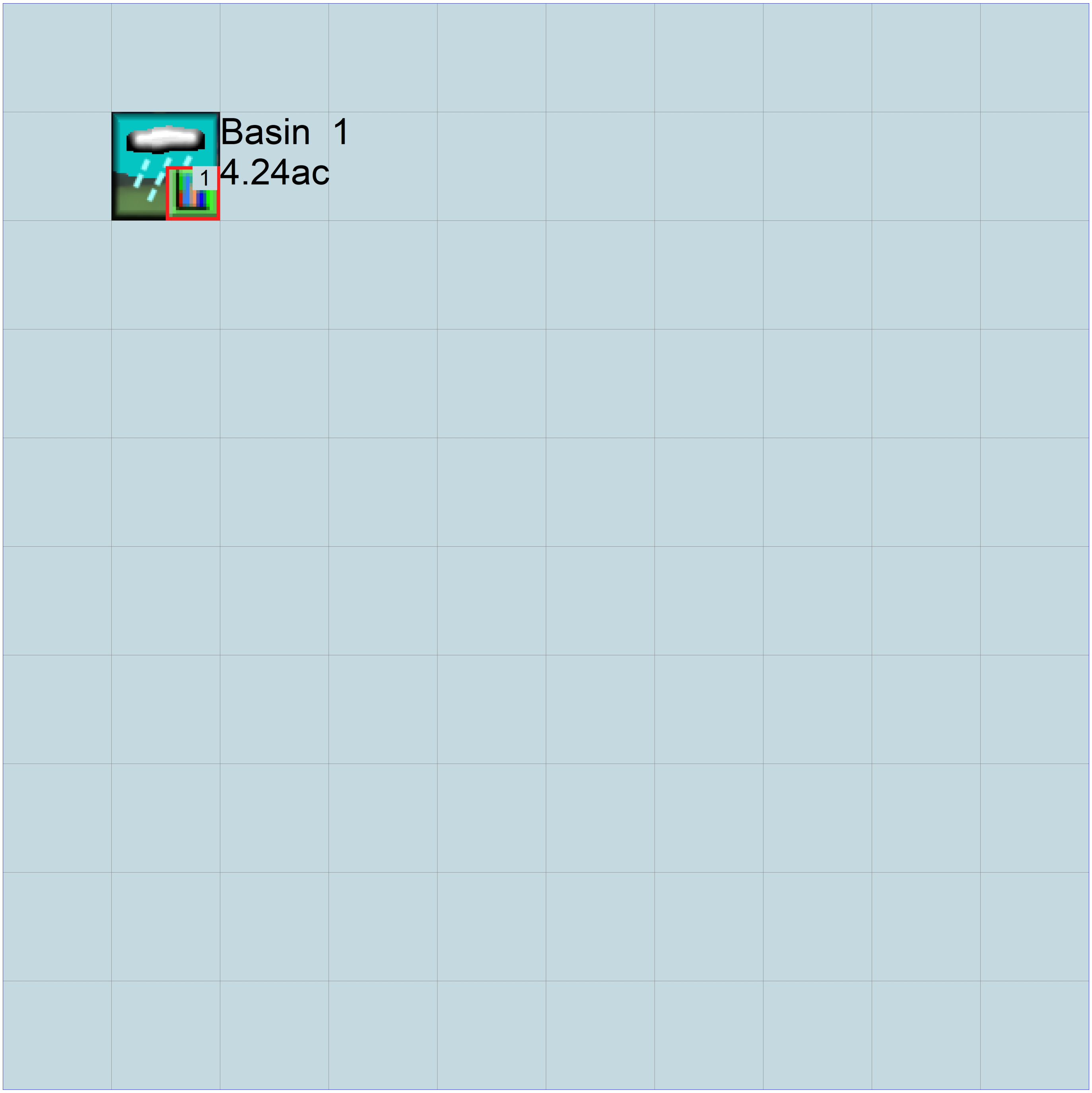
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   East Hill TDA 2.wdm
MESSU      25   PreEast Hill TDA 2.MES
           27   PreEast Hill TDA 2.L61
           28   PreEast Hill TDA 2.L62
           30   POCEast Hill TDA 21.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      11
      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           ***
   11     C, Forest, Mod          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

