THE REDWOOD APARTMENTS PRELIMINARY STORM WATER MITIGATION PLAN

APRIL 2019

CIVIL DESIGN CONSULTANTS, INC. 2200 Range Avenue, Sulte 204 Santa Rosa, CA 95403 (707) 542-4820



PRELIMINARY STORM WATER MITIGATION PLAN

FOR

REDWOOD APARTMENTS

Located at 3422 Santa Rosa Avenue

APN 134-132-070

Prepared for:

Pacific West Communities 430 E. State Street, Suite 100 Eagle, Idaho 83616

April 2019



Prepared by:

CIVIL DESIGN CONSULTANTS, INC. 2200 RANGE AVENUE, SUITE 204 SANTA ROSA, CA 95403

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1 INTRODUCTION

The Redwood Apartments project site is within the permit boundary of the recently adopted NPDES MS4 Storm Water Permit which regulates discharges into the watershed with the intent to reduce storm water pollution and protect the water quality of our local creeks and waterways and continue to promote groundwater recharge. The City of Santa Rosa and the County of Sonoma have adopted the Storm Water Low Impact Development (LID) Technical Design Manual. This Preliminary Storm Water Mitigation Plan (PSWMP) was developed to show compliance with its requirements.

Standard Urban Storm Water Mitigation Plan (SUSMP) requirements are part of the Storm Water Management Plan that is an enforceable part of the reissued municipal storm water National Pollutant Discharge Elimination System (NPDES) permit for the City of Santa Rosa, the County of Sonoma and the Sonoma County Water Agency. Satisfying the SUSMP and the NPDES Permit will require meeting the following goals to the maximum extent practicable:

- 1. Prevent pollutants generated at the site from leaving the site.
- 2. Prevent increases in Storm Water runoff for the 85th percentile 24-hour storm.
- 3. Strive to maximize the amount of land left in a natural undisturbed condition.

This PSWMP will provide the following information:

- Project Description
- Pollution Prevention Measures
- Types of Best Management Practices (BMPs) selected to mitigate pollutants and provide volume capture
- Responsibility for BMP maintenance
- Location and design of BMPs (on project drawings)

2 PROJECT DESCRIPTION

The Redwood Apartments project site is located at 3422 Santa Rosa Avenue within the City of Santa Rosa.

The Redwood Apartments property contains an area of 4.13 acres and is comprised of one assessor's parcel number, APN 134-132-070. The existing site is vacant, containing native grasses and is relatively flat and slopes at approximately less than 1% from both north to south and west to east.

The project is proposed by Pacific West Communities as a single, non-phased project. The project proposes to construct 96 affordable rental units within 4 separate 3-story buildings, a community building, site amenities and parking lot on the 4.13 acres. The project will collect overland flow and route it to a series of proposed stormwater treatment facilities before entering the underground drainage system. These features will be constructed over aggregate layers where stormwater will be retained and allowed to infiltrate through native soil before entering the underground storm drain system. This pre-treatment design feature shall not only remove pollutants, but also will reduce the amount of runoff by capturing and infiltrating storm water onsite. The treatment facilities are proposed at various locations throughout the project site, providing treatment for each of the site tributaries. The purpose of these devices and their effect on the quality and quantity of runoff leaving the developed site will be further explained throughout this report.

The attached plan titled "PSWMP Exhibit" shows the proposed general grading pattern for the project along with the drainage tributary areas and proposed treatment facilities. Treatment facility details showing volume capture designed to meet the 100% volume capture goal can be found in the attachments section of this document.

3 POLLUTION PREVENTION MEASURES

Storm drainage from the rooftop of the proposed apartment buildings will be allowed to splash onto concrete splash blocks within landscape areas and surface flow to a stormwater treatment facility before entering the underground storm drain system.

The project will incorporate field drains with inlet openings at least 3" above grade within bio-retention beds. This will allow sediment to settle out of storm water before entering storm drain systems. The field drains will be equipped with horizontal bars on the inlet openings to assist with trash capture.

Storm drain drop inlets and curb inlets will be equipped with removable trash basket inserts to prevent trash from entering the storm drain system and polluting the receiving body of water.

All storm drain inlets will also be marked with a "No Dumping, Drains to Creek" decals to discourage dumping of pollutants into the storm drain system.

The project will also utilize covered trash enclosures designed with area drains that will collect storm water runoff within the enclosure and drain to the projects sanitary sewer system.

The total tributary areas used for volume capture calculations have been reduced by taking credit for some of these measures.

4 TYPES OF BMP'S SELECTED TO MITIGATE POLLUTANTS AND PROVIDE VOLUME CAPTURE

Best Management Practices (BMP's) are design features that address the quality and quantity of the storm waters that flow from a development. In most cases, these BMP's are used to mitigate a development's impact on the quality of storm water by treating or cleaning the storm water. Some controls have dual treatment control measure capabilities, not only treating, but also containing a required volume of storm water. The Redwood Apartment project will implement bio-retention beds to mitigate pollutants and provide volume capture for the 85th percentile 24-hour storm. Volume capture is accomplished by incorporating an area for storm water storage beneath the bio-retention facilities.

Bio-retention beds have been selected for this project because of their ability to remove pollutants through a variety of natural physical, biological and chemical treatment processes. These BMP's are considered a Low Impact Development (LID) device for treatment control. They have also been selected because they provide an excellent opportunity for the runoff to settle any suspended solids and remove hydrocarbons. Both of which have been identified as pollutants that can degrade the downstream receiving waters of the project. Compared to pipe networks, bio-retention beds and permeable concrete with gravel storage areas will reduce runoff from the site and provide ground water recharge. For this project we have selected structural soil – which has a porosity of 30% - consisting of ¾ inch to 1-1/2 inch aggregate for the storage areas under the bio-retention beds, and, in some cases, extend under adjacent concrete sidewalks. All storm water runoff will pass through a vegetative component within the landscape-based bio-retention beds prior to entering the structural soil volume capture areas. The structural soil will also provide an environment for landscaping to thrive. This provides the opportunity to reduce the peak flow in a basin.

The structural soil shall meet standards set forth in the City of Santa Rosa Low Impact Development Design Manual reference document 'E' and geotechnical report. The structural soil will also provide an environment for landscaping to thrive as it is composed of angular rocks and fine organics, providing an excellent environment for water infiltration and plant growth.

This project meets the Design Goal by achieving 100% volume capture.

5 RESPONSIBILITY FOR BMP MAINTENANCE

All treatment control devices serving the Redwood Apartments project are located within the project site. The property owner will be responsible for the surface and sub-surface oversight and maintenance of the treatment control devices on site.

Attached is a Draft of the Declaration of Covenants Regarding Maintenance of Storm Water BMP Facilities.

FOR OFFICE USE ONLY:							
Does this project require permanent							
storm water BMP's?							
Y N							
Date Submitted:							



File No:	Quadrant
Related Files:	25.
Set:	
Departn	nent Use Only

2017 Storm Water LID Determination Worksheet

PURPOSE AND APPLICABILITY: This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.

