

Appendix F  
Preliminary Hydrology Study

---

# Preliminary Hydrology Study

Avalon Bay Commons

Northwest Corner of Enterprise Road & Aliso Creek Road

**Aliso Viejo, CA.**

June 12, 2023

This Hydraulic Study has been prepared by, and under the direction of, the undersigned, a duly Registered Civil Engineer in the State of California. Except as noted, the undersigned attests to the technical information contained herein, and has judged to be acceptable the qualifications of any technical specialists providing engineering data for this report, upon which findings, conclusions, and recommendations are based.



**Ryan Haskin, P.E.**

Registered Civil Engineer No. C84850

Exp.: 03/31/24

*Prepared for:*

**AvalonBay Communities**

11111 Santa Monica Blvd.  
Suite 1700  
Los Angeles, CA. 90025

*Prepared by:*



**Tait & Associates, Inc.**

701 N. Parkcenter Drive  
Santa Ana, CA 92705  
(714) 560-8200

TAIT JOB # **SP8969**

## Table of Contents

Section 1	Purpose and Scope.....	1
Section 2	Project Information.....	2
2.1	Project Description.....	2
2.1.1	Project Location.....	2
2.2	Hydrologic Setting.....	2
2.2.1	Watershed.....	3
2.2.2	Existing Topography and Facilities.....	3
2.2.3	Adjacent Land Use.....	3
2.2.4	Soil Conditions.....	3
2.2.5	Downstream Conditions.....	3
2.2.6	Existing Drainage Patterns.....	4
2.2.7	Proposed Drainage Patterns.....	4
2.2.8	Impervious Cover.....	4
Section 3	Design Criteria and Methodology.....	5
3.1	Design Criteria.....	5
3.1.1	Drainage Design Criteria.....	5
3.1.2	Runoff Calculation Method.....	5
3.1.3	Runoff and Detention.....	5
Section 4	Hydrology and Drainage Analysis.....	7
4.1	Drainage Delineation.....	7
4.2	Summary of Results.....	7
Appendix A	Hydrology Maps.....	A
Appendix B	Soil Group Map.....	B
Appendix C	Existing Condition Runoff Analysis.....	C
Appendix D	Post-Construction Runoff Analysis.....	D
Appendix E	SOHM Detention Basin Analysis.....	E

## **Section 1 Purpose and Scope**

This hydrology study presents an analysis of the hydrologic effects of the development of 4.1 acre, in the City of Aliso Viejo, California.

This hydrology study addresses runoff from the project site and its impact to the existing downstream storm drainage system. The study includes calculations for the 25 -year storm for both the existing and proposed condition. The study also details the general project characteristics, the design, criteria and methodology applied to the analysis of the project. The report provides a design analysis for the drainage facilities proposed as part of the project, with the drainage improvements being designed to mitigate all rainfall event frequencies up to a 24-hour, 25-year storm event.

This Hydrology Study fulfills the requirements of the Orange County Drainage Area Management Plan (DAMP 2011) and the Orange County Hydrology Manual (October 1986 and 1996 Addendum).

The plans and specifications in the Hydrology Study are not for construction purposes; the contractor shall refer to final approved construction documents for plans and specifications.

## Section 2 Project Information

### 2.1 Project Description

The project consists of the redevelopment of an existing 4.1 acre area of a commercial/business center currently composed of a parking field for the anchor businesses in the center. The proposed project will consist of constructing of a 6 level apartment complex totaling approximately 360 units. The project also includes the construction of a parking structure, leasing office, fitness club, community pool, and retail space.

#### 2.1.1 Project Location

The site is located at the northeast corner of Enterprise & Town Center in the City of Aliso Viejo for the purpose of developing a proposed mixed use apartment development.



Figure 1 – Vicinity Map (Not To Scale)

### 2.2 Hydrologic Setting

This section summarizes the project's size and location in the context of the larger watershed perspective, topography, soil and vegetation conditions, percent impervious area, natural and

infrastructure drainage features, and other relevant hydrologic and environmental factors to be protected specific to the project area's watershed.

### 2.2.1 Watershed

The project site is located within the Aliso Watershed and is tributary to the Aliso Creek.

### 2.2.2 Existing Topography and Facilities

The site features a large slope between Enterprise and the parking field. At the intersection of Enterprise and Town Center, the parking field is roughly 4 feet lower than the public roadway. As Enterprise travels north, the roadway has an upward slope of approximately 7%, resulting in a 50 foot difference in elevation from the roadway down to the parking field at the northerly end of the project. Existing grades within the parking field are relatively flat with 1-2 feet of relief from one side of the site to the other.

### 2.2.3 Adjacent Land Use

The project is bounded by a commercial shopping center to the north and east Enterprise road to the west and south.

### 2.2.4 Soil Conditions

In accordance with the Natural Resources Conservation Service Soil Survey, published in 2021, the project site is located within the hydrology soil group of D.

The project site location has been graphically shown on a soil group map and a USDA Soil Resource map, which have been included in *Appendix B* section of this report.

### 2.2.5 Downstream Conditions

The project discharges to the existing private onsite storm drain network within the shopping center which is piped into the city's RCP storm drain within Enterprise near the intersection

with Aliso Creek Road. The city storm drain flows east to the Aliso Creek Channel, which is a natural water course tributary to the Pacific Ocean.

Based on the results of this study, the project mitigation measures proposed will prevent an increase in runoff. Therefore, the proposed project improvements will not have an adverse effect on the downstream storm drain system.

### **2.2.6 Existing Drainage Patterns**

The existing drainage pattern consists of overland flow to several drop inlets scattered across the parking field. The drop inlets connect to an onsite storm drain system that flows south and exits the property through a 36" RCP connection to a County owned 90" RCP within Enterprise near its intersection with Aliso Creek Road.

### **2.2.7 Proposed Drainage Patterns**

The proposed site will match existing grading in the parking field area. Portions of the proposed buildings extend into the existing slope adjacent to Enterprise and will require retaining walls to retain the existing grade up to Enterprise. The proposed improvements feature courtyards between the blocks of apartment buildings that face the roadside slope. Runoff within these courtyards will be designed to freely flow away from the structures to the proposed storm drain system. The proposed site is composed of two main drainage areas capturing the east and west portions of the site. An underground detention system is provided for each area that will mitigate any increase in peak flow runoff and Hydrologic Conditions of Concern (HCOCs). After each detention system, runoff flow through proprietary bio-treatment systems before discharging to the centers existing storm drain system.

### **2.2.8 Impervious Cover**

The existing project drainage area is approximately 75% impervious consisting of hillside landscape and asphalt parking field. The proposed site will be approximately 80% impervious composed of the proposed structure, hardscape, landscape, and reduced hillside area.

## **Section 3 Design Criteria and Methodology**

This section summarizes the design criteria and methodology applied during the drainage analysis of the project site.

### **3.1 Design Criteria**

#### **3.1.1 Drainage Design Criteria**

The project storm drain facilities (inlets, culverts, detention, etc.) have been designed to conform to Orange County standards.

#### **3.1.2 Runoff Calculation Method**

Runoff calculations for this study were accomplished using the rational method in accordance with the recommendations of the OCHM. The hydrology analysis was prepared using the Advanced Engineer Software (AES), approved by Orange County Flood Control District. AES follows the hydrology methodology and criteria from the OCHM. The RATSCX module was used to analyze and route runoff through each subarea using elevations, slopes, flow lengths, soil types, land use and area inputs to calculate time of concentration and peak flow rates for the various year storm events. For simplicity, the average imperviousness of the entire project area was used for each subarea in the rational method AES analysis. Within AES, land use for each subarea is selected based on imperviousness. For the existing condition, “mobile home park” land use was selected for all subareas which matches the existing condition average imperviousness of 75%. For the post-construction condition, “apartment” land use was selected for all subareas which matches the proposed average imperviousness of 80%.

#### **3.1.3 Runoff and Detention**

In accordance with the Orange County Local Drainage Manual (OCLDM), the project’s Hydrologic design criteria shall be to mitigate the 25-year storm event for discharging to the shopping center’s storm drain network with sump condition inlets. 100-year flood of the proposed structure is provided with the proposed grading design. All runoff flows away from

the structure and secondary paths for overflow are provided in the event of flooding or a clogged drainage facility.

This project is also subject to South Orange County Hydromodification requirements stemming from the Water Quality Management Plan (WQMP) for being in a location with Hydrologic Conditions of Concern (HCOC). The Hydromodification requires the post developed peak flows to not exceed the pre-development, naturally occurring, runoff flow rates and durations by more than 10% of the time, from 10% of the 2-year runoff event up to the 10-year runoff event. This requirement is more stringent and results in a larger detention requirement than the OCLDM requirement since the “naturally occurring” pre-development analysis considers the entire site to be pervious whereas the OCLDM allows for the existing site’s impervious area to be considered.

The detention basin analysis was performed using the County’s South Orange County Hydrology Model software (SOHM). The analysis included 2- through 25-year predeveloped, natural condition, runoff rates and post-development mitigated runoff rates. Basin 1 captures runoff from the western portion of the property and Basin 2 captures all other site runoff. The final detention systems will be determined during the design and preparation of final construction documents. For the purpose of this preliminary study and preliminary sizing, Basin 1 is required to provide approximately 5,055 cubic feet and Basin 2 is required to provide 26,011 cubic feet. SOHM analysis is provided in the *Appendix E* of this report.

## Section 4 Hydrology and Drainage Analysis

This section summarizes the quantitative hydrologic analysis of the existing and proposed conditions of the site.

### 4.1 Drainage Delineation

Appendix A of this report contains the existing condition and post-construction condition hydrology maps, which shows the drainage patterns and subareas of the project.

### 4.2 Summary of Results

**25-year storm Rational Method Summary Table**

Tributary Drainage	Existing Condition			Proposed Condition		
	Area (ac)	Q25 (cfs)	Tc (min)	Area (ac)	Q25 (cfs)	Tc (min)
Outfall 1 - Ex. 15" SD	1.07	4.09	6.39	0.96	3.65	7.09
Outfall 2 - Ex. 24" SD	3.10	11.72	6.42	3.21	8.59	12.16
<b>Site Total</b>	<b>4.17</b>	<b>15.81</b>		<b>4.17</b>	<b>12.24</b>	

Rational Method analysis shows the 25-year peak flow rate from the project area decreases from 15.81 cfs to 12.24 cfs. This may seem counterintuitive given that the project increases imperviousness from 75% to 80%, however the decrease in peak flow is caused by the much longer and flatter travel course of the runoff in the proposed condition which results in an increase in Time of Concentration and corresponding lower rainfall intensity rate used to calculate peak flow. By decreasing the project's peak flow rate from the existing condition, no detention is required by the OCLDM, however hydromodification requirements of the WQMP consider the existing conditional in a natural, 100% pervious condition and still apply. Preliminary detention basin analysis using the County's SOHM software is provided as a reference in Appendix E. Full detailed detention basin analysis will be provided with the Final Hydrology report and WQMP.

Based on the results of this preliminary study, the proposed project will reduce peak flow runoff. The proposed project improvements will not have an adverse effect on the downstream drainage system.

