Exhibit "11-B"

Preliminary
Storm Drainage Report

FOR

GAGES CROSSING

BURLINGTON, WA

7/19/2023

Prepared for: Landed Gentry
504 E Fairhaven Avenue
Burlington, WA 98233

Prepared by: Sydney Stanton, E.I.T.
Approved by: Daniel J. Larson, P.E.
Date: July 19, 2023
Core No: 22127

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Table of Contents

Figures

Tables

Appendix

1. Project Overview

The Gages Crossing project is located in the City of Burlington. The subject property is approximately 13.36 acres. Skagit County parcel numbers and parcel areas are provided in Table 1.1 below.

Table 1-1 Parcel Areas	
Skagit County Parcel Numbers	**Area (acres)**
P62772	4.01
P62771	3.82
P72178	0.93
P72179	1.65
P72181	0.75
P133596	1.27
P133597	0.93
Total Area	13.36

The site is currently developed with two wood-framed single-family homes, a 2-story steel framed storage structure with carports, and three large industrial buildings along with driveways and utilities. The site is mostly vegetated with grass. A few trees are located near the Gages Slough. A majority of parcel P62771 contains Gages Slough and Critical Area buffer.

The proposed development of the site includes construction of 89 units, with associated access road and driveways as well as green spaces, bioretention, infiltration trenches and an infiltration pond. The site will be subdivided with each unit on a separate lot and the remaining areas in tracts.

The project will be designed using the guidelines and requirements established in the Washington State Department of Ecology 2019 Stormwater Management Manual for Western Washington (2019 SMMWW).

2. Conditions and Requirement Summary

The proposed project is classified as a new development which adds 5,000 square feet or more of new impervious surfaces. The project site is adding approximately 227,713SF of new impervious surface. Therefore, all nine minimum requirements will be addressed per Section 2.4.1 of the DOE Manual. Section 2.5 in Volume I of the DOE Manual lists the nine minimum requirements for development. The applicable minimum requirements, and how the project proposal addresses each, are listed below.

Minimum Requirement #1: Preparation of Stormwater Site Plans: Preliminary Civil Plans under separate cover and a Preliminary Storm Drainage Report herein have been prepared for the subject project.

Minimum Requirement #2: Construction Stormwater Pollution Prevention: A SWPPP Report using the Washington State DOE template will be provided during Final Engineering.

Minimum Requirement #3: Source Control Pollution: This project is classified as a single-family project and is not classified as a commercial property, industrial property, multifamily property, boatyard, or sand and gravel mining operation, so the implementation of source control BMPs is not required.

Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls: A majority of the site ponds and infiltrates on site. The critical buffer area flows to the Gages Slough. The site will maintain the natural discharge location by infiltrating runoff onsite through the use of infiltration trenches, bioretention cells, and an infiltration pond.

Minimum Requirement #5: On-Site Stormwater Management: The project falls under minimum requirement #1 through #9 and is within UGA area, thus LID BMP from List #2 is chosen to comply with minimum requirement #5. An evaluation of the feasibility of each BMP from list #2 is provided below.

The BMPs in list #2 will be considered for each surface and applied where feasible. The following is a discussion evaluating the feasibility of each BMP from list #2.

List #2

For each surface, consider the BMPs in the order listed for that type of surface. Use the BMP that is considered feasible. No other On-site Stormwater Management BMP is necessary for that surface. Feasibility shall be determined by the evaluation against:

1. Design criteria, limitations, and infeasibility criteria identified for each BMP in this manual; and
2. Competing Needs Criteria listed in Chapter V-5 – On-site Stormwater Management

Lawn and landscaped areas:

- Post-Construction Soil Quality and Depth in accordance with BMP T5.13.

Response: *BMP T5.13 will be implemented for all landscaped areas proposed by the project.*

Roofs:

1. Full dispersion in accordance with BMP T5.30 or Downspout Full Infiltration Systems in accordance with BMP T5.10A.

Response: *The project site cannot support the required 100-foot flow path, therefore this BMP is not applicable. Downspout full infiltration trenches will be implemented for each individual building and will overflow into the permanent conveyance system and ultimately the proposed infiltration pond.*

2. Bioretention facilities have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.

Response: *Five Bioretention Cells are proposed onsite along the internal private access road. The infiltration trenches for the buildings will overflow into the bioretention facilities, which then overflow into the permanent proposed conveyance system if necessary.*

3. Downspout Dispersion Systems in accordance with BMP T5.10B

Response: *The project site cannot support the required flowpath for full dispersion due to site constraints. This BMP is not applicable.*

4. Perforated Stub-out Connection in accordance with BMP T5.10C

Response: *The roofs are connected to infiltration trenches which overflow into the bioretention facility, therefore perforated stub-out connections are not proposed.*

Other Hard Surfaces:

1. Full dispersion in accordance with BMP T5.30 or Downspout Full Infiltration Systems in accordance with BMP T5.10A.

Response: *The project site cannot support the required flowpath for full dispersion due to site constraints. This BMP is not applicable. The site is proposing to fully infiltrate runoff through the use of an infiltration pond.*

2. Permeable pavement in accordance with BMP T5.15

Response: *The site is proposing to fully infiltrate other hard surfaces through the use of an infiltration pond as well as bioretention cells. Therefore, this BMP is not required.*

3. Bioretention BMPs have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.

Response: *Bioretention Cells are proposed onsite to mitigate both roof and other hard surface runoff.*

4. Sheet Flow Dispersion in accordance with BMP T5.12 or Concentrated Flow Dispersion in accordance with BMP T5.11.

Response: *The project site proposes to fully infiltrate impervious areas onsite through the use of an infiltration pond and bioretention cells. Therefore, this BMP is not required.*

Minimum Requirement #6: Runoff Treatment: See Section 4 of this report for runoff treatment facility information and sizing.

Minimum Requirement #7: Flow Control: Design of the flow control facilities is described in Section 4 of this Report. Infiltration trenches and an infiltration pond are proposed to mitigate flow onsite.

Minimum Requirement #8: Wetlands Protection: Gages Slough flows through the property. 150' critical area buffers will be maintained onsite.

Minimum Requirement #9: Operation and Maintenance: An Operation and Maintenance Manual has been provided in Section 9.

3. Off-Site Analysis

TASK 1 Study Area Definition and Maps

The proposed project is comprised of 7 parcels totaling approximately 13.38 acres. The site is zoned RA-1 Residential Attached per the City of Burlington Zoning Map.

TASK 2 Resource Review

FEMA Maps

A FEMA map dated number was reviewed. The developable site is The FEMA Map is included in Appendix A. The site is located within Zone A7 within the 100-year flood boundary. LOMA removal applications have been submitted to FEMA.

Sensitive Areas Folio

GageS Slough flows through the southern portion of the site. Sensitive Area Maps were reviewed. Per The Skagit County Aquifer Recharge Area Map, the site is located in the Lower Skagit Flow-Sensitive Area. Per the Skagit County Potential Landslide and Erosion Areas Map, no potential landslide and erosion areas are located onsite.

TASK 3 Field Investigation

Upstream Tributary Area

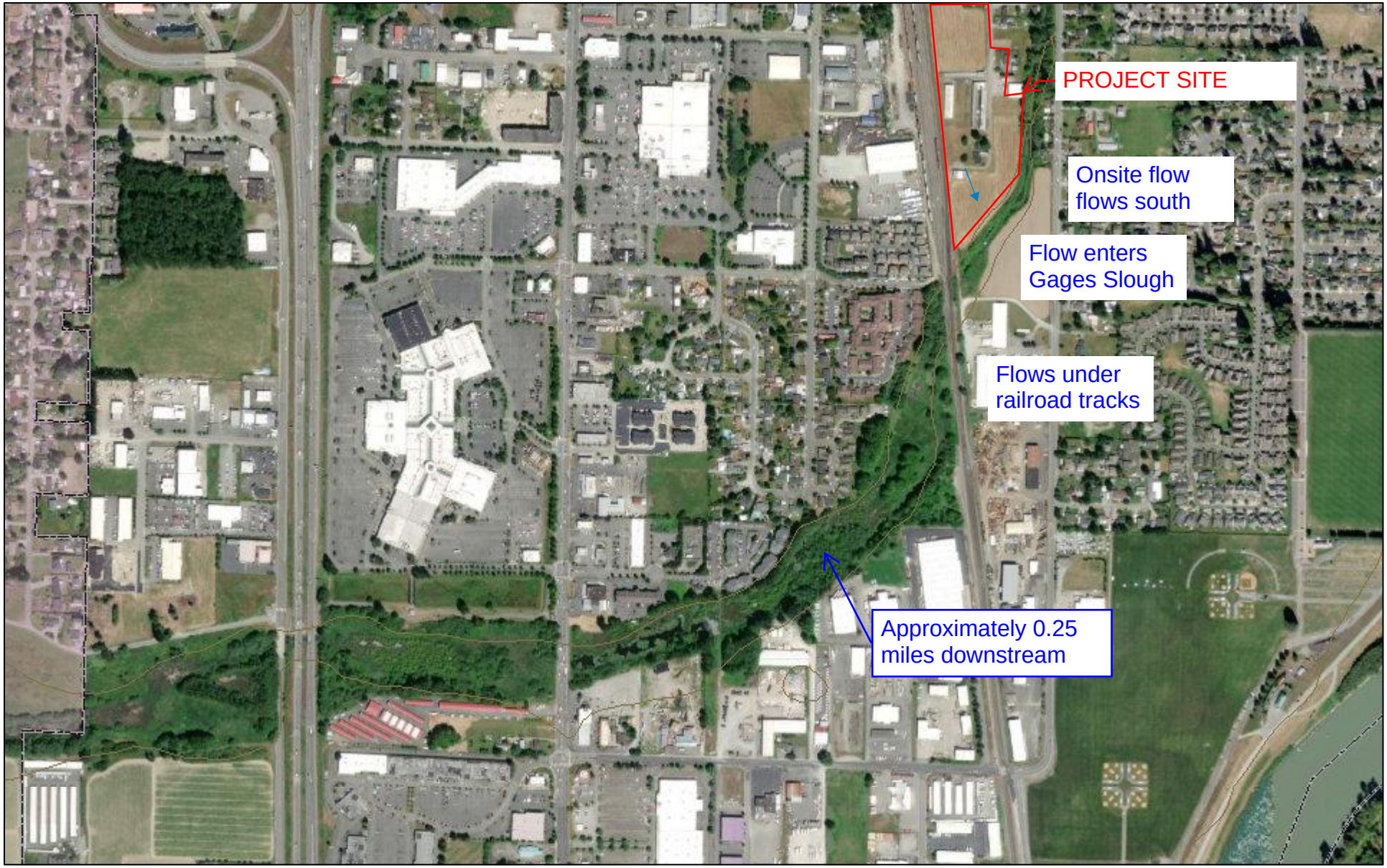
There is no upstream drainage onto the site.

TASK 4 Drainage system Description and Problem Description

Downstream Analysis

The project site and surrounding topography is very flat, therefore a majority of stormwater runoff on the site will pond and infiltrate into the onsite soils. Some flow will flow overland to the south and enter Gages Slough. Gages Slough flows southwest. Gages Slough flows underneath a railroad track bridge and then continues southwest for approximately 0.25 miles where the analysis is terminated.

Downstream Drainage Exhibit



June 16, 2023

1:9,028

0 0.075 0.15 0.3 mi

0 0.1 0.2 0.4 km

Legend

- County Boundary
- Incorporated Areas
- 500 foot contours
- 100 foot contours
- 20 foot contours
- NPDES Permit Area

Data Accuracy Warning: All GIS data was created from available public records and existing map sources. Map features have been adjusted to achieve a best-fit registration. While great care was taken in this process, maps from different sources rarely agree as to the precise location of geographic features. Map discrepancies can be as great as 300 feet.

4. Flow Control and Water Quality Facility Analysis and Design

Existing Conditions

The site is currently developed with two wood-framed single-family homes, a 2-story steel framed storage structure with carports, three larger industrial buildings along with with driveways and utilities. The site is mostly vegetated with grass. A few trees are located near Gages Slough. The site is modeled as Forested in the Existing Condition for sizing of the flow control facilities, as required in the 2019 SMMWW. Although the entire total area of the site is 14.87 acres as shown in Section 1, the total buildable area of the site that is tributary to the proposed flow control facilities is 5.02 Acres. The buildings along the west property line will be mitigated entirely by infiltration trenches and this area is not included in the modeling of the flow control facilities. Refer to the Existing Conditions Exhibit included in this section.

Table 4-1 Existing Condition Onsite Areas	
Land Cover	**Area (acres)**
Forested (to Flow Control Facility)	5.02

The project is also required to provide frontage improvements along S Pine Street. The existing areas along S Pine Street are included in Table 4-2 below.

Table 4-2 Offsite Existing Areas - S Pine Street				
	Impervious	Pervious	Total (sf)	Total (ac)
Road	19,142	-	19,142	0.44
Sidewalk	-	-	-	-
Landscaping	-	29,692	29,692	0.68
Total (sf)	19,142	29,692	48,834	1.12
Total (ac)	0.44	0.68	1.12	

SEC. XX, TWP. XX N., RGE. X E., W.M.

S PINE ST EXISTING FRONTAGE
IMPERVIOUS AREA = 0.44 AC
PERVIOUS AREA = 0.68 AC
TOTAL = 1.12 AC

ONSITE DEVELOPED AREA TRIBUTARY TO INFILTRATION POND
TOTAL (FORESTED) = 5.02 AC

S. ANACORTES ST. (PUBLIC RIGHT-OF-WAY)

S. PINE STREET (PUBLIC RIGHT-OF-WAY)

CRITICAL AREA

PARCEL A
PARCEL B
PARCEL C
PARCEL D
PARCEL E

CEDAR ST VACATED

AREA TO BE MITIGATED ENTIRELY WITH INFILTRATION TRENCHES

851.60

N06°43'14"W 789.

N06°43'14"W 643.

638,608 SF

60.01

16.5'
15.4'
14.0'
14.1'

MOST E'LY RAIL

SCALE: 1" = 100'
0 25 50 100

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EXISTING CONDITION EXHIBIT
DYNES FARM PROPERTIES
LANDED GENTRY
504 E FAIRHAVEN AVENUE
BURLINGTON, WA 98233

DATE JUNE 2023
DESIGNED
DRAWN
APPROVED
PROJECT MANAGER

SHEET OF

PROJECT NUMBER
22127

Developed Conditions

The proposed development of the site includes construction of 89 units, with associated access roads and driveways as well as green spaces, bioretention and an infiltration pond. Frontage improvements along S. Pine Street include roadway, sidewalk, and infiltration trenches on the west side of the road. Table 4.3 below shows the entire onsite area tributary to the flow control facilities. Table 4-4 below shows the proposed frontage improvements along S Pine St.