Part 1: Project Infor	<u>mation</u>						
Project Name			Applicant (owner or developer) Name				
Project Site Address		Applicant Mailing Address					
Project City/State/Zip			Applicant City/State/Zip				
Permit Number(s) - (if	applicable)		Applicant Phone/Email/Fax				
Designer Name			Designer Mailing Address				
Designer City/State/Zip	0		Designer Phone/Email				
Type of Application/	Project:						
Subdivison	Grading Permit	Building Permit	Hillside Development				
DesignReview	Use Permit	Encroachment	Time Extensions Other:				
PART 2: Project Exem	<u>ptions</u>						
1. Is this a project the	nat creates or replaces	s <i>less than</i> 10,000 sq	uare feet of impervious surface ¹ , including all project				
phases and off-si	te improvements?						
Yes	No						
1 Impervious surface replace	ment, such as the reconstruct	ion of parking lots or excava	tion to roadway subgrades is not a routine maintenance				

activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacing, trenching and patching are

defined as maintenance activities per section VI.D.2.b.

2017 Storm Water LID Determination Worksheet

2.	Is this project a routine maintenance activity ² that is being conducted to maintain original line and grade,
	hydraulic capacity, and original purpose of facility such as resurfacing existing roads and parking lots?

Yes No

3. Is this project a stand alone pedestrian pathway, trail or off-street bike lane?

Yes No

4. Did you answer "YES" to any of the questions in Part 2?

YES: This project will *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete the "Exemption Signature Section" on Page 4.**

NO: Please complete the remainder of this worksheet.

Part 3: Project Triggers

Projects that Trigger Requirements:

Please answer the following questions to determine whether this project requires permanent Storm Water BMP's and the submittal of a SW LIDs as required by the NPDES MS4 Permit order No. R1-2015-0030.

1. Does this project create or replace a combined total of 10,000 square feet or more of impervious surface¹ including all project phases and off-site improvements?

Yes No

- Does this project create or replace a combined total or 10,000 square feet or more of impervious streets, roads, highways, or freeway construction or reconstruction³? Yes No
- 3. Does this project create or replace a combined total of 1.0 acre or more of impervious surface¹ including all project phases and off-site improvements? Yes No
- 4. Did you answer "YES" to any of the above questions in Part 3?

YES: This project will need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete remainder of worksheet and sign the "Acknowledgement Signature Section" on Page 4.**

NO: This project will *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 permit. **Please complete the "Exemption Signature Section" on Page 4.**

¹ Imprevious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintence activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacint, trenching and patching are defined as maintenance activities per section VI.D.2.b.

^{2 &}quot;Rountine Maintenance Activity" includes activities such as overlays and/or resurfacing of existing roads or parking lots as well as trenching and patching activities and reroofing activities per section VI.D.2.b.

^{3 &}quot;Reconstruction" is defined as work that extends into the subgrade of a pavement per section VI.D.2.b.

Part 4: Project Description

1. Total	Project area:		square f	eet		
2. Existin	ng land use(s): (chec	k all that apply)				
	Commercial	Industrial	Residential	Public	Other	
	Description of buil	dings, significan	t site features (cr	eeks, wetlan	ds, heritage tre	es), etc.:
3. Existin	g impervious surface	e area:		square fo	eet	
4. Propos	sed Land Use(s): (ch	eck all that app	ly)	0.0.00		
	Commercial	Industrial	Residential	Public	Other	
	Description of buil	dings, significar	nt site features (cr	eeks, wetlan	ds, heritage tre	es), etc.:
5. Propos	sed impervious surfa	ice area:		square f	eet	
				40.03		

Redwood Apartments

Acknowledgment Signature Section:

As the property owner or developer, I understand that this project is required to implement permanent Storm Water Best Management Practices and provide a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit Order No. R1-2015-0030. *Any unknown responses must be resolved to determine if the project is subject to these requirements?

Applicant Signature

Date

Exemption Signature Section:

As the property owner or developer, I understand that this project as currently designed does not require permanent Storm Water BMP's nor the submittal of a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit*. I understand that redesign may require submittal of a new Determination Worksheet and may require permanent Storm Water BMP's.

Applicant Signature

Date

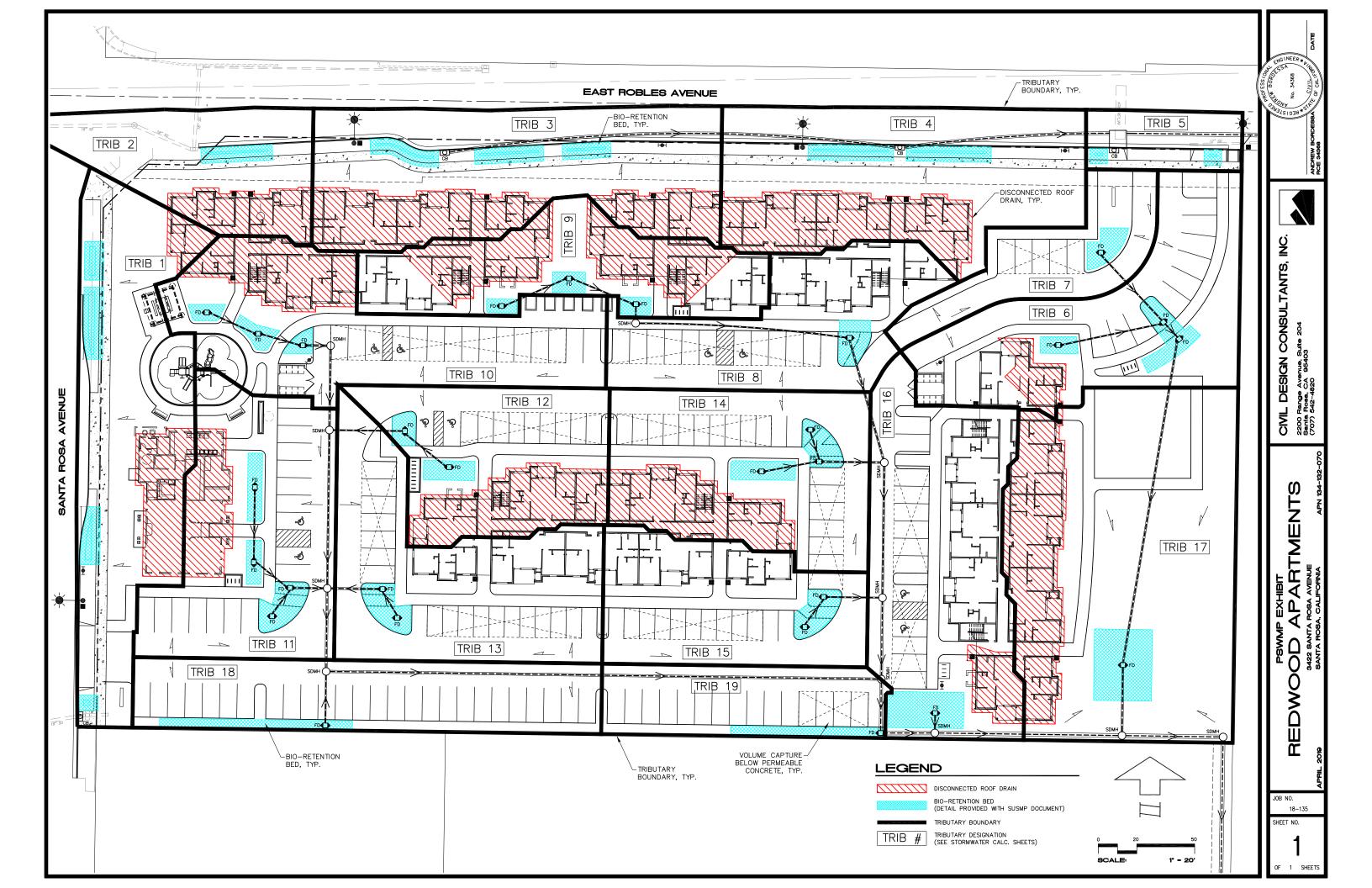
* This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.