# **APPENDIX**

## Appendix A - Hydrology Maps

Jun 15, 2023 - 12:53pm by rmaslin K:\Drawings\SP\SP8669 - Also Map\Avalon\Hydrology\SP8669-HYD\_PRC.dwg



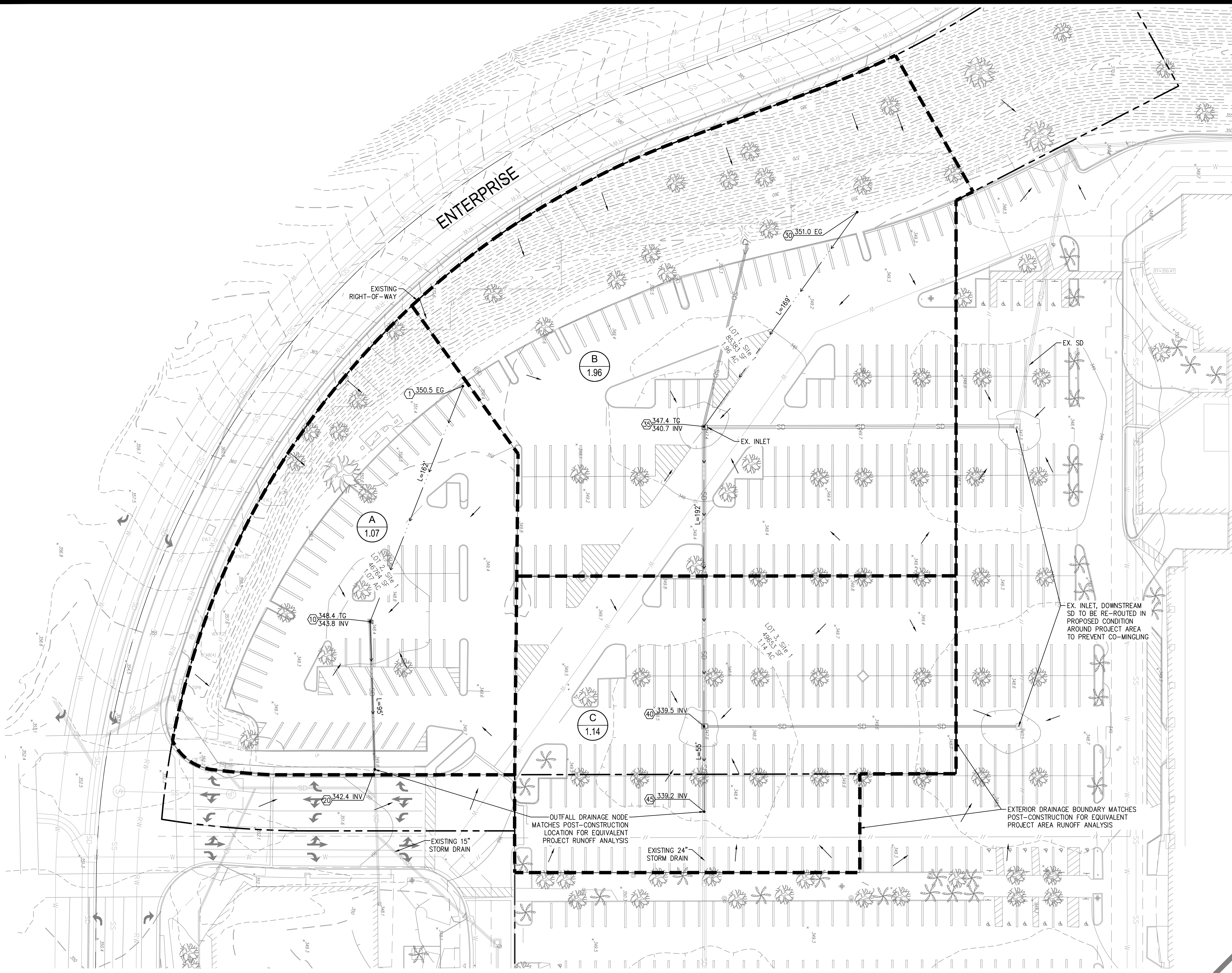
Know what's below  
Call before you dig.

### UNAUTHORIZED CHANGES & USES

THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES OF THESE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS PRIOR TO CONSTRUCTION. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

### NOTE TO CONTRACTOR

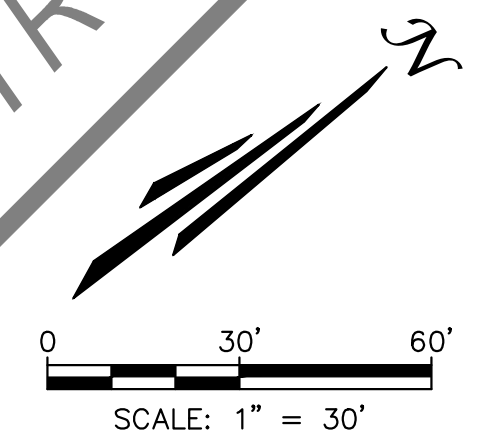
THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES, PIPES, AND/OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THERE MAYBE EXISTING UTILITIES NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL ASCERTAIN THE TRUE VERTICAL AND HORIZONTAL LOCATION OF THOSE UNDERGROUND UTILITIES TO BE USED PRIOR TO CONSTRUCTION AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON.



### LEGEND

---XXX---	MAJOR CONTOUR
-XXX-	MINOR CONTOUR
----	PARCEL LINE
----	PROPERTY LINE
----	OVERALL SHED AREA
-R-	RIDGE LINE
-SD-	STORM DRAIN LINE
⊙	STORM DRAIN MANHOLE (OR CDS, SEE PLAN)
⊠	STORM DRAIN CATCH BASIN
↘	SLOPE ARROW
⊙ X.#	DRAINAGE AREA ID
⊙ #.##AC	ACREAGE

FOR REVIEW ONLY  
NOT FOR  
CONSTRUCTION



PRELIMINARY EXISTING CONDITION HYDROLOGY MAP  
AVALON BAY COMMONS  
NORTHWEST CORNER OF ENTERPRISE  
AND ALISO CREEK ROAD  
ALISO VIEJO, CA 92656

DRAWN: JM  
DATE: 11/2/23  
CHECKED: RH  
DATE: 11/2/23  
REVISION #:  
DATE:  
JOB NO.: SP8669

701 North Parkcenter Drive  
Santa Ana, CA 92705  
p: 714.580.9200  
www.tait.com  
ENGINEERING ENVIRONMENTAL BUILDING LAND  
Santa Ana Sacramento Denver  
San Diego Inland Empire Atlanta

NO.	DESCRIPTION	BY	DATE

5/15/2019 Internal Review #1

FOR REVIEW ONLY - NOT FOR CONSTRUCTION

Jun 15, 2023 - 12:35pm by rmaslin K:\Drawings\SP\SP8969 - Also Vepic\ENR\Hydrology\SP8969-H1D\_001.dwg

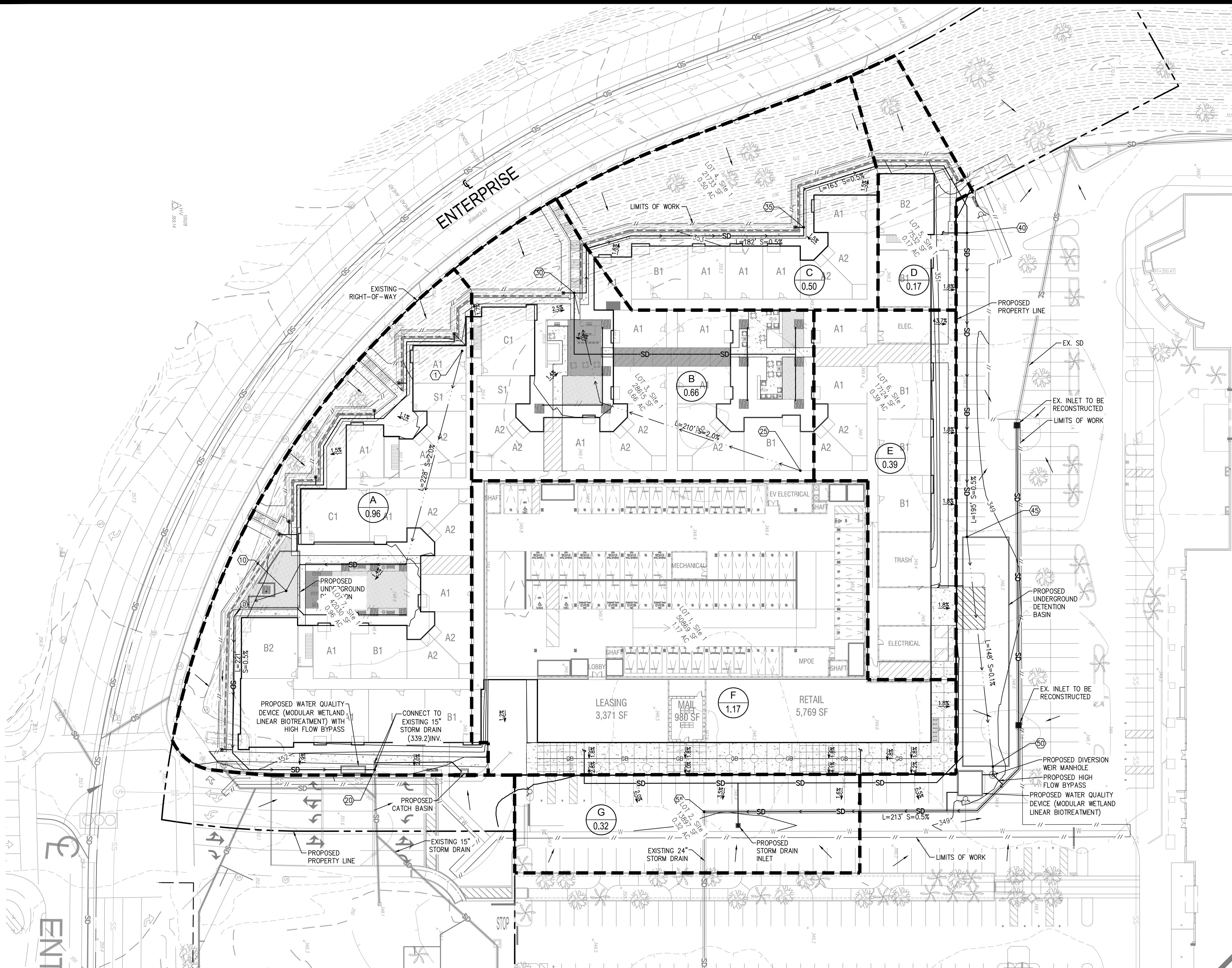
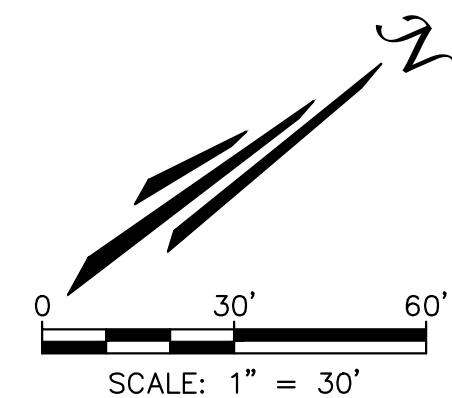


**UNAUTHORIZED CHANGES & USES**

THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES OF THESE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS PRIOR TO CONSTRUCTION. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

**NOTE TO CONTRACTOR**

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES, PIPES, AND/OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THERE MAYBE EXISTING UTILITIES NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL ASCERTAIN THE TRUE VERTICAL AND HORIZONTAL LOCATION OF THOSE UNDERGROUND UTILITIES TO BE USED PRIOR TO CONSTRUCTION AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON.



