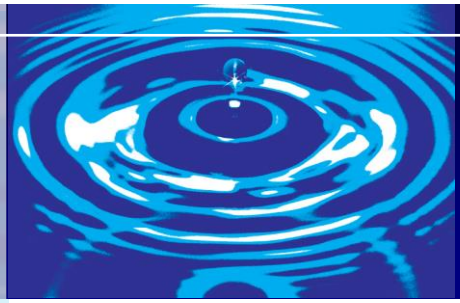


Hydromodification Mitigation Study

Pacifica Estates
San Diego, California

June 2014

Prepared for:
Jose Luis Islas
514 La Costa Avenue
Encinitas, CA 92024

Prepared by:

RBF CONSULTING
5050 Avenida Encinas, STE 260
Carlsbad, California 92008
760.603.6240 telephone

RBF Contact Person:

Tim Thiele, P.E. 60283

RBF JN 141257

H:\PDATA\55100256_Pacifica Estates\Admin\reports\Surface Water\Hydromod\Pacifica Estates Hydromod Study.doc

Table of Contents

List of Tables

Table of Appendices

Section 1. Integrated Management Practices

This report addresses hydromodification mitigation for the proposed development at Pacifica Estates. Please refer to the project specific Drainage Study and Storm Water Management Plan (SWMP), found under separate cover, for additional project site information pertaining to 100-year peak flows and water quality treatment.

1.1. Bioretention

Bioretention basins have been strategically located along the westerly edge of the residential development, both north and south of the drive aisle. The only non-landscaped portion of the project site not draining to the proposed bioretention areas will consist of permeable pavement . As such, all project site runoff is disconnected prior to discharge from the site.

The two proposed bioretention basins will consist of a 24-inch rock section, an 18-inch soil matrix layer, and 12 inches of available surface ponding (100-percent voids). Passive infiltration at a conservative rate of 0.1 inches per hour has been accounted for in the San Diego Hydrology Model (SDHM). The basins will be fitted with perforated sub-drains and impermeable side-wall liners will be extended into the sub-grade to prevent the potential for lateral migration of flow.

A 12-inch diameter riser will be set at one foot above the bioretention basin surface.

Bioretention Maintenance

Maintenance Program for Bioretention Area

Inspection Frequency/Indications:	Regular Inspections ❑ Before wet season begins (September); ❑ Every 60 days during wet season (September-April); ❑ After wet season (April). Performance Inspections ❑ After rainfall events greater than 0.5 inch
Maintenance Indications Connections	**Maintenance Activities Connections**
❑ Damage to inlet/outlet, sideslopes, headwall, or other structures	❑ Repair inlet/outlet structures, side slopes, fences, or other structural elements as needed to maintain performance of the facility.
❑ Over-grown vegetation, emergent woody vegetation and/or weeds	❑ Trim vegetation to average height of 12 inches and remove trimmings. ❑ Remove emergent trees and other vegetation that are not part of bioretention basin plan and weeds ❑ Re-seed and re-plan barren areas prior to rainy season ❑ Install erosion blanket on barrent spots if re-vegetation is not successful
❑ Sediment accumulation over 3 inches	❑ Remove sediment accumulation at or near plant height
❑ Trash, debris, and vegetative litter	❑ Remove trash, debris, and vegetative litter
❑ Rodents or other vectors	❑ Abate and control rodents as necessary to maintain performance of the facility ❑ Drain standing water
Waste Disposal	Sediment, other pollutants, and all other waste shall be properly disposed of in a licensed landfill or by another appropriate disposal method in accordance with local, state, and federal regulations.

1.2. Permeable Pavement

The easterly drive aisle (access road) will not drain to the proposed bioretention due to the topography of the site. This access road will be constructed of permeable pavement, and is considered a self-treating area for water quality purposes. Project site area draining easterly consists of landscaped slopes and the access road, which will be constructed with permeable pavement. As such, all project site area draining easterly under proposed conditions is considered self-treating.

The permeable pavement section will consist of a 6-inch rock section and the permeable pavers themselves. The permeable pavement is not required for hydromodification mitigation, and thus has not been included in the SDHM analysis.

1.2.1 Permeable Pavement Maintenance

Maintenance Program for Permeable Pavement

Inspection Frequency/Indications:	Regular Inspections ❑ Before wet season begins (September); ❑ After wet season (April). Performance Inspections ❑ After rainfall events greater than 0.5 inches, or any rainfall that fills the basin.
Activity	**Schedule**
❑ Keep landscaped areas well maintained	❑ Ongoing
❑ Prevent soil from being washed onto pavement	
❑ Vacuum clean surface using commercially available sweeping machines	❑ 2 – 3 times per year, preferably before and after rainy season, and once mid-summer.
❑ Pressure wash or power blow surface to restore porosity.	❑ Annually
❑ If routine cleaning does not restore infiltration rates, then reconstruction of part of the whole of a pervious surface may be required.	❑ As needed (max every 15 – 20 years).
❑ The surface area affected by hydraulic failure should be lifted for inspection of the internal materials to identify the location and extent of the blockage.	
❑ Surface materials should be lifted and replaced after brush cleaning. Geotextiles may need complete replacement.	
❑ Sub-surface layers may need cleaning and replacing.	
❑ Removed silts may need to be disposed of as controlled waste.	
Waste Disposal	Sediment, other pollutants, and all other waste shall be properly disposed of in a licensed landfill or by another appropriate disposal method in accordance with local, state, and federal regulations.

Section 2. Hydromodification Study Methods

To determine the impact of hydromodification and to provide a design that fully mitigates potential hydromodification impacts, calculations were performed using the Hydrologic Simulation Program Fortran (HSPF) within the San Diego Hydrology Model (SDHM). HSPF has been the state-of-the-art program for long-term continuous simulation calculations since its inception over 30 years ago.

The model uses hourly rainfall data collected at the Fallbrook rain gage. The loss rates applied to the precipitation data are provided in Appendix F of the Final Hydromodification Management Plan for the County of San Diego.

2.1. Typical Case

Two Points of Compliance have been modeled within SDHM, based on the project site discharging to the west and east under pre and post development conditions. The project site area draining easterly is reduced under proposed conditions, as compared to existing conditions. This reduction in area is enough to "pass" hydromodification without the need for IMPs, despite a slight increase in impervious area (access road).

2.2. Modeling Approach

The northerly and southerly bioretention areas have each been modeled within SDHM. The proposed storm drain system will be installed such that all runoff from the residential pads and street is discharged evenly between the two bioretention areas. As such, the amount of impervious and pervious area draining to each bioretention basin is the same.

As mentioned above in Section 1.2, the area draining easterly does not require IMPs to mitigate hydromodification impacts. As such, the proposed permeable pavement along the easterly drive aisle is not included in the SDHM analysis.

Section 3. Conclusions

The site is currently steep agriculture land. To mitigate potential hydromodification impacts from development, two bioretention areas and level grading have been proposed. They collectively serve a number of important purposes:

- The bioretention areas provide runoff storage and attenuation of peak flow discharge rates and flow duration to pre-project levels.

- The use of select import in IMPs will provide increased infiltration rate and flow retention, which will result in increased initial abstraction (the minimum precipitation required to cause runoff).

- The bioretention areas provide a means to disconnect impervious area runoff prior to discharge from the project site. In that regard, they serve as a Low Impact Development (LID) IMP.

- The soil filtration and biological uptake of the plant life within the bioretention areas will provide water quality treatment from the pollutants typically associated with residential rooftop runoff and roadways, respectively.

Table 3-1 presents the hydrologic soil type, land cover/use and slope for areas that drain to each point of compliance. The pre- and post-project areas analyzed for this study are equal and total 13.39 acres. The remaining portion of the 17-acre site is not developed or disturbed (Lots "A" and "C").

Table 3-2 provides a summary of the volume and area necessary to meet hydromodification and water quality requirements. The "proposed plan" volume and area represent the maximum of volume and area, respectively, necessary to provide both hydromodification mitigation and water quality treatment.

Table 3-3 shows that the mitigated post-development 2-, 5-, 10-, and 25-year peak runoff rates are less than or equal to the predevelopment runoff rates at each of the two POC's. Each point of compliance mitigates hydromodification at the project boundary.

Complete results of the SDHM analysis are included in Attachment A, and clearly show that mitigation of both peak flow and flow duration are accomplished for the statistical range of events between 10% of Q2 and Q10 (hydromodification zone). This result is in compliance with the latest standards of the County of San Diego SUSMP.