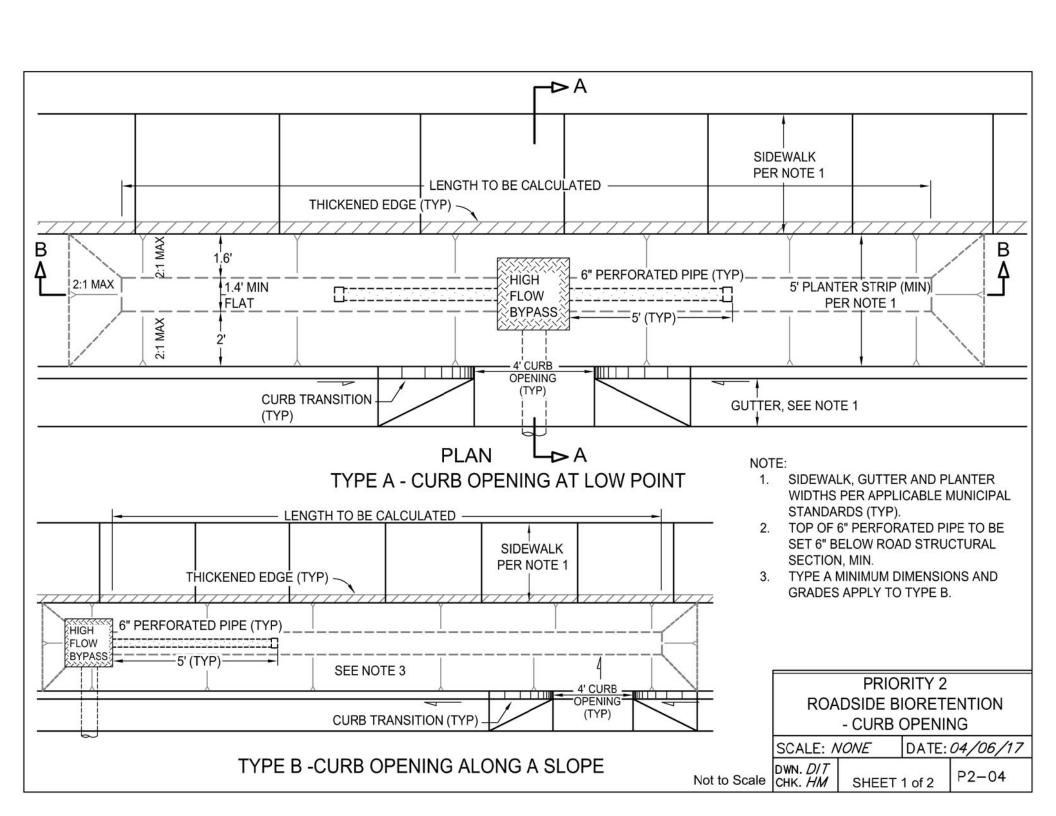
Implementation Requirements: All calculations shall be completed using the "Storm Water Calculator" available at: www.srcity.org/stormwaterLID

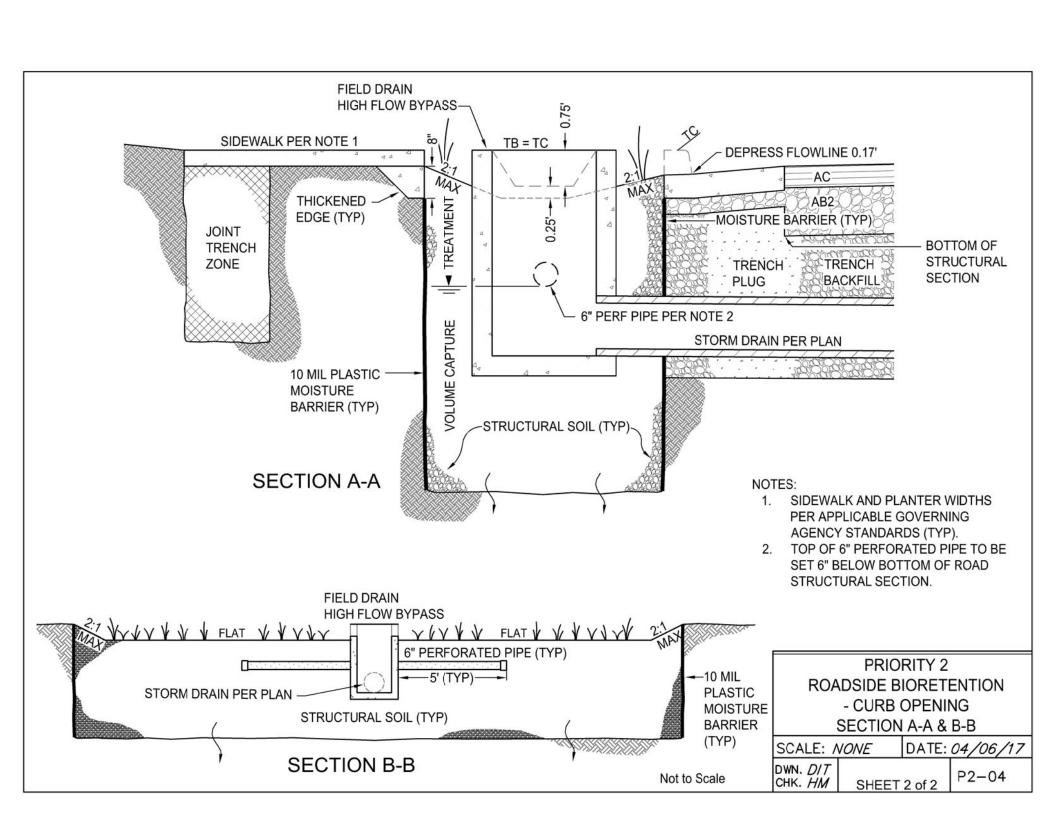
Hydromodification Control/100% Volume Capture: Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