Table 4-3 Onsite Proposed - Total

	Impervious	Pervious	Total (sf)	Total (ac)
Roof	64,488	-	64,488	1.48
Road	41,267	-	41,267	0.95
Driveway/Sidewalk	28,676	-	28,676	0.66
Landscape	-	84,251	84,251	1.93
Total (sf)	134,431	84,251	218,682	5.02
Total (ac)	3.09	1.93	5.02	

Table 4-4 Offsite Proposed - Pine Street

	Impervious	Pervious	Total (sf)	Total (ac)
Road	37,992	-	37,992	0.87
Sidewalk	6,738	-	6,738	0.15
Landscaping	-	4,104	4,104	0.09
Total (sf)	44,730	4,104	48,834	1.12
Total (ac)	1.03	0.09	1.12	

A majority of the site will flow into bioretention cells where infiltration will be maximized before being conveyed to the onsite infiltration pond. The basin that is tributary to the bioretention cells and the basin that is tributary directly to the infiltration pond are separated into Table 4-5 and Table 4-6 below. These areas are used for modeling of the flow control facilities. Refer to the Developed Conditions Exhibit included in this section.

Table 4-5 Onsite Proposed - Bioretention

	Impervious	Pervious	Total (sf)	Total (ac)
Roof	51,646	-	51,646	1.19
Road	35,180	-	35,180	0.81
Driveway/Sidewalk	24,082	-	24,082	0.55
Landscape	-	60,245	60,245	1.38
Total (sf)	110,908	60,245	171,153	3.93
Total (ac)	2.55	1.38	3.93	

Table 4-6 Onsite Proposed - Infiltration Pond				
	Impervious	Pervious	Total (sf)	Total (ac)
Roof	12,842	-	12,842	0.29
Road	6,087	-	6,087	
Driveway/Sidewalk	4,594	-	4,594	0.11
Landscape	-	24,006	24,006	0.55
Total (sf)	23,523	24,006	47,529	1.09
Total (ac)	0.54	0.55	1.09	

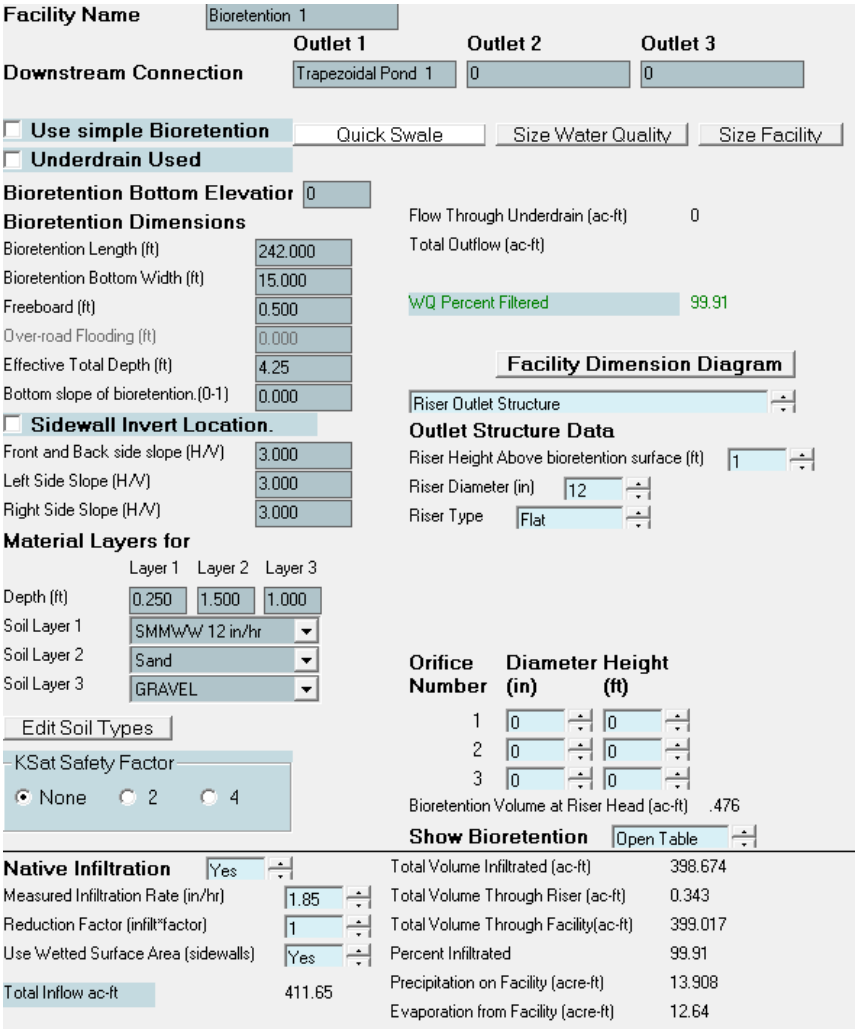
Flow Control

The site is proposing to implement bioretention and infiltration pond onsite to mitigate flows from impervious areas. Modeling of the facilities was done in WWHM, an approved modeling software by the 2019 SMMWW. The required performance standard for the project is for stormwater discharges to match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 50% of the 2-year peak flow to the full 50-year peak flow.

Bioretention

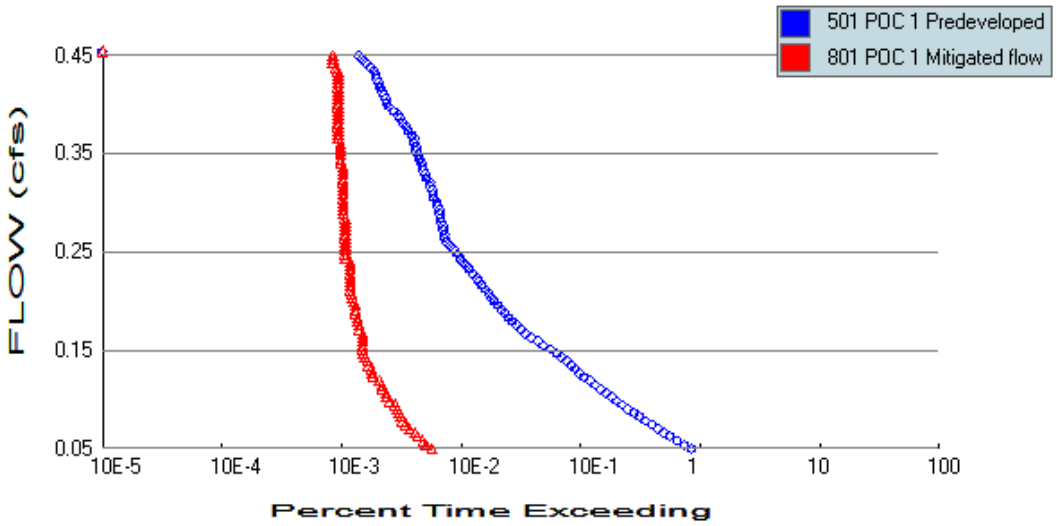
The site proposes to implement 5 connected bioretention cells onsite to mitigate a portion of the flow onsite. The bioretention cells will mitigate flow from the northern portion of the onsite loop roadway as well as flow from roofs and driveways on the northern portion of the site.

All of the individual bioretention cells are inter-connected and are modeled as a single facility. The design infiltration rate used is 1.85 in/hr and has been provided by the geotechnical engineer as a result of PIT tests completed on the project site. Design information used for modeling in WWHM is included below.



Infiltration Pond

An infiltration pond is proposed onsite to mitigate a portion of the onsite flows. The infiltration pond will mitigate flow from the southern portion of the onsite loop roadway as well as flow from roofs and driveways on the southern portion of the site. Stormwater runoff from the bioretention cells will be conveyed to the infiltration pond in the event of an overflow. The graph from the WWHM model is included below and shows that the infiltration pond meets the flow control requirement for the site. The full WWHM report is included in the Appendix.



Infiltration Trenches

Infiltration trenches are proposed along the west side of S. Pine Street to mitigate runoff from the proposed roadway and frontage improvements. The trenches will be sized to mitigate any increase in impervious surface as a result of the project. Existing and proposed areas along S Pine St in the frontage are shown in Table 4-2 and 4-4. Design of these infiltration trenches will be determined in final engineering.

Water Quality

The project is required to provide water quality treatment per Minimum Requirement #6 of the 2019 SMMWW. As shown in the clip from the bioretention design above, the bioretention facilities provide water quality treatment onsite for 99.91% of stormwater runoff. Complete design of the treatment facilities will be provided during final engineering.

To provide runoff treatment for the frontage improvements that are not tributary to the onsite facilities, the project will proposed stormfilter catch basins that will provide treatment before entering the infiltration trenches. Design of the stormfilter catch basins will be provided during final engineering.

SEC. XX, TWP. XX N., RGE. X E., W.M.

S PINE ST FRONTAGE IMPROVEMENTS
IMPERVIOUS AREA = 1.03 AC
PERVIOUS AREA = 0.09 AC
TOTAL = 1.12 AC

ONSITE DEVELOPED AREA TRIBUTARY TO INFILTRATION POND
IMPERVIOUS AREA = 3.09 AC
PERVIOUS AREA = 1.93 AC
TOTAL = 5.02 AC

CRITICAL AREA

BIORETENTION CELL (TYP)

AREA TO BE MITIGATED ENTIRELY WITH INFILTRATION TRENCHES

BASIN LINE. AREA NORTH OF LINE TRIBUTARY TO BIORETENTION CELLS, AREA SOUTH OF LINE CONVEYED DIRECTLY TO INFILTRATION POND

INFILTRATION POND

SCALE: 1" = 100'

0 25 50 100

NO.	REVISIONS	DATE

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN

12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

DEVELOPED CONDITION EXHIBIT

DYNES FARM PROPERTIES

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5. Conveyance System and Analysis and Design

Conveyance System Analysis and Design will be provided in final engineering.

6. Special Reports and Studies

The following reports have been submitted under separate cover.

The following reports and assessments are provided for reference and informational purposes only. Core Design takes no responsibility or liability for these reports, assessments or designs as they were not completed under the direct supervision of Core Design.

- Preliminary Stormwater Infiltration Feasibility Assessment
    - Prepared by: GeoTest
    - Date: September 15, 2022

7. Erosion and Sedimentation Control Analysis and Design

Erosion and Sedimentation Analysis and Design will be provided in final engineering.

8. Bond Quantities, Facility Summaries and Declaration of Covenant

Bond Quantities, Facility Summaries, and Declaration of Covenant will be provided in final engineering.

9. Operations and Maintenance Manual

Operations and Maintenance Manual is provided below.

Table V-A.1: Maintenance Standards - Detention Ponds (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
	Liner (if Applicable)	Liner is visible and has more than three 1/4-inch holes in it.	Liner repaired or replaced. Liner is fully covered.
Ponds Berms (Dikes)	Settlements	Any part of berm which has settled 4 inches lower than the design elevation If settlement is apparent, measure berm to determine amount of settlement Settling can be an indication of more severe problems with the berm or outlet works. A licensed engineer in the state of Washington should be consulted to determine the source of the settlement.	Dike is built back to the design elevation.
	Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Goethechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential resolved.
Emergency Overflow/ Spillway and Berms over 4 feet in height	Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping. Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed engineer in the state of Washington should be consulted for proper berm/spillway restoration.
	Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential resolved.
Emergency Overflow/Spillway	Emergency Overflow/Spillway	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway. (Rip-rap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
	Erosion	See "Side Slopes of Pond"	

Table V-A.2: Maintenance Standards - Infiltration

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash & Debris	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Poisonous/Noxious Vegetation	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Contaminants and Pollution	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Rodent Holes	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
Storage Area	Sediment	Water ponding in infiltration pond after rainfall ceases and appropriate time allowed for infiltration. Treatment basins should infiltrate Water Quality Design Storm Volume within 48 hours, and empty within 24 hours after cessation of most rain events.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design.

Table V-A.2: Maintenance Standards - Infiltration (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
		(A percolation test pit or test of facility indicates facility is only working at 90% of its designed capabilities. Test every 2 to 5 years. If two inches or more sediment is present, remove).	
Filter Bags (if applicable)	Filled with Sediment and Debris	Sediment and debris fill bag more than 1/2 full.	Filter bag is replaced or system is redesigned.
Rock Filters	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Gravel in rock filter is replaced.
Side Slopes of Pond	Erosion	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
Emergency Overflow Spillway and Berms over 4 feet in height.	Tree Growth	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Piping	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
Emergency Overflow Spillway	Rock Missing	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Erosion	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
Pre-settling Ponds and Vaults	Facility or sump filled with Sediment and/or debris	6" or designed sediment trap depth of sediment.	Sediment is removed.

Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning.
	Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for 1/2 length of storage vault or any point depth exceeds 15% of diameter. (Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than 1/2 length of tank.)	All sediment and debris removed from storage area.
	Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into facility. (Will require engineering analysis to determine structural stability).	All joint between tank/pipe sections are sealed.
	Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of its design shape. (Review required by engineer to determine structural stability).	Tank/pipe repaired or replaced to design.
	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound. Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	Vault replaced or repaired to design specifications and is structurally sound. No cracks more than 1/4-inch wide at the joint of the inlet/outlet pipe.

Table V-A.5: Maintenance Standards - Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%. Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe. Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height. Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No Trash or debris located immediately in front of catch basin or on grate opening. No trash or debris in the catch basin. Inlet and outlet pipes free of trash or debris. No dead animals or vegetation present within the catch basin.
	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch. (Intent is to make sure no material is running into basin). Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	Top slab is free of holes and cracks. Frame is sitting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound. Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Basin replaced or repaired to design standards. Pipe is regrouted and secure at basin wall.
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening. Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation blocking opening to basin. No vegetation or root growth present.
	Contamination and Pollution	See Table V-A.1: Maintenance Standards - Detention Ponds	No pollution present.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Cover/grate is in place, meets design standards, and is secured
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place, meets the design standards, and is installed and aligned with the flow path.