Table 3-1 Summary of Pre- and Post-Project SDHM Land Characteristics

Hydrologic Soil Type	Cover	Slope	POC #1 (acres)	POC #2 (acres)
Existing Condition				
D	Grass	Steep (10-20%)	10.00	3.39
Proposed Condition				
D	Grass	Flat (0-5%)	8.13	-
D	Impervious	Flat (0-5%)	3.15	-
D	Impervious	Moderate (5-10%)	1.1	-
D	Grass	Steep (10-20%)	-	0.86
D	Impervious	Moderate (5-10%)	-	0.15

Table 3-2: Hydromodification Mitigation Requirements

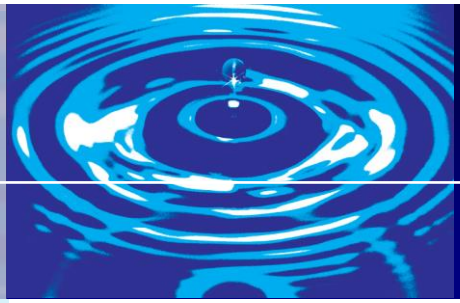
P.O.C.	Post Development Drainage Area	Hydromodification Mitigation Requirements		Water Quality Treatment Requirements		Proposed Plan		
		HM_V	HM_{SF}	WQ_V	WQ_{SF}	Bioretention Storage Volume	Bioretention Surface Area	Permeable Pavement Surface Area
	(ac)	(ac-ft)	(ac)	(ac-ft)	(SF)	(ac-ft)	(SF)	(SF)
1	12.38	0.44	8,336	0.43	8,354	0.44	8,840	-
2	1.01	-	-	0.01	261	-	-	6,534

Table 3-3: Pre- and Mitigated Post-Development 2-, 5-, 10-, and 25-Year Peak Flows

P.O.C.	2-Year		5-Year		10-Year		25-Year	
	Pre-Project	Mitigated Post-Project	Pre-Project	Mitigated Post-Project	Pre-Project	Mitigated Post-Project	Pre-Project	Mitigated Post-Project
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
1	3.35	1.89	5.55	3.16	6.44	3.40	7.72	3.69
2	1.14	0.44	1.88	0.61	2.18	0.71	2.62	0.86

Section 4. References

Brown and Caldwell, 2011. Brown and Caldwell. (March 2011). Final Hydromodification Management Plan, prepared for the County of San Diego



Appendix A: IMP Design Calculations

SDHM

PROJECT REPORT

General Model Information

Project Name:	Pacifica Estates
Site Name:	Pacifica Estates
Site Address:	
City:	
Report Date:	5/29/2014
Gage:	FALLBROO
Data Start:	10/01/1959
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.00
Version:	2014/04/24

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year
Low Flow Threshold for POC2:	10 Percent of the 2 Year
High Flow Threshold for POC2:	10 Year

Landuse Basin Data

Predeveloped Land Use

EX West

Bypass:	No
GroundWater:	No

Pervious Land Use	Acres
D,Grass,STEEP(10-20	10
Pervious Total	10

Impervious Land Use	Acres
Impervious Total	0
Basin Total	10

Element Flows To:

Surface	Interflow	Groundwater

EX East

Bypass:	No
GroundWater:	No

Pervious Land Use	Acres
D,Grass,STEEP(10-20	3.39
Pervious Total	3.39

Impervious Land Use	Acres
Impervious Total	0
Basin Total	3.39

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Northerly Half Road and Lots

Bypass:	Yes
GroundWater:	No

Pervious Land Use	Acres
D,Grass,FLAT(0-5%)	4.065
Pervious Total	4.065

Impervious Land Use	Acres
IMPERVIOUS-FLAT	1.575
IMPERVIOUS-MOD	0.55
Impervious Total	2.125
Basin Total	6.19

Element Flows To:

Surface	Interflow	Groundwater
Surface tention Area	Surface tention Area	

Access Road

Bypass:	No
GroundWater:	No

Pervious Land Use	Acres
D,Grass,STEEP(10-20	0.86
Pervious Total	0.86

Impervious Land Use	Acres
IMPERVIOUS-MOD	0.15
Impervious Total	0.15
Basin Total	1.01

Element Flows To:

Surface	Interflow	Groundwater

Southerly Half Road and Lots

Bypass:	Yes
GroundWater:	No

Pervious Land Use	Acres
D,Grass,FLAT(0-5%)	4.065
Pervious Total	4.065

Impervious Land Use	Acres
IMPERVIOUS-FLAT	1.575
IMPERVIOUS-MOD	0.55
Impervious Total	2.125
Basin Total	6.19

Element Flows To:

Surface	Interflow	Groundwater
Surface tention Area	Surface tention Area	

Routing Elements
Predeveloped Routing

Mitigated Routing

South Bioretention Area

Bottom Length:	44.00 ft.
Bottom Width:	44.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	Amended 5 in/hr
Material thickness of second layer:	2
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.1
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	33.439
Total Volume Through Riser (ac-ft):	106.213
Total Volume Through Facility (ac-ft):	139.652
Percent Infiltrated:	23.94
Underdrain used	
Underdrain Diameter (ft):	0.5
Orifice Diameter (in):	1
Offset (in):	18
Flow Through Underdrain (ac-ft):	26.492
Total Outflow (ac-ft):	139.652
Percent Through Underdrain:	18.97
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	12 in.
Notch Type:	Rectangular
Notch Width:	0.250 ft.
Notch Height:	0.500 ft.
Element Flows To:	
Outlet 1	Outlet 2

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0772	0.0000	0.0000	0.0000
0.0604	0.0766	0.0011	0.0000	0.0000
0.1209	0.0760	0.0023	0.0000	0.0000
0.1813	0.0754	0.0034	0.0045	0.0045
0.2418	0.0747	0.0046	0.0045	0.0045
0.3022	0.0741	0.0058	0.0045	0.0045
0.3626	0.0735	0.0070	0.0045	0.0045
0.4231	0.0728	0.0082	0.0045	0.0045
0.4835	0.0722	0.0094	0.0045	0.0045
0.5440	0.0716	0.0107	0.0045	0.0045
0.6044	0.0710	0.0119	0.0045	0.0045
0.6648	0.0704	0.0132	0.0045	0.0045
0.7253	0.0698	0.0145	0.0045	0.0045
0.7857	0.0691	0.0157	0.0045	0.0045
0.8462	0.0685	0.0170	0.0045	0.0045
0.9066	0.0679	0.0184	0.0045	0.0045
0.9670	0.0673	0.0197	0.0045	0.0045
1.0275	0.0667	0.0210	0.0045	0.0045
1.0879	0.0661	0.0224	0.0045	0.0045

1.1484	0.0655	0.0238	0.0045	0.0045
1.2088	0.0649	0.0251	0.0045	0.0045
1.2692	0.0644	0.0265	0.0045	0.0045
1.3297	0.0638	0.0279	0.0045	0.0045
1.3901	0.0632	0.0294	0.0045	0.0045
1.4505	0.0626	0.0308	0.0045	0.0045
1.5110	0.0620	0.0322	0.0045	0.0045
1.5714	0.0614	0.0337	0.0045	0.0045
1.6319	0.0609	0.0352	0.0045	0.0045
1.6923	0.0603	0.0366	0.0045	0.0045
1.7527	0.0597	0.0381	0.0045	0.0045
1.8132	0.0592	0.0396	0.0045	0.0045
1.8736	0.0586	0.0411	0.0045	0.0045
1.9341	0.0580	0.0427	0.0045	0.0045
1.9945	0.0575	0.0442	0.0045	0.0045
2.0549	0.0569	0.0458	0.0045	0.0045
2.1154	0.0564	0.0474	0.0045	0.0045
2.1758	0.0558	0.0490	0.0045	0.0045
2.2363	0.0553	0.0506	0.0045	0.0045
2.2967	0.0547	0.0522	0.0045	0.0045
2.3571	0.0542	0.0538	0.0045	0.0045
2.4176	0.0537	0.0555	0.0045	0.0045
2.4780	0.0531	0.0571	0.0045	0.0045
2.5385	0.0526	0.0588	0.0045	0.0045
2.5989	0.0521	0.0605	0.0045	0.0045
2.6593	0.0515	0.0622	0.0045	0.0045
2.7198	0.0510	0.0640	0.0045	0.0045
2.7802	0.0505	0.0657	0.0045	0.0045
2.8407	0.0500	0.0675	0.0045	0.0045
2.9011	0.0495	0.0692	0.0045	0.0045
2.9615	0.0489	0.0710	0.0045	0.0045
3.0220	0.0484	0.0728	0.0045	0.0045
3.0824	0.0479	0.0746	0.0045	0.0045
3.1429	0.0474	0.0765	0.0045	0.0045
3.2033	0.0469	0.0783	0.0045	0.0045
3.2637	0.0464	0.0802	0.0045	0.0045
3.3242	0.0459	0.0821	0.0045	0.0045
3.3846	0.0454	0.0840	0.0045	0.0045
3.4451	0.0449	0.0859	0.0045	0.0045
3.5000	0.0444	0.0876	0.0045	0.0045