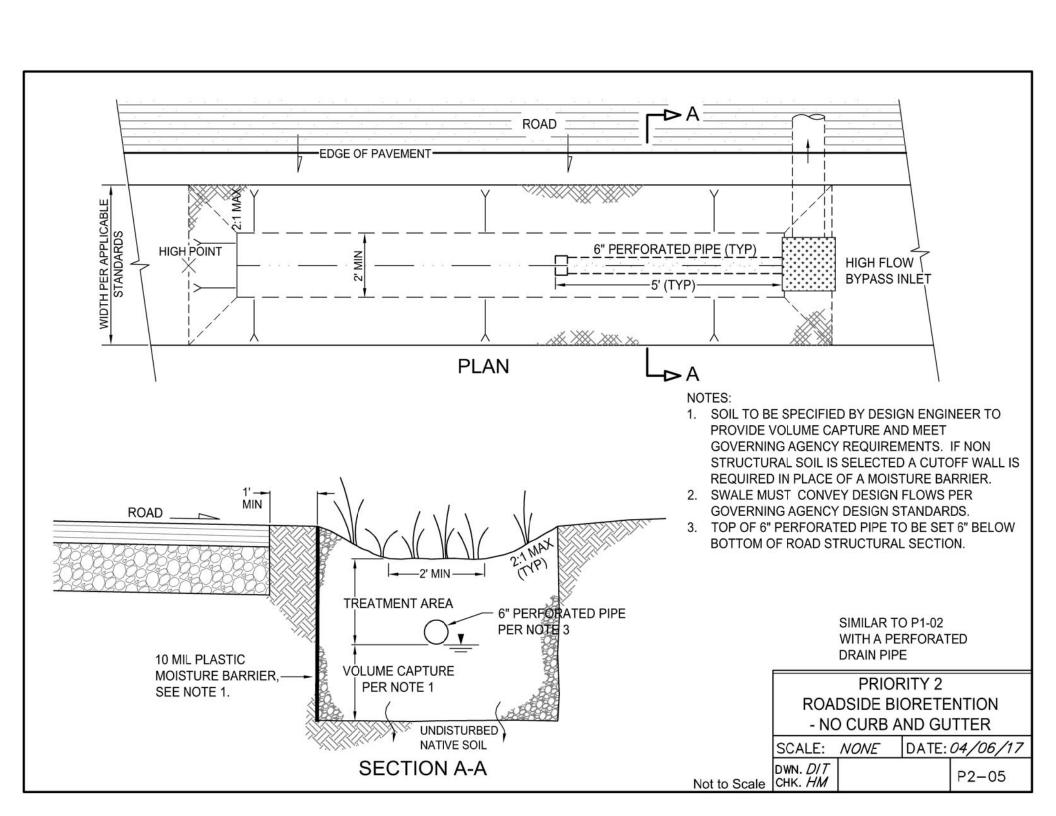
Treatment Requirement: Treatment of 100% of the flow calculated using the modified Rational Method and a known intensity of 0.20 inches per hour.

Delta Volume Capture Requirement: Capture (infiltration and/or reuse) of the increase in volume of storm water due to development generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.











LID BMP Summary Page & Site Global Values

Г				Site Global Values			Cita Information.				Pacad us s	the ere co	d nost der	olonmont
	Project Information: Project Name: The Redwood Apartments					Site Information: Mean Seasonal Precipitation (MSP) of Project Site: 30.00 (inches) Based upon the pre and post developr impervious area, the post construction								
l		ress/Location:		Rosa Avenue			K=MSP/30	(inches)	requirement is:					
I	Addi						N-WOF/30							
		3	4/23/2019				Impervious area - pre development:	ft ²	100%	Capture	& Trea	atment		
l							Impervious area - post development:		150,327.0	ft ²		<u>'</u>		
I					S	Sumn	mary of Saved BMP Results:							
Ī										ВМР	Design Re	sults		
l		Tributa	ry Area		Requiren	ements	5		Hydromodification Control		Flow Base Treatment		Delta Volume Capture	
			Runoff						Required		Required			
	BMP ID:	Tributary	Reduction							Achieved	Q	Achieved	Required	Achieved
		Area (ft ² .)	Measures (Y/N)	Type of Requirement Met			Type of BMP Design	Percent Achieved	V _{Hydromod} (ft ³)	(ft ³)	Treatment (cfs)	(ft ³)	Vdelta (ft ³)	
1	TRIB 1	13,742	Yes	Hydromod Volume Capture	Priority 2: P2-04	04 Roa	adside Bioretention - Curb Opening	102.8		635.3910	_ ` '	. ,	, ,	. ,
2	TRIB-2	7,107	Yes	Hydromod Volume Capture	Priority 2: P2-04	04 Roa	adside Bioretention - Curb Opening	102.8	224.6846	230.8800				
3	TRIB-3	13,792	Yes	Hydromod Volume Capture	Priority 2: P2-04	04 Roa	adside Bioretention - Curb Opening	100.8	424.3297	427.6710				
4	TRIB-4	13,535	Yes	Hydromod Volume Capture	Priority 2: P2-04	04 Roa	adside Bioretention - Curb Opening	103.5	326.4178	337.9200				
5	TRIB-5	2,485	No	Hydromod Volume Capture	Priority 2: P2-04	04 Roa	adside Bioretention - Curb Opening	105.2	83.2972	87.6000				
6	TRIB-6	11,373	Yes	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	107.2	375.0218	402.0000				
7	TRIB-7	5,015	No	Hydromod Volume Capture	Priority 2: P2-04	04 Roa	adside Bioretention - Curb Opening	101.7	168.1028	171.0000				
8	TRIB-8	8,685	No	Hydromod Volume Capture	Priority 3: P3-04	04 Roa	adside Bioretention - Curb Opening	101.4	291.1212	295.2000				
9	TRIB-9	8,541	Yes	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	101.1	253.8805	256.8000				
0	TRIB-10	12,206	Yes	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	106.0	388.7650	412.2000				
1	TRIB-11	11,616	Yes	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	105.3	375.4575	395.4000				
2	TRIB-12	8,655	Yes	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	104.5	265.2102	277.2000				
3	TRIB-13	11,308	No	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	102.3	379.0442	387.8100				
4	TRIB-14	11,065	Yes	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	116.6	347.3678	405.0000				
5	TRIB-15	8,369	No	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	106.7	280.5289	299.2500				
6	TRIB-16	13,050	Yes	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	100.7	429.7599	432.6000				
7	TRIB-17	20,754	Yes	Hydromod Volume Capture	Priority 2: P2-05	05 Roa	adside Bioretention - No Curb AND Gutter	100.8	660.6457	666.0000				
8	TRIB-18	8,869	No	Hydromod Volume Capture	Priority 2: P2-04	04 Roa	adside Bioretention - Curb Opening	100.9	297.2889	300.0000				
9	TRIB-19	5,342	No	Hydromod Volume Capture	Priority 3: P3-04	04 Roa	adside Bioretention - Curb Opening	100.5	179.0638	180.0000				
0														
1														
2														
3														
4														
5														
6														
7														
8														
9														
30														

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BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB 1 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 13,742 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.315 Acre **BMP Design Criteria** Action Buttons: 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-04 Roadside Bioretention - Curb Opening Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 2,306 ft INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 577 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft Resulting reduced Tributary Area used for BMP sizing: 13,166 ft² Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate **Urban districts - Commercial and business** Post development ground cover description: CN_{POST} : User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 618.28 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground

Depth

Width

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

Measured from bottom of perforated pipe if

Reset Hydromod

Sizing Inputs

klhi

- OR --

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Depth

Width

Calculate

Results

909.00 ft² Ponded Area: Total Volume achieved in BMP: 0.00

0.00

635.39 ft

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

102.77

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-2 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 7,107 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.163 **BMP Design Criteria** Action Buttons: 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-04 Roadside Bioretention - Curb Opening Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 1,617 ft² INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: 0 Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 404 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft² Resulting reduced Tributary Area used for BMP sizing: 6,703 ft² Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 224.68 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00 Width Width 0.00

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

- OR --

Reset Hydromod

Sizing Inputs

klhi

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296.00 ft² Ponded Area: Total Volume achieved in BMP:

Calculate

Results

230.88 ft

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

102.76

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-3 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 13,792 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.317 **BMP Design Criteria** Action Buttons: 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-04 Roadside Bioretention - Curb Opening Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 4,534 ft INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: 0 Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 1,134 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft Resulting reduced Tributary Area used for BMP sizing: 12,659 Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 424.33 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground

Depth

Width

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

Measured from bottom of perforated pipe if

Reset Hydromod

Sizing Inputs

klhi

- OR --

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Depth

Width

Calculate

Results

779.00 ft² Ponded Area: Total Volume achieved in BMP: 0.00

0.00

427.67 ft

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

100.79

103.52

Yes

Select Hydromodification BMP Design

when Saving?