Table V-A.21: Maintenance Standards - Bioretention Facilities

Maintenance Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Facility Footprint				
Earthen side slopes and berms	B, S		Erosion (gullies/ rills) greater than 2 inches deep around inlets, outlet, and alongside slopes	• Eliminate cause of erosion and stabilize damaged area (regrade, rock, vegetation, erosion control matting) • For deep channels or cuts (over 3 inches in ponding depth), temporary erosion control measures should be put in place until permanent repairs can be made. • Properly designed, constructed and established facilities with appropriate flow velocities should not have erosion problems except perhaps in extreme events. If erosion problems persist, the following should be reassessed: (1) flow volumes from contributing areas and bioretention facility sizing; (2) flow velocities and gradients within the facility; and (3) flow dissipation and erosion protection strategies at the facility inlet.
	A		Erosion of sides causes slope to become a hazard	Take actions to eliminate the hazard and stabilize slopes
	A, S		Settlement greater than 3 inches (relative to undisturbed sections of berm)	Restore to design height
	A, S		Downstream face of berm wet, seeps or leaks evident	Plug any holes and compact berm (may require consultation with engineer, particularly for larger berms)
	A		Any evidence of rodent holes or water piping in berm	• Eradicate rodents (see "Pest control") • Fill holes and compact (may require consultation with engineer, particularly for larger berms)
Concrete sidewalls	A		Cracks or failure of concrete sidewalls	• Repair/ seal cracks • Replace if repair is insufficient
Rockery sidewalls	A		Rockery side walls are insecure	Stabilize rockery sidewalls (may require consultation with engineer, particularly for walls 4 feet or greater in height)
Facility area		All maintenance visits (at least biannually)	Trash and debris present	Clean out trash and debris
Facility bottom area	A, S		Accumulated sediment to extent that infiltration rate is reduced (see "Ponded water") or surface storage capacity significantly impacted	• Remove excess sediment • Replace any vegetation damaged or destroyed by sediment accumulation and removal • Mulch newly planted vegetation • Identify and control the sediment source (if feasible) • If accumulated sediment is recurrent, consider adding presettlement or installing berms to create a forebay at the inlet
		During/after fall leaf drop	Accumulated leaves in facility	Remove leaves if there is a risk to clogging outlet structure or water flow is impeded
Low permeability check dams and weirs	A, S		Sediment, vegetation, or debris accumulated at or blocking (or having the potential to block) check dam, flow control weir or orifice	Clear the blockage
	A, S		Erosion and/or undercutting present	Repair and take preventative measures to prevent future erosion and/or undercutting
	A		Grade board or top of weir damaged or not level	Restore to level position

Table V-A.21: Maintenance Standards - Bioretention Facilities (continued)

Maintenance Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Ponded water	B, S		Excessive ponding water: Water overflows during storms smaller than the design event or ponded water remains in the basin 48 hours or longer after the end of a storm.	Determine cause and resolve in the following order: 1. Confirm leaf or debris buildup in the bottom of the facility is not impeding infiltration. If necessary, remove leaf litter/debris. 2. Ensure that underdrain (if present) is not clogged. If necessary, clear underdrain. 3. Check for other water inputs (e.g., groundwater, illicit connections). 4. Verify that the facility is sized appropriately for the contributing area. Confirm that the contributing area has not increased. If steps #1-4 do not solve the problem, the bioretention soil is likely clogged by sediment accumulation at the surface or has become overly compacted. Dig a small hole to observe soil profile and identify compaction depth or clogging front to help determine the soil depth to be removed or otherwise rehabilitated (e.g., tilled). Consultation with an engineer is recommended.
Bioretention soil mix	As needed		Bioretention soil mix protection is needed when performing maintenance requiring entrance into the facility footprint	• Minimize all loading in the facility footprint (foot traffic and other loads) to the degree feasible in order to prevent compaction of bioretention soils. • Never drive equipment or apply heavy loads in facility footprint. • Because the risk of compaction is higher during saturated soil conditions, any type of loading in the cell (including foot traffic) should be minimized during wet conditions. • Consider measures to distribute loading if heavy foot traffic is required or equipment must be placed in facility. As an example, boards may be placed across soil to distribute loads and minimize compaction. • If compaction occurs, soil must be loosened or otherwise rehabilitated to original design state.
Inlets/Outlets/Pipes				
Splash block inlet	A		Water is not being directed properly to the facility and away from the inlet structure	Reconfigure/ repair blocks to direct water to facility and away from structure
Curb cut inlet/outlet	M during the wet season and before severe storm is forecasted	Weekly during fall leaf drop	Accumulated leaves at curb cuts	Clear leaves (particularly important for key inlets and low points along long, linear facilities)
Pipe inlet/outlet	A		Pipe is damaged	Repair/ replace
	W		Pipe is clogged	Remove roots or debris
	A, S		Sediment, debris, trash, or mulch reducing capacity of inlet/outlet	• Clear the blockage • Identify the source of the blockage and take actions to prevent future blockages
		Weekly during fall leaf drop	Accumulated leaves at inlets/outlets	Clear leaves (particularly important for key inlets and low points along long, linear facilities)
		A	Maintain access for inspections	• Clear vegetation (transplant vegetation when possible) within 1 foot of inlets and outlets, maintain access pathways • Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants

Table V-A.21: Maintenance Standards - Bioretention Facilities (continued)

Maintenance Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Erosion control at inlet	A		Concentrated flows are causing erosion	Maintain a cover of rock or cobbles or other erosion protection measure (e.g., matting) to protect the ground where concentrated water enters the facility (e.g., a pipe, curb cut or swale)
Trash rack	S		Trash or other debris present on trash rack	Remove/dispose
	A		Bar screen damaged or missing	Repair/replace
Overflow	A, S		Capacity reduced by sediment or debris	Remove sediment or debris/dispose
Underdrain pipe	Clean pipe as needed	Clean orifice at least biannually (may need more frequent cleaning during wet season)	• Plant roots, sediment or debris reducing capacity of underdrain • Prolonged surface ponding (see "Ponded water"	• Jet clean or rotary cut debris/roots from underdrain(s) • If underdrains are equipped with a flow restrictor (e.g., orifice) to attenuate flows, the orifice must be cleaned regularly.
Vegetation				
Facility bottom area and upland slope vegetation	Fall and Spring		Vegetation survival rate falls below 75% within first two years of establishment (unless project O&M manual or record drawing stipulates more or less than 75% survival rate).	• Determine cause of poor vegetation growth and correct condition • Replant as necessary to obtain 75% survival rate or greater. Refer to original planting plan, or approved jurisdictional species list for appropriate plant replacements (See Appendix 3 - Bioretention Plant List, in the *LID Technical Guidance Manual for Puget Sound*, (Hinman and Wulkan, 2012)). • Confirm that plant selection is appropriate for site growing conditions • Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants
Vegetation (general)	As needed		Presence of diseased plants and plant material	• Remove any diseased plants or plant parts and dispose of in an approved location (e.g., commercial landfill) to avoid risk of spreading the disease to other plants • Disinfect gardening tools after pruning to prevent the spread of disease • See the *Pacific Northwest Plant Disease Management Handbook* (Pscheidt and Ocamb, 2016) for information on disease recognition and for additional resources • Replant as necessary according to recommendations provided for "facility bottom area and upland slope vegetation".
Trees and shrubs		All pruning seasons (timing varies by species)	Pruning as needed	• Prune trees and shrubs in a manner appropriate for each species. Pruning should be performed by landscape professionals familiar with proper pruning techniques • All pruning of mature trees should be performed by or under the direct guidance of an ISA certified arborist
	A		Large trees and shrubs interfere with operation of the facility or access for maintenance	• Prune trees and shrubs using most current ANSI A300 standards and ISA BMPs. • Remove trees and shrubs, if necessary.
	Fall and Spring		Standing dead vegetation is present	• Remove standing dead vegetation • Replace dead vegetation within 30 days of reported dead and dying plants (as practical depending on weather/planting season) • If vegetation replacement is not feasible within 30 days, and absence of vegetation may result in erosion problems, temporary erosion control measures should be put in place immediately. • Determine cause of dead vegetation and address issue, if possible

Table V-A.21: Maintenance Standards - Bioretention Facilities (continued)

Maintenance Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
				• If specific plants have a high mortality rate, assess the cause and replace with appropriate species. Consultation with a landscape architect is recommended.
	Fall and Spring		Planting beneath mature trees	• When working around and below mature trees, follow the most current ANSI A300 standards and ISA BMPs to the extent practicable (e.g., take care to minimize any damage to tree roots and avoid compaction of soil). • Planting of small shrubs or groundcovers beneath mature trees may be desirable in some cases; such plantings should use mainly plants that come as bulbs, bare root or in 4-inch pots; plants should be in no larger than 1-gallon containers.
	Fall and Spring		Presence of or need for stakes and guys (tree growth, maturation, and support needs)	• Verify location of facility liners and underdrain (if any) prior to stake installation in order to prevent liner puncture or pipe damage • Monitor tree support systems: Repair and adjust as needed to provide support and prevent damage to tree. • Remove tree supports (stakes, guys, etc.) after one growing season or maximum of 1 year. • Backfill stake holes after removal.
Trees and shrubs adjacent to vehicle travel areas (or areas where visibility needs to be maintained)	A		Vegetation causes some visibility (line of sight) or driver safety issues	• Maintain appropriate height for sight clearance • When continued, regular pruning (more than one time/ growing season) is required to maintain visual sight lines for safety or clearance along a walk or drive, consider relocating the plant to a more appropriate location. • Remove or transplant if continual safety hazard • Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants
Flowering plants		A	Dead or spent flowers present	Remove spent flowers (deadhead)
Perennials		Fall	Spent plants	Cut back dying or dead and fallen foliage and stems
Emergent vegetation		Spring	Vegetation compromises conveyance	Hand rake sedges and rushes with a small rake or fingers to remove dead foliage before new growth emerges in spring or earlier only if the foliage is blocking water flow (sedges and rushes do not respond well to pruning)
Ornamental grasses (perennial)		Winter and Spring	Dead material from previous year's growing cycle or dead collapsed foliage	• Leave dry foliage for winter interest • Hand rake with a small rake or fingers to remove dead foliage back to within several inches from the soil before new growth emerges in spring or earlier if the foliage collapses and is blocking water flow
Ornamental grasses (evergreen)		Fall and Spring	Dead growth present in spring	• Hand rake with a small rake or fingers to remove dead growth before new growth emerges in spring • Clean, rake, and comb grasses when they become too tall • Cut back to ground or thin every 2-3 years as needed
Noxious weeds		M (March - October, preceding seed dispersal)	Listed noxious vegetation is present (refer to current county noxious weed list)	• By law, class A & B noxious weeds must be removed, bagged and disposed as garbage immediately • Reasonable attempts must be made to remove and dispose of class C noxious weeds • It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality; use of herbicides and pesticides may be prohibited in some jurisdictions • Apply mulch after weed removal (see "Mulch")
Weeds		M (March - October,	Weeds are present	• Remove weeds with their roots manually with pincer-type weeding tools, flame weeders, or hot water weeders as

Table V-A.21: Maintenance Standards - Bioretention Facilities (continued)

Maintenance Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
		preceding seed dispersal)		appropriate • Follow IPM protocols for weed management (see "Additional Maintenance Resources" section for more information on IPM protocols)
Excessive vegetation		Once in early to mid- May and once in early- to mid-September	Low-lying vegetation growing beyond facility edge onto sidewalks, paths, or street edge poses pedestrian safety hazard or may clog adjacent permeable pavement surfaces due to associated leaf litter, mulch, and soil	• Edge or trim groundcovers and shrubs at facility edge • Avoid mechanical blade-type edger and do not use edger or trimmer within 2 feet of tree trunks • While some clippings can be left in the facility to replenish organic material in the soil, excessive leaf litter can cause surface soil clogging
	As needed		Excessive vegetation density inhibits stormwater flow beyond design ponding or becomes a hazard for pedestrian and vehicular circulation and safety	• Determine whether pruning or other routine maintenance is adequate to maintain proper plant density and aesthetics • Determine if planting type should be replaced to avoid ongoing maintenance issues (an aggressive grower under perfect growing conditions should be transplanted to a location where it will not impact flow) • Remove plants that are weak, broken or not true to form; replace in-kind • Thin grass or plants impacting facility function without leaving visual holes or bare soil areas • Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants
	As needed		Vegetation blocking curb cuts, causing excessive sediment buildup and flow bypass	Remove vegetation and sediment buildup
Mulch				
Mulch		Following weeding	Bare spots (without mulch cover) are present or mulch depth less than 2 inches	• Supplement mulch with hand tools to a depth of 2 to 3 inches • Replenish mulch per O&M manual. Often coarse compost is used in the bottom of the facility and arborist wood chips are used on side slopes and rim (above typical water levels) • Keep all mulch away from woody stems
Watering				
Irrigation system (if any)		Based on manufacturer's instructions	Irrigation system present	Follow manufacturer's instructions for O&M
	A		Sprinklers or drip irrigation not directed/located to properly water plants	Redirect sprinklers or move drip irrigation to desired areas
Summer watering (first year)		Once every 1-2 weeks or as needed during prolonged dry periods	Trees, shrubs and groundcovers in first year of establishment period	• 10 to 15 gallons per tree • 3 to 5 gallons per shrub • 2 gallons water per square foot for groundcover areas • Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist • Use soaker hoses or spot water with a shower type wand when irrigation system is not present ◦ Pulse water to enhance soil absorption, when feasible

Table V-A.21: Maintenance Standards - Bioretention Facilities (continued)

Maintenance Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
				◦ Pre-moisten soil to break surface tension of dry or hydrophobic soils/mulch, followed by several more passes. With this method , each pass increases soil absorption and allows more water to infiltrate prior to runoff • Add a tree bag or slow-release watering device (e.g., bucket with a perforated bottom) for watering newly installed trees when irrigation system is not present
Summer watering (second and third years)		Once every 2-4 weeks or as needed during prolonged dry periods	Trees, shrubs and groundcovers in second or third year of establishment period	• 10 to 15 gallons per tree • 3 to 5 gallons per shrub • 2 gallons water per square foot for groundcover areas • Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist • Use soaker hoses or spot water with a shower type wand when irrigation system is not present ◦ Pulse water to enhance soil absorption, when feasible ◦ Pre-moisten soil to break surface tension of dry or hydrophobic soils/mulch, followed by several more passes. With this method , each pass increases soil absorption and allows more water to infiltrate prior to runoff
Summer watering (after establishment)		As needed	Established vegetation (after 3 years)	• Plants are typically selected to be drought tolerant and not require regular watering after establishment; however, trees may take up to 5 years of watering to become fully established • Identify trigger mechanisms for drought-stress (e.g., leaf wilt, leaf senescence, etc.) of different species and water immediately after initial signs of stress appear • Water during drought conditions or more often if necessary to maintain plant cover
Pest Control				
Mosquitoes	B, S		Standing water remains for more than 3 days after the end of a storm	• Identify the cause of the standing water and take appropriate actions to address the problem (see "Ponded water") • To facilitate maintenance, manually remove standing water and direct to the storm drainage system (if runoff is from non pollution-generating surfaces) or sanitary sewer system (if runoff is from pollution-generating surfaces) after getting approval from sanitary sewer authority. • Use of pesticides or *Bacillus thuringiensis israelensis* (Bti) may be considered only as a temporary measure while addressing the standing water cause. If overflow to a surface water will occur within 2 weeks after pesticide use, apply for coverage under the Aquatic Mosquito Control NPDES General Permit.
Nuisance animals	As needed		Nuisance animals causing erosion, damaging plants, or depositing large volumes of feces	• Reduce site conditions that attract nuisance species where possible (e.g., plant shrubs and tall grasses to reduce open areas for geese, etc.) • Place predator decoys • Follow IPM protocols for specific nuisance animal issues (see "Additional Maintenance Resources" section for more information on IPM protocols) • Remove pet waste regularly • For public and right-of-way sites consider adding garbage cans with dog bags for picking up pet waste.
Insect pests	Every site visit associated with		Signs of pests, such as wilting leaves, chewed leaves and bark, spotting or other indicators	• Reduce hiding places for pests by removing diseased and dead plants • For infestations, follow IPM protocols (see "Additional Maintenance Resources" section for more information on IPM

Table V-A.21: Maintenance Standards - Bioretention Facilities (continued)

Maintenance Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
	vegetation management			protocols)

Note that the inspection and routine maintenance frequencies listed above are recommended by Ecology. They do not supersede or replace the municipal stormwater permit requirements for inspection frequency required of municipal stormwater permittees for "stormwater treatment and flow control BMPs/facilities".