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended()cfs)	Infilt(cfs)
3.5000	0.0772	0.0876	0.0000	0.2386	0.0000
3.5604	0.0779	0.0923	0.0000	0.2386	0.0000
3.6209	0.0785	0.0971	0.0000	0.2479	0.0000
3.6813	0.0792	0.1018	0.0000	0.2571	0.0000
3.7418	0.0798	0.1066	0.0000	0.2663	0.0000
3.8022	0.0805	0.1115	0.0000	0.2756	0.0000
3.8626	0.0811	0.1164	0.0000	0.2848	0.0000
3.9231	0.0818	0.1213	0.0000	0.2941	0.0000
3.9835	0.0825	0.1262	0.0000	0.3033	0.0000
4.0440	0.0831	0.1312	0.0000	0.3125	0.0000
4.1044	0.0838	0.1363	0.0000	0.3218	0.0000
4.1648	0.0845	0.1414	0.0000	0.3310	0.0000
4.2253	0.0851	0.1465	0.0000	0.3403	0.0000
4.2857	0.0858	0.1517	0.0000	0.3495	0.0000
4.3462	0.0865	0.1569	0.0000	0.3588	0.0000

4.4066	0.0872	0.1621	0.0000	0.3680	0.0000
4.4670	0.0879	0.1674	0.0000	0.3772	0.0000
4.5275	0.0886	0.1727	0.0000	0.3865	0.0000
4.5879	0.0892	0.1781	0.0000	0.3957	0.0000
4.6484	0.0899	0.1835	0.0000	0.4050	0.0000
4.7088	0.0906	0.1890	0.0000	0.4142	0.0000
4.7692	0.0913	0.1945	0.0000	0.4234	0.0000
4.8297	0.0920	0.2000	0.0000	0.4327	0.0000
4.8901	0.0927	0.2056	0.0000	0.4419	0.0000
4.9505	0.0935	0.2112	0.0000	0.4512	0.0000
5.0110	0.0942	0.2169	0.0000	0.4604	0.0000
5.0714	0.0949	0.2226	0.0000	0.4697	0.0000
5.1319	0.0956	0.2284	0.0000	0.4789	0.0000
5.1923	0.0963	0.2342	0.0000	0.4881	0.0000
5.2527	0.0970	0.2400	0.0000	0.4974	0.0000
5.3132	0.0977	0.2459	0.0000	0.5066	0.0000
5.3736	0.0985	0.2518	0.0000	0.5159	0.0000
5.4341	0.0992	0.2578	0.0000	0.5251	0.0000
5.4945	0.0999	0.2638	0.0000	0.5344	0.0000
5.5000	0.1000	0.2644	0.0000	0.5352	0.0000

Surface tention Area

Element Flows To:

Outlet 1	Outlet 2
	South Bioretention Area

North Bioretention Area

Bottom Length:	80.00 ft.
Bottom Width:	80.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	Amended 5 in/hr
Material thickness of second layer:	2
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.1
Infiltration safety factor:	1
Total Volume Infiltrated (ac-ft):	75.157
Total Volume Through Riser (ac-ft):	65.221
Total Volume Through Facility (ac-ft):	140.378
Percent Infiltrated:	53.54
Underdrain used	
Underdrain Diameter (ft):	0.5
Orifice Diameter (in):	1
Offset (in):	18
Flow Through Underdrain (ac-ft):	16.451
Total Outflow (ac-ft):	140.378
Percent Through Underdrain:	11.72
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	12 in.
Notch Type:	Rectangular
Notch Width:	0.250 ft.
Notch Height:	0.500 ft.
Element Flows To:	
Outlet 1	Outlet 2

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.2028	0.0000	0.0000	0.0000
0.0604	0.2019	0.0037	0.0000	0.0000
0.1209	0.2009	0.0075	0.0000	0.0000
0.1813	0.1998	0.0113	0.0148	0.0148
0.2418	0.1988	0.0151	0.0148	0.0148
0.3022	0.1978	0.0189	0.0148	0.0148
0.3626	0.1967	0.0228	0.0148	0.0148
0.4231	0.1957	0.0267	0.0148	0.0148
0.4835	0.1947	0.0306	0.0148	0.0148
0.5440	0.1937	0.0345	0.0148	0.0148
0.6044	0.1926	0.0384	0.0148	0.0148
0.6648	0.1916	0.0424	0.0148	0.0148
0.7253	0.1906	0.0464	0.0148	0.0148
0.7857	0.1896	0.0504	0.0148	0.0148
0.8462	0.1886	0.0545	0.0148	0.0148
0.9066	0.1876	0.0585	0.0148	0.0148
0.9670	0.1866	0.0626	0.0148	0.0148
1.0275	0.1856	0.0667	0.0148	0.0148
1.0879	0.1846	0.0709	0.0148	0.0148
1.1484	0.1836	0.0750	0.0148	0.0148
1.2088	0.1826	0.0792	0.0148	0.0148

1.2692	0.1816	0.0834	0.0148	0.0148
1.3297	0.1806	0.0876	0.0148	0.0148
1.3901	0.1796	0.0919	0.0148	0.0148
1.4505	0.1787	0.0962	0.0148	0.0148
1.5110	0.1777	0.1004	0.0148	0.0148
1.5714	0.1767	0.1047	0.0148	0.0148
1.6319	0.1757	0.1090	0.0148	0.0148
1.6923	0.1748	0.1133	0.0148	0.0148
1.7527	0.1738	0.1177	0.0148	0.0148
1.8132	0.1728	0.1220	0.0148	0.0148
1.8736	0.1719	0.1264	0.0148	0.0148
1.9341	0.1709	0.1308	0.0148	0.0148
1.9945	0.1700	0.1353	0.0148	0.0148
2.0549	0.1690	0.1398	0.0148	0.0148
2.1154	0.1681	0.1443	0.0148	0.0148
2.1758	0.1671	0.1488	0.0148	0.0148
2.2363	0.1662	0.1533	0.0148	0.0148
2.2967	0.1652	0.1579	0.0148	0.0148
2.3571	0.1643	0.1625	0.0148	0.0148
2.4176	0.1633	0.1671	0.0148	0.0148
2.4780	0.1624	0.1717	0.0148	0.0148
2.5385	0.1615	0.1764	0.0148	0.0148
2.5989	0.1605	0.1811	0.0148	0.0148
2.6593	0.1596	0.1858	0.0148	0.0148
2.7198	0.1587	0.1906	0.0148	0.0148
2.7802	0.1578	0.1953	0.0148	0.0148
2.8407	0.1569	0.2001	0.0148	0.0148
2.9011	0.1559	0.2049	0.0148	0.0148
2.9615	0.1550	0.2098	0.0148	0.0148
3.0220	0.1541	0.2146	0.0148	0.0148
3.0824	0.1532	0.2195	0.0148	0.0148
3.1429	0.1523	0.2245	0.0148	0.0148
3.2033	0.1514	0.2294	0.0148	0.0148
3.2637	0.1505	0.2344	0.0148	0.0148
3.3242	0.1496	0.2394	0.0148	0.0148
3.3846	0.1487	0.2444	0.0148	0.0148
3.4451	0.1478	0.2495	0.0148	0.0148
3.5000	0.1469	0.2541	0.0148	0.0148

Landscape Swale Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	To Amended()cfs)	Infilt(cfs)
3.5000	0.2028	0.2541	0.0000	0.7888	0.0000
3.5604	0.2039	0.2664	0.0000	0.7888	0.0000
3.6209	0.2049	0.2787	0.0000	0.8193	0.0000
3.6813	0.2060	0.2911	0.0000	0.8499	0.0000
3.7418	0.2070	0.3036	0.0000	0.8804	0.0000
3.8022	0.2081	0.3162	0.0000	0.9110	0.0000
3.8626	0.2092	0.3288	0.0000	0.9415	0.0000
3.9231	0.2102	0.3415	0.0000	0.9721	0.0000
3.9835	0.2113	0.3542	0.0000	1.0027	0.0000
4.0440	0.2123	0.3670	0.0000	1.0332	0.0000
4.1044	0.2134	0.3799	0.0000	1.0638	0.0000
4.1648	0.2145	0.3928	0.0000	1.0943	0.0000
4.2253	0.2156	0.4058	0.0000	1.1249	0.0000
4.2857	0.2166	0.4188	0.0000	1.1554	0.0000
4.3462	0.2177	0.4320	0.0000	1.1860	0.0000
4.4066	0.2188	0.4452	0.0000	1.2165	0.0000
4.4670	0.2199	0.4584	0.0000	1.2471	0.0000