**LEGEND**

- XXX--- MAJOR CONTOUR
- XXX--- MINOR CONTOUR
- --- PARCEL LINE
- --- PROPERTY LINE
- --- OVERALL SHED AREA
- --- RIDGE LINE
- SD--- STORM DRAIN LINE
- ⊙ STORM DRAIN MANHOLE (OR CDS, SEE PLAN)
- ⊠ STORM DRAIN CATCH BASIN
- ↘ SLOPE ARROW
- X.#
- ##AC

**FOR REVIEW ONLY  
NOT FOR  
CONSTRUCTION**

PRELIMINARY POST-CONSTRUCTION HYDROLOGY MAP  
AVALON BAY COMMONS  
NORTHWEST CORNER OF ENTERPRISE  
AND ALISO CREEK ROAD  
ALISO VIEJO, CA 92656

DRAWN: JM  
DATE: 11/2/23  
CHECKED: RH  
DATE: 11/2/23  
REVISED:  
DATE:  
JOB NO.: SP8969

**TAIT**  
& ASSOCIATES  
Since 1964

701 North Parkcenter Drive  
Santa Ana, CA 92705  
p: 714.580.9200  
www.tait.com

ENGINEERING ENVIRONMENTAL BUILDING LAND  
Sacramento Denver  
San Diego Atlanta

NO.	DESCRIPTION	BY	DATE

FOR REVIEW ONLY - NOT FOR CONSTRUCTION

## Appendix B – Soil Group Map

Hydrologic Soil Group—Orange County and Part of Riverside County, California



Soil Map may not be valid at this scale.

Map Scale: 1:1,530 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84




Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

8/3/2022  
Page 1 of 4


## MAP LEGEND

### Area of Interest (AOI)









 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons





 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines


 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points






 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Orange County and Part of Riverside County, California  
 Survey Area Data: Version 15, Sep 13, 2021

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

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

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

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
129	Bosanko-Balcom complex, 15 to 30 percent slopes	D	5.3	100.0%
<b>Totals for Area of Interest</b>			<b>5.3</b>	<b>100.0%</b>

### Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

### Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule: Higher*

## **Appendix C – Existing Condition Runoff Analysis**

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2016 Advanced Engineering Software (aes)  
Ver. 23.0 Release Date: 07/01/2016 License ID 1334

Analysis prepared by:

SP8969 - ALISO VIEJO - OUTFALL 1  
EXISTING CONDITION - 25 YEAR STORM

-----  
FILE NAME: 8969X25A.DAT  
TIME/DATE OF STUDY: 12:46 06/15/2023  
-----

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 6.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*DATA BANK RAINFALL USED\*  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)  
=== =====  
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 1.00 TO NODE 10.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 162.00  
ELEVATION DATA: UPSTREAM(FEET) = 350.50 DOWNSTREAM(FEET) = 348.40

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] * 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.132  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.298  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA  $F_p$   $A_p$  SCS  $T_c$   
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
MOBILE HOME PARK D 1.07 0.20 0.250 75 6.13  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.20  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.250  
SUBAREA RUNOFF(CFS) = 4.09  
TOTAL AREA(ACRES) = 1.07 PEAK FLOW RATE(CFS) = 4.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 10.00 TO NODE 20.00 IS CODE = 41  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 343.80 DOWNSTREAM(FEET) = 342.40  
FLOW LENGTH(FEET) = 95.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 15.0 INCH PIPE IS 7.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.20  
GIVEN PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 4.09  
PIPE TRAVEL TIME(MIN.) = 0.26  $T_c$ (MIN.) = 6.39  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 20.00 = 257.00 FEET.  
=====

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 1.1  $T_c$ (MIN.) = 6.39  
EFFECTIVE AREA(ACRES) = 1.07 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.05  
AREA-AVERAGED  $F_p$ (INCH/HR) = 0.20 AREA-AVERAGED  $A_p$  = 0.250  
PEAK FLOW RATE(CFS) = 4.09  
=====

END OF RATIONAL METHOD ANALYSIS

▲

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2016 Advanced Engineering Software (aes)  
Ver. 23.0 Release Date: 07/01/2016 License ID 1334

Analysis prepared by:

SP8969 - ALISO VIEJO - OUTFALL 2  
EXISTING CONDITION - 25 YEAR STORM

-----  
FILE NAME: 8969X25B.DAT  
TIME/DATE OF STUDY: 12:53 06/15/2023  
-----

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 6.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*DATA BANK RAINFALL USED\*  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)  
=====  
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 30.00 TO NODE 35.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 169.00  
ELEVATION DATA: UPSTREAM(FEET) = 351.00 DOWNSTREAM(FEET) = 347.40

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.647  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.503  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA  $F_p$   $A_p$  SCS  $T_c$   
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
MOBILE HOME PARK D 1.96 0.20 0.250 75 5.65  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.20  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.250  
SUBAREA RUNOFF(CFS) = 7.85  
TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 7.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 35.00 TO NODE 40.00 IS CODE = 41  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 340.70 DOWNSTREAM(FEET) = 339.50  
FLOW LENGTH(FEET) = 192.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 11.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.30  
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 7.85  
PIPE TRAVEL TIME(MIN.) = 0.60  $T_c$ (MIN.) = 6.25  
LONGEST FLOWPATH FROM NODE 30.00 TO NODE 40.00 = 361.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40.00 TO NODE 40.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.25  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.251  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA  $F_p$   $A_p$  SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
MOBILE HOME PARK D 1.14 0.20 0.250 75  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.20  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.250  
SUBAREA AREA(ACRES) = 1.14 SUBAREA RUNOFF(CFS) = 4.31  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.05  
AREA-AVERAGED  $F_p$ (INCH/HR) = 0.20 AREA-AVERAGED  $A_p$  = 0.25  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 11.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40.00 TO NODE 45.00 IS CODE = 41  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	339.50	DOWNSTREAM(FEET) =	339.20
FLOW LENGTH(FEET) =	55.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.4 INCHES			
PIPE-FLOW VELOCITY(FEET/SEC.) =	5.52		
GIVEN PIPE DIAMETER(INCH) =	24.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	11.72		
PIPE TRAVEL TIME(MIN.) =	0.17	Tc(MIN.) =	6.42
LONGEST FLOWPATH FROM NODE	30.00	TO NODE	45.00 = 416.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) =	3.1	TC(MIN.) =	6.42
EFFECTIVE AREA(ACRES) =	3.10	AREA-AVERAGED Fm(INCH/HR)=	0.05
AREA-AVERAGED Fp(INCH/HR) =	0.20	AREA-AVERAGED Ap =	0.250
PEAK FLOW RATE(CFS) =	11.72		

=====

END OF RATIONAL METHOD ANALYSIS

↑

## **Appendix D – Post-Construction Runoff Analysis**

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2016 Advanced Engineering Software (aes)  
Ver. 23.0 Release Date: 07/01/2016 License ID 1334

Analysis prepared by:

SP8969 - ALISO VIEJO - OUTFALL 1  
PROPOSED CONDITION - 25 YEAR STORM

-----  
FILE NAME: 8969Q25.DAT  
TIME/DATE OF STUDY: 14:19 06/14/2023  
-----

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 6.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*DATA BANK RAINFALL USED\*  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)  
=== =====  
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 1.00 TO NODE 10.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 228.00

ELEVATION DATA: UPSTREAM(FEET) = 100.00 DOWNSTREAM(FEET) = 95.44

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.216  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.265  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
APARTMENTS D 0.96 0.20 0.200 75 6.22  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 3.65  
TOTAL AREA(ACRES) = 0.96 PEAK FLOW RATE(CFS) = 3.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10.00 TO NODE 20.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

REPRESENTATIVE SLOPE = 0.0050  
FLOW LENGTH(FEET) = 221.00 MANNING'S N = 0.012  
DEPTH OF FLOW IN 15.0 INCH PIPE IS 9.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.23  
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.65  
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 7.09  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 20.00 = 449.00 FEET.

=====

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 1.0 TC(MIN.) = 7.09  
EFFECTIVE AREA(ACRES) = 0.96 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.200  
PEAK FLOW RATE(CFS) = 3.65

=====

END OF RATIONAL METHOD ANALYSIS

▲

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2016 Advanced Engineering Software (aes)  
Ver. 23.0 Release Date: 07/01/2016 License ID 1334

Analysis prepared by:

SP8969 - ALISO VIEJO - OUTFALL 2  
PROPOSED CONDITION - 25 YEAR STORM

-----  
FILE NAME: 8969Q25B.DAT  
TIME/DATE OF STUDY: 14:35 06/14/2023  
-----

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 6.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*DATA BANK RAINFALL USED\*  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)  
=== =====  
1 30.0 20.0 0.018/0.018/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 25.00 TO NODE 30.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 210.00

ELEVATION DATA: UPSTREAM(FEET) = 100.00 DOWNSTREAM(FEET) = 95.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.015  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.345  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
APARTMENTS D 0.66 0.20 0.200 75 6.01  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.56  
TOTAL AREA(ACRES) = 0.66 PEAK FLOW RATE(CFS) = 2.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 30.00 TO NODE 35.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

-----  
REPRESENTATIVE SLOPE = 0.0050  
FLOW LENGTH(FEET) = 182.00 MANNING'S N = 0.012  
DEPTH OF FLOW IN 12.0 INCH PIPE IS 9.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.75  
ESTIMATED PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.56  
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 6.82  
LONGEST FLOWPATH FROM NODE 25.00 TO NODE 35.00 = 392.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 35.00 TO NODE 35.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

-----  
MAINLINE Tc(MIN.) = 6.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.046  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
APARTMENTS D 0.50 0.20 0.200 75  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.80  
EFFECTIVE AREA(ACRES) = 1.16 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.20  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 4.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 35.00 TO NODE 40.00 IS CODE = 31  
-----

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
REPRESENTATIVE SLOPE = 0.0050
FLOW LENGTH(FEET) = 163.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS 11.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.32
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.18
PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 7.45
LONGEST FLOWPATH FROM NODE 25.00 TO NODE 40.00 = 555.00 FEET.

*****
FLOW PROCESS FROM NODE 40.00 TO NODE 40.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 7.45
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.849
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS D 0.17 0.20 0.200 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.17 SUBAREA RUNOFF(CFS) = 0.58
EFFECTIVE AREA(ACRES) = 1.33 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 4.56

*****
FLOW PROCESS FROM NODE 40.00 TO NODE 45.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
REPRESENTATIVE SLOPE = 0.0050
FLOW LENGTH(FEET) = 195.00 MANNING'S N = 0.012
DEPTH OF FLOW IN 15.0 INCH PIPE IS 11.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.36
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.56
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 8.20
LONGEST FLOWPATH FROM NODE 25.00 TO NODE 45.00 = 750.00 FEET.

*****
FLOW PROCESS FROM NODE 45.00 TO NODE 45.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN.) = 8.20
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.647
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS D 0.39 0.20 0.200 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.39 SUBAREA RUNOFF(CFS) = 1.27
EFFECTIVE AREA(ACRES) = 1.72 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 5.58

*****
FLOW PROCESS FROM NODE 45.00 TO NODE 50.00 IS CODE = 36
-----
>>>>COMPUTE BOX-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED BOX SIZE (PRESSURE FLOW)<<<<
=====
REPRESENTATIVE SLOPE = 0.0010
FLOW LENGTH(FEET) = 148.00 MANNING'S N = 0.015
*GIVEN BOX BASEWIDTH(FEET) = 29.00 ESTIMATED BOX HEIGHT(FEET) = 0.26
BOX-FLOW VELOCITY(FEET/SEC.) = 0.75
BOX-FLOW(CFS) = 5.58
BOX-FLOW TRAVEL TIME(MIN.) = 3.29 Tc(MIN.) = 11.48
LONGEST FLOWPATH FROM NODE 25.00 TO NODE 50.00 = 898.00 FEET.