[a] Frequency: A = Annually; B = Biannually (twice per year); M = Monthly; W = At least one visit should occur during the wet season (for debris/clog related maintenance, this inspection/maintenance visit should occur in the early fall, after deciduous trees have lost their leaves); S = Perform inspections after major storm events (24-hour storm event with a 10-year or greater recurrence interval).

IPM - Integrated Pest Management

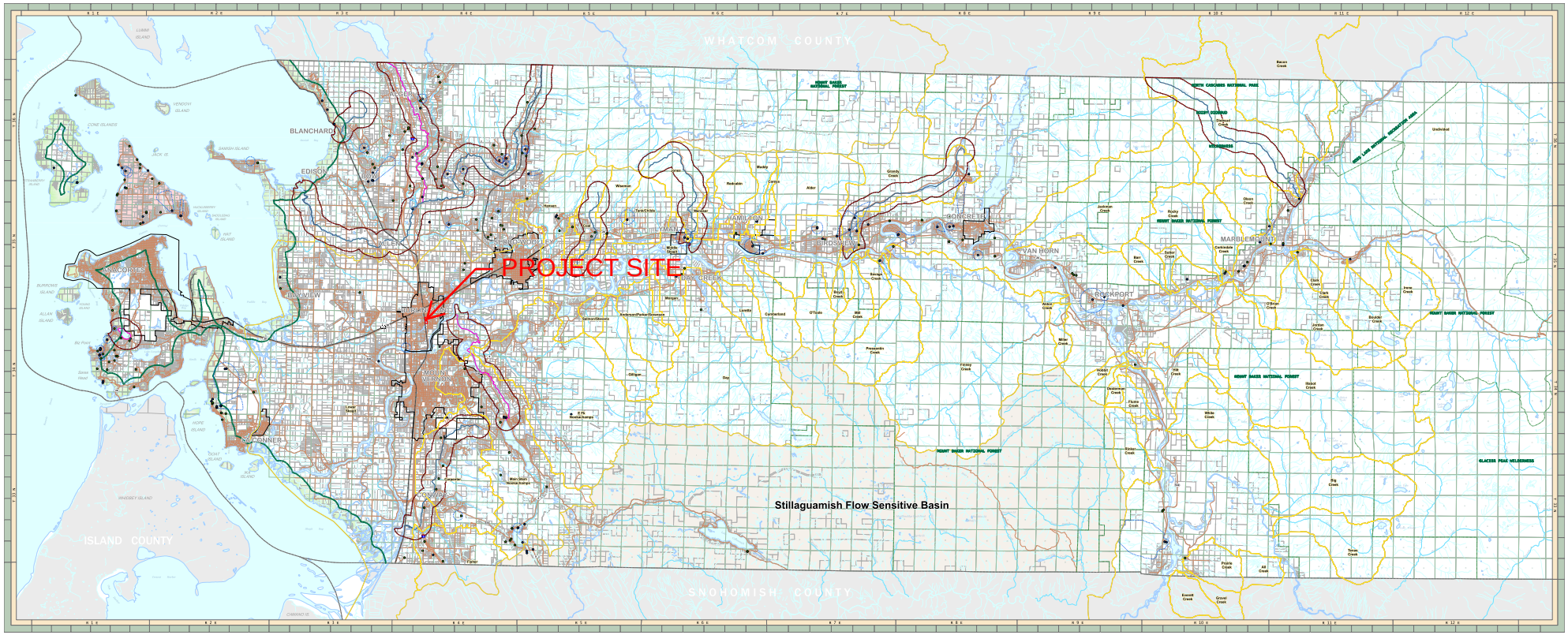
ISA - International Society of Arboriculture

Table V-A.22: Maintenance Standards - Permeable Pavement

Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Surface/Wearing Course				
Permeable Pavements, all	A, S		Runoff from adjacent pervious areas deposits soil, mulch or sediment on paving	• Clean deposited soil or other materials from permeable pavement or other adjacent surfacing • Check if surface elevation of planted area is too high, or slopes towards pavement, and can be regraded (prior to regrading, protect permeable pavement by covering with temporary plastic and secure covering in place) • Mulch and/or plant all exposed soils that may erode to pavement surface
Porous asphalt or pervious concrete		A or B	None (routine maintenance)	Clean surface debris from pavement surface using one or a combination of the following methods: • Remove sediment, debris, trash, vegetation, and other debris deposited onto pavement (rakes and leaf blowers can be used for removing leaves) • Vacuum/sweep permeable paving installation using: ◦ Walk-behind vacuum (sidewalks) ◦ High efficiency regenerative air or vacuum sweeper (roadways, parking lots) ◦ ShopVac or brush brooms (small areas) • Hand held pressure washer or power washer with rotating brushes Follow equipment manufacturer guidelines for when equipment is most effective for cleaning permeable pavement. Dry weather is more effective for some equipment.
	A[b]		Surface is clogged: Ponding on surface or water flows off the permeable pavement surface during a rain event (does not infiltrate)	• Review the overall performance of the facility (note that small clogged areas may not reduce overall performance of facility) • Test the surface infiltration rate using ASTM C1701 as a corrective maintenance indicator. Perform one test per installation, up to 2,500 square feet. Perform an additional test for each additional 2,500 square feet up to 15,000 square feet total. Above 15,000 square feet, add one test for every 10,000 square feet. • If the results indicate an infiltration rate of 10 inches per hour or less, then perform corrective maintenance to restore permeability. To clean clogged pavement surfaces, use one or combination of the following methods:

Appendix A

Sensitive Area Maps



Skagit County

Aquifer Recharge Area Map
Category 1 Areas
SCC 14.24.310
January 11, 2010

Category 1 Areas SCC 14.24.310

Other

January 11, 2010

Map Produced By: Skagit County GIS

MAP AREA

PROJECT SITE

City of Burlington Zoning Map

Legend

- [R-1-6.0] Single Family Residence
- [R-1-7.6] Single Family Residence
- [R-1-8.4] Single Family Residence
- [R-1-9.6] Single Family Residence
- [R-2] Two Family Residence
- [R-3] Multi Family Residence
- [R-S] Semi-Public District
- [B-1] Business District
- [B-P] Business Park District
- [C-1] Commercial District
- [C-2] Heavy Commercial
- [M-1] Industrial District
- [MR-NB] Medium Density Residential & Neighborhood Business
- [OSPA] Open Space, Parks & Agriculture
- [T-C] Tranportation Corridor
- City Limits

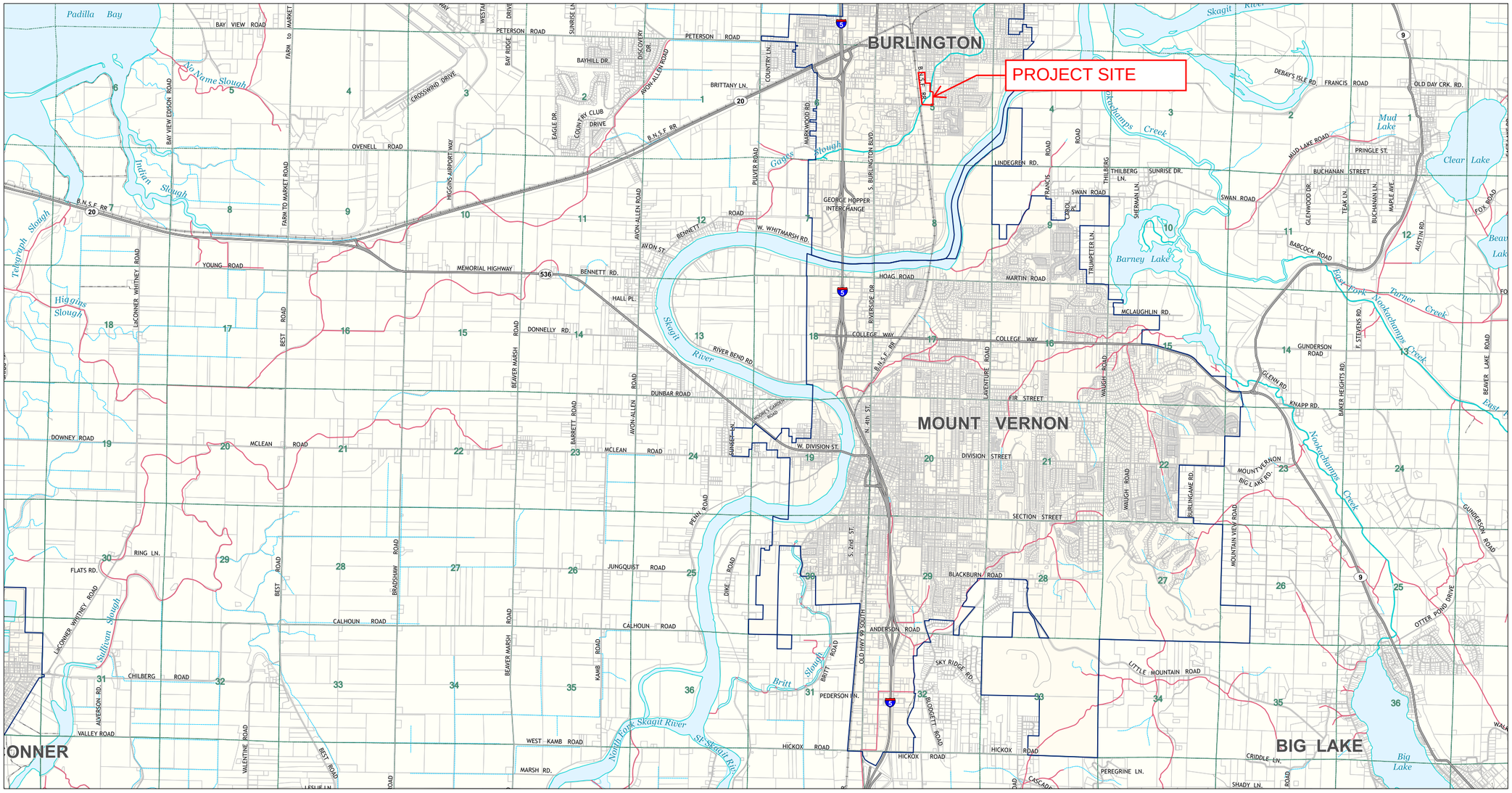
This map adopted by the Burlington City Council through Ordinance 1850 on December 28, 2017.
Amended December 27, 2018 Ordinance No. 1867
This map shall replace and supersede all previous zoning maps effective March 1, 2019.

Steve Sexton, Mayor

Map Print Date:
January 30, 2019

0 500 1,000 2,000
Feet

CITY OF Burlington
SKAGIT COUNTY, WASHINGTON INCORPORATED 1902



SKAGIT COUNTY
DNR (WC) Hydrography

October 25, 2021

Legend

D.N.R. Fish Habitat Water Type Code

- (S) *Designated Shoreline of the State as defined in WAC 222-16-030*
- (F) *Fish Habitat as defined in WAC 222-16-030 (2)*
- (N) *Non-fish Habitat as defined in WAC 222-16-030 (3) and (4)*
- (U) *Mapped hydrographic feature having unknown water type. May be one of the following:*
  (1) Location or existence of water segment may be unverified
  (2) Water segment may be un-modeled
  (3) Water segment may lie outside of modeled area
  (4) The water type has not yet been assigned
  (5) Segment may be an artificial connector (WC_LN_TYPE_CD = 5)

Fish Habitat Water Type Code. For stream features, this Code is based on a multi-parameter, field verified geographic information system (GIS)logistic regression model. The water typing model is based on thousands of field surveys of fish presence and fish habitat. Other model parameters are gradient, elevation, basin size and average annual precipitation derived from the US Geological Survey's digital elevation model (DEM) for the state of Washington. Technical considerations required that the model be developed on a "virtual" stream network system derived from the DEM database. The DEM-based model results were then transferred to the DNR's hydrographic GIS map (HYDRO) in order to implement the new water types.

Data Source: Wasgington State Department of Natural Resources

N

0 0.5 1
Miles

0 1,000 2,000 4,000 6,000
Feet

Map scale 1:24,000

T34N R 3 & 4E W.M.

SHEET 6

For current Skagit County Assessor tax lots the maps available in the Skagit County Assessor office or on the web at www.skagitcounty.net should be consulted.