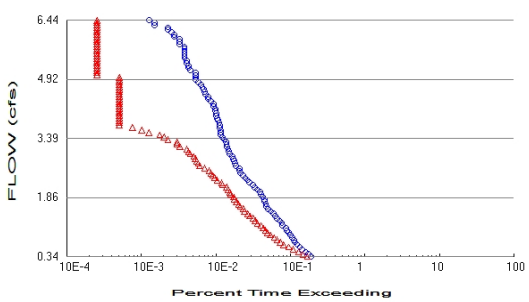
4.5275	0.2210	0.4717	0.0000	1.2776	0.0000
4.5879	0.2221	0.4851	0.0000	1.3082	0.0000
4.6484	0.2232	0.4986	0.0000	1.3387	0.0000
4.7088	0.2243	0.5121	0.0000	1.3693	0.0000
4.7692	0.2253	0.5257	0.0000	1.3998	0.0000
4.8297	0.2265	0.5393	0.0000	1.4304	0.0000
4.8901	0.2276	0.5531	0.0000	1.4609	0.0000
4.9505	0.2287	0.5669	0.0000	1.4915	0.0000
5.0110	0.2298	0.5807	0.0000	1.5220	0.0000
5.0714	0.2309	0.5946	0.0000	1.5526	0.0000
5.1319	0.2320	0.6086	0.0000	1.5831	0.0000
5.1923	0.2331	0.6227	0.0000	1.6137	0.0000
5.2527	0.2342	0.6368	0.0000	1.6442	0.0000
5.3132	0.2354	0.6510	0.0000	1.6748	0.0000
5.3736	0.2365	0.6652	0.0000	1.7053	0.0000
5.4341	0.2376	0.6796	0.0000	1.7359	0.0000
5.4945	0.2387	0.6940	0.0000	1.7664	0.0000
5.5000	0.2388	0.6953	0.0000	1.7692	0.0000

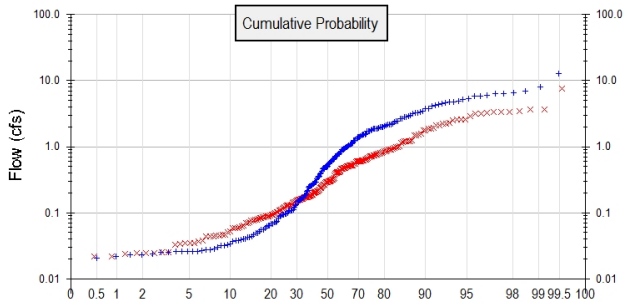
Surface tention Area

Element Flows To:

Outlet 1	Outlet 2
	North Bioretention Area

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 10
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 8.13
Total Impervious Area: 4.25

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	3.350492
5 year	5.554619
10 year	6.442857
25 year	7.723491

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	1.885651
5 year	3.158942
10 year	3.395838
25 year	3.691697

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.3350	741	672	90	Pass
0.3967	681	582	85	Pass
0.4584	628	506	80	Pass
0.5201	573	432	75	Pass
0.5818	530	377	71	Pass
0.6435	486	319	65	Pass
0.7052	459	289	62	Pass
0.7669	439	261	59	Pass
0.8286	418	240	57	Pass
0.8903	392	213	54	Pass
0.9520	373	194	52	Pass
1.0137	357	182	50	Pass
1.0754	344	171	49	Pass
1.1371	312	161	51	Pass
1.1988	304	143	47	Pass
1.2605	286	133	46	Pass
1.3222	264	125	47	Pass
1.3839	248	113	45	Pass
1.4456	236	106	44	Pass
1.5073	216	96	44	Pass
1.5689	198	92	46	Pass
1.6306	188	84	44	Pass
1.6923	185	80	43	Pass
1.7540	179	75	41	Pass
1.8157	176	70	39	Pass
1.8774	170	69	40	Pass
1.9391	159	62	38	Pass
2.0008	155	61	39	Pass
2.0625	141	58	41	Pass
2.1242	132	55	41	Pass
2.1859	123	49	39	Pass
2.2476	110	47	42	Pass
2.3093	105	41	39	Pass
2.3710	98	38	38	Pass
2.4327	92	36	39	Pass
2.4944	84	34	40	Pass
2.5561	82	32	39	Pass
2.6178	82	28	34	Pass
2.6795	73	24	32	Pass
2.7412	72	23	31	Pass
2.8029	69	22	31	Pass
2.8645	68	21	30	Pass
2.9262	65	20	30	Pass
2.9879	61	18	29	Pass
3.0496	59	17	28	Pass
3.1113	58	16	27	Pass
3.1730	56	13	23	Pass
3.2347	55	12	21	Pass
3.2964	54	12	22	Pass
3.3581	51	9	17	Pass
3.4198	48	8	16	Pass
3.4815	46	7	15	Pass
3.5432	46	5	10	Pass

3.6049	46	4	8	Pass
3.6666	45	3	6	Pass
3.7283	45	2	4	Pass
3.7900	44	2	4	Pass
3.8517	42	2	4	Pass
3.9134	41	2	4	Pass
3.9751	40	2	5	Pass
4.0368	40	2	5	Pass
4.0984	39	2	5	Pass
4.1601	39	2	5	Pass
4.2218	37	2	5	Pass
4.2835	37	2	5	Pass
4.3452	34	2	5	Pass
4.4069	31	2	6	Pass
4.4686	31	2	6	Pass
4.5303	29	2	6	Pass
4.5920	28	2	7	Pass
4.6537	27	2	7	Pass
4.7154	26	2	7	Pass
4.7771	25	2	8	Pass
4.8388	23	2	8	Pass
4.9005	21	2	9	Pass
4.9622	21	2	9	Pass
5.0239	21	1	4	Pass
5.0856	21	1	4	Pass
5.1473	18	1	5	Pass
5.2090	17	1	5	Pass
5.2707	17	1	5	Pass
5.3323	16	1	6	Pass
5.3940	16	1	6	Pass
5.4557	15	1	6	Pass
5.5174	15	1	6	Pass
5.5791	15	1	6	Pass
5.6408	15	1	6	Pass
5.7025	15	1	6	Pass
5.7642	15	1	6	Pass
5.8259	13	1	7	Pass
5.8876	13	1	7	Pass
5.9493	13	1	7	Pass
6.0110	11	1	9	Pass
6.0727	11	1	9	Pass
6.1344	10	1	10	Pass
6.1961	9	1	11	Pass
6.2578	9	1	11	Pass
6.3195	6	1	16	Pass
6.3812	6	1	16	Pass
6.4429	5	1	20	Pass

Water Quality

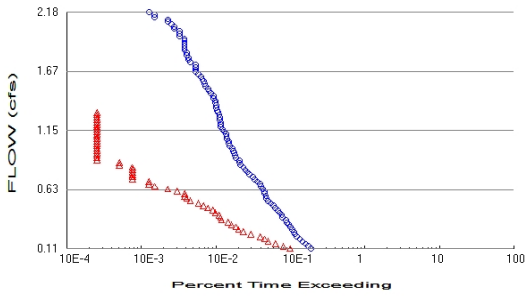
Drawdown Time Results

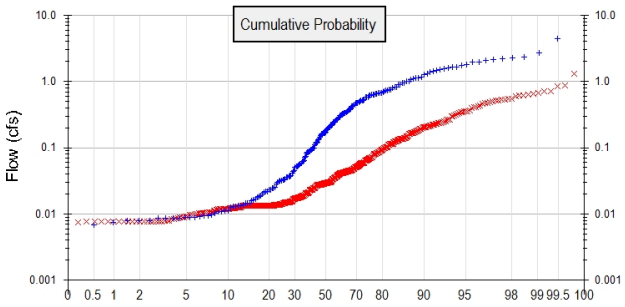
Pond: Surface tention Area

Days	Stage(feet)	Percent of Total Run Time
1	N/A	N/A
2	N/A	N/A
3	N/A	N/A
4	N/A	N/A
5	N/A	N/A

Maximum Stage: 1.465 Drawdown Time: Less than 1 day

POC 2





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #2
Total Pervious Area: 3.39
Total Impervious Area: 0

Mitigated Landuse Totals for POC #2
Total Pervious Area: 0.86
Total Impervious Area: 0.15

Flow Frequency Method: Cunnane

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	**Flow(cfs)**
2 year	1.135817
5 year	1.883016
10 year	2.184128
25 year	2.618263

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	**Flow(cfs)**
2 year	0.436489
5 year	0.613257
10 year	0.707745
25 year	0.863982