*****
FLOW PROCESS FROM NODE 50.00 TO NODE 50.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.013
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS D 1.17 0.20 0.200 75
APARTMENTS D 0.32 0.20 0.200 75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 1.49 SUBAREA RUNOFF(CFS) = 3.99
EFFECTIVE AREA(ACRES) = 3.21 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 8.59

*****
FLOW PROCESS FROM NODE 50.00 TO NODE 55.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

```

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

REPRESENTATIVE SLOPE =	0.0050			
FLOW LENGTH(FEET) =	213.00	MANNING'S N =	0.012	
DEPTH OF FLOW IN 21.0 INCH PIPE IS	13.5 INCHES			
PIPE-FLOW VELOCITY(FEET/SEC.) =	5.25			
ESTIMATED PIPE DIAMETER(INCH) =	21.00	NUMBER OF PIPES =	1	
PIPE-FLOW(CFS) =	8.59			
PIPE TRAVEL TIME(MIN.) =	0.68	Tc(MIN.) =	12.16	
LONGEST FLOWPATH FROM NODE	25.00	TO NODE	55.00 =	1111.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) =	3.2	TC(MIN.) =	12.16
EFFECTIVE AREA(ACRES) =	3.21	AREA-AVERAGED Fm(INCH/HR)=	0.04
AREA-AVERAGED Fp(INCH/HR) =	0.20	AREA-AVERAGED Ap =	0.200
PEAK FLOW RATE(CFS) =	8.59		

=====

END OF RATIONAL METHOD ANALYSIS

↑

## **Appendix E – SOHM Detention Basin Analysis**

**SOHM**

**PROJECT REPORT**

**REPORT 1 - VAULT 1**

## General Model Information

Project Name: default[6]  
Site Name: Aliso Viejo  
Site Address: 26501 Aliso Creek Rd  
City: Aliso Viejo  
Report Date: 6/14/2023  
Gage: Laguna Beach  
Data Start: 10/01/1949  
Data End: 09/30/2006  
Timestep: 15 Minute  
Precip Scale: 1.000  
Version Date: 2020/10/14

## POC Thresholds

---

Low Flow Threshold for POC1: 10 Percent of the 2 Year  
High Flow Threshold for POC1: 10 Year

---

DRAFT

# Landuse Basin Data

## Predeveloped Land Use

### Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use D,Open Brush,Mod	acre 0.96
Pervious Total	0.96
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.96

Element Flows To:  
Surface                      Interflow                      Groundwater

DRAFT

## Mitigated Land Use

### Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use D,Open Brush,Mod	acre 0.34
Pervious Total	0.34
Impervious Land Use Impervious,Mod(5-10)	acre 0.62
Impervious Total	0.62
Basin Total	0.96

### Element Flows To:

Surface	Interflow	Groundwater
Vault 1	Vault 1	

DRAFT

*Routing Elements*  
*Predeveloped Routing*

DRAFT

## Mitigated Routing

### Vault 1

Width: 35.5516582053359 ft.  
 Length: 35.5516582053359 ft.  
 Depth: 4 ft.  
 Discharge Structure  
 Riser Height: 3 ft.  
 Riser Diameter: 54 in.  
 Notch Type: Rectangular  
 Notch Width: 0.902 ft.  
 Notch Height: 0.347 ft.  
 Orifice 1 Diameter: 0.826 in. Elevation:0 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

Vault Hydraulic Table

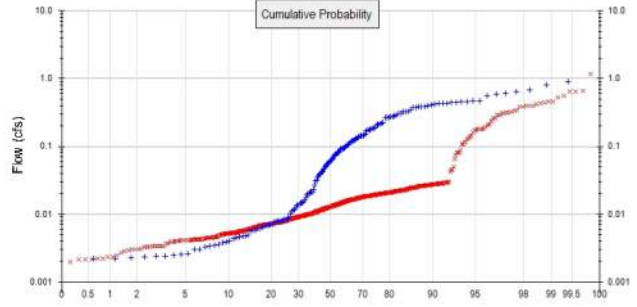
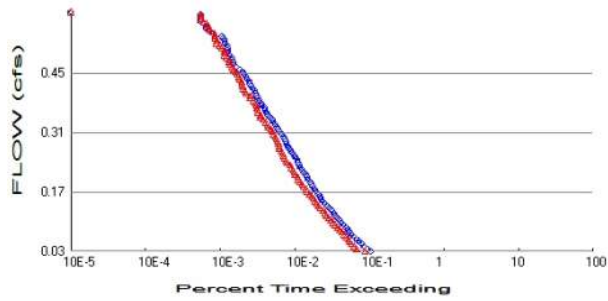
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.029	0.000	0.000	0.000
0.0444	0.029	0.001	0.003	0.000
0.0889	0.029	0.002	0.005	0.000
0.1333	0.029	0.003	0.006	0.000
0.1778	0.029	0.005	0.007	0.000
0.2222	0.029	0.006	0.008	0.000
0.2667	0.029	0.007	0.009	0.000
0.3111	0.029	0.009	0.010	0.000
0.3556	0.029	0.010	0.011	0.000
0.4000	0.029	0.011	0.011	0.000
0.4444	0.029	0.012	0.012	0.000
0.4889	0.029	0.014	0.012	0.000
0.5333	0.029	0.015	0.013	0.000
0.5778	0.029	0.016	0.014	0.000
0.6222	0.029	0.018	0.014	0.000
0.6667	0.029	0.019	0.015	0.000
0.7111	0.029	0.020	0.015	0.000
0.7556	0.029	0.021	0.016	0.000
0.8000	0.029	0.023	0.016	0.000
0.8444	0.029	0.024	0.017	0.000
0.8889	0.029	0.025	0.017	0.000
0.9333	0.029	0.027	0.017	0.000
0.9778	0.029	0.028	0.018	0.000
1.0222	0.029	0.029	0.018	0.000
1.0667	0.029	0.030	0.019	0.000
1.1111	0.029	0.032	0.019	0.000
1.1556	0.029	0.033	0.019	0.000
1.2000	0.029	0.034	0.020	0.000
1.2444	0.029	0.036	0.020	0.000
1.2889	0.029	0.037	0.021	0.000
1.3333	0.029	0.038	0.021	0.000
1.3778	0.029	0.040	0.021	0.000
1.4222	0.029	0.041	0.022	0.000
1.4667	0.029	0.042	0.022	0.000
1.5111	0.029	0.043	0.022	0.000
1.5556	0.029	0.045	0.023	0.000
1.6000	0.029	0.046	0.023	0.000

1.6444	0.029	0.047	0.023	0.000
1.6889	0.029	0.049	0.024	0.000
1.7333	0.029	0.050	0.024	0.000
1.7778	0.029	0.051	0.024	0.000
1.8222	0.029	0.052	0.025	0.000
1.8667	0.029	0.054	0.025	0.000
1.9111	0.029	0.055	0.025	0.000
1.9556	0.029	0.056	0.025	0.000
2.0000	0.029	0.058	0.026	0.000
2.0444	0.029	0.059	0.026	0.000
2.0889	0.029	0.060	0.026	0.000
2.1333	0.029	0.061	0.027	0.000
2.1778	0.029	0.063	0.027	0.000
2.2222	0.029	0.064	0.027	0.000
2.2667	0.029	0.065	0.027	0.000
2.3111	0.029	0.067	0.028	0.000
2.3556	0.029	0.068	0.028	0.000
2.4000	0.029	0.069	0.028	0.000
2.4444	0.029	0.070	0.028	0.000
2.4889	0.029	0.072	0.029	0.000
2.5333	0.029	0.073	0.029	0.000
2.5778	0.029	0.074	0.029	0.000
2.6222	0.029	0.076	0.030	0.000
2.6667	0.029	0.077	0.035	0.000
2.7111	0.029	0.078	0.073	0.000
2.7556	0.029	0.080	0.129	0.000
2.8000	0.029	0.081	0.200	0.000
2.8444	0.029	0.082	0.283	0.000
2.8889	0.029	0.083	0.376	0.000
2.9333	0.029	0.085	0.478	0.000
2.9778	0.029	0.086	0.588	0.000
3.0222	0.029	0.087	0.805	0.000
3.0667	0.029	0.089	1.469	0.000
3.1111	0.029	0.090	2.415	0.000
3.1556	0.029	0.091	3.575	0.000
3.2000	0.029	0.092	4.914	0.000
3.2444	0.029	0.094	6.410	0.000
3.2889	0.029	0.095	8.047	0.000
3.3333	0.029	0.096	9.811	0.000
3.3778	0.029	0.098	11.69	0.000
3.4222	0.029	0.099	13.68	0.000
3.4667	0.029	0.100	15.77	0.000
3.5111	0.029	0.101	17.94	0.000
3.5556	0.029	0.103	20.20	0.000
3.6000	0.029	0.104	22.54	0.000
3.6444	0.029	0.105	24.94	0.000
3.6889	0.029	0.107	27.40	0.000
3.7333	0.029	0.108	29.91	0.000
3.7778	0.029	0.109	32.46	0.000
3.8222	0.029	0.110	35.05	0.000
3.8667	0.029	0.112	37.67	0.000
3.9111	0.029	0.113	40.30	0.000
3.9556	0.029	0.114	42.94	0.000
4.0000	0.029	0.116	45.58	0.000
4.0444	0.029	0.117	48.22	0.000
4.0889	0.000	0.000	50.84	0.000

DRAFT

# Analysis Results

## POC 1



+ Predeveloped    x Mitigated

### Predeveloped Landuse Totals for POC #1

Total Pervious Area: 0.96  
 Total Impervious Area: 0

### Mitigated Landuse Totals for POC #1

Total Pervious Area: 0.34  
 Total Impervious Area: 0.62

Flow Frequency Method: Cunnane

### Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.309626
5 year	0.448674
10 year	0.585656
25 year	0.699281

### Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.209518
5 year	0.404215
10 year	0.515124
25 year	0.649912

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0310	2081	1737	83	Pass
0.0366	1866	1351	72	Pass
0.0422	1702	1245	73	Pass
0.0478	1571	1153	73	Pass
0.0534	1447	1086	75	Pass
0.0590	1352	1047	77	Pass
0.0646	1239	981	79	Pass
0.0702	1144	914	79	Pass
0.0758	1085	855	78	Pass
0.0814	1028	793	77	Pass
0.0870	968	747	77	Pass
0.0926	902	694	76	Pass
0.0982	829	649	78	Pass
0.1038	784	612	78	Pass
0.1094	737	563	76	Pass
0.1150	695	533	76	Pass
0.1206	669	507	75	Pass
0.1262	621	474	76	Pass
0.1318	585	435	74	Pass
0.1374	544	411	75	Pass
0.1430	502	394	78	Pass
0.1486	475	373	78	Pass
0.1542	449	356	79	Pass
0.1598	430	336	78	Pass
0.1654	408	315	77	Pass
0.1710	386	294	76	Pass
0.1766	372	284	76	Pass
0.1822	349	261	74	Pass
0.1878	331	253	76	Pass
0.1934	321	236	73	Pass
0.1991	302	221	73	Pass
0.2047	292	219	75	Pass
0.2103	282	201	71	Pass
0.2159	264	197	74	Pass
0.2215	250	191	76	Pass
0.2271	236	180	76	Pass
0.2327	229	172	75	Pass
0.2383	222	157	70	Pass
0.2439	216	151	69	Pass
0.2495	206	146	70	Pass
0.2551	197	141	71	Pass
0.2607	187	136	72	Pass
0.2663	177	132	74	Pass
0.2719	168	124	73	Pass
0.2775	161	123	76	Pass
0.2831	153	121	79	Pass
0.2887	151	118	78	Pass
0.2943	145	114	78	Pass
0.2999	140	110	78	Pass
0.3055	133	102	76	Pass
0.3111	122	100	81	Pass
0.3167	119	96	80	Pass
0.3223	114	88	77	Pass

0.3279	109	86	78	Pass
0.3335	104	82	78	Pass
0.3391	100	75	75	Pass
0.3447	92	69	75	Pass
0.3503	86	69	80	Pass
0.3559	83	65	78	Pass
0.3615	80	63	78	Pass
0.3671	78	62	79	Pass
0.3727	72	61	84	Pass
0.3783	70	59	84	Pass
0.3839	67	56	83	Pass
0.3896	63	51	80	Pass
0.3952	61	50	81	Pass
0.4008	60	45	75	Pass
0.4064	58	43	74	Pass
0.4120	55	41	74	Pass
0.4176	52	40	76	Pass
0.4232	50	39	78	Pass
0.4288	49	39	79	Pass
0.4344	46	37	80	Pass
0.4400	44	35	79	Pass
0.4456	42	34	80	Pass
0.4512	40	32	80	Pass
0.4568	37	30	81	Pass
0.4624	33	29	87	Pass
0.4680	30	27	90	Pass
0.4736	30	26	86	Pass
0.4792	29	26	89	Pass
0.4848	29	24	82	Pass
0.4904	27	23	85	Pass
0.4960	25	23	92	Pass
0.5016	25	23	92	Pass
0.5072	25	21	84	Pass
0.5128	25	20	80	Pass
0.5184	23	18	78	Pass
0.5240	23	18	78	Pass
0.5296	22	17	77	Pass
0.5352	21	17	80	Pass
0.5408	16	17	106	Pass
0.5464	14	15	107	Pass
0.5520	13	14	107	Pass
0.5576	13	14	107	Pass
0.5632	12	13	108	Pass
0.5688	11	12	109	Pass
0.5745	11	11	100	Pass
0.5801	11	11	100	Pass
0.5857	11	11	100	Pass

DRAFT

DRAFT

## *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.

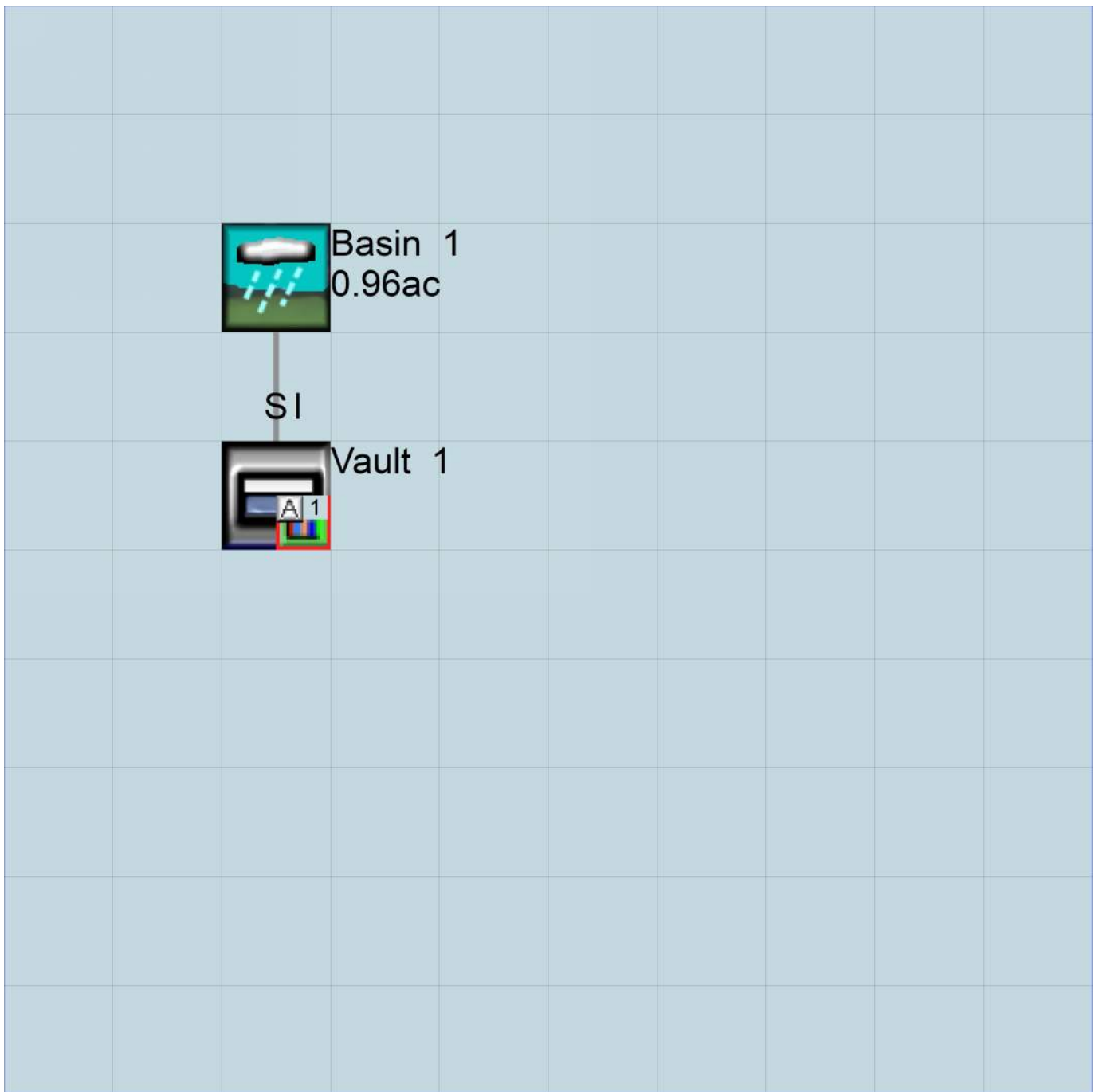
DRAFT

# Appendix

## Predeveloped Schematic



# Mitigated Schematic



# Predeveloped UCI File

RUN

GLOBAL