For more information see:
http://fortress.wa.gov/dnr/app1/dataweb/metadata/WA_Hydro_Data_Dic.htm

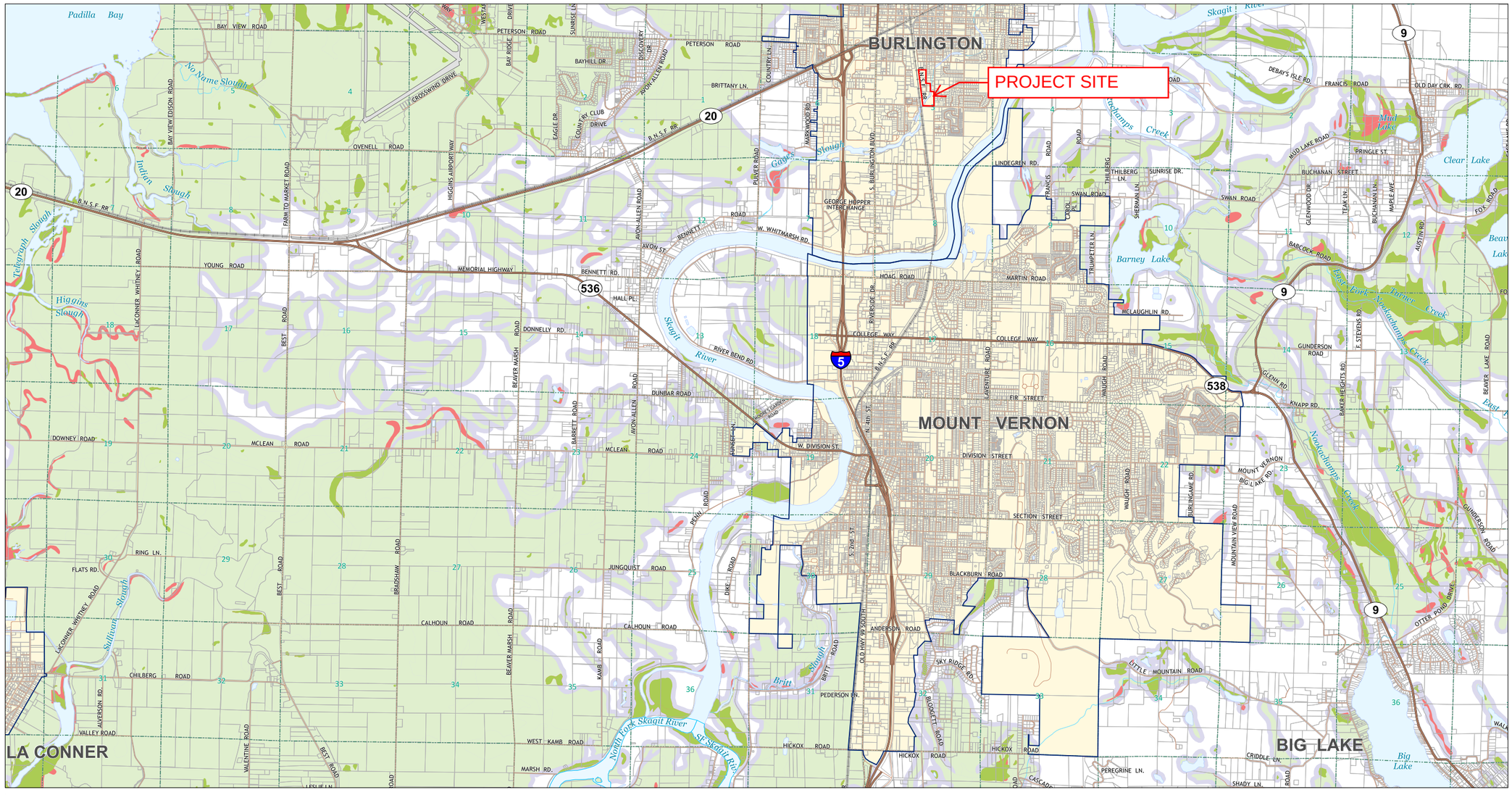
SKAGIT COUNTY WASHINGTON

Geographic Information Services

SKAGIT COUNTY

NWI Wetlands and Hydric Soils

May 11, 2015



National Wetlands Inventory

Air Photo Interpretation of Wetland Boundaries

Hydric Soils

200 Foot Area

The National Wetlands Inventory (NWI) Database is an inventory system developed in 1974 by U.S. Fish and Wildlife Service. NWI data is collected through steroscopic analysis of high altitude color infrared aerial photographs. Because methodology and scope of work impose limitations on the accuracy of the data, there is an inherent margin of error. As there has been no attempt in the design of the inventory system to delineate wetland boundaries, the maps should not be used for regulatory purposes. They are useful as an initial means of identifying the general location and extent of wetlands within a region, and when used in conjunction with hydric soils maps and aerial surveys, as a starting point for developing more detailed wetland inventories.

N

0 0.5 1 Miles

0 1,000 2,000 4,000 6,000 Feet

T34N R 3 & 4E W.M.

SHEET 6

This map was created from available public records and existing map sources, not from field surveys. Map features from all sources have been adjusted to achive a "best fit" registration to the Ownership Parcels Map. While great care was taken in this process, maps from different sources rarely agree as to the precise location of geographic features. The relative positioning of map features to one another results from combining different map sources without field "ground truthing".

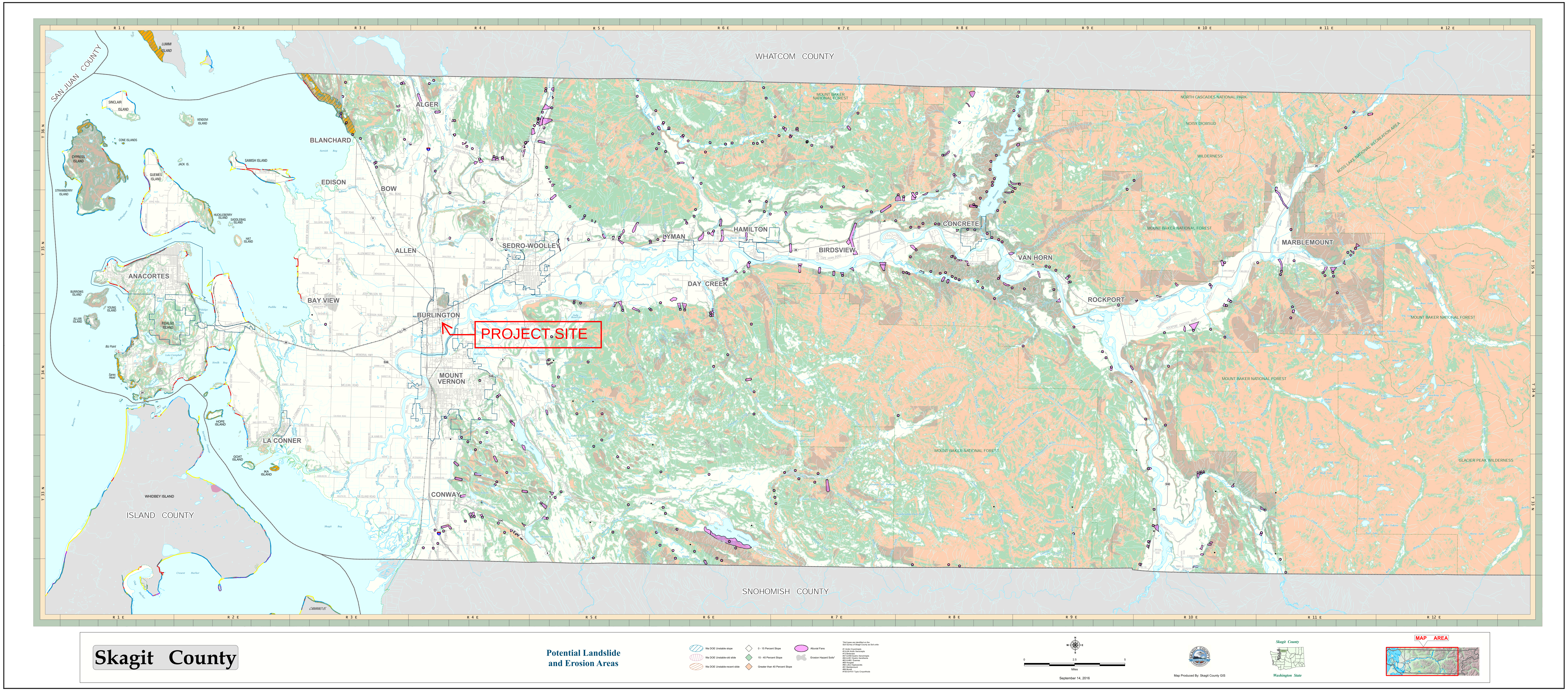
For more information see:

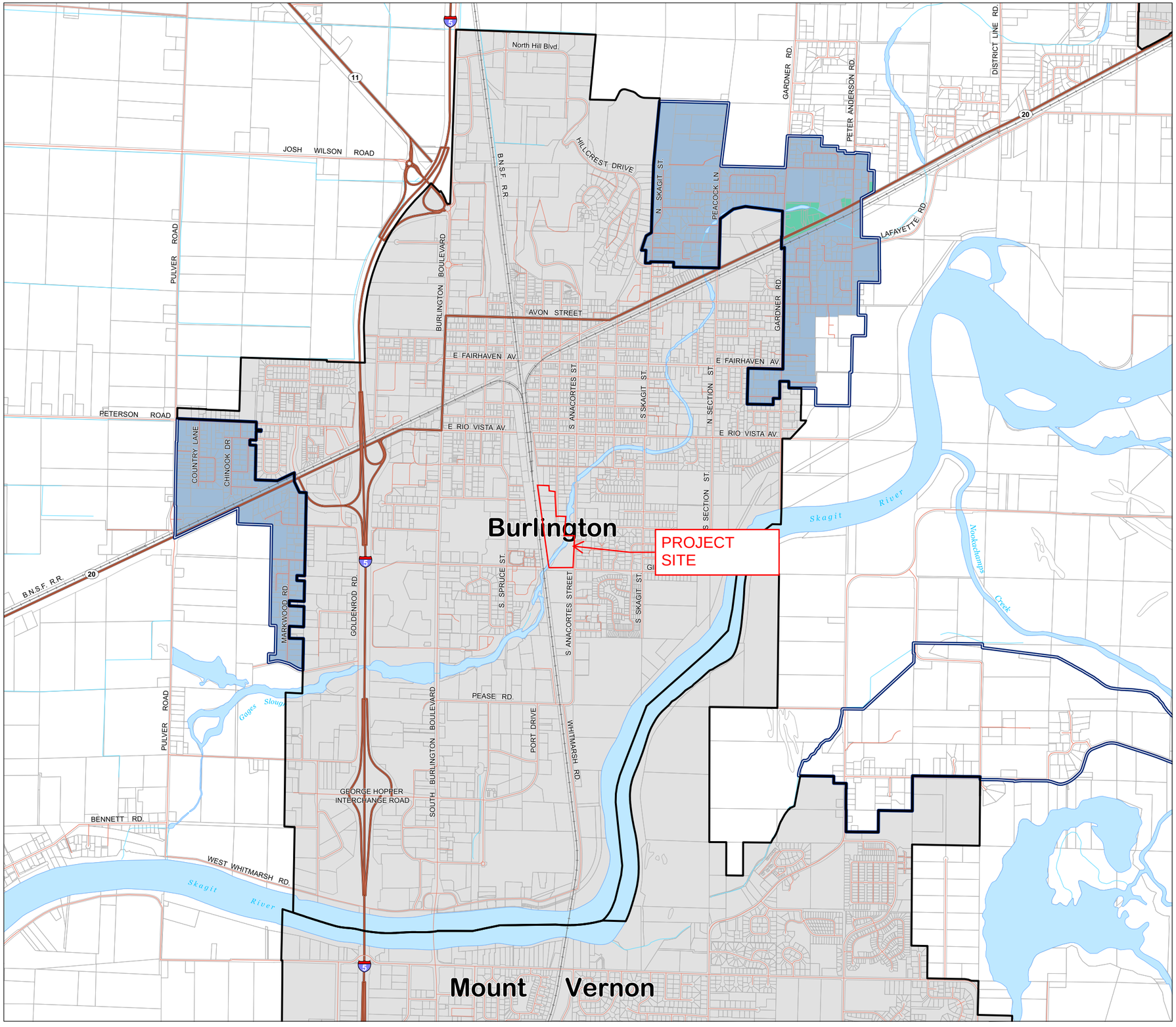
http://www.fws.gov/wetlands/index.html

http://www.or.nrcs.usda.gov/pnw_soil/wa_reports.html

Map Print Date: May 11, 2015

Geographic Information Services


WHATCOM COUNTY
SAN JUAN COUNTY
SNOHOMISH COUNTY
ISLAND COUNTY
ALGER
BLANCHARD
EDISON
BOW
ALLEN
SEDRO-WOOLLEY
LYMAN
HAMILTON
CONCRETE
BIRDSVIEW
VAN HORN
MARBLEMOUNT
ROCKPORT
DAY CREEK
ANACORTES
BAY VIEW
BURLINGTON
PROJECT SITE
MOUNT VERNON
LA CONNER
CONWAY
WHIDBEY ISLAND
Skagit County
Potential Landslide and Erosion Areas
MAP AREA



LEGEND

- Urban Growth Area Boundary
- [URR] Urban Reserve Residential
- [URC-I] Urban Reserve Commercial Industrial
- Incorporated Areas

For current up to date parcel information the maps available in the Skagit County Assessor office or on the web at www.skagitcounty.net should be consulted.