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1136	742	392	52	Pass
0.1345	681	316	46	Pass
0.1554	628	249	39	Pass
0.1763	574	199	34	Pass
0.1972	530	179	33	Pass
0.2182	485	156	32	Pass
0.2391	459	116	25	Pass
0.2600	439	92	20	Pass
0.2809	419	80	19	Pass
0.3018	392	74	18	Pass
0.3227	373	64	17	Pass
0.3436	357	58	16	Pass
0.3646	344	47	13	Pass
0.3855	312	46	14	Pass
0.4064	304	44	14	Pass
0.4273	286	39	13	Pass
0.4482	266	36	13	Pass
0.4691	248	31	12	Pass
0.4900	236	27	11	Pass
0.5110	217	23	10	Pass
0.5319	198	18	9	Pass
0.5528	189	16	8	Pass
0.5737	185	15	8	Pass
0.5946	179	15	8	Pass
0.6155	176	12	6	Pass
0.6364	170	9	5	Pass
0.6574	159	6	3	Pass
0.6783	155	5	3	Pass
0.6992	141	5	3	Pass
0.7201	132	3	2	Pass
0.7410	123	3	2	Pass
0.7619	110	3	2	Pass
0.7828	105	3	2	Pass
0.8038	98	3	3	Pass
0.8247	93	3	3	Pass
0.8456	84	2	2	Pass
0.8665	82	2	2	Pass
0.8874	82	1	1	Pass
0.9083	73	1	1	Pass
0.9293	72	1	1	Pass
0.9502	69	1	1	Pass
0.9711	68	1	1	Pass
0.9920	65	1	1	Pass
1.0129	61	1	1	Pass
1.0338	59	1	1	Pass
1.0547	59	1	1	Pass
1.0757	56	1	1	Pass
1.0966	55	1	1	Pass
1.1175	54	1	1	Pass
1.1384	51	1	1	Pass
1.1593	48	1	2	Pass
1.1802	46	1	2	Pass
1.2011	46	1	2	Pass

1.2221	46	1	2	Pass
1.2430	45	1	2	Pass
1.2639	45	1	2	Pass
1.2848	44	1	2	Pass
1.3057	42	1	2	Pass
1.3266	41	0	0	Pass
1.3475	40	0	0	Pass
1.3685	40	0	0	Pass
1.3894	39	0	0	Pass
1.4103	39	0	0	Pass
1.4312	37	0	0	Pass
1.4521	37	0	0	Pass
1.4730	34	0	0	Pass
1.4939	32	0	0	Pass
1.5149	31	0	0	Pass
1.5358	29	0	0	Pass
1.5567	28	0	0	Pass
1.5776	27	0	0	Pass
1.5985	26	0	0	Pass
1.6194	25	0	0	Pass
1.6403	23	0	0	Pass
1.6613	21	0	0	Pass
1.6822	21	0	0	Pass
1.7031	21	0	0	Pass
1.7240	21	0	0	Pass
1.7449	18	0	0	Pass
1.7658	17	0	0	Pass
1.7868	17	0	0	Pass
1.8077	16	0	0	Pass
1.8286	16	0	0	Pass
1.8495	15	0	0	Pass
1.8704	15	0	0	Pass
1.8913	15	0	0	Pass
1.9122	15	0	0	Pass
1.9332	15	0	0	Pass
1.9541	15	0	0	Pass
1.9750	13	0	0	Pass
1.9959	13	0	0	Pass
2.0168	13	0	0	Pass
2.0377	11	0	0	Pass
2.0586	11	0	0	Pass
2.0796	10	0	0	Pass
2.1005	9	0	0	Pass
2.1214	9	0	0	Pass
2.1423	6	0	0	Pass
2.1632	6	0	0	Pass
2.1841	5	0	0	Pass

Water Quality

Drawdown Time Results

Pond: Surface tention Area

Days	Stage(feet)	Percent of Total Run Time
1	N/A	N/A
2	N/A	N/A
3	N/A	N/A
4	N/A	N/A
5	N/A	N/A

Maximum Stage: 1.465 Drawdown Time: Less than 1 day

Model Default Modifications

Total of 0 changes have been made.

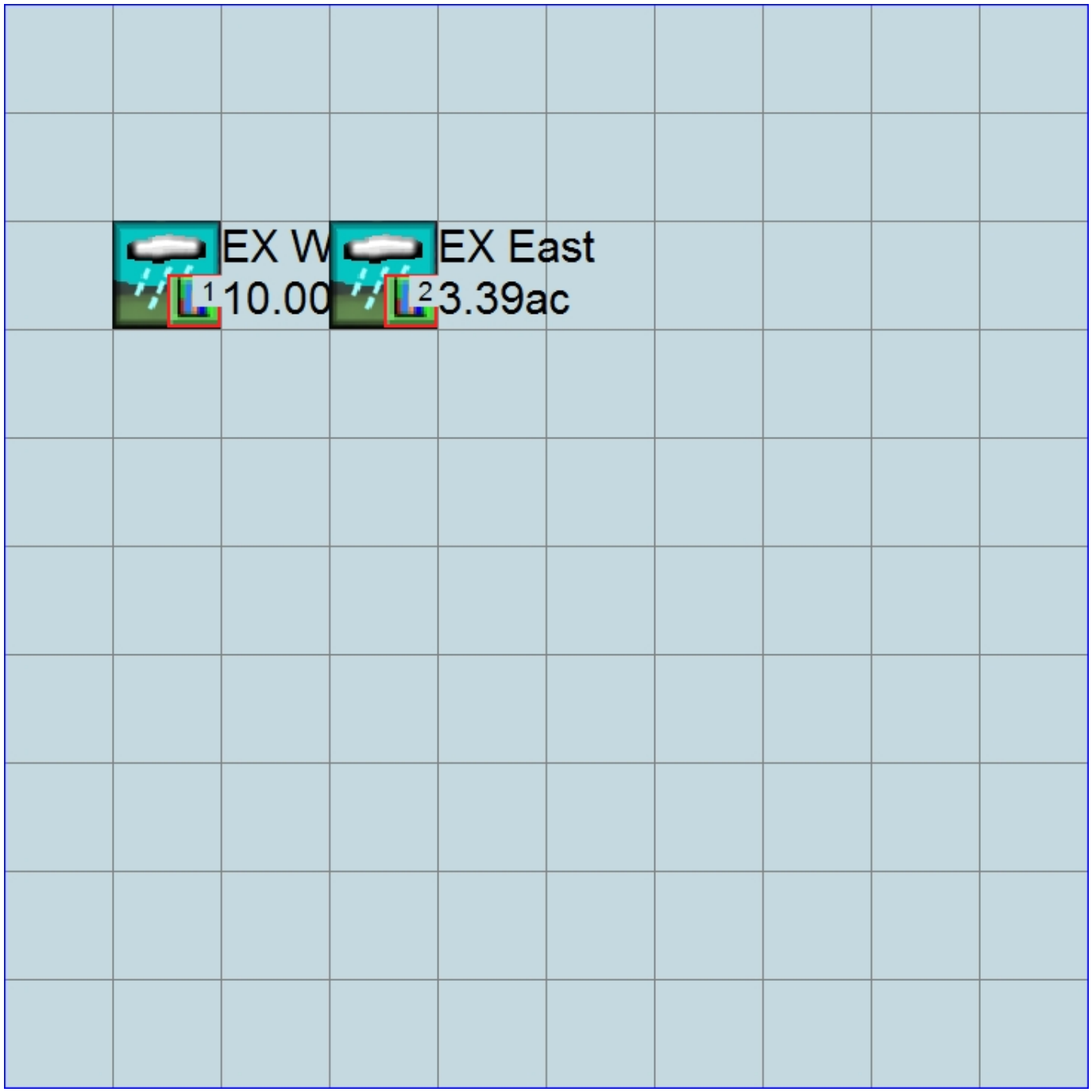
PERLND Changes

No PERLND changes have been made.