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

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

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

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

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   11             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   11           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

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

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                    User  t-series Engl Metr ***
                                     in  out           ***
  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  11                        4.24     COPY   501     12
PERLND  11                        4.24     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   12.1        DISPLY   1     INPUT  TIMSER 1


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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2        SUM  PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2        SUM  IMPLND   1 999 EXTNL  PREC
```

```
WDM       1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM       1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                             ***
WDM        26   East Hill TDA 2.wdm
MESSU      25   MitEast Hill TDA 2.MES
           27   MitEast Hill TDA 2.L61
           28   MitEast Hill TDA 2.L62
           30   POCEast Hill TDA 21.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      13
      IMPLND       1
      IMPLND       4
      IMPLND       8
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   13      C, Pasture, Flat        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   13         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  *********
   13         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 ***
   13         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
   13              0       4.5      0.06       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   13              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                     ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   13           0.15       0.4       0.3         6       0.5       0.4
  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
   13              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> 	Unit-systems   Printer ***
    # -  #                    User  t-series Engl Metr ***
                                      in  out          ***
    1      ROADS/FLAT           1    1    1   27    0
    4      ROOF TOPS/FLAT       1    1    1   27    0
    8      SIDEWALKS/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
    4         0    0    1    0    0    0
    8         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
    4         0    0    4    0    0    0    1    9
    8         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
    4         0    0    0    0    0
    8         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
    4             400      0.01       0.1       0.1
    8             400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -   # ***PETMAX    PETMIN
    1               0         0
    4               0         0
    8               0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -   # ***  RETS      SURS
    1               0         0
    4               0         0
    8               0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  13                        1.55     RCHRES   1      2
PERLND  13                        1.55     RCHRES   1      3
IMPLND   1                        0.91     RCHRES   1      5
IMPLND   4                        1.43     RCHRES   1      5
IMPLND   8                        0.35     RCHRES   1      5

******Routing******
PERLND  13                        1.55     COPY     1     12
IMPLND   1                        0.91     COPY     1     15
IMPLND   4                        1.43     COPY     1     15
IMPLND   8                        0.35     COPY     1     15
PERLND  13                        1.55     COPY     1     13
RCHRES   1                           1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                            in  out                          ***
    1     Trapezoidal Pond-005    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