N
W E
S

0 0.5 1
Miles

October 29, 2018
Map Print Date July 22, 2020

Map Produced By Skagit County GIS

City of Burlington

URBAN GROWTH AREA REGULATIONS

Appendix B

WWHM Report

WWHM2012

PROJECT REPORT

General Model Information

Project Name: 22127 Flow Control
Site Name:
Site Address:
City:
Report Date: 7/17/2023
Gage: Burlington
Data Start: 1948/10/01
Data End: 2009/09/30
Timestep: 15 Minute
Precip Scale: 1.000
Version Date: 2019/09/13
Version: 4.2.17

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, Flat	5.02
Pervious Total	5.02
Impervious Land Use	acre
Impervious Total	0
Basin Total	5.02

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	1.38
Pervious Total	1.38

Impervious Land Use	acre
ROADS FLAT	2.55
Impervious Total	2.55
Basin Total	3.93

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 1	Surface retention 1	

Basin 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	0.55
Pervious Total	0.55

Impervious Land Use	acre
ROADS FLAT	0.54
Impervious Total	0.54
Basin Total	1.09

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bioretention 1

Bottom Length:	242.00 ft.
Bottom Width:	15.00 ft.
Material thickness of first layer:	0.25
Material type for first layer:	SMMWW 12 in/hr
Material thickness of second layer:	1.5
Material type for second layer:	Sand
Material thickness of third layer:	1
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	1.85
Infiltration safety factor:	1
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	398.674
Total Volume Through Riser (ac-ft.):	0.343
Total Volume Through Facility (ac-ft.):	399.017
Percent Infiltrated:	99.91
Total Precip Applied to Facility:	13.908
Total Evap From Facility:	12.64
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	12 in.
Element Flows To:	
Outlet 1	Outlet 2
Trapezoidal Pond 1	

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.1869	0.0000	0.0000	0.0000
0.0467	0.1853	0.0018	0.0000	0.0000
0.0934	0.1834	0.0036	0.0000	0.0000
0.1401	0.1816	0.0055	0.0000	0.0000
0.1868	0.1797	0.0074	0.0000	0.0000
0.2335	0.1779	0.0093	0.0000	0.0000
0.2802	0.1760	0.0111	0.0000	0.0041
0.3269	0.1742	0.0128	0.0000	0.0072
0.3736	0.1723	0.0146	0.0000	0.0117
0.4203	0.1705	0.0164	0.0000	0.0175
0.4670	0.1687	0.0183	0.0000	0.0251
0.5137	0.1668	0.0202	0.0000	0.0344
0.5604	0.1650	0.0221	0.0000	0.0458
0.6071	0.1632	0.0240	0.0000	0.0492
0.6538	0.1614	0.0260	0.0000	0.0604
0.7005	0.1596	0.0280	0.0000	0.0767
0.7473	0.1578	0.0301	0.0000	0.0957
0.7940	0.1560	0.0322	0.0000	0.1175
0.8407	0.1541	0.0343	0.0000	0.1424
0.8874	0.1523	0.0364	0.0000	0.1706
0.9341	0.1506	0.0386	0.0000	0.1893
0.9808	0.1488	0.0408	0.0000	0.2052
1.0275	0.1470	0.0430	0.0000	0.2249
1.0742	0.1452	0.0453	0.0000	0.2282
1.1209	0.1434	0.0476	0.0000	0.2314

1.1676	0.1416	0.0499	0.0000	0.2347
1.2143	0.1399	0.0523	0.0000	0.2379
1.2610	0.1381	0.0547	0.0000	0.2412
1.3077	0.1363	0.0571	0.0000	0.2444
1.3544	0.1346	0.0596	0.0000	0.2477
1.4011	0.1328	0.0621	0.0000	0.2510
1.4478	0.1310	0.0646	0.0000	0.2543
1.4945	0.1293	0.0672	0.0000	0.2576
1.5412	0.1275	0.0698	0.0000	0.2609
1.5879	0.1258	0.0724	0.0000	0.2642
1.6346	0.1241	0.0751	0.0000	0.2675
1.6813	0.1223	0.0778	0.0000	0.2708
1.7280	0.1206	0.0805	0.0000	0.2742
1.7747	0.1188	0.0833	0.0000	0.2775
1.8214	0.1171	0.0862	0.0000	0.2808
1.8681	0.1154	0.0892	0.0000	0.2842
1.9148	0.1137	0.0922	0.0000	0.2875
1.9615	0.1120	0.0952	0.0000	0.2909
2.0082	0.1102	0.0982	0.0000	0.2943
2.0549	0.1085	0.1013	0.0000	0.2977
2.1016	0.1068	0.1044	0.0000	0.3010
2.1484	0.1051	0.1075	0.0000	0.3044
2.1951	0.1034	0.1107	0.0000	0.3078
2.2418	0.1017	0.1139	0.0000	0.3112
2.2885	0.1000	0.1172	0.0000	0.3146
2.3352	0.0984	0.1205	0.0000	0.3181
2.3819	0.0967	0.1238	0.0000	0.3215
2.4286	0.0950	0.1271	0.0000	0.3249
2.4753	0.0933	0.1305	0.0000	0.3284
2.5220	0.0916	0.1340	0.0000	0.3318
2.5687	0.0900	0.1374	0.0000	0.3352
2.6154	0.0883	0.1409	0.0000	0.3387
2.6621	0.0866	0.1445	0.0000	0.3422
2.7088	0.0850	0.1480	0.0000	0.3456
2.7500	0.0833	0.1512	0.0000	0.3487

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
2.7500	0.1869	0.1512	0.0000	0.9336	0.0035
2.7967	0.1888	0.1600	0.0000	0.9336	0.0070
2.8434	0.1907	0.1689	0.0000	0.9578	0.0105
2.8901	0.1925	0.1778	0.0000	0.9821	0.0140
2.9368	0.1944	0.1868	0.0000	1.0064	0.0175
2.9835	0.1963	0.1960	0.0000	1.0306	0.0210
3.0302	0.1982	0.2052	0.0000	1.0549	0.0245
3.0769	0.2001	0.2145	0.0000	1.0792	0.0281
3.1236	0.2020	0.2239	0.0000	1.1034	0.0316
3.1703	0.2039	0.2334	0.0000	1.1277	0.0351
3.2170	0.2058	0.2429	0.0000	1.1520	0.0387
3.2637	0.2077	0.2526	0.0000	1.1762	0.0422
3.3104	0.2096	0.2623	0.0000	1.2005	0.0458
3.3571	0.2115	0.2721	0.0000	1.2248	0.0494
3.4038	0.2134	0.2821	0.0000	1.2491	0.0530
3.4505	0.2153	0.2921	0.0000	1.2733	0.0565
3.4973	0.2172	0.3022	0.0000	1.2976	0.0601
3.5440	0.2192	0.3124	0.0000	1.3219	0.0637
3.5907	0.2211	0.3227	0.0000	1.3461	0.0673
3.6374	0.2230	0.3330	0.0000	1.3704	0.0709

3.6841	0.2250	0.3435	0.0000	1.3947	0.0746
3.7308	0.2269	0.3540	0.0000	1.4189	0.0782
3.7775	0.2288	0.3647	0.0483	1.4432	0.0818
3.8242	0.2308	0.3754	0.2137	1.4675	0.0855
3.8709	0.2327	0.3862	0.4414	1.4917	0.0891
3.9176	0.2347	0.3972	0.7089	1.5160	0.0928
3.9643	0.2367	0.4082	0.9966	1.5403	0.0964
4.0110	0.2386	0.4193	1.2841	1.5645	0.1001
4.0577	0.2406	0.4304	1.5516	1.5888	0.1037
4.1044	0.2425	0.4417	1.7818	1.6131	0.1074
4.1511	0.2445	0.4531	1.9637	1.6373	0.1111
4.1978	0.2465	0.4646	2.0963	1.6616	0.1148
4.2445	0.2485	0.4761	2.1930	1.6859	0.1152
4.2500	0.2487	0.4775	2.3171	1.6887	0.0376

Surface retention 1

Element Flows To:

Outlet 1	Outlet 2
Trapezoidal Pond 1	Bioretention 1

Trapezoidal Pond 1

Bottom Length:	40.00 ft.	
Bottom Width:	40.00 ft.	
Depth:	3 ft.	
Volume at riser head:	0.0977 acre-feet.	
Infiltration On		
Infiltration rate:	0.56	
Infiltration safety factor:	1	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		93.838
Total Volume Through Riser (ac-ft.):		0.777
Total Volume Through Facility (ac-ft.):		94.616
Percent Infiltrated:		99.18
Total Precip Applied to Facility:		0
Total Evap From Facility:		0
Side slope 1:	3 To 1	
Side slope 2:	3 To 1	
Side slope 3:	3 To 1	
Side slope 4:	3 To 1	
Discharge Structure		
Riser Height:	2 ft.	
Riser Diameter:	18 in.	
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

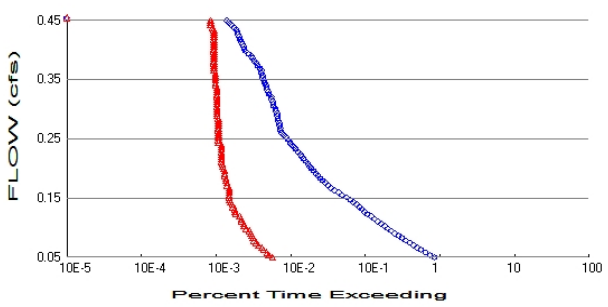
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.036	0.000	0.000	0.000
0.0333	0.037	0.001	0.000	0.020
0.0667	0.037	0.002	0.000	0.021
0.1000	0.037	0.003	0.000	0.021
0.1333	0.038	0.005	0.000	0.021
0.1667	0.038	0.006	0.000	0.021
0.2000	0.039	0.007	0.000	0.022
0.2333	0.039	0.008	0.000	0.022
0.2667	0.039	0.010	0.000	0.022
0.3000	0.040	0.011	0.000	0.022
0.3333	0.040	0.012	0.000	0.022
0.3667	0.040	0.014	0.000	0.023
0.4000	0.041	0.015	0.000	0.023
0.4333	0.041	0.017	0.000	0.023
0.4667	0.042	0.018	0.000	0.023
0.5000	0.042	0.019	0.000	0.024
0.5333	0.042	0.021	0.000	0.024
0.5667	0.043	0.022	0.000	0.024
0.6000	0.043	0.024	0.000	0.024
0.6333	0.044	0.025	0.000	0.024
0.6667	0.044	0.027	0.000	0.025
0.7000	0.044	0.028	0.000	0.025
0.7333	0.045	0.030	0.000	0.025
0.7667	0.045	0.031	0.000	0.025
0.8000	0.046	0.033	0.000	0.026
0.8333	0.046	0.034	0.000	0.026
0.8667	0.046	0.036	0.000	0.026
0.9000	0.047	0.037	0.000	0.026

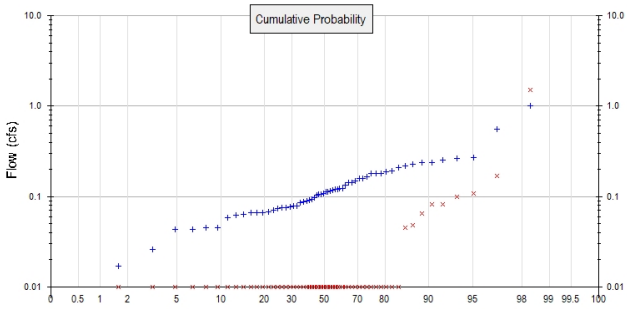
0.9333	0.047	0.039	0.000	0.027
0.9667	0.048	0.040	0.000	0.027
1.0000	0.048	0.042	0.000	0.027
1.0333	0.049	0.044	0.000	0.027
1.0667	0.049	0.045	0.000	0.027
1.1000	0.049	0.047	0.000	0.028
1.1333	0.050	0.049	0.000	0.028
1.1667	0.050	0.050	0.000	0.028
1.2000	0.051	0.052	0.000	0.028
1.2333	0.051	0.054	0.000	0.029
1.2667	0.052	0.055	0.000	0.029
1.3000	0.052	0.057	0.000	0.029
1.3333	0.052	0.059	0.000	0.029
1.3667	0.053	0.061	0.000	0.030
1.4000	0.053	0.063	0.000	0.030
1.4333	0.054	0.064	0.000	0.030
1.4667	0.054	0.066	0.000	0.030
1.5000	0.055	0.068	0.000	0.031
1.5333	0.055	0.070	0.000	0.031
1.5667	0.056	0.072	0.000	0.031
1.6000	0.056	0.074	0.000	0.031
1.6333	0.056	0.075	0.000	0.032
1.6667	0.057	0.077	0.000	0.032
1.7000	0.057	0.079	0.000	0.032
1.7333	0.058	0.081	0.000	0.032
1.7667	0.058	0.083	0.000	0.033
1.8000	0.059	0.085	0.000	0.033
1.8333	0.059	0.087	0.000	0.033
1.8667	0.060	0.089	0.000	0.034
1.9000	0.060	0.091	0.000	0.034
1.9333	0.061	0.093	0.000	0.034
1.9667	0.061	0.095	0.000	0.034
2.0000	0.062	0.097	0.000	0.035
2.0333	0.062	0.099	0.096	0.035
2.0667	0.063	0.101	0.273	0.035
2.1000	0.063	0.104	0.502	0.035
2.1333	0.064	0.106	0.771	0.036
2.1667	0.064	0.108	1.074	0.036
2.2000	0.065	0.110	1.404	0.036
2.2333	0.065	0.112	1.756	0.037
2.2667	0.066	0.114	2.123	0.037
2.3000	0.066	0.117	2.501	0.037
2.3333	0.066	0.119	2.882	0.037
2.3667	0.067	0.121	3.261	0.038
2.4000	0.067	0.123	3.632	0.038
2.4333	0.068	0.126	3.988	0.038
2.4667	0.068	0.128	4.326	0.038
2.5000	0.069	0.130	4.639	0.039
2.5333	0.070	0.132	4.924	0.039
2.5667	0.070	0.135	5.178	0.039
2.6000	0.071	0.137	5.401	0.040
2.6333	0.071	0.140	5.592	0.040
2.6667	0.072	0.142	5.754	0.040
2.7000	0.072	0.144	5.892	0.040
2.7333	0.073	0.147	6.014	0.041
2.7667	0.073	0.149	6.205	0.041
2.8000	0.074	0.152	6.338	0.041
2.8333	0.074	0.154	6.469	0.042

2.8667	0.075	0.157	6.597	0.042
2.9000	0.075	0.159	6.723	0.042
2.9333	0.076	0.162	6.846	0.043
2.9667	0.076	0.164	6.967	0.043
3.0000	0.077	0.167	7.086	0.043
3.0333	0.077	0.169	7.203	0.043

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 5.02
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.93
Total Impervious Area: 3.09

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.10855
5 year	0.197206
10 year	0.267633
25 year	0.368787
50 year	0.452407
100 year	0.542709

Flow Frequency Return Periods for Mitigated. POC #1

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

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.262	0.082
1950	0.181	0.045
1951	0.238	0.000
1952	0.141	0.000
1953	0.098	0.000
1954	0.119	0.000
1955	0.103	0.000
1956	0.079	0.000
1957	0.148	0.000
1958	0.088	0.000

1959	0.157	0.000
1960	0.113	0.000
1961	0.076	0.000
1962	0.017	0.000
1963	0.064	0.000
1964	0.075	0.000
1965	0.144	0.000
1966	0.074	0.000
1967	0.093	0.000
1968	0.192	0.064
1969	0.062	0.000
1970	0.043	0.000
1971	0.178	0.000
1972	0.091	0.000
1973	0.106	0.000
1974	0.179	0.000
1975	0.556	1.526
1976	0.066	0.000
1977	0.079	0.000
1978	0.124	0.000
1979	0.067	0.000
1980	0.157	0.048
1981	0.089	0.000
1982	0.217	0.108
1983	0.118	0.000
1984	0.252	0.000
1985	0.045	0.000
1986	0.135	0.000
1987	0.123	0.000
1988	0.208	0.000
1989	0.058	0.000
1990	0.164	0.099
1991	0.235	0.081
1992	0.109	0.000
1993	0.105	0.000
1994	0.026	0.000
1995	0.043	0.000
1996	0.228	0.000
1997	1.011	0.000
1998	0.115	0.000
1999	0.067	0.000
2000	0.045	0.000
2001	0.013	0.000
2002	0.086	0.000
2003	0.067	0.000
2004	0.120	0.000
2005	0.074	0.000
2006	0.189	0.000
2007	0.114	0.000
2008	0.272	0.170
2009	0.071	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.0112	1.5260
2	0.5558	0.1704
3	0.2715	0.1084