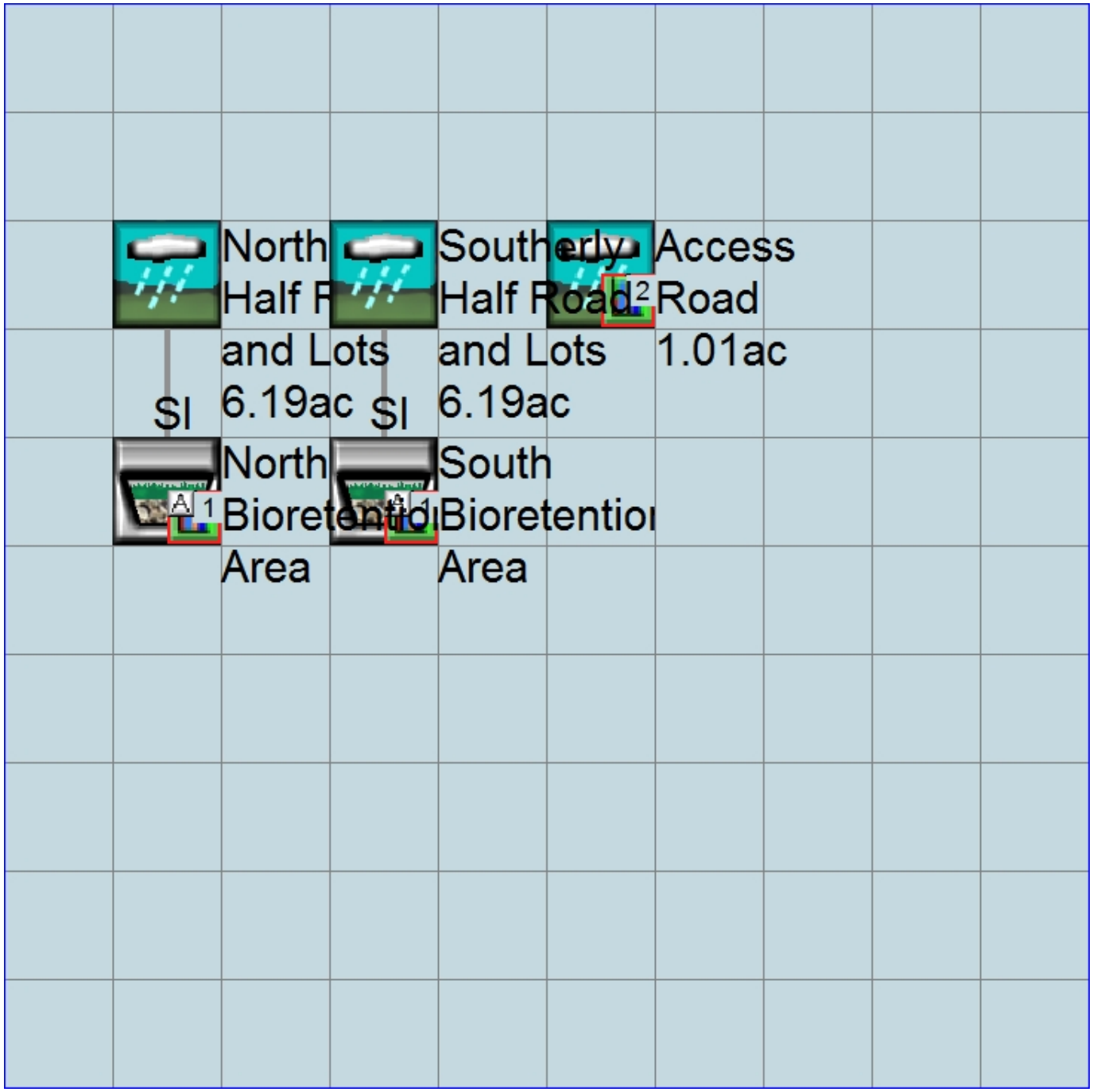
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 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   Pacifica Estates.wdm
MESSU       25   PrePacifica Estates.MES
            27   PrePacifica Estates.L61
            28   PrePacifica Estates.L62
            30   POCPacifica Estates1.dat
            31   POCPacifica Estates2.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:60
      PERLND      30
      COPY       501
      COPY       502
      DISPLY       1
      DISPLY       2
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        EX West                   MAX                    1    2   30    9
    2        EX East                   MAX                    1    2   31    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  502         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   30      D,Grass,STEEP(10-20    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 ***
   30         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  *********
   30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   30         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   30              0       4.2      0.02       200      0.15         3      0.92
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   30             35        30         2         2       0.4      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC      LZETP ***
   30           0.08       0.6       0.2       1.5       0.7        0.5
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   30       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  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  ***
   30       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  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
   30              0         0      0.15         0         4      0.05         0
  END PWAT-STATE1

END PERLND

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

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

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

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

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

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

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

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
EX West***
PERLND  30                         10     COPY   501     12
PERLND  30                         10     COPY   501     13
EX East***
PERLND  30                       3.39     COPY   502     12
PERLND  30                       3.39     COPY   502     13

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

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1
COPY   502 OUTPUT MEAN   1 1   12.1        DISPLY   2     INPUT  TIMSER 1



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

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

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->      ***
```

```
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                    ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    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     12.1      WDM    501 FLOW     ENGL      REPL
COPY   502 OUTPUT MEAN   1 1     12.1      WDM    502 FLOW     ENGL      REPL
END EXT TARGETS

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

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 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   Pacifica Estates.wdm
MESSU       25   MitPacifica Estates.MES
            27   MitPacifica Estates.L61
            28   MitPacifica Estates.L62
            30   POCPacifica Estates1.dat
            31   POCPacifica Estates2.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:60
      PERLND      28
      IMPLND       1
      IMPLND       2
      PERLND      30
      GENER        2
      RCHRES       1
      RCHRES       2
      GENER        4
      RCHRES       3
      RCHRES       4
      COPY       502
      COPY         1
      COPY       501
      COPY       601
      DISPLY       2
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    2        Access Road                 MAX                    1    2   31    9
    1        Surface tention Area        MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  502         1    1
  501         1    1
  601         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    2        24
    4        24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
    4             0.
  END PARM
END GENER
```

```
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                        in  out           ***
   28      D,Grass,FLAT(0-5%)     1    1    1    1   27    0
   30      D,Grass,STEEP(10-20    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 ***
   28         0    0    1    0    0    0    0    0    0    0    0    0
   30         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  *********
   28         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   28         0    1    1    1    0    0    0    0    1    1    0
   30         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN     INFILT      LSUR     SLSUR     KVARY     AGWRC
   28              0       4.8       0.04       200      0.05         3      0.92
   30              0       4.2       0.02       200      0.15         3      0.92
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   28             35        30         2         2       0.4      0.05      0.05
   30             35        30         2         2       0.4      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   28           0.08       0.6       0.2       1.5       0.7       0.5
   30           0.08       0.6       0.2       1.5       0.7       0.5
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   28       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
   30       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  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  ***
   28       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
   30       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  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
   28              0         0      0.15          0         4      0.05          0
   30              0         0      0.15          0         4      0.05          0
  END PWAT-STATE1
```

```
END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                    in  out           ***
    1      IMPERVIOUS-FLAT        1    1    1   27    0
    2      IMPERVIOUS-MOD         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

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

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL     *********
    1         0    0    4    0    0    0     1    9
    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      ***
    1         0    0    0    0    1
    2         0    0    0    0    1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR      SLSUR      NSUR     RETSC
    1            100      0.035      0.05       0.1
    2            100        0.1      0.05       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    2              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    2              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Northerly Half Road and Lots***
PERLND  28                      4.065     RCHRES   3      2
PERLND  28                      4.065     RCHRES   3      3
IMPLND   1                      1.575     RCHRES   3      5
IMPLND   2                       0.55     RCHRES   3      5
Southerly Half Road and Lots***
PERLND  28                      4.065     RCHRES   1      2
PERLND  28                      4.065     RCHRES   1      3
IMPLND   1                      1.575     RCHRES   1      5
IMPLND   2                       0.55     RCHRES   1      5
```

```
Access Road***
PERLND  30                          0.86     COPY   502     12
PERLND  30                          0.86     COPY   502     13
IMPLND   2                          0.15     COPY   502     15

******Routing******
RCHRES   1                             1     COPY     1     18
RCHRES   1                                   RCHRES   2      8
PERLND  28                          4.065     COPY     1     12
IMPLND   1                          1.575     COPY     1     15
IMPLND   2                           0.55     COPY     1     15
PERLND  28                          4.065     COPY     1     13
RCHRES   3                             1     RCHRES   4      8
RCHRES   3                                   COPY     1     18
RCHRES   2                             1     COPY   501     17
RCHRES   1                             1     COPY   501     17
RCHRES   4                             1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   502 OUTPUT MEAN   1 1   12.1        DISPLY   2     INPUT  TIMSER 1
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER      .0002778     RCHRES   1     EXTNL  OUTDGT 1
GENER    4 OUTPUT TIMSER      .0002778     RCHRES   3     EXTNL  OUTDGT 1



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

RCHRES
  GEN-INFO
    RCHRES       Name          Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG             ***
                                       in  out                                ***
    1     Surface tention -010    3    1    1    1   28    0    1
    2     South Bioretenti-009    2    1    1    1   28    0    1
    3     Surface tention -015    3    1    1    1   28    0    1
    4     North Bioretenti-014    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

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

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
    4         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