```
WVHM4 model simulation
START      1949 10 01      END      2006 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      default[6].wdm
MESSU    25      Predefault[6].MES
          27      Predefault[6].L61
          28      Predefault[6].L62
          30      POCdefault[6]1.dat
```

END FILES

OPN SEQUENCE

```
INGRP          INDELT 00:15
  PERLND        42
  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

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

END OPCODE

PARAM

```
# # K ***
```

END PARAM

END GENER

PERLND

GEN-INFO

```
<PLS ><-----Name----->NBLKS Unit-systems Printer ***
# - # User t-series Engl Metr ***
          in out ***
```

```
42   D,Open Brush,Mod 1 1 1 1 27 0
```

END GEN-INFO

\*\*\* Section PWATER\*\*\*

ACTIVITY

```
<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ***
42   0   0   1   0   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 *****
42   0   0   4   0   0   0   0   0   0   0   0   0   0   1   9
```

END PRINT-INFO

```

PWAT-PARM1
<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRG VLE INFC HWT ***
42 0 0 0 1 0 0 0 0 1 0 0
END PWAT-PARM1

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARY AGWRC
42 0 4.3 0.035 350 0.1 0.8 0.955
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
42 40 35 4 2 0 0.03 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
42 0 0.65 0.25 0.8 0.45 0
END PWAT-PARM4

MON-LZETPARM
<PLS > PWATER input info: Part 3 ***
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC ***
42 0.4 0.4 0.4 0.5 0.55 0.55 0.55 0.55 0.55 0.45 0.4
END MON-LZETPARM

MON-INTERCEP
<PLS > PWATER input info: Part 3 ***
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC ***
42 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12
END MON-INTERCEP

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
42 0 0 0.065 0 0.86 0.3 0.01
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

```



SPEC-ACTIONS  
END SPEC-ACTIONS  
FTABLES  
END FTABLES

EXT SOURCES

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

END EXT SOURCES

EXT TARGETS

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

END EXT TARGETS

MASS-LINK

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

```
WVHM4 model simulation
START      1949 10 01      END      2006 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      default[6].wdm
MESSU    25      Mitdefault[6].MES
          27      Mitdefault[6].L61
          28      Mitdefault[6].L62
          30      POCdefault[6]1.dat
```

END FILES

OPN SEQUENCE

```
INGRP          INDELT 00:15
  PERLND        42
  IMPLND         2
  RCHRES         1
  COPY           1
  COPY          501
  DISPLY         1
```

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INFO1

```
# - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
1      Vault 1      MAX      1      2      30      9
```

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES

```
# - # NPT NMN ***
1      1      1
501    1      1
```

END TIMESERIES

END COPY

GENER

OPCODE

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

END OPCODE

PARAM

```
#      #      K ***
```

END PARAM

END GENER

PERLND

GEN-INFO

```
<PLS ><-----Name----->NBLKS  Unit-systems  Printer ***
# - #      User  t-series  Engl Metr ***
          in  out      ***
42      D,Open Brush,Mod      1      1      1      1      27      0
```

END GEN-INFO

\*\*\* Section PWATER\*\*\*

ACTIVITY

```
<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL MSTL  PEST  NITR  PHOS  TRAC ***
42      0      0      1      0      0      0      0      0      0      0      0
```

END ACTIVITY

PRINT-INFO

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

42 0 0 4 0 0 0 0 0 0 0 0 0 0 1 9  
END PRINT-INFO

PWAT-PARM1  
<PLS > PWATER variable monthly parameter value flags \*\*\*  
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT \*\*\*  
42 0 0 0 1 0 0 0 0 1 0 0  
END PWAT-PARM1

PWAT-PARM2  
<PLS > PWATER input info: Part 2 \*\*\*  
# - # \*\*\*FOREST LZSN INFILT LSUR SLSUR KVARY AGWRC  
42 0 4.3 0.035 350 0.1 0.8 0.955  
END PWAT-PARM2

PWAT-PARM3  
<PLS > PWATER input info: Part 3 \*\*\*  
# - # \*\*\*PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP  
42 40 35 4 2 0 0.03 0  
END PWAT-PARM3

PWAT-PARM4  
<PLS > PWATER input info: Part 4 \*\*\*  
# - # CEPSC UZSN NSUR INTFW IRC LZETP \*\*\*  
42 0 0.65 0.25 0.8 0.45 0  
END PWAT-PARM4

MON-LZETPARM  
<PLS > PWATER input info: Part 3 \*\*\*  
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC \*\*\*  
42 0.4 0.4 0.4 0.5 0.55 0.55 0.55 0.55 0.55 0.55 0.45 0.4  
END MON-LZETPARM

MON-INTERCEP  
<PLS > PWATER input info: Part 3 \*\*\*  
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC \*\*\*  
42 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12  
END MON-INTERCEP

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  
42 0 0 0.065 0 0.86 0.3 0.01  
END PWAT-STATE1

END PERLND

IMPLND

GEN-INFO  
<PLS ><-----Name-----> Unit-systems Printer \*\*\*  
# - # User t-series Engl Metr \*\*\*  
in out \*\*\*  
2 Impervious,Mod(5-10) 1 1 1 27 0  
END GEN-INFO  
\*\*\* Section IWATER\*\*\*

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

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

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

END IWAT-PARM1

IWAT-PARM2
<PLS > IWATER input info: Part 2 \*\*\*
# - # \*\*\* LSUR SLSUR NSUR RETSC
2 100 0.1 0.1 0.09
END IWAT-PARM2

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

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

END IMPLND

SCHEMATIC
<-Source-> <--Area--> <-Target-> MBLK \*\*\*
<Name> # <-factor-> <Name> # Tbl# \*\*\*
Basin 1\*\*\*
PERLND 42 0.34 RCHRES 1 2
PERLND 42 0.34 RCHRES 1 3
IMPLND 2 0.62 RCHRES 1 5

\*\*\*\*\*Routing\*\*\*\*\*
PERLND 42 0.34 COPY 1 12
IMPLND 2 0.62 COPY 1 15
PERLND 42 0.34 COPY 1 13
RCHRES 1 1 COPY 501 16
END SCHEMATIC

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

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

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

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

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

HYDR-PARM1

```

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

```

```

HYDR-PARM2
# - #   FTABNO          LEN          DELTH          STCOR          KS          DB50          ***
<-----><-----><-----><-----><-----><-----><----->          ***
1        1          0.01          0.0          0.0          0.5          0.0
END HYDR-PARM2

```

```

HYDR-INIT
RCHRES  Initial conditions for each HYDR section                       ***
# - #   *** VOL      Initial value of COLIND  Initial value of OUTDGT
          *** ac-ft  for each possible exit  for each possible exit
<-----><----->  <-----><-----><-----><-----> *** <-----><-----><-----><-----><----->
1        0          4.0  0.0  0.0  0.0  0.0          0.0  0.0  0.0  0.0  0.0
END HYDR-INIT
END RCHRES