4	0.2618	0.0987
5	0.2518	0.0825
6	0.2384	0.0812
7	0.2351	0.0643
8	0.2280	0.0478
9	0.2167	0.0451
10	0.2075	0.0000
11	0.1920	0.0000
12	0.1891	0.0000
13	0.1807	0.0000
14	0.1793	0.0000
15	0.1784	0.0000
16	0.1637	0.0000
17	0.1574	0.0000
18	0.1573	0.0000
19	0.1479	0.0000
20	0.1438	0.0000
21	0.1409	0.0000
22	0.1347	0.0000
23	0.1238	0.0000
24	0.1226	0.0000
25	0.1205	0.0000
26	0.1190	0.0000
27	0.1183	0.0000
28	0.1147	0.0000
29	0.1137	0.0000
30	0.1125	0.0000
31	0.1088	0.0000
32	0.1062	0.0000
33	0.1047	0.0000
34	0.1033	0.0000
35	0.0976	0.0000
36	0.0928	0.0000
37	0.0906	0.0000
38	0.0889	0.0000
39	0.0881	0.0000
40	0.0859	0.0000
41	0.0792	0.0000
42	0.0790	0.0000
43	0.0765	0.0000
44	0.0752	0.0000
45	0.0745	0.0000
46	0.0736	0.0000
47	0.0710	0.0000
48	0.0671	0.0000
49	0.0666	0.0000
50	0.0665	0.0000
51	0.0664	0.0000
52	0.0641	0.0000
53	0.0617	0.0000
54	0.0584	0.0000
55	0.0450	0.0000
56	0.0449	0.0000
57	0.0430	0.0000
58	0.0429	0.0000
59	0.0261	0.0000
60	0.0168	0.0000
61	0.0133	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0543	18009	122	0	Pass
0.0583	15637	109	0	Pass
0.0623	13635	102	0	Pass
0.0663	11916	92	0	Pass
0.0704	10525	87	0	Pass
0.0744	9396	79	0	Pass
0.0784	8410	74	0	Pass
0.0824	7484	69	0	Pass
0.0864	6639	67	1	Pass
0.0905	5948	64	1	Pass
0.0945	5302	62	1	Pass
0.0985	4748	60	1	Pass
0.1025	4282	54	1	Pass
0.1066	3856	51	1	Pass
0.1106	3476	50	1	Pass
0.1146	3138	46	1	Pass
0.1186	2847	46	1	Pass
0.1226	2539	44	1	Pass
0.1267	2257	39	1	Pass
0.1307	2082	38	1	Pass
0.1347	1931	38	1	Pass
0.1387	1771	36	2	Pass
0.1427	1616	35	2	Pass
0.1468	1474	33	2	Pass
0.1508	1342	32	2	Pass
0.1548	1197	32	2	Pass
0.1588	1045	32	3	Pass
0.1629	933	32	3	Pass
0.1669	825	32	3	Pass
0.1709	730	32	4	Pass
0.1749	673	30	4	Pass
0.1789	623	30	4	Pass
0.1830	567	29	5	Pass
0.1870	534	29	5	Pass
0.1910	495	28	5	Pass
0.1950	461	28	6	Pass
0.1991	434	28	6	Pass
0.2031	405	27	6	Pass
0.2071	381	26	6	Pass
0.2111	363	26	7	Pass
0.2151	346	25	7	Pass
0.2192	318	25	7	Pass
0.2232	303	25	8	Pass
0.2272	288	25	8	Pass
0.2312	267	25	9	Pass
0.2352	247	25	10	Pass
0.2393	234	25	10	Pass
0.2433	218	25	11	Pass
0.2473	210	23	10	Pass
0.2513	199	23	11	Pass
0.2554	185	23	12	Pass
0.2594	173	23	13	Pass
0.2634	160	23	14	Pass

0.2674	157	23	14	Pass
0.2714	155	23	14	Pass
0.2755	151	23	15	Pass
0.2795	149	23	15	Pass
0.2835	147	23	15	Pass
0.2875	143	23	16	Pass
0.2915	141	22	15	Pass
0.2956	139	22	15	Pass
0.2996	137	22	16	Pass
0.3036	134	22	16	Pass
0.3076	127	22	17	Pass
0.3117	125	22	17	Pass
0.3157	121	22	18	Pass
0.3197	119	22	18	Pass
0.3237	118	22	18	Pass
0.3277	111	22	19	Pass
0.3318	106	22	20	Pass
0.3358	103	22	21	Pass
0.3398	101	22	21	Pass
0.3438	99	21	21	Pass
0.3478	95	21	22	Pass
0.3519	93	21	22	Pass
0.3559	90	21	23	Pass
0.3599	89	21	23	Pass
0.3639	87	21	24	Pass
0.3680	86	20	23	Pass
0.3720	82	20	24	Pass
0.3760	77	20	25	Pass
0.3800	74	20	27	Pass
0.3840	69	20	28	Pass
0.3881	66	20	30	Pass
0.3921	64	20	31	Pass
0.3961	58	20	34	Pass
0.4001	54	20	37	Pass
0.4041	51	20	39	Pass
0.4082	50	20	40	Pass
0.4122	48	20	41	Pass
0.4162	46	20	43	Pass
0.4202	45	20	44	Pass
0.4243	43	20	46	Pass
0.4283	42	20	47	Pass
0.4323	41	20	48	Pass
0.4363	40	20	50	Pass
0.4403	37	19	51	Pass
0.4444	34	18	52	Pass
0.4484	32	18	56	Pass
0.4524	30	18	60	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	☐	86.10			☐	99.18			
retention 1	☐	363.10			☐	99.91			
Total Volume Infiltrated		449.20	0.00	0.00		99.77	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.

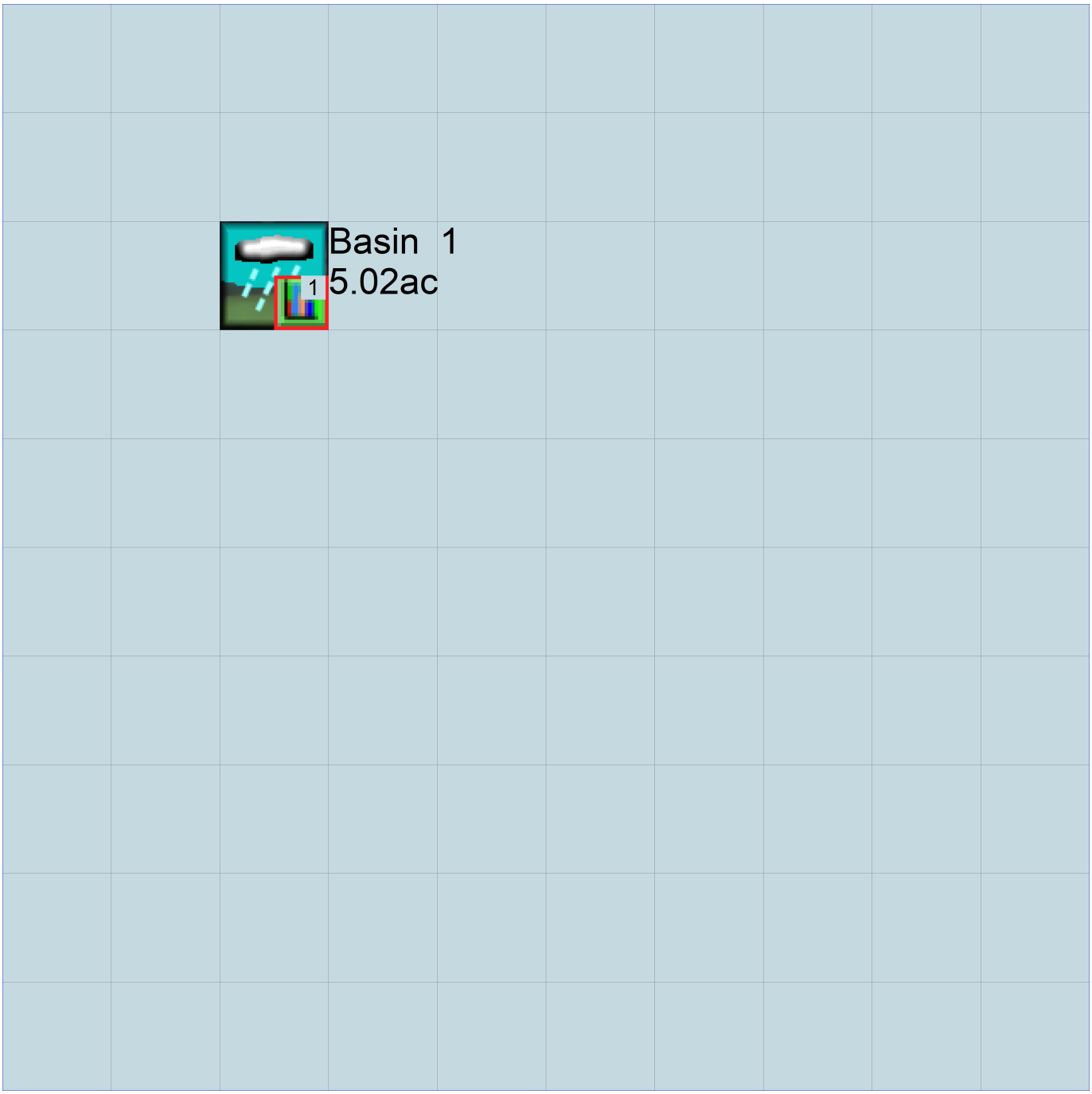
PERLND Changes

No PERLND changes have been made.

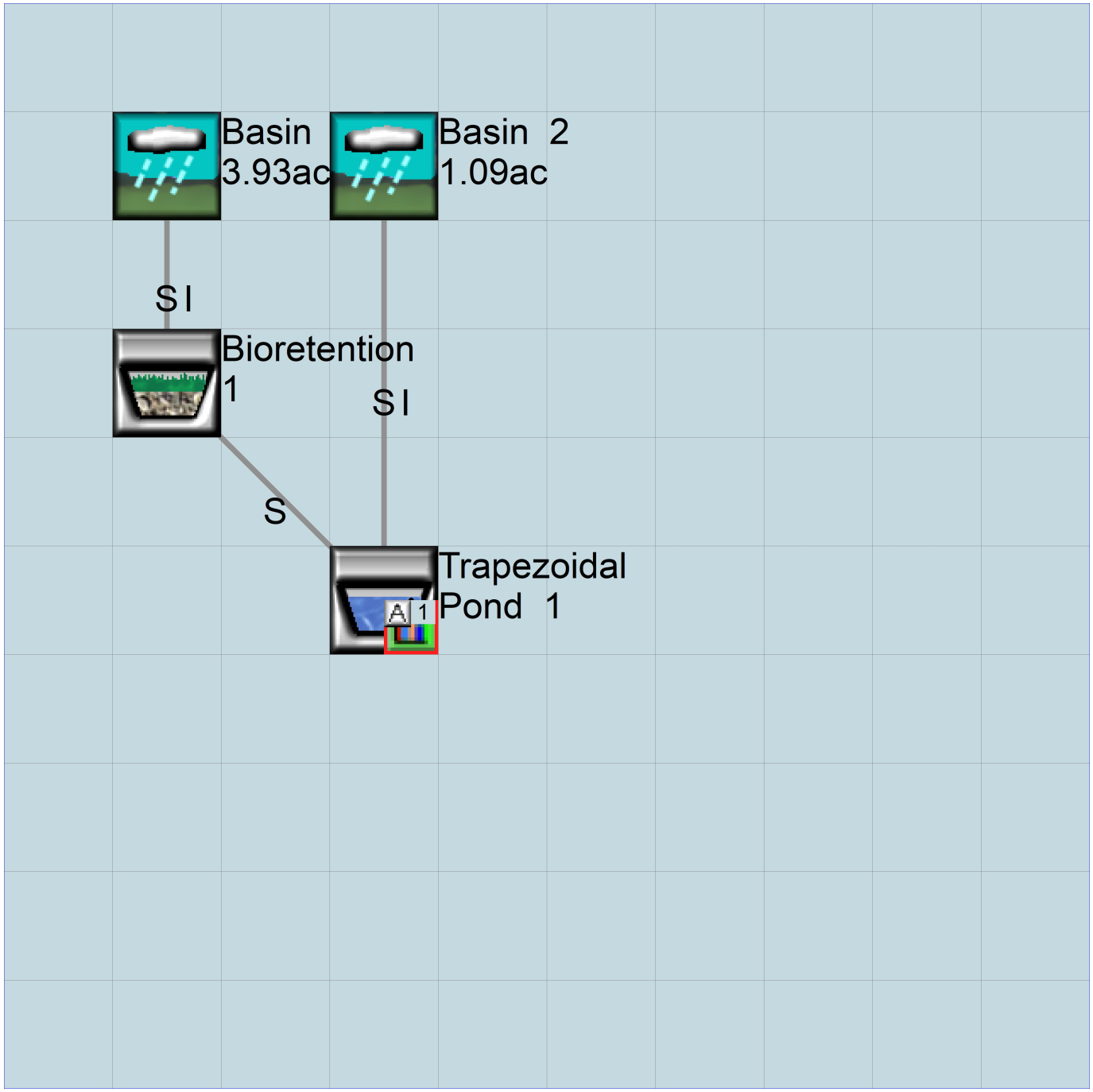
IMPLND Changes

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   22127 Flow Control.wdm
MESSU       25   Pre22127 Flow Control.MES
            27   Pre22127 Flow Control.L61
            28   Pre22127 Flow Control.L62
            30   POC22127 Flow Control1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      10
      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           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         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  *********
   10         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 ***
   10         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
   10              0       4.5      0.08       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
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           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
   10             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  10                        5.02     COPY   501     12
PERLND  10                        5.02     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              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              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   22127 Flow Control.wdm
MESSU       25   Mit22127 Flow Control.MES
            27   Mit22127 Flow Control.L61
            28   Mit22127 Flow Control.L62
            30   POC22127 Flow Control1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      13
      IMPLND       1
      GENER        2
      RCHRES       1
      RCHRES       2
      RCHRES       3
      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 ***
    2        24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
  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
  END GEN-INFO
  *** Section IWATER***

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

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL     *********
    1         0    0    4    0    0    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
  END IWAT-PARM1