STORM WATER CALCULATOR

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-4 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 13,535 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.311 Acre **BMP Design Criteria** Action Buttons: 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-04 Roadside Bioretention - Curb Opening Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Select disconnection condition Method 1 3,797 ft² INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: 0 Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 3,797 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft² Resulting reduced Tributary Area used for BMP sizing: 9,738 Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 326.42 ft Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00 Width Width 0.00 Percent of Requirement Achieved: Lenath

- OR --

Reset Hydromod

Sizing Inputs

klhi

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

Area BMP:

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704.00 ft² Ponded Area:

Total Volume achieved in BMP:

Calculate

Results

337.92 ft

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-5 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 2,485 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.057 Acre **BMP Design Criteria** Action Buttons: 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-04 Roadside Bioretention - Curb Opening Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 0 ft² INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 0 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft² Resulting reduced Tributary Area used for BMP sizing: 2,485 Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 83.30 ft Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00 Width Width 0.00 Percent of Requirement Achieved: Lenath - OR --Entering an Area information will override Width & Length information! 105.17 Area BMP: 146.00 ft² Ponded Area: Total Volume achieved in BMP:

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Display "Hydromod Sizing"

calculation worksheet

Reset Hydromod

Sizing Inputs

klhi

87.60 ft

Calculate

Results

Select Hydromodification BMP Design

when Saving?

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

107.19

Yes

STORM WATER CALCULATOR

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-6 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 11,373 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.261 Acre **BMP Design Criteria** Action Buttons: 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 739 ft INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: 0 Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 185 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft² Resulting reduced Tributary Area used for BMP sizing: 11,188 Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 375.02 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00 Width Width 0.00

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

- OR --

Reset Hydromod

Sizing Inputs

klhi

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670.00 ft² Ponded Area:

Total Volume achieved in BMP:

Calculate

Results

402.00 ft

BMP Input Worksho	eet									
Enter BMP ID and BMP	's Information	n:				Instructions	: Enter in t	the Individual BMP's Tributary parameters in the yellow		
To start a New BMP calcu	lation			TOID 7				ulation worksheet, Click on the Display button for that section.		
Press the Clear/Reset All	la acción	•	ST BE unique):			All calculations are performed in the individual worksheets. To update the results on				
button.	iliputs	BMP's Physical	Tributary Area:	5,015	ft ²			e "Calculate Results" or "Calculate All" buttons.		
Duttoin					Acres			UST USE the Calculate button(s) to update results!		
		BMP D	Design Criteria:	100% Captur	re &	Action Butt				
Type of BMP Design (se	alaat fram mull d	la\t		Treatmen	ıt	Clear/Res	Clear or load default values into cells of individual section or entire page.			
Priority 2: P2-04 Roadsi	de Bioretentio	on - Curb Openi	ng			Calcul	iate	Will load values into worksheet, calculate and displays results.		
BMP Notes:						Display Cal		Will load the values, calculate and display the corresponding		
						Worksl	heet	worksheet with results.		
						Save BMP I		Calculates all sections before saving the BMP's design data, and		
							ilts	then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction		
Clear/Reset		Calculate All		Save BMP Da				Measures or selected treatment method.		
All Inputs		Sections		and Result	S					
Runoff Reduction M	leasures							Note: The maximum Runoff Reduction Measures		
lutana antan Taran								allowed is 50% of the physical tributary area.		
Interceptor Trees	ow Evergreen T	rees that qualify a	s interceptor trees:	0		Interceptor Tr	roo trunk m	nuct ho		
			s interceptor trees:			no greater tha				
			sting tree canopy		ft ²	impervious su				
Disconnected Roof Drain	ns									
		Select disco	nnection condition:	Runoff is directed	d across	s landscape; V	Vidth of are	ea: 5' to 9'		
Method 1										
	of rooftop area that	at drain to disconn	ected downspouts:	0	ft ²			INSTRUCTIONS:		
OR Method 2	of roofton area t	o ha diacannactad	from downspouts:	0	0/_			Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary		
reiceill	torroonop area t	to be disconnected	Select Density:		Unit	s per Acre		Area as designated. Can be from separate buildings.		
Paved Area Disconnection			•			•		<u>OR</u>		
				Select paved area	a type			Method 2: Total Rooftop percentage (%) area relating to		
	Enter area	of alternatively des	signed paved area:	0.0	tt-			the total physical Tributary Area as designated.		
Buffer Strips & Bovine Te	orracos							Total Runoff Reduction Measures : 0 ft ²		
Bullet Outpa & Boville 16		ng to a Buffer Strip	or Bovine Terrace:	0.0	ft ²			Total Nullon Neduction Wedsures .		
						Resultin	g reduced "	Tributary Area used for BMP sizing: 5.015 ft ²		
								3 5,515		
Reset Reduction Measures Inputs			"Runoff Reduction calculation worksh			Calculate Results				
ivieasures iriputs		ivieasures	Calculation works	ieet		Results				
11 1 1161 41	0 (10		200/ 1/ 1	O		If	Hear Com	nposite CN is used, Supporting calculations are required		
Hydromodification	Control Re	quirement: 1	00% volume	Capture; V _{hy}	dromod		be submi			
Post	development hyd	drologic soil type w	ithin tributary area:			•	•			
	Post de	evelopment ground		Residential - 1/8 a	acre or I	ess (town hou	ises)			
	U	ser Composite nos	CN _{POST} = t development CN:	92						
Entering a calculated com										
	oull down menu									
								V _{Hydromod} : 168.10 ft ³		
Reset Hydromod		Displ	ay "Hydromod"			Calculate				
Inputs		calcul	ation worksheet			Results				
BMP Sizing Tool: H	ydromodific	cation Contr	ol Requireme	ent			Ponded	The above and below ground Depth, Width, and Lengt		
BMP Depth:			-	BMP Volume			Water	or Areas will be summed together for the Percent of		
- Measured from ground su	rface WITHOUT		DMD 0-22 D	Below Ground			Above	Requirement Achieved calculation.		
perforrated pipe Measured from bottom of	perforated pino i		BMP Soil Porosity: Depth:		ft	Depth:	Ground 0.00	Tft		
installed.	portorated pipe I		Width:		ft	Width:	0.00			
			Length:		ft	Length:	0.00			
0	R Entering	an Area informa		Width & Length inf				101.72 %		
			Area BMP:	285.00	ft Por	nded Area:		ft ² Results must be at least 100%		
				Total Volum	ne achiev	ved in BMP:	171.00	ft ³		

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Calculate Results Select Hydromodification BMP Design when Saving?