```

```

SPEC-ACTIONS
END SPEC-ACTIONS

```

```

FTABLES

```

```

FTABLE      1
92      4
Depth      Area      Volume  Outflowl Velocity  Travel Time***
(ft)      (acres)  (acre-ft)  (cfs)  (ft/sec)  (Minutes)***
0.000000  0.029016  0.000000  0.000000
0.044444  0.029016  0.001290  0.003903
0.088889  0.029016  0.002579  0.005520
0.133333  0.029016  0.003869  0.006761
0.177778  0.029016  0.005158  0.007807
0.222222  0.029016  0.006448  0.008728
0.266667  0.029016  0.007737  0.009561
0.311111  0.029016  0.009027  0.010327
0.355556  0.029016  0.010317  0.011040
0.400000  0.029016  0.011606  0.011710
0.444444  0.029016  0.012896  0.012343
0.488889  0.029016  0.014185  0.012946
0.533333  0.029016  0.015475  0.013521
0.577778  0.029016  0.016765  0.014073
0.622222  0.029016  0.018054  0.014605
0.666667  0.029016  0.019344  0.015117
0.711111  0.029016  0.020633  0.015613
0.755556  0.029016  0.021923  0.016094
0.800000  0.029016  0.023212  0.016560
0.844444  0.029016  0.024502  0.017014
0.888889  0.029016  0.025792  0.017456
0.933333  0.029016  0.027081  0.017887
0.977778  0.029016  0.028371  0.018308
1.022222  0.029016  0.029660  0.018719
1.066667  0.029016  0.030950  0.019122
1.111111  0.029016  0.032240  0.019516
1.155556  0.029016  0.033529  0.019903
1.200000  0.029016  0.034819  0.020282
1.244444  0.029016  0.036108  0.020654
1.288889  0.029016  0.037398  0.021020
1.333333  0.029016  0.038687  0.021379
1.377778  0.029016  0.039977  0.021732
1.422222  0.029016  0.041267  0.022080
1.466667  0.029016  0.042556  0.022423
1.511111  0.029016  0.043846  0.022760
1.555556  0.029016  0.045135  0.023092
1.600000  0.029016  0.046425  0.023420
1.644444  0.029016  0.047715  0.023743
1.688889  0.029016  0.049004  0.024061
1.733333  0.029016  0.050294  0.024376
1.777778  0.029016  0.051583  0.024686
1.822222  0.029016  0.052873  0.024993

```

```

1.866667 0.029016 0.054162 0.025296
1.911111 0.029016 0.055452 0.025595
1.955556 0.029016 0.056742 0.025891
2.000000 0.029016 0.058031 0.026184
2.044444 0.029016 0.059321 0.026473
2.088889 0.029016 0.060610 0.026759
2.133333 0.029016 0.061900 0.027043
2.177778 0.029016 0.063190 0.027323
2.222222 0.029016 0.064479 0.027600
2.266667 0.029016 0.065769 0.027875
2.311111 0.029016 0.067058 0.028147
2.355556 0.029016 0.068348 0.028416
2.400000 0.029016 0.069637 0.028683
2.444444 0.029016 0.070927 0.028947
2.488889 0.029016 0.072217 0.029209
2.533333 0.029016 0.073506 0.029469
2.577778 0.029016 0.074796 0.029726
2.622222 0.029016 0.076085 0.029982
2.666667 0.029016 0.077375 0.035230
2.711111 0.029016 0.078665 0.072970
2.755556 0.029016 0.079954 0.129932
2.800000 0.029016 0.081244 0.200936
2.844444 0.029016 0.082533 0.283599
2.888889 0.029016 0.083823 0.376457
2.933333 0.029016 0.085112 0.478490
2.977778 0.029016 0.086402 0.588935
3.022222 0.029016 0.087692 0.805532
3.066667 0.029016 0.088981 1.469563
3.111111 0.029016 0.090271 2.415809
3.155556 0.029016 0.091560 3.575668
3.200000 0.029016 0.092850 4.914661
3.244444 0.029016 0.094140 6.410593
3.288889 0.029016 0.095429 8.047264
3.333333 0.029016 0.096719 9.811830
3.377778 0.029016 0.098008 11.69346
3.422222 0.029016 0.099298 13.68256
3.466667 0.029016 0.100587 15.77033
3.511111 0.029016 0.101877 17.94845
3.555556 0.029016 0.103167 20.20885
3.600000 0.029016 0.104456 22.54361
3.644444 0.029016 0.105746 24.94486
3.688889 0.029016 0.107035 27.40470
3.733333 0.029016 0.108325 29.91519
3.777778 0.029016 0.109615 32.46828
3.822222 0.029016 0.110904 35.05587
3.866667 0.029016 0.112194 37.66974
3.911111 0.029016 0.113483 40.30163
3.955556 0.029016 0.114773 42.94320
4.000000 0.029016 0.116062 45.58611
4.044444 0.029016 0.117352 48.22201

```

END FTABLE 1

END FTABLES

EXT SOURCES

```

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

```

END EXT SOURCES

EXT TARGETS

```

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

```

END EXT TARGETS

MASS-LINK

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

MASS-LINK		2			
PERLND	PWATER	SURO	0.083333	RCHRES	INFLOW IVOL
END MASS-LINK		2			

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

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

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

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

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

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

END MASS-LINK

END RUN

DRAFT

DRAFT

DRAFT

## *Disclaimer*

### *Legal Notice*

This program and accompanying documentation are provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by End User. Clear Creek Solutions Inc. and the governmental licensee or sublicensees disclaim all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions Inc. be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions Inc. or their authorized representatives have been advised of the possibility of such damages. Software Copyright © by : Clear Creek Solutions, Inc. 2005-2023; All Rights Reserved.

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

[www.clearcreeksolutions.com](http://www.clearcreeksolutions.com)

DRAFT

**SOHM**

**PROJECT REPORT**

**REPORT 2 - VAULT 2**

## General Model Information

Project Name: default[6]  
Site Name: Aliso Viejo  
Site Address: 26501 Aliso Creek Rd  
City: Aliso Viejo  
Report Date: 6/14/2023  
Gage: Laguna Beach  
Data Start: 10/01/1949  
Data End: 09/30/2006  
Timestep: 15 Minute  
Precip Scale: 1.000  
Version Date: 2020/10/14

## POC Thresholds

---

Low Flow Threshold for POC1: 10 Percent of the 2 Year  
High Flow Threshold for POC1: 10 Year

---

DRAFT

# Landuse Basin Data

## Predeveloped Land Use

### Basin 1

Bypass: No

GroundWater: No

Pervious Land Use acre  
D,Open Brush,Mod 3.1

Pervious Total 3.1

Impervious Land Use acre

Impervious Total 0

Basin Total 3.1

Element Flows To:  
Surface Interflow Groundwater

DRAFT

*Mitigated Land Use*

**Basin 1**

Bypass:	No
GroundWater:	No
Pervious Land Use D,Open Brush,Mod	acre 0.12
Pervious Total	0.12
Impervious Land Use Impervious,Mod(5-10)	acre 2.97
Impervious Total	2.97
Basin Total	3.09

Element Flows To:

Surface	Interflow	Groundwater
Vault 1	Vault 1	

DRAFT

*Routing Elements*  
*Predeveloped Routing*

DRAFT

## Mitigated Routing

### Vault 1

Width: 80.6409780071213 ft.  
 Length: 80.6409780071213 ft.  
 Depth: 4 ft.  
 Discharge Structure  
 Riser Height: 3 ft.  
 Riser Diameter: 54 in.  
 Notch Type: Rectangular  
 Notch Width: 2.626 ft.  
 Notch Height: 0.323 ft.  
 Orifice 1 Diameter: 1.49 in. Elevation:0 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

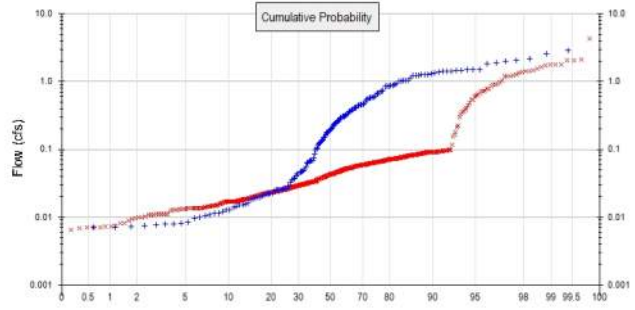
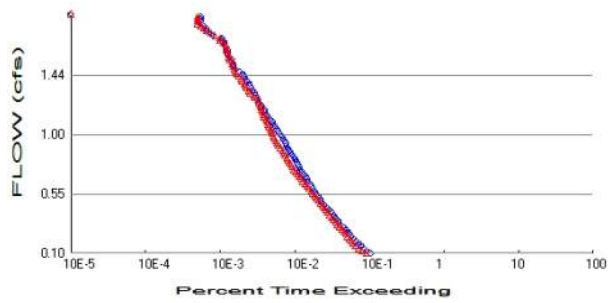
Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.149	0.000	0.000	0.000
0.0444	0.149	0.006	0.012	0.000
0.0889	0.149	0.013	0.018	0.000
0.1333	0.149	0.019	0.022	0.000
0.1778	0.149	0.026	0.025	0.000
0.2222	0.149	0.033	0.028	0.000
0.2667	0.149	0.039	0.031	0.000
0.3111	0.149	0.046	0.033	0.000
0.3556	0.149	0.053	0.035	0.000
0.4000	0.149	0.059	0.038	0.000
0.4444	0.149	0.066	0.040	0.000
0.4889	0.149	0.073	0.042	0.000
0.5333	0.149	0.079	0.044	0.000
0.5778	0.149	0.086	0.045	0.000
0.6222	0.149	0.092	0.047	0.000
0.6667	0.149	0.099	0.049	0.000
0.7111	0.149	0.106	0.050	0.000
0.7556	0.149	0.112	0.052	0.000
0.8000	0.149	0.119	0.053	0.000
0.8444	0.149	0.126	0.055	0.000
0.8889	0.149	0.132	0.056	0.000
0.9333	0.149	0.139	0.058	0.000
0.9778	0.149	0.146	0.059	0.000
1.0222	0.149	0.152	0.060	0.000
1.0667	0.149	0.159	0.062	0.000
1.1111	0.149	0.165	0.063	0.000
1.1556	0.149	0.172	0.064	0.000
1.2000	0.149	0.179	0.066	0.000
1.2444	0.149	0.185	0.067	0.000
1.2889	0.149	0.192	0.068	0.000
1.3333	0.149	0.199	0.069	0.000
1.3778	0.149	0.205	0.070	0.000
1.4222	0.149	0.212	0.071	0.000
1.4667	0.149	0.219	0.073	0.000
1.5111	0.149	0.225	0.074	0.000
1.5556	0.149	0.232	0.075	0.000
1.6000	0.149	0.238	0.076	0.000