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

```
    3        0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    4        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN      DELTH     STCOR        KS      DB50        ***
  <------><--------><--------><--------><--------><--------><--------><--------> ***
    1              1      0.01       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
    4              4      0.02       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                          ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    4            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL                4
  UVQUAN v2m2   GLOBAL     WORKSP  1          3
  UVQUAN vpo2   GLOBAL     WORKSP  2          3
  UVQUAN v2d2   GENER    2 K       1          3
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol4   RCHRES   4 VOL                4
  UVQUAN v2m4   GLOBAL     WORKSP  3          3
  UVQUAN vpo4   GLOBAL     WORKSP  4          3
  UVQUAN v2d4   GENER    4 K       1          3
*** User-Defined Target Variable Names
***                  addr or                          addr or
***                 <------>                         <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1          1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2          1.0 QUAN
  UVNAME  v2d2    1 K       1          1.0 QUAN
*** User-Defined Target Variable Names
***                  addr or                          addr or
***                 <------>                         <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m4    1 WORKSP  3          1.0 QUAN
  UVNAME  vpo4    1 WORKSP  4          1.0 QUAN
  UVNAME  v2d4    1 K       1          1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   2                               v2m2            =  3554.
*** Compute remaining available pore space
  GENER   2                               vpo2            =  v2m2
  GENER   2                               vpo2           -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                               vpo2            =  0.0
END IF
*** Infiltration volume
```

```
  GENER   2                                  v2d2            =  vpo2
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   4                                  v2m4            =  10323.
*** Compute remaining available pore space
  GENER   4                                  vpo4            =  v2m4
  GENER   4                                  vpo4           -=  vol4
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo4 < 0.0) THEN
  GENER   4                                  vpo4            =  0.0
END IF
*** Infiltration volume
  GENER   4                                  v2d4            =  vpo4
END SPEC-ACTIONS
FTABLES
  FTABLE      2
   59    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.077227  0.000000  0.000000  0.000000
  0.060440  0.076643  0.001134  0.000000  0.000000
  0.120879  0.076003  0.002281  0.000000  0.000000
  0.181319  0.075365  0.003441  0.000000  0.004481
  0.241758  0.074731  0.004613  0.000000  0.004481
  0.302198  0.074099  0.005797  0.000000  0.004481
  0.362637  0.073469  0.006995  0.000000  0.004481
  0.423077  0.072843  0.008205  0.000000  0.004481
  0.483516  0.072219  0.009428  0.000000  0.004481
  0.543956  0.071598  0.010664  0.000000  0.004481
  0.604396  0.070979  0.011913  0.000000  0.004481
  0.664835  0.070363  0.013176  0.000000  0.004481
  0.725275  0.069750  0.014451  0.000000  0.004481
  0.785714  0.069140  0.015739  0.000000  0.004481
  0.846154  0.068532  0.017041  0.000000  0.004481
  0.906593  0.067927  0.018356  0.000000  0.004481
  0.967033  0.067324  0.019685  0.000000  0.004481
  1.027473  0.066724  0.021027  0.000000  0.004481
  1.087912  0.066127  0.022382  0.000000  0.004481
  1.148352  0.065533  0.023752  0.000000  0.004481
  1.208791  0.064941  0.025135  0.000000  0.004481
  1.269231  0.064352  0.026531  0.000000  0.004481
  1.329670  0.063766  0.027942  0.000000  0.004481
  1.390110  0.063182  0.029366  0.000000  0.004481
  1.450549  0.062601  0.030805  0.000000  0.004481
  1.510989  0.062023  0.032240  0.000000  0.004481
  1.571429  0.061447  0.033689  0.000000  0.004481
  1.631868  0.060874  0.035152  0.000000  0.004481
  1.692308  0.060304  0.036629  0.000000  0.004481
  1.752747  0.059736  0.038120  0.000000  0.004481
  1.813187  0.059172  0.039626  0.000000  0.004481
  1.873626  0.058609  0.041145  0.000000  0.004481
  1.934066  0.058050  0.042679  0.000000  0.004481
  1.994505  0.057493  0.044228  0.000000  0.004481
  2.054945  0.056939  0.045791  0.000000  0.004481
  2.115385  0.056387  0.047368  0.000000  0.004481
  2.175824  0.055839  0.048960  0.000000  0.004481
  2.236264  0.055293  0.050567  0.000000  0.004481
  2.296703  0.054749  0.052189  0.000000  0.004481
  2.357143  0.054208  0.053825  0.000000  0.004481
  2.417582  0.053670  0.055476  0.000000  0.004481
  2.478022  0.053135  0.057142  0.000000  0.004481
  2.538462  0.052602  0.058823  0.000000  0.004481
  2.598901  0.052072  0.060520  0.000000  0.004481
  2.659341  0.051545  0.062231  0.000000  0.004481
  2.719780  0.051020  0.063957  0.000000  0.004481
  2.780220  0.050498  0.065699  0.000000  0.004481
  2.840659  0.049979  0.067456  0.000000  0.004481
  2.901099  0.049463  0.069229  0.000000  0.004481
  2.961538  0.048949  0.071017  0.000000  0.004481
  3.021978  0.048438  0.072821  0.003274  0.004481
```

```
  3.082418  0.047929  0.074640  0.007272  0.004481
  3.142857  0.047423  0.076475  0.009751  0.004481
  3.203297  0.046920  0.078326  0.011720  0.004481
  3.263736  0.046420  0.080192  0.013406  0.004481
  3.324176  0.045922  0.082075  0.014909  0.004481
  3.384615  0.045427  0.083973  0.016285  0.004481
  3.445055  0.044934  0.085887  0.017590  0.004481
  3.500000  0.044444  0.184047  0.019075  0.004481
  END FTABLE  2
  FTABLE      1
   35    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.044444  0.000000  0.000000  0.019075  0.000000
  0.060440  0.077872  0.004687  0.000000  0.238609  0.000000
  0.120879  0.078520  0.009413  0.000000  0.247851  0.000000
  0.181319  0.079170  0.014179  0.000000  0.257093  0.000000
  0.241758  0.079823  0.018983  0.000000  0.266335  0.000000
  0.302198  0.080479  0.023828  0.000000  0.275577  0.000000
  0.362637  0.081138  0.028712  0.000000  0.284819  0.000000
  0.423077  0.081799  0.033636  0.000000  0.294061  0.000000
  0.483516  0.082463  0.038600  0.000000  0.303303  0.000000
  0.543956  0.083130  0.043604  0.007672  0.312545  0.000000
  0.604396  0.083799  0.048648  0.028081  0.321786  0.000000
  0.664835  0.084471  0.053733  0.055713  0.331028  0.000000
  0.725275  0.085146  0.058859  0.089013  0.340270  0.000000
  0.785714  0.085823  0.064026  0.127140  0.349512  0.000000
  0.846154  0.086503  0.069233  0.169546  0.358754  0.000000
  0.906593  0.087186  0.074482  0.215836  0.367996  0.000000
  0.967033  0.087871  0.079772  0.265709  0.377238  0.000000
  1.027473  0.088559  0.085104  0.338680  0.386480  0.000000
  1.087912  0.089250  0.090477  0.548189  0.395722  0.000000
  1.148352  0.089943  0.095893  0.850818  0.404964  0.000000
  1.208791  0.090640  0.101350  1.223476  0.414206  0.000000
  1.269231  0.091338  0.106849  1.654842  0.423447  0.000000
  1.329670  0.092040  0.112391  2.137795  0.432689  0.000000
  1.390110  0.092744  0.117975  2.667317  0.441931  0.000000
  1.450549  0.093451  0.123602  3.239623  0.451173  0.000000
  1.510989  0.094160  0.129271  3.851725  0.460415  0.000000
  1.571429  0.094873  0.134984  4.501186  0.469657  0.000000
  1.631868  0.095588  0.140739  5.185968  0.478899  0.000000
  1.692308  0.096305  0.146538  5.904336  0.488141  0.000000
  1.752747  0.097025  0.152381  6.654787  0.497383  0.000000
  1.813187  0.097748  0.158267  7.436004  0.506625  0.000000
  1.873626  0.098474  0.164197  8.246820  0.515866  0.000000
  1.934066  0.099202  0.170170  9.086191  0.525108  0.000000
  1.994505  0.099933  0.176188  9.953177  0.534350  0.000000
  2.000000  0.100000  0.176738  10.84692  0.535190  0.000000
  END FTABLE  1
  FTABLE      4
   59    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.202847  0.000000  0.000000  0.000000
  0.060440  0.201899  0.003741  0.000000  0.000000
  0.120879  0.200860  0.007504  0.000000  0.000000
  0.181319  0.199823  0.011291  0.000000  0.014815
  0.241758  0.198788  0.015099  0.000000  0.014815
  0.302198  0.197757  0.018931  0.000000  0.014815
  0.362637  0.196728  0.022786  0.000000  0.014815
  0.423077  0.195702  0.026663  0.000000  0.014815
  0.483516  0.194678  0.030564  0.000000  0.014815
  0.543956  0.193657  0.034488  0.000000  0.014815
  0.604396  0.192639  0.038435  0.000000  0.014815
  0.664835  0.191624  0.042405  0.000000  0.014815
  0.725275  0.190611  0.046398  0.000000  0.014815
  0.785714  0.189601  0.050415  0.000000  0.014815
  0.846154  0.188593  0.054455  0.000000  0.014815
```

```
  0.906593  0.187589  0.058518  0.000000  0.014815
  0.967033  0.186587  0.062606  0.000000  0.014815
  1.027473  0.185587  0.066716  0.000000  0.014815
  1.087912  0.184591  0.070851  0.000000  0.014815
  1.148352  0.183597  0.075009  0.000000  0.014815
  1.208791  0.182605  0.079191  0.000000  0.014815
  1.269231  0.181617  0.083397  0.000000  0.014815
  1.329670  0.180631  0.087627  0.000000  0.014815
  1.390110  0.179647  0.091881  0.000000  0.014815
  1.450549  0.178667  0.096160  0.000000  0.014815
  1.510989  0.177689  0.100411  0.000000  0.014815
  1.571429  0.176714  0.104686  0.000000  0.014815
  1.631868  0.175741  0.108985  0.000000  0.014815
  1.692308  0.174771  0.113308  0.000000  0.014815
  1.752747  0.173804  0.117655  0.000000  0.014815
  1.813187  0.172840  0.122027  0.000000  0.014815
  1.873626  0.171878  0.126423  0.000000  0.014815
  1.934066  0.170919  0.130843  0.000000  0.014815
  1.994505  0.169962  0.135288  0.000000  0.014815
  2.054945  0.169009  0.139757  0.000000  0.014815
  2.115385  0.168058  0.144250  0.000000  0.014815
  2.175824  0.167109  0.148769  0.000000  0.014815
  2.236264  0.166164  0.153312  0.000000  0.014815
  2.296703  0.165221  0.157880  0.000000  0.014815
  2.357143  0.164280  0.162472  0.000000  0.014815
  2.417582  0.163343  0.167090  0.000000  0.014815
  2.478022  0.162408  0.171732  0.000000  0.014815
  2.538462  0.161475  0.176400  0.000000  0.014815
  2.598901  0.160546  0.181092  0.000000  0.014815
  2.659341  0.159619  0.185810  0.000000  0.014815
  2.719780  0.158695  0.190553  0.000000  0.014815
  2.780220  0.157773  0.195321  0.000000  0.014815
  2.840659  0.156854  0.200115  0.000000  0.014815
  2.901099  0.155938  0.204934  0.000000  0.014815
  2.961538  0.155024  0.209779  0.000000  0.014815
  3.021978  0.154114  0.214649  0.003274  0.014815
  3.082418  0.153206  0.219545  0.007272  0.014815
  3.142857  0.152300  0.224466  0.009751  0.014815
  3.203297  0.151397  0.229414  0.011720  0.014815
  3.263736  0.150497  0.234387  0.013406  0.014815
  3.324176  0.149600  0.239386  0.014909  0.014815
  3.384615  0.148705  0.244411  0.016285  0.014815
  3.445055  0.147813  0.249462  0.017590  0.014815
  3.500000  0.146924  0.533561  0.019075  0.014815
  END FTABLE  4
  FTABLE      3
   35    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.146924  0.000000  0.000000  0.019075  0.000000
  0.060440  0.203891  0.012292  0.000000  0.788791  0.000000
  0.120879  0.204939  0.024646  0.000000  0.819343  0.000000
  0.181319  0.205989  0.037064  0.000000  0.849894  0.000000
  0.241758  0.207042  0.049546  0.000000  0.880446  0.000000
  0.302198  0.208097  0.062092  0.000000  0.910998  0.000000
  0.362637  0.209155  0.074701  0.000000  0.941550  0.000000
  0.423077  0.210216  0.087374  0.000000  0.972101  0.000000
  0.483516  0.211280  0.100112  0.000000  1.002653  0.000000
  0.543956  0.212346  0.112914  0.007672  1.033205  0.000000
  0.604396  0.213415  0.125780  0.028081  1.063757  0.000000
  0.664835  0.214486  0.138711  0.055713  1.094309  0.000000
  0.725275  0.215561  0.151707  0.089013  1.124860  0.000000
  0.785714  0.216638  0.164768  0.127140  1.155412  0.000000
  0.846154  0.217717  0.177894  0.169546  1.185964  0.000000
  0.906593  0.218800  0.191085  0.215836  1.216516  0.000000
  0.967033  0.219885  0.204342  0.265709  1.247067  0.000000
  1.027473  0.220972  0.217665  0.338680  1.277619  0.000000
  1.087912  0.222063  0.231053  0.548189  1.308171  0.000000
```

```
  1.148352  0.223156  0.244508  0.850818  1.338723  0.000000
  1.208791  0.224251  0.258028  1.223476  1.369274  0.000000
  1.269231  0.225350  0.271615  1.654842  1.399826  0.000000
  1.329670  0.226451  0.285268  2.137795  1.430378  0.000000
  1.390110  0.227555  0.298988  2.667317  1.460930  0.000000
  1.450549  0.228661  0.312775  3.239623  1.491481  0.000000
  1.510989  0.229770  0.326629  3.851725  1.522033  0.000000
  1.571429  0.230882  0.340550  4.501186  1.552585  0.000000
  1.631868  0.231997  0.354538  5.185968  1.583137  0.000000
  1.692308  0.233114  0.368593  5.904336  1.613688  0.000000
  1.752747  0.234234  0.382716  6.654787  1.644240  0.000000
  1.813187  0.235356  0.396907  7.436004  1.674792  0.000000
  1.873626  0.236482  0.411166  8.246820  1.705344  0.000000
  1.934066  0.237609  0.425493  9.086191  1.735896  0.000000
  1.994505  0.238740  0.439888  9.953177  1.766447  0.000000
  2.000000  0.238843  0.441200  10.84692  1.769225  0.000000
  END FTABLE  3
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      2 PREC     ENGL    1              RCHRES   3     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5            RCHRES   3     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   4     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     2 OUTPUT MEAN   1 1     12.1      WDM    702 FLOW     ENGL       REPL
COPY   502 OUTPUT MEAN   1 1     12.1      WDM    802 FLOW     ENGL       REPL
COPY   602 OUTPUT MEAN   1 1     12.1      WDM    902 FLOW     ENGL       REPL
RCHRES   2 HYDR   RO     1 1        1      WDM   1005 FLOW     ENGL       REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1006 FLOW     ENGL       REPL
RCHRES   2 HYDR   O      2 1        1      WDM   1007 FLOW     ENGL       REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1008 STAG     ENGL       REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1009 STAG     ENGL       REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1010 FLOW     ENGL       REPL
COPY     1 OUTPUT MEAN   1 1     12.1      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    801 FLOW     ENGL       REPL
COPY   601 OUTPUT MEAN   1 1     12.1      WDM    901 FLOW     ENGL       REPL
RCHRES   4 HYDR   RO     1 1        1      WDM   1011 FLOW     ENGL       REPL
RCHRES   4 HYDR   O      1 1        1      WDM   1012 FLOW     ENGL       REPL
RCHRES   4 HYDR   O      2 1        1      WDM   1013 FLOW     ENGL       REPL
RCHRES   4 HYDR   STAGE  1 1        1      WDM   1014 STAG     ENGL       REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1015 STAG     ENGL       REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1016 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        8
RCHRES     OFLOW  OVOL   2               RCHRES         INFLOW IVOL
  END MASS-LINK    8

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

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

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

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

  MASS-LINK       18
RCHRES     OFLOW  OVOL   2               COPY           INPUT  MEAN
  END MASS-LINK   18


END MASS-LINK

END RUN
```