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

```
    1            400      0.01       0.1       0.1
  END IWAT-PARM2

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

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

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  13                        1.38     RCHRES   1      2
PERLND  13                        1.38     RCHRES   1      3
IMPLND   1                        2.55     RCHRES   1      5
Basin  2***
PERLND  13                        0.55     RCHRES   3      2
PERLND  13                        0.55     RCHRES   3      3
IMPLND   1                        0.54     RCHRES   3      5

******Routing******
RCHRES   2                           1     RCHRES   3      7
RCHRES   2                                 COPY     1     17
RCHRES   1                           1     RCHRES   3      7
RCHRES   1                                 COPY     1     17
RCHRES   1                           1     RCHRES   2      8
PERLND  13                        0.55     COPY     1     12
IMPLND   1                        0.54     COPY     1     15
PERLND  13                        0.55     COPY     1     13
RCHRES   3                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER      .0011111     RCHRES   1     EXTNL  OUTDGT 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     Surface retentio-012    3    1    1    1   28    0    1
    2     Bioretention  1         2    1    1    1   28    0    1
    3     Trapezoidal Pond-013    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         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
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
    1        0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    2        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    3        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><--------> ***
    1              1      0.01       0.0       0.0       0.0       0.0
    2              2      0.05       0.0       0.0       0.0       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                        <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL              4
  UVQUAN v2m2   GLOBAL     WORKSP  1        3
  UVQUAN vpo2   GLOBAL     WORKSP  2        3
  UVQUAN v2d2   GENER    2 K       1        3
*** User-Defined Target Variable Names
***                  addr or                      addr or
***                 <------>                     <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1         1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2         1.0 QUAN
  UVNAME  v2d2    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><><--------> <> <-><->
  GENER   2                              v2m2            =  6901.33
*** Compute remaining available pore space
  GENER   2                              vpo2            =  v2m2
  GENER   2                              vpo2           -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                              vpo2            =  0.0
END IF
*** Infiltration volume
  GENER   2                              v2d2            =  vpo2
END SPEC-ACTIONS
FTABLES
```

```
FTABLE      2
 60    5
    Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
     (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.186932  0.000000  0.000000  0.000000
0.046703  0.185287  0.001797  0.000000  0.000000
0.093407  0.183427  0.003630  0.000000  0.000000
0.140110  0.181570  0.005499  0.000000  0.000000
0.186813  0.179716  0.007402  0.000000  0.000000
0.233516  0.177866  0.009342  0.000000  0.000000
0.280220  0.176020  0.011070  0.000000  0.004093
0.326923  0.174178  0.012829  0.000000  0.007248
0.373626  0.172339  0.014619  0.000000  0.011661
0.420330  0.170503  0.016441  0.000000  0.017531
0.467033  0.168672  0.018294  0.000000  0.025055
0.513736  0.166844  0.020179  0.000000  0.034424
0.560440  0.165019  0.022095  0.000000  0.045831
0.607143  0.163198  0.024043  0.000000  0.049180
0.653846  0.161381  0.026023  0.000000  0.060434
0.700549  0.159567  0.028035  0.000000  0.076745
0.747253  0.157757  0.030078  0.000000  0.095713
0.793956  0.155951  0.032154  0.000000  0.117540
0.840659  0.154148  0.034262  0.000000  0.142428
0.887363  0.152348  0.036401  0.000000  0.170580
0.934066  0.150553  0.038573  0.000000  0.189257
0.980769  0.148761  0.040777  0.000000  0.205187
1.027473  0.146972  0.043014  0.000000  0.224928
1.074176  0.145187  0.045282  0.000000  0.228163
1.120879  0.143406  0.047583  0.000000  0.231405
1.167582  0.141628  0.049917  0.000000  0.234654
1.214286  0.139854  0.052283  0.000000  0.237910
1.260989  0.138084  0.054682  0.000000  0.241172
1.307692  0.136317  0.057114  0.000000  0.244441
1.354396  0.134554  0.059578  0.000000  0.247717
1.401099  0.132794  0.062075  0.000000  0.250999
1.447802  0.131038  0.064606  0.000000  0.254288
1.494505  0.129286  0.067169  0.000000  0.257584
1.541209  0.127537  0.069765  0.000000  0.260887
1.587912  0.125792  0.072394  0.000000  0.264196
1.634615  0.124050  0.075056  0.000000  0.267512
1.681319  0.122312  0.077752  0.000000  0.270835
1.728022  0.120578  0.080481  0.000000  0.274164
1.774725  0.118847  0.083347  0.000000  0.277501
1.821429  0.117120  0.086248  0.000000  0.280844
1.868132  0.115396  0.089183  0.000000  0.284193
1.914835  0.113676  0.092153  0.000000  0.287550
1.961538  0.111960  0.095158  0.000000  0.290913
2.008242  0.110247  0.098199  0.000000  0.294283
2.054945  0.108538  0.101274  0.000000  0.297659
2.101648  0.106832  0.104384  0.000000  0.301043
2.148352  0.105131  0.107529  0.000000  0.304433
2.195055  0.103432  0.110710  0.000000  0.307829
2.241758  0.101737  0.113926  0.000000  0.311233
2.288462  0.100046  0.117178  0.000000  0.314643
2.335165  0.098359  0.120465  0.000000  0.318060
2.381868  0.096675  0.123787  0.000000  0.321484
2.428571  0.094995  0.127145  0.000000  0.324914
2.475275  0.093318  0.130539  0.000000  0.328351
2.521978  0.091645  0.133968  0.000000  0.331795
2.568681  0.089975  0.137434  0.000000  0.335246
2.615385  0.088309  0.140935  0.000000  0.338703
2.662088  0.086647  0.144472  0.000000  0.342167
2.708791  0.084988  0.148045  0.000000  0.345638
2.750000  0.083333  0.158433  0.000000  0.348706
END FTABLE  2
FTABLE      1
 34    6
    Depth      Area    Volume  Outflow1  Outflow2  Outflow3  Velocity  Travel
Time***
     (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
```

```
(Minutes)***
  0.000000  0.083333  0.000000  0.000000  0.000000  0.003483
  0.046703  0.188799  0.008774  0.000000  0.933576  0.003483
  0.093407  0.190670  0.017635  0.000000  0.957844  0.006974
  0.140110  0.192545  0.026584  0.000000  0.982111  0.010470
  0.186813  0.194423  0.035620  0.000000  1.006378  0.013974
  0.233516  0.196305  0.044744  0.000000  1.030646  0.017484
  0.280220  0.198190  0.053956  0.000000  1.054913  0.021001
  0.326923  0.200079  0.063257  0.000000  1.079180  0.024525
  0.373626  0.201972  0.072645  0.000000  1.103447  0.028056
  0.420330  0.203868  0.082122  0.000000  1.127715  0.031593
  0.467033  0.205768  0.091688  0.000000  1.151982  0.035137
  0.513736  0.207671  0.101342  0.000000  1.176249  0.038687
  0.560440  0.209578  0.111086  0.000000  1.200517  0.042245
  0.607143  0.211489  0.120918  0.000000  1.224784  0.045809
  0.653846  0.213403  0.130840  0.000000  1.249051  0.049380
  0.700549  0.215321  0.140852  0.000000  1.273318  0.052957
  0.747253  0.217242  0.150953  0.000000  1.297586  0.056542
  0.793956  0.219167  0.161144  0.000000  1.321853  0.060133
  0.840659  0.221096  0.171425  0.000000  1.346120  0.063730
  0.887363  0.223028  0.181796  0.000000  1.370387  0.067335
  0.934066  0.224964  0.192257  0.000000  1.394655  0.070946
  0.980769  0.226904  0.202809  0.000000  1.418922  0.074564
  1.027473  0.228847  0.213451  0.048301  1.443189  0.078189
  1.074176  0.230793  0.224185  0.213745  1.467457  0.081820
  1.120879  0.232744  0.235009  0.441409  1.491724  0.085458
  1.167582  0.234697  0.245925  0.708936  1.515991  0.089103
  1.214286  0.236655  0.256931  0.996598  1.540258  0.092754
  1.260989  0.238616  0.268030  1.284115  1.564526  0.096413
  1.307692  0.240581  0.279220  1.551565  1.588793  0.100078
  1.354396  0.242549  0.290502  1.781797  1.613060  0.103749
  1.401099  0.244521  0.301876  1.963728  1.637328  0.107428
  1.447802  0.246496  0.313342  2.096308  1.661595  0.111113
  1.494505  0.248476  0.324900  2.193018  1.685862  0.114805
  1.500000  0.248709  0.326266  2.317085  1.688717  0.115240
  END FTABLE  1
  FTABLE      3
   91    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.036731  0.000000  0.000000  0.000000
  0.033333  0.037099  0.001231  0.000000  0.020949
  0.066667  0.037469  0.002473  0.000000  0.021158
  0.100000  0.037841  0.003728  0.000000  0.021368
  0.133333  0.038215  0.004996  0.000000  0.021579
  0.166667  0.038590  0.006276  0.000000  0.021791
  0.200000  0.038968  0.007569  0.000000  0.022004
  0.233333  0.039347  0.008874  0.000000  0.022218
  0.266667  0.039728  0.010192  0.000000  0.022433
  0.300000  0.040111  0.011523  0.000000  0.022649
  0.333333  0.040496  0.012866  0.000000  0.022867
  0.366667  0.040882  0.014222  0.000000  0.023085
  0.400000  0.041271  0.015592  0.000000  0.023304
  0.433333  0.041661  0.016974  0.000000  0.023525
  0.466667  0.042053  0.018369  0.000000  0.023746
  0.500000  0.042447  0.019777  0.000000  0.023969
  0.533333  0.042843  0.021199  0.000000  0.024192
  0.566667  0.043241  0.022634  0.000000  0.024417
  0.600000  0.043640  0.024082  0.000000  0.024642
  0.633333  0.044041  0.025543  0.000000  0.024869
  0.666667  0.044444  0.027018  0.000000  0.025096
  0.700000  0.044849  0.028506  0.000000  0.025325
  0.733333  0.045256  0.030008  0.000000  0.025555
  0.766667  0.045665  0.031523  0.000000  0.025785
  0.800000  0.046075  0.033052  0.000000  0.026017
  0.833333  0.046488  0.034595  0.000000  0.026250
  0.866667  0.046902  0.036151  0.000000  0.026484
  0.900000  0.047318  0.037722  0.000000  0.026719
  0.933333  0.047736  0.039306  0.000000  0.026955
  0.966667  0.048155  0.040904  0.000000  0.027192
```

```
  1.000000  0.048577  0.042516  0.000000  0.027430
  1.033333  0.049000  0.044143  0.000000  0.027669
  1.066667  0.049425  0.045783  0.000000  0.027909
  1.100000  0.049852  0.047438  0.000000  0.028150
  1.133333  0.050281  0.049106  0.000000  0.028392
  1.166667  0.050712  0.050790  0.000000  0.028635
  1.200000  0.051144  0.052487  0.000000  0.028879
  1.233333  0.051579  0.054199  0.000000  0.029125
  1.266667  0.052015  0.055926  0.000000  0.029371
  1.300000  0.052453  0.057667  0.000000  0.029618
  1.333333  0.052893  0.059423  0.000000  0.029867
  1.366667  0.053334  0.061193  0.000000  0.030116
  1.400000  0.053778  0.062978  0.000000  0.030367
  1.433333  0.054223  0.064778  0.000000  0.030618
  1.466667  0.054670  0.066593  0.000000  0.030871
  1.500000  0.055119  0.068423  0.000000  0.031124
  1.533333  0.055570  0.070268  0.000000  0.031379
  1.566667  0.056023  0.072128  0.000000  0.031634
  1.600000  0.056478  0.074003  0.000000  0.031891
  1.633333  0.056934  0.075893  0.000000  0.032149
  1.666667  0.057392  0.077798  0.000000  0.032407
  1.700000  0.057852  0.079719  0.000000  0.032667
  1.733333  0.058314  0.081655  0.000000  0.032928
  1.766667  0.058778  0.083607  0.000000  0.033190
  1.800000  0.059243  0.085574  0.000000  0.033453
  1.833333  0.059711  0.087556  0.000000  0.033717
  1.866667  0.060180  0.089555  0.000000  0.033982
  1.900000  0.060651  0.091568  0.000000  0.034248
  1.933333  0.061124  0.093598  0.000000  0.034515
  1.966667  0.061599  0.095643  0.000000  0.034783
  2.000000  0.062075  0.097705  0.000000  0.035052
  2.033333  0.062554  0.099782  0.096853  0.035322
  2.066667  0.063034  0.101875  0.273695  0.035593
  2.100000  0.063516  0.103984  0.502178  0.035865
  2.133333  0.064000  0.106109  0.771465  0.036139
  2.166667  0.064486  0.108251  1.074270  0.036413
  2.200000  0.064973  0.110408  1.404464  0.036688
  2.233333  0.065463  0.112582  1.756250  0.036965
  2.266667  0.065954  0.114773  2.123824  0.037242
  2.300000  0.066447  0.116979  2.501261  0.037521
  2.333333  0.066942  0.119202  2.882519  0.037800
  2.366667  0.067439  0.121442  3.261505  0.038081
  2.400000  0.067938  0.123698  3.632201  0.038362
  2.433333  0.068438  0.125971  3.988826  0.038645
  2.466667  0.068940  0.128261  4.326027  0.038928
  2.500000  0.069444  0.130567  4.639092  0.039213
  2.533333  0.069950  0.132891  4.924197  0.039499
  2.566667  0.070458  0.135231  5.178660  0.039785
  2.600000  0.070968  0.137588  5.401220  0.040073
  2.633333  0.071479  0.139962  5.592337  0.040362
  2.666667  0.071993  0.142353  5.754494  0.040652
  2.700000  0.072508  0.144762  5.892534  0.040943
  2.733333  0.073025  0.147187  6.013989  0.041235
  2.766667  0.073544  0.149630  6.205051  0.041528
  2.800000  0.074064  0.152090  6.338508  0.041822
  2.833333  0.074587  0.154568  6.469213  0.042117
  2.866667  0.075111  0.157063  6.597328  0.042413
  2.900000  0.075637  0.159575  6.723003  0.042710
  2.933333  0.076165  0.162105  6.846371  0.043008
  2.966667  0.076695  0.164653  6.967555  0.043307
  3.000000  0.077227  0.167218  7.086668  0.043607
  END FTABLE  3
END FTABLES

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

```
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.76           RCHRES   2     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   3 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL       REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL       REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL       REPL
END EXT TARGETS

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

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

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

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

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

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

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

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

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


END MASS-LINK

END RUN
```

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