Yes

Display "Hydromod Sizing" calculation worksheet

Reset Hydromod Sizing Inputs

klhj

BMP Input Worksheet								
Enter BMP ID and BMP's Informa	tion:	Instructions: Enter in the Individual BMP's Tributary parameters in the yellow						
To start a New BMP calculation,	BMP ID (MUST BE unique)	- TRIB-8	cells. To view the calculation worksheet, Click on the Display button for that section. All calculations are performed in the individual worksheets. To update the results on					
Press the Clear/Reset All Inputs	BMP's Physical Tributary Area	8,685 ft ²	this worksheet, use the "Calculate Results" or "Calculate All" buttons.					
button.		0.199 Acres		UST USE the Calculate button(s) to update results!				
	BMP Design Criteria	100 % Capture &	Action Buttons: Clear/Reset All	Clear or load default values into cells of individual section or entire				
Type of BMP Design (select from p		Treatment	Inputs	page.				
Priority 3: P3-04 Roadside Biorete	ntion - Curb Opening		Calculate	Will load values into worksheet, calculate and displays results.				
BMP Notes:			Display Calculation Worksheet	Will load the values, calculate and display the corresponding worksheet with results.				
			Save BMP Data and Results	Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction				
Clear/Reset All Inputs	Calculate All Sections	Save BMP Data and Results		Measures or selected treatment method.				
Runoff Reduction Measures				Note: The maximum Runoff Reduction Measures				
Interceptor Trees				allowed is 50% of the physical tributary area.				
	en Trees that qualify as interceptor trees		Interceptor Tree trunk m					
	us Trees that qualify as interceptor trees otage of qualifying existing tree canopy		no greater than 25 feet f impervious surface.	rom				
Disconnected Roof Drains								
	Select disconnection condition	Runoff is directed across	s landscape; Width of are	ea: 5' to 9'				
Method 1	a that drain to disconnected downspouts	0 ft ²		INSTRUCTIONS:				
OR Method 2	a that drain to disconnected downspodis			Method 1: Total Rooftop square foot area (ft 2) that is				
Percent of rooftop a	rea to be disconnected from downspouts Select Density		ts per Acre	drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings.				
Paved Area Disconnection			ts per Acre	<u>OR</u>				
	ed Area Type (select from drop down list) area of alternatively designed paved area			Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated.				
Enter o	nea or alternatively designed paved area	. <u>0.0</u> It		and total physical Photology 7 and do doorghated.				
Buffer Strips & Bovine Terraces				Total Runoff Reduction Measures : 0 ft ²				
Area dr	aining to a Buffer Strip or Bovine Terrace	:ft²						
			Resulting reduced	Tributary Area used for BMP sizing: 8,685 ft ²				
Reset Reduction	Display "Runoff Reduction		Calculate					
Measures Inputs	Measures" calculation works	neet	Results					
Hydromodification Control	Requirement: 100% Volum	Canture: V	If User Com	posite CN is used, Supporting calculations are required				
Try aromounious control	rtoquiromont. 10070 Totum	o Captaio, Inyaromoa	to be subm	itted.				
Post developmen	t hydrologic soil type within tributary area	D: 0 - 0.05 in/hr infiltration	on (transmission) rate					
	st development ground cover description	Residential - 1/8 acre or	less (town houses)					
	CN _{POST} User Composite post development CN							
Entering a calculated composite CN v	rill override selections made from the							
pull down m	enus above.			V _{Hydromod} : 291.12 ft ³				
Reset Hydromod	Display "Hydromod"		Calculate	Tydrolliou 20112				
Inputs	calculation worksheet		Results					
BMP Sizing Tool: Hydromod	lification Control Requirem	ent	Ponded	The above and below ground Depth, Width, and Length				
BMP Depth:		BMP Volume	Water	or Areas will be summed together for the Percent of Requirement Achieved calculation.				
 Measured from ground surface WITHO perforrated pipe. 	DUT Imported BMP Soil Porosity	Below Ground 0.30	Above Ground	roqui omoni 7 omorou outoutumom				
 Measured from bottom of perforated p 	pe if Depth	3.00 ft	Depth: 0.00					
installed.	Width Length		Width: 0.00 Length: 0.00					
OR Ente	ring an Area information will override		on!	101.40 %				
	Area BMF	2: 328.00 ft ² Po	nded Area:	ft ² Results must be at least 100%				
		Total Volume achie	ved in BMP: 295.20	ft³				
Reset Hydromod Sizing Inputs	Display "Hydromod Sizing calculation worksheet	9"	Calculate Results	Select Hydromodification BMP Design when Saving?				

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klhj

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-9 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 8,541 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.196 Action Buttons: **BMP Design Criteria** 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 3,868 ft INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 967 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft² Resulting reduced Tributary Area used for BMP sizing: 7.574 ft² Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 253.88 ft Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00

Width

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

- OR --

Reset Hydromod

Sizing Inputs

klhi

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Width

Calculate

Results

428.00 ft² Ponded Area:

Total Volume achieved in BMP:

0.00

256.80 ft

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

101.15

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-10 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: this worksheet, use the "Calculate Results" or "Calculate All" buttons. 12,206 ft 0.280 Action Buttons: **BMP Design Criteria** 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 2,433 ft INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: 0 Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 608 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft Resulting reduced Tributary Area used for BMP sizing: 11,598 Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 388.76 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00

Width

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

- OR --

Reset Hydromod

Sizing Inputs

klhi

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Width

Calculate

Results

458.00 ft² Ponded Area:

Total Volume achieved in BMP:

0.00

412.20 ft

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

106.03

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

105.31 %

Yes

STORM WATER CALCULATOR

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-11 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 11,616 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.267 Action Buttons: **BMP Design Criteria** 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 1,660 ft INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: 0 Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 415 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft Resulting reduced Tributary Area used for BMP sizing: 11,201 ft² Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 375.46 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00 Width Width 0.00

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

- OR --

Reset Hydromod

Sizing Inputs

klhi

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1,318.00 ft² Ponded Area:

Total Volume achieved in BMP:

Calculate

Results

395.40 ft

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, TRIB-12 BMP ID (MUST BE unique): All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 8,655 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.199 Action Buttons: **BMP Design Criteria** 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 2,972 ft² INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 743 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft Resulting reduced Tributary Area used for BMP sizing: 7,912 ft² Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 265.21 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground