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.

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

Appendix B: IMP Site Map

DMA 2
POC 2
SELF-TREATING AREA

549.1 550.8 555.1 564.0 575.7 582.5 585.2 581.7 575.0

UNPAVED
UNDEVELOPED
AREA

550.65 RIM
550.20 RIM

DMA 1
POC 1
DRAINS TO BIORETENTION AREAS

550.3 554.9 563.5 572.1 577.2 577.2 575.5 572.0 570.2

DMA 2
POC 2
PERMEABLE PAVEMENT

FOUND LEAD&DISK
SAN DIEGO ENG

542.04 RIM
541.19 RIM
540.57 RIM
538.86 RIM

UNPAVED
UNDEVELOPED
AREA

COUNTY 100-YEAR FLOODLINE

DMA 2
POC 2
SELF-TREATING AREA

ELECTRIC
VAULT
ELECTRIC
CABINET

SCALE: 1"=110'

DRAINAGE MANAGEMENT AREA							
				WQ. VOLUME FT³		WQ. SURFACE AREA FT²	
DMA	AREA AC	IMP (AC)	PER (AC)	REQUIRED	PROVIDED	REQUIRED	PROVIDED
DMA-1	12.38	3.95	8.43	18,605	19,050	8,354	8,840
DMA-2	1.01	0.15	0.86	255	1,780	261	6,534
TOTAL	13.39	4.10	9.29	18,860	20,830	8,615	15,374

REMAINING PORTION OF THE 17-AC PROJECT SITE IS UNDISTURBED AND UNPAVED IN PRE AND POST DEVELOPMENT CONDITIONS.

POINT OF COMPLIANCE ①
PERVIOUS PAVEMENT
BIORETENTION
DRAINAGE MANAGEMENT AREA
DRAINAGE MANAGEMENT SUB-AREA

PACIFIC ESTATES
DRAINAGE MANAGEMENT AREA EXHIBIT

RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
9755 CLAIREMONT MESA BOULEVARD, SUITE 100
SAN DIEGO, CALIFORNIA 92124-1324
858.614.5000 FAX 858.614.5001 www.RBF.com

H:\PDATA\55100256\CADD\Exhibits\Stormwater\Pacifica Estates DMA Exhibit.dwg 06/09/14 - 5:09pm jsullivan

Appendix C: Digital SDHM Files