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

```
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

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

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                     ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1        0  1  0  0    4  0  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      0.04       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  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.148646  0.000000  0.000000
  0.116667  0.148646  0.017342  0.011088
  0.233333  0.148646  0.034684  0.015681
  0.350000  0.148646  0.052026  0.019206
  0.466667  0.148646  0.069368  0.022177
  0.583333  0.148646  0.086710  0.024794
  0.700000  0.148646  0.104052  0.027161
  0.816667  0.148646  0.121394  0.029337
  0.933333  0.148646  0.138736  0.031363
  1.050000  0.148646  0.156078  0.033265
  1.166667  0.148646  0.173420  0.035065
  1.283333  0.148646  0.190762  0.036776
  1.400000  0.148646  0.208104  0.038411
  1.516667  0.148646  0.225446  0.039980
  1.633333  0.148646  0.242788  0.041489
  1.750000  0.148646  0.260130  0.042945
  1.866667  0.148646  0.277472  0.044354
  1.983333  0.148646  0.294814  0.045719
  2.100000  0.148646  0.312156  0.047044
  2.216667  0.148646  0.329498  0.048333
  2.333333  0.148646  0.346840  0.049589
  2.450000  0.148646  0.364182  0.050813
  2.566667  0.148646  0.381524  0.052009
  2.683333  0.148646  0.398866  0.053178
  2.800000  0.148646  0.416208  0.054322
  2.916667  0.148646  0.433550  0.055442
  3.033333  0.148646  0.450891  0.056540
  3.150000  0.148646  0.468233  0.057617
  3.266667  0.148646  0.485575  0.058674
  3.383333  0.148646  0.502917  0.059713
  3.500000  0.148646  0.520259  0.060734
  3.616667  0.148646  0.537601  0.061738
```

```
  3.733333  0.148646  0.554943  0.062725
  3.850000  0.148646  0.572285  0.063698
  3.966667  0.148646  0.589627  0.064656
  4.083333  0.148646  0.606969  0.065600
  4.200000  0.148646  0.624311  0.066530
  4.316667  0.148646  0.641653  0.067448
  4.433333  0.148646  0.658995  0.068353
  4.550000  0.148646  0.676337  0.069247
  4.666667  0.148646  0.693679  0.070129
  4.783333  0.148646  0.711021  0.071000
  4.900000  0.148646  0.728363  0.071861
  5.016667  0.148646  0.745705  0.072711
  5.133333  0.148646  0.763047  0.073552
  5.250000  0.148646  0.780389  0.074383
  5.366667  0.148646  0.797731  0.075205
  5.483333  0.148646  0.815073  0.076018
  5.600000  0.148646  0.832415  0.076823
  5.716667  0.148646  0.849757  0.077619
  5.833333  0.148646  0.867099  0.078407
  5.950000  0.148646  0.884441  0.079187
  6.066667  0.148646  0.901783  0.096595
  6.183333  0.148646  0.919125  0.119292
  6.300000  0.148646  0.936467  0.133426
  6.416667  0.148646  0.953809  0.144754
  6.533333  0.148646  0.971151  0.154528
  6.650000  0.148646  0.988493  0.163278
  6.766667  0.148646  1.005835  0.171285
  6.883333  0.148646  1.023177  0.178721
  7.000000  0.148646  1.040519  0.185701
  7.116667  0.148646  1.057861  0.192305
  7.233333  0.148646  1.075203  0.198592
  7.350000  0.148646  1.092545  0.213788
  7.466667  0.148646  1.109887  0.224779
  7.583333  0.148646  1.127229  0.234122
  7.700000  0.148646  1.144571  0.242619
  7.816667  0.148646  1.161913  0.250548
  7.933333  0.148646  1.179255  0.258047
  8.050000  0.148646  1.196597  0.265202
  8.166667  0.148646  1.213939  0.272069
  8.283333  0.148646  1.231281  0.278689
  8.400000  0.148646  1.248623  0.285091
  8.516667  0.148646  1.265965  0.291302
  8.633333  0.148646  1.283307  0.297339
  8.750000  0.148646  1.300649  0.303219
  8.866667  0.148646  1.317991  0.308956
  8.983333  0.148646  1.335332  0.314561
  9.100000  0.148646  1.352674  0.320044
  9.216667  0.148646  1.370016  0.325413
  9.333333  0.148646  1.387358  0.330676
  9.450000  0.148646  1.404700  0.335840
  9.566667  0.148646  1.422042  0.614607
  9.683333  0.148646  1.439384  1.582202
  9.800000  0.148646  1.456726  2.852056
  9.916667  0.148646  1.474068  4.168235
  10.03333  0.148646  1.491410  5.284559
  10.15000  0.148646  1.508752  6.041830
  10.26667  0.148646  1.526094  6.574697
  10.38333  0.148646  1.543436  7.034652
  10.50000  0.148646  1.560778  7.465339
  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    1.2        SUM  PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2        SUM  IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76            PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76            IMPLND   1 999 EXTNL  PETINP
```

```
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     12.1      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

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

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

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

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

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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Appendix 4: Conveyance Analysis

Nothing is necessary for this appendix at this time

Appendix 5: Operations and Maintenance Manual

1. Operations and Maintenance Manual

Appendix 6: Special Reports and Studies

1. N/A