Depth

Width

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

Measured from bottom of perforated pipe if

Reset Hydromod

Sizing Inputs

klhi

- OR --

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Depth

Width

Calculate

Results

462.00 ft² Ponded Area: Total Volume achieved in BMP: 0.00

0.00

277.20 ft

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

104.52

BMP Input Worksh	neet							
Enter BMP ID and BMI	P's Information	on:				Instructions	: Enter in t	the Individual BMP's Tributary parameters in the yellow
To start a New BMP calc	ulation			TDID 40				ulation worksheet, Click on the Display button for that section.
Press the Clear/Reset Al		•	ST BE unique):					formed in the individual worksheets. To update the results on
button.	ii iiiputs	BMP's Physical	Tributary Area:		ft ²			"Calculate Results" or "Calculate All" buttons.
Duttom					Acres			UST USE the Calculate button(s) to update results!
		BMP I	Design Criteria:	100% Captur	re &	Action But		T
Type of BMP Design (s	and and from mult	dawa).		Treatmen	t	Clear/Re Inpu	Clear or load default values into cells of individual section or entire page.	
		·	ID Course	1		•		
Priority 2: P2-05 Roads	side Bioretenti	on - No Curb Ar	ND Gutter			Calcu	iate	Will load values into worksheet, calculate and displays results.
BMP Notes:						Display Ca		Will load the values, calculate and display the corresponding
						Works	heet	worksheet with results.
						Save BMP		Calculates all sections before saving the BMP's design data, and
							ilts	then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction
Clear/Reset		Calculate All		Save BMP Da				Measures or selected treatment method.
All Inputs		Sections		and Results	S			
Runoff Reduction I	Measures							Note: The maximum Runoff Reduction Measures
I								allowed is 50% of the physical tributary area.
Interceptor Trees	new Everareen	Trees that qualify a	e intercentor trees:	0		Interceptor To	roo trunk m	ust be
		Trees that qualify a				no greater the		
		ige of qualifying exi			ft ²	impervious s		
Disconnected Roof Drai	ins							
		Select disco	nnection condition:	Runoff is directed	d across	s landscape; V	Vidth of are	ea: 5' to 9'
Method 1								
	of rooftop area th	nat drain to disconn	ected downspouts:	0	ft ²			INSTRUCTIONS:
OR Method 2	at of roofton area	to be disconnected	from downeroute:	0	0/_			Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary
reicei	iii oi iooitop area	to be disconnected	Select Density:		,, Unit	s per Acre		Area as designated. Can be from separate buildings.
Paved Area Disconnecti			•			•		OR OR
				Select paved area	a type			Method 2: Total Rooftop percentage (%) area relating to
	Enter area	a of alternatively de	signed paved area:	0.0	nt-			the total physical Tributary Area as designated.
Buffer Strips & Bovine 1	Terraces							Total Runoff Reduction Measures : 0 ft ²
Bullet outpa & Boville 1		ing to a Buffer Strip	or Bovine Terrace:	0.0	ft ²			Total Number Neduction Wedsures .
						Resultin	g reduced "	Tributary Area used for BMP sizing: 11,308 ft ²
								, ,,,,
Reset Reduction Measures Inputs			"Runoff Reduction calculation worksh			Calculate Results		
weasures inputs		ivieasures	Calculation works	neet		Results		
11 1 12 41	0 (10		000/ 1/ 1	O ()/		If	Hear Com	posite CN is used, Supporting calculations are required
Hydromodification	Control Re	equirement: 1	00% volume	Capture; V _{hy}	dromod		be submi	
Pos	t development hy	drologic soil type w	ithin tributary area:			•	•	
	Post of	development ground		Residential - 1/8 a	acre or I	ess (town hou	ises)	
	ı	Jser Composite pos	CN _{POST} =					
Entering a calculated con								
	pull down men	us above.						
								V _{Hydromod} : 379.04 ft ³
Reset Hydromod		Displ	ay "Hydromod"			Calculate		
Inputs		calcul	ation worksheet			Results		
BMP Sizing Tool: F	lydromodif	ication Contr	ol Requireme	ent			Ponded	The above and below ground Depth, Width, and Lengtl
BMP Depth:			-	BMP Volume			Water	or Areas will be summed together for the Percent of
- Measured from ground s	surface WITHOU	Г	DMD Call Day 1	Below Ground			Above	Requirement Achieved calculation.
perforrated pipe Measured from bottom o	of perforated pino		BMP Soil Porosity: Depth:		ft	Depth:	Ground 0.00	T _{ff}
installed.	n penorateu pipe	"	Width:		ft	Width:	0.00	ft
			Length:		ft	Length:	0.00	
(OR Enterin	g an Area informa		Width & Length inf				102.31 %
			Area BMP:	417.00	ft Por	nded Area:		ft ² Results must be at least 100%
				Total Volum	ne achiev	ved in BMP:	387.81	ft ³

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Calculate Results Select Hydromodification BMP Design when Saving?

Yes

Display "Hydromod Sizing" calculation worksheet

Reset Hydromod Sizing Inputs

klhj

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, TRIB-14 BMP ID (MUST BE unique): All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 11,065 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.254 Action Buttons: **BMP Design Criteria** 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 2,808 ft INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : **702** ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft Resulting reduced Tributary Area used for BMP sizing: 10,363 Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 347.37 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00

Width

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

- OR --

Reset Hydromod

Sizing Inputs

klhi

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Width

Calculate

Results

675.00 ft² Ponded Area:

Total Volume achieved in BMP:

0.00

405.00 ft

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

116.59

BMP Input Worksheet							
Enter BMP ID and BMP's Informa	tion:			the Individual BMP's Tributary parameters in the yellow			
To start a New BMP calculation,	DAND ID (MILICE DE	TRIB-15		ulation worksheet, Click on the Display button for that section.			
Press the Clear/Reset All Inputs	BMP ID (MUST BE unique): BMP's Physical Tributary Area:	8,369 ft ²	All calculations are performed in the individual worksheets. To update the results on this worksheet, use the "Calculate Results" or "Calculate All" buttons.				
button.	BIMIP'S PHYSICAL HIDULARY Area.	0.192 Acres	· ·	JST USE the Calculate button(s) to update results!			
	BMP Design Criteria:	•	Action Buttons:	or oct the delonate patient of the apartie recents.			
	· ·	100% Capture & Treatment	Clear/Reset All	Clear or load default values into cells of individual section or entire			
Type of BMP Design (select from pu	ıll down):		Inputs	page.			
Priority 2: P2-05 Roadside Bioreter	ntion - No Curb AND Gutter		Calculate	Will load values into worksheet, calculate and displays results.			
BMP Notes:			Display Calculation Worksheet	Will load the values, calculate and display the corresponding worksheet with results.			
			Save BMP Data and Results	calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID.			
Clear/Reset	Calculate All	Save BMP Data		Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method.			
All Inputs	Sections	and Results		Wedsures or selected treatment metriod.			
Runoff Reduction Measures	·	·	L	Note: The maximum Runoff Reduction Measures			
				allowed is 50% of the physical tributary area.			
Interceptor Trees	en Trees that qualify as interceptor trees:	0	Interceptor Tree trunk m	uset ha			
	us Trees that qualify as interceptor trees:	0	no greater than 25 feet f				
Enter square for	otage of qualifying existing tree canopy:	0 ft ²	impervious surface.				
Disconnected Roof Drains	0.1	D (())		The state of the s			
Mathada	Select disconnection condition:	Runom is directed acros	s landscape; width of are	sa: 5 to 9			
Method 1 Amount of roofton area	a that drain to disconnected downspouts:	0 ft ²		INSTRUCTIONS:			
OR Method 2	a mar dram to diocomicotou do miopodio.			Method 1: Total Rooftop square foot area (ft 2) that is			
Percent of rooftop ar	ea to be disconnected from downspouts: Select Density:	0 %	its per Acre	drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings.			
Paved Area Disconnection	Select Density.		its per Acre	OR			
	d Area Type (select from drop down list):			Method 2: Total Rooftop percentage (%) area relating to			
Enter a	rea of alternatively designed paved area:	0.0 ft ²		the total physical Tributary Area as designated.			
Buffer Strips & Bovine Terraces				Total Runoff Reduction Measures : 0 ft ²			
	aining to a Buffer Strip or Bovine Terrace:	0.0 ft ²		Total Nation Notation included to			
			Resulting reduced	Tributary Area used for BMP sizing: 8,369 ft ²			
Reset Reduction	Display "Runoff Reduction		Calculate				
Measures Inputs	Measures" calculation worksh		Results				
Hydromodification Control	Requirement: 100% Volume	Capture; V _{hydromod}		posite CN is used, Supporting calculations are required			
			to be submi	птеа.			
Post development	hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltrati	on (transmission) rate				
Pos	st development ground cover description:	Residential - 1/8 acre or	less (town houses)				
	CN _{POST} = User Composite post development CN:	92					
Entering a calculated composite CN w							
pull down me	enus above.			V			
				V _{Hydromod} : 280.53 ft ³			
Reset Hydromod Inputs	Display "Hydromod" calculation worksheet		Calculate Results				
·	ification Control Demuiroma	t		The above and below ground Depth, Width, and Length			
BMP Sizing Tool: Hydromod	mication Control Requireme	BMP Volume	Ponded Water	or Areas will be summed together for the Percent of			
BMP Depth: - Measured from ground surface WITHC	DUT	Below Ground	Above	Requirement Achieved calculation.			
perforrated pipe.	Imported BMP Soil Porosity:	0.30	Ground Depth: 0.00				
 Measured from bottom of perforated pi installed. 	pe if Depth: Width:	2.50 ft ft	Depth: 0.00 Width: 0.00	ft			
	Length:	ft	Length: 0.00	ft Percent of Requirement Achieved:			
OR Ente	ring an Area information will override V Area BMP:			106.67 % Results must be at least 100%			
	Area BMP:	399.00 ft ² Po	onded Area:	nt Results must be at least 100%			
		Total Volume achie	eved in BMP: 299.25	ft ³			