1.6444	0.149	0.245	0.077	0.000
1.6889	0.149	0.252	0.078	0.000
1.7333	0.149	0.258	0.079	0.000
1.7778	0.149	0.265	0.080	0.000
1.8222	0.149	0.272	0.081	0.000
1.8667	0.149	0.278	0.082	0.000
1.9111	0.149	0.285	0.083	0.000
1.9556	0.149	0.291	0.084	0.000
2.0000	0.149	0.298	0.085	0.000
2.0444	0.149	0.305	0.086	0.000
2.0889	0.149	0.311	0.087	0.000
2.1333	0.149	0.318	0.088	0.000
2.1778	0.149	0.325	0.088	0.000
2.2222	0.149	0.331	0.089	0.000
2.2667	0.149	0.338	0.090	0.000
2.3111	0.149	0.345	0.091	0.000
2.3556	0.149	0.351	0.092	0.000
2.4000	0.149	0.358	0.093	0.000
2.4444	0.149	0.364	0.094	0.000
2.4889	0.149	0.371	0.095	0.000
2.5333	0.149	0.378	0.095	0.000
2.5778	0.149	0.384	0.096	0.000
2.6222	0.149	0.391	0.097	0.000
2.6667	0.149	0.398	0.098	0.000
2.7111	0.149	0.404	0.154	0.000
2.7556	0.149	0.411	0.293	0.000
2.8000	0.149	0.418	0.478	0.000
2.8444	0.149	0.424	0.701	0.000
2.8889	0.149	0.431	0.956	0.000
2.9333	0.149	0.437	1.239	0.000
2.9778	0.149	0.444	1.547	0.000
3.0222	0.149	0.451	1.869	0.000
3.0667	0.149	0.457	2.534	0.000
3.1111	0.149	0.464	3.480	0.000
3.1556	0.149	0.471	4.641	0.000
3.2000	0.149	0.477	5.980	0.000
3.2444	0.149	0.484	7.477	0.000
3.2889	0.149	0.491	9.114	0.000
3.3333	0.149	0.497	10.87	0.000
3.3778	0.149	0.504	12.76	0.000
3.4222	0.149	0.510	14.75	0.000
3.4667	0.149	0.517	16.83	0.000
3.5111	0.149	0.524	19.01	0.000
3.5556	0.149	0.530	21.27	0.000
3.6000	0.149	0.537	23.61	0.000
3.6444	0.149	0.544	26.01	0.000
3.6889	0.149	0.550	28.47	0.000
3.7333	0.149	0.557	30.98	0.000
3.7778	0.149	0.564	33.54	0.000
3.8222	0.149	0.570	36.12	0.000
3.8667	0.149	0.577	38.74	0.000
3.9111	0.149	0.583	41.37	0.000
3.9556	0.149	0.590	44.01	0.000
4.0000	0.149	0.597	46.66	0.000
4.0444	0.149	0.603	49.29	0.000
4.0889	0.000	0.000	51.91	0.000

# Analysis Results

## POC 1



+ Predeveloped x Mitigated

### Predeveloped Landuse Totals for POC #1

Total Pervious Area: 3.1  
Total Impervious Area: 0

### Mitigated Landuse Totals for POC #1

Total Pervious Area: 0.12  
Total Impervious Area: 2.97

Flow Frequency Method: Cunnane

### Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.999834
5 year	1.448843
10 year	1.891181
25 year	2.258096

### Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.746977
5 year	1.442559
10 year	1.775871
25 year	2.081494

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1000	2063	1830	88	Pass
0.1181	1849	1596	86	Pass
0.1362	1700	1437	84	Pass
0.1543	1551	1308	84	Pass
0.1724	1443	1199	83	Pass
0.1904	1335	1144	85	Pass
0.2085	1235	1080	87	Pass
0.2266	1144	1023	89	Pass
0.2447	1074	969	90	Pass
0.2628	1024	911	88	Pass
0.2809	962	860	89	Pass
0.2990	899	806	89	Pass
0.3171	827	753	91	Pass
0.3352	780	707	90	Pass
0.3533	734	661	90	Pass
0.3714	696	622	89	Pass
0.3895	666	581	87	Pass
0.4076	621	550	88	Pass
0.4257	583	519	89	Pass
0.4437	542	492	90	Pass
0.4618	502	470	93	Pass
0.4799	471	437	92	Pass
0.4980	448	413	92	Pass
0.5161	427	390	91	Pass
0.5342	407	369	90	Pass
0.5523	386	344	89	Pass
0.5704	368	330	89	Pass
0.5885	349	311	89	Pass
0.6066	331	292	88	Pass
0.6247	321	275	85	Pass
0.6428	304	256	84	Pass
0.6609	292	244	83	Pass
0.6790	282	231	81	Pass
0.6970	261	219	83	Pass
0.7151	250	205	82	Pass
0.7332	236	194	82	Pass
0.7513	229	185	80	Pass
0.7694	221	179	80	Pass
0.7875	214	171	79	Pass
0.8056	206	160	77	Pass
0.8237	197	157	79	Pass
0.8418	186	149	80	Pass
0.8599	176	142	80	Pass
0.8780	168	136	80	Pass
0.8961	161	128	79	Pass
0.9142	153	120	78	Pass
0.9323	151	117	77	Pass
0.9503	145	111	76	Pass
0.9684	138	106	76	Pass
0.9865	133	103	77	Pass
1.0046	122	99	81	Pass
1.0227	119	97	81	Pass
1.0408	114	95	83	Pass

1.0589	109	89	81	Pass
1.0770	103	86	83	Pass
1.0951	100	85	85	Pass
1.1132	92	82	89	Pass
1.1313	85	77	90	Pass
1.1494	83	75	90	Pass
1.1675	80	73	91	Pass
1.1856	78	72	92	Pass
1.2037	72	70	97	Pass
1.2217	70	69	98	Pass
1.2398	66	66	100	Pass
1.2579	63	64	101	Pass
1.2760	61	58	95	Pass
1.2941	60	56	93	Pass
1.3122	58	51	87	Pass
1.3303	55	48	87	Pass
1.3484	52	45	86	Pass
1.3665	50	43	86	Pass
1.3846	49	42	85	Pass
1.4027	46	40	86	Pass
1.4208	43	38	88	Pass
1.4389	42	35	83	Pass
1.4570	40	33	82	Pass
1.4750	37	32	86	Pass
1.4931	32	31	96	Pass
1.5112	30	30	100	Pass
1.5293	30	29	96	Pass
1.5474	29	29	100	Pass
1.5655	29	27	93	Pass
1.5836	27	26	96	Pass
1.6017	25	26	104	Pass
1.6198	25	25	100	Pass
1.6379	25	24	96	Pass
1.6560	24	24	100	Pass
1.6741	23	24	104	Pass
1.6922	23	22	95	Pass
1.7103	21	20	95	Pass
1.7283	21	20	95	Pass
1.7464	16	17	106	Pass
1.7645	14	15	107	Pass
1.7826	13	13	100	Pass
1.8007	13	12	92	Pass
1.8188	12	11	91	Pass
1.8369	11	10	90	Pass
1.8550	11	10	90	Pass
1.8731	11	10	90	Pass
1.8912	11	10	90	Pass

DRAFT

DRAFT

## *Model Default Modifications*

Total of 0 changes have been made.

### *PERLND Changes*

No PERLND changes have been made.

### *IMPLND Changes*

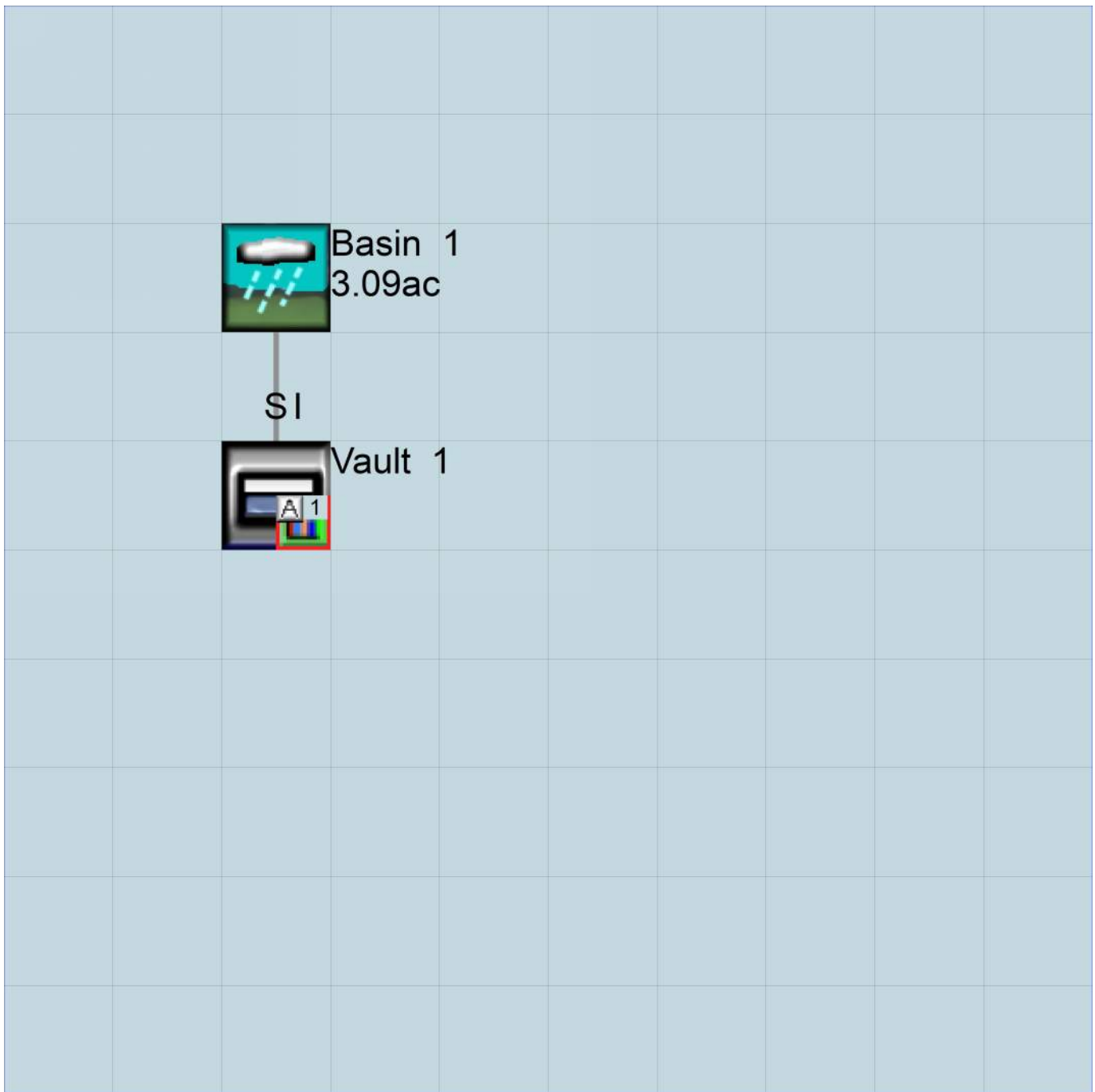
No IMPLND changes have been made.

DRAFT

*Appendix*  
*Predeveloped Schematic*



# Mitigated Schematic



# Predeveloped UCI File

RUN

GLOBAL

```
WVHM4 model simulation
START      1949 10 01      END      2006 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      default[6].wdm
MESSU    25      Predefault[6].MES
          27      Predefault[6].L61
          28      Predefault[6].L62
          30      POCdefault[6]1.dat
```

END FILES

OPN SEQUENCE

```
INGRP          INDELT 00:15
  PERLND       42
  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

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

END OPCODE

PARAM

```
# # K ***
```

END PARAM

END GENER

PERLND

GEN-INFO

```
<PLS ><-----Name----->NBLKS Unit-systems Printer ***
# - # User t-series Engl Metr ***
                               in out ***
```

```
42   D,Open Brush,Mod   1   1   1   1   27   0
```

END GEN-INFO

\*\*\* Section PWATER\*\*\*

ACTIVITY

```
<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ***
42   0   0   1   0   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 *****
42   0   0   4   0   0   0   0   0   0   0   0   0   0   1   9
```

END PRINT-INFO

```

PWAT-PARM1
<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRG VLE INFC HWT ***
42 0 0 0 1 0 0 0 0 0 1 0 0
END PWAT-PARM1

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARY AGWRC
42 0 4.3 0.035 350 0.1 0.8 0.955
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
42 40 35 4 2 0 0.03 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
42 0 0.65 0.25 0.8 0.45 0
END PWAT-PARM4

MON-LZETPARM
<PLS > PWATER input info: Part 3 ***
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC ***
42 0.4 0.4 0.4 0.5 0.55 0.55 0.55 0.55 0.55 0.45 0.4
END MON-LZETPARM

MON-INTERCEP
<PLS > PWATER input info: Part 3 ***
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC ***
42 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12
END MON-INTERCEP

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
42 0 0 0.065 0 0.86 0.3 0.01
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

```



SPEC-ACTIONS  
END SPEC-ACTIONS  
FTABLES  
END FTABLES

EXT SOURCES

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

END EXT SOURCES

EXT TARGETS

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

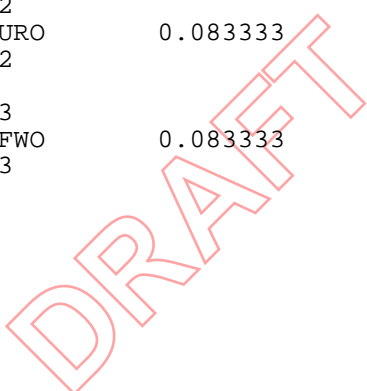
END EXT TARGETS

MASS-LINK

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

```
WVHM4 model simulation
START      1949 10 01      END      2006 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      default[6].wdm
MESSU    25      Mitdefault[6].MES
          27      Mitdefault[6].L61
          28      Mitdefault[6].L62
          30      POCdefault[6]1.dat
```

END FILES

OPN SEQUENCE

```
INGRP          INDELT 00:15
  PERLND        42
  IMPLND         2
  RCHRES         1
  COPY           1
  COPY          501
  DISPLY         1
```

END INGRP

END OPN SEQUENCE

DISPLY

```
DISPLY-INFO1
# - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
1   Vault 1          MAX          1   2   30   9
END DISPLY-INFO1
```

END DISPLY

COPY

```
TIMESERIES
# - # NPT NMN ***
1   1   1
501 1   1
END TIMESERIES
```

END COPY

GENER

```
OPCODE
#   # OPCODE ***
END OPCODE
PARAM
#   #           K ***
END PARAM
```

END GENER

PERLND

```
GEN-INFO
<PLS ><-----Name----->NBLKS  Unit-systems  Printer ***
# - #           User  t-series  Engl Metr ***
           in  out           ***
42      D,Open Brush,Mod      1   1   1   1   27   0
END GEN-INFO
*** Section PWATER***
```

ACTIVITY

```
<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL MSTL  PEST  NITR  PHOS  TRAC ***
42   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  *****
```

42 0 0 4 0 0 0 0 0 0 0 0 0 0 1 9  
END PRINT-INFO

PWAT-PARM1  
<PLS > PWATER variable monthly parameter value flags \*\*\*  
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT \*\*\*  
42 0 0 0 1 0 0 0 0 1 0 0  
END PWAT-PARM1

PWAT-PARM2  
<PLS > PWATER input info: Part 2 \*\*\*  
# - # \*\*\*FOREST LZSN INFILT LSUR SLSUR KVARY AGWRC  
42 0 4.3 0.035 350 0.1 0.8 0.955  
END PWAT-PARM2

PWAT-PARM3  
<PLS > PWATER input info: Part 3 \*\*\*  
# - # \*\*\*PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP  
42 40 35 4 2 0 0.03 0  
END PWAT-PARM3

PWAT-PARM4  
<PLS > PWATER input info: Part 4 \*\*\*  
# - # CEPSC UZSN NSUR INTFW IRC LZETP \*\*\*  
42 0 0.65 0.25 0.8 0.45 0  
END PWAT-PARM4

MON-LZETPARM  
<PLS > PWATER input info: Part 3 \*\*\*  
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC \*\*\*  
42 0.4 0.4 0.4 0.5 0.55 0.55 0.55 0.55 0.55 0.55 0.45 0.4  
END MON-LZETPARM

MON-INTERCEP  
<PLS > PWATER input info: Part 3 \*\*\*  
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC \*\*\*  
42 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12  
END MON-INTERCEP

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  
42 0 0 0.065 0 0.86 0.3 0.01  
END PWAT-STATE1

END PERLND

IMPLND

GEN-INFO  
<PLS ><-----Name-----> Unit-systems Printer \*\*\*  
# - # User t-series Engl Metr \*\*\*  
in out \*\*\*  
2 Impervious,Mod(5-10) 1 1 1 27 0  
END GEN-INFO  
\*\*\* Section IWATER\*\*\*

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

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

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

END IWAT-PARM1

IWAT-PARM2
<PLS > IWATER input info: Part 2 \*\*\*
# - # \*\*\* LSUR SLSUR NSUR RETSC
2 100 0.1 0.1 0.09
END IWAT-PARM2

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

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

END IMPLND

SCHEMATIC
<-Source-> <--Area--> <-Target-> MBLK \*\*\*
<Name> # <-factor-> <Name> # Tbl# \*\*\*
Basin 1\*\*\*
PERLND 42 0.12 RCHRES 1 2
PERLND 42 0.12 RCHRES 1 3
IMPLND 2 2.97 RCHRES 1 5

\*\*\*\*\*Routing\*\*\*\*\*
PERLND 42 0.12 COPY 1 12
IMPLND 2 2.97 COPY 1 15
PERLND 42 0.12 COPY 1 13
RCHRES 1 1 COPY 501 16
END SCHEMATIC

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

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

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

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

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

HYDR-PARM1

```

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

```

```

HYDR-PARM2
# - #   FTABNO      LEN      DELTH      STCOR      KS      DB50      ***
<-----><-----><-----><-----><-----><-----><----->      ***
1        1        0.02      0.0      0.0      0.5      0.0
END HYDR-PARM2

```

```

HYDR-INIT
RCHRES  Initial conditions for each HYDR section                       ***
# - #   *** VOL      Initial value of COLIND      Initial value of OUTDGT
          *** ac-ft      for each possible exit      for each possible exit
<-----><----->      <-----><-----><-----><----->      *** <-----><-----><-----><-----><----->
1        0          4.0  0.0  0.0  0.0  0.0          0.0  0.0  0.0  0.0  0.0
END HYDR-INIT
END RCHRES

```

```

SPEC-ACTIONS
END SPEC-ACTIONS

```

FTABLES

```

FTABLE      1
92      4
Depth      Area      Volume      Outflowl Velocity      Travel Time***
(ft)      (acres) (acre-ft) (cfs)      (ft/sec) (Minutes)***
0.000000  0.149288  0.000000  0.000000
0.044444  0.149288  0.006635  0.012701
0.088889  0.149288  0.013270  0.017962
0.133333  0.149288  0.019905  0.021999
0.177778  0.149288  0.026540  0.025402
0.222222  0.149288  0.033175  0.028400
0.266667  0.149288  0.039810  0.031111
0.311111  0.149288  0.046445  0.033604
0.355556  0.149288  0.053080  0.035924
0.400000  0.149288  0.059715  0.038103
0.444444  0.149288  0.066350  0.040164
0.488889  0.149288  0.072985  0.042125
0.533333  0.149288  0.079620  0.043998
0.577778  0.149288  0.086255  0.045794
0.622222  0.149288  0.092890  0.047523
0.666667  0.149288  0.099525  0.049191
0.711111  0.149288  0.106160  0.050804
0.755556  0.149288  0.112795  0.052368
0.800000  0.149288  0.119430  0.053886
0.844444  0.149288  0.126065  0.055363
0.888889  0.149288  0.132700  0.056801
0.933333  0.149288  0.139335  0.058204
0.977778  0.149288  0.145970  0.059573
1.022222  0.149288  0.152605  0.060912
1.066667  0.149288  0.159240  0.062222
1.111111  0.149288  0.165875  0.063505
1.155556  0.149288  0.172510  0.064763
1.200000  0.149288  0.179145  0.065997
1.244444  0.149288  0.185780  0.067208
1.288889  0.149288  0.192415  0.068397
1.333333  0.149288  0.199050  0.069567
1.377778  0.149288  0.205685  0.070717
1.422222  0.149288  0.212320  0.071848
1.466667  0.149288  0.218955  0.072962
1.511111  0.149288  0.225590  0.074059
1.555556  0.149288  0.232225  0.075140
1.600000  0.149288  0.238860  0.076206
1.644444  0.149288  0.245495  0.077258
1.688889  0.149288  0.252130  0.078295
1.733333  0.149288  0.258765  0.079318
1.777778  0.149288  0.265400  0.080329
1.822222  0.149288  0.272035  0.081326

```

1.866667	0.149288	0.278670	0.082312
1.911111	0.149288	0.285305	0.083286
1.955556	0.149288	0.291940	0.084249
2.000000	0.149288	0.298575	0.085201
2.044444	0.149288	0.305210	0.086143
2.088889	0.149288	0.311845	0.087074
2.133333	0.149288	0.318480	0.087996
2.177778	0.149288	0.325115	0.088907
2.222222	0.149288	0.331750	0.089810
2.266667	0.149288	0.338385	0.090704
2.311111	0.149288	0.345020	0.091589
2.355556	0.149288	0.351655	0.092465
2.400000	0.149288	0.358290	0.093333
2.444444	0.149288	0.364925	0.094194
2.488889	0.149288	0.371560	0.095046
2.533333	0.149288	0.378195	0.095891
2.577778	0.149288	0.384830	0.096728
2.622222	0.149288	0.391465	0.097559
2.666667	0.149288	0.398100	0.098382
2.711111	0.149288	0.404735	0.154700
2.755556	0.149288	0.411370	0.293162
2.800000	0.149288	0.418005	0.478809
2.844444	0.149288	0.424640	0.701676
2.888889	0.149288	0.431275	0.956322
2.933333	0.149288	0.437910	1.239172
2.977778	0.149288	0.444545	1.547644
3.022222	0.149288	0.451180	1.869532
3.066667	0.149288	0.457815	2.534094
3.111111	0.149288	0.464450	3.480867
3.155556	0.149288	0.471085	4.641250
3.200000	0.149288	0.477720	5.980764
3.244444	0.149288	0.484355	7.477212
3.288889	0.149288	0.490990	9.114397
3.333333	0.149288	0.497625	10.87947
3.377778	0.149288	0.504260	12.76161
3.422222	0.149288	0.510895	14.75121
3.466667	0.149288	0.517530	16.83949
3.511111	0.149288	0.524165	19.01810
3.555556	0.149288	0.530800	21.27899
3.600000	0.149288	0.537435	23.61424
3.644444	0.149288	0.544070	26.01598
3.688889	0.149288	0.550705	28.47631
3.733333	0.149288	0.557340	30.98727
3.777778	0.149288	0.563975	33.54085
3.822222	0.149288	0.570610	36.12891
3.866667	0.149288	0.577245	38.74325
3.911111	0.149288	0.583880	41.37561
3.955556	0.149288	0.590515	44.01765
4.000000	0.149288	0.597150	46.66102
4.044444	0.149288	0.603785	49.29738

END FTABLE 1

END FTABLES

EXT SOURCES

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

END EXT SOURCES

EXT TARGETS

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

END EXT TARGETS

MASS-LINK

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

MASS-LINK		2			
PERLND	PWATER	SURO	0.083333	RCHRES	INFLOW IVOL
END MASS-LINK		2			

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

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

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

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

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

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

END MASS-LINK

END RUN

DRAFT

DRAFT

DRAFT

## *Disclaimer*

### *Legal Notice*

This program and accompanying documentation are provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by End User. Clear Creek Solutions Inc. and the governmental licensee or sublicensees disclaim all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions Inc. be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions Inc. or their authorized representatives have been advised of the possibility of such damages. Software Copyright © by : Clear Creek Solutions, Inc. 2005-2023; All Rights Reserved.

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

[www.clearcreeksolutions.com](http://www.clearcreeksolutions.com)

DRAFT