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Calculate Results Select Hydromodification BMP Design when Saving?

Yes

Display "Hydromod Sizing" calculation worksheet

Reset Hydromod Sizing Inputs

klhj

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, TRIB-16 BMP ID (MUST BE unique): All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 13,050 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.300 Action Buttons: **BMP Design Criteria** 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 915 ft² INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: 0 Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 229 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft² Resulting reduced Tributary Area used for BMP sizing: 12,821 Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 429.76 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground

Depth

Width

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

Measured from bottom of perforated pipe if

Reset Hydromod

Sizing Inputs

klhi

- OR --

ase 8 Rev. 8 4/23/2019

Depth

Width

Calculate

Results

721.00 ft² Ponded Area: Total Volume achieved in BMP: 0.00

0.00

432.60 ft

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

100.66

Percent of Requirement Achieved:

Select Hydromodification BMP Design

when Saving?

100.81 %

Yes

STORM WATER CALCULATOR

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-17 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: 20,754 ft this worksheet, use the "Calculate Results" or "Calculate All" buttons. 0.476 Acre **BMP Design Criteria** Action Buttons: 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 4,182 ft INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: 0 Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 1,046 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft Resulting reduced Tributary Area used for BMP sizing: 19,709 Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 660.65 ft Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00 Width Width 0.00

Lenath

Area BMP:

Entering an Area information will override Width & Length information!

Display "Hydromod Sizing"

calculation worksheet

- OR --

Reset Hydromod

Sizing Inputs

klhi

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1,110.00 ft² Ponded Area:

Total Volume achieved in BMP:

Calculate

Results

666.00 ft

BMP Input Worksheet Enter BMP ID and BMP's Information: Instructions: Enter in the Individual BMP's Tributary parameters in the yellow cells. To view the calculation worksheet, Click on the Display button for that section. To start a New BMP calculation, BMP ID (MUST BE unique): TRIB-18 All calculations are performed in the individual worksheets. To update the results on Press the Clear/Reset All Inputs BMP's Physical Tributary Area: this worksheet, use the "Calculate Results" or "Calculate All" buttons. 8,869 ft 0.204 **BMP Design Criteria** Action Buttons: 100% Capture & Clear/Reset All Clear or load default values into cells of individual section or entire Treatment Type of BMP Design (select from pull down): Inputs page. Priority 2: P2-04 Roadside Bioretention - Curb Opening Calculate Will load values into worksheet, calculate and displays results BMP Notes: Display Calculation Will load the values, calculate and display the corresponding Worksheet vorksheet with results Save BMP Data and Calculates all sections before saving the BMP's design data, and then copies the results to the Summary worksheet by BMP ID. Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. Results Clear/Reset All Inputs Calculate All Sections Save BMP Data and Results Note: The maximum Runoff Reduction Measures **Runoff Reduction Measures** allowed is 50% of the physical tributary area. nterceptor Trees Number of new Evergreen Trees that qualify as interceptor trees Interceptor Tree trunk must be Number of new **Deciduous Trees** that qualify as interceptor trees no greater than 25 feet from Enter square footage of qualifying existing tree canopy impervious surface Disconnected Roof Drains Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9' Method 1 0 ft² INSTRUCTIONS: Amount of rooftop area that drain to disconnected downspouts: OR Method 2 Method 1: Total Rooftop square foot area (ft 2) that is drained by the downspouts flowing to the single Tributary Area as designated. Can be from separate buildings. Percent of rooftop area to be disconnected from downspouts: Units per Acre Select Density Paved Area Disconnection Paved Area Type (select from drop down list): Select paved area ty Method 2: Total Rooftop percentage (%) area relating to the total physical Tributary Area as designated. Enter area of alternatively designed paved area: 0.0 ft **Buffer Strips & Bovine Terraces** Total Runoff Reduction Measures : 0 ft² Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft² Resulting reduced Tributary Area used for BMP sizing: 8.869 Reset Reduction Display "Runoff Reduction Calculate Measures Inputs Measures" calculation worksheet Results Hydromodification Control Requirement: 100% Volume Capture; Vhydromod If User Composite CN is used, Supporting calculations are required to be submitted. Post development hydrologic soil type within tributary area: D: 0 - 0.05 in/hr infiltration (transmission) rate Residential - 1/8 acre or less (town houses) Post development ground cover description: CN_{POST} User Composite post development CN Entering a calculated composite CN will override selections made from the pull down menus above. 297.29 ft³ Display "Hydromod" calculation worksheet Reset Hydromod Calculate Results BMP Sizing Tool: Hydromodification Control Requirement The above and below ground Depth, Width, and Length Ponded or Areas will be summed together for the Percent of **BMP Volume** BMP Depth: - Measured from ground surface WITHOUT perforrated pipe. Water Requirement Achieved calculation. Below Ground Above Imported BMP Soil Porosity Ground Measured from bottom of perforated pipe if Depth Depth 0.00 Width Width 0.00 Percent of Requirement Achieved: Lenath - OR --Entering an Area information will override Width & Length information! 100.91 % Area BMP: 500.00 ft² Ponded Area: Total Volume achieved in BMP: 300.00 ft

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Calculate

Results

Select Hydromodification BMP Design

when Saving?

Yes

Display "Hydromod Sizing"

calculation worksheet

Reset Hydromod

Sizing Inputs

klhi

STORM WATER CALCULATOR

BMP Input Worksheet									
Enter BMP ID and BMP's Informa	tion:		Instructions: Enter in	the Individual BMP's Tributary parameters in the yellow					
To start a New BMP calculation,		TDID 40	cells . To view the calculation worksheet, Click on the Display button for that section.						
Press the Clear/Reset All Inputs	BMP ID (MUST BE unique):			formed in the individual worksheets. To update the results on					
button.	BMP's Physical Tributary Area:	5,342 ft ²		e "Calculate Results" or "Calculate All" buttons.					
	PMP Decian Criteries	0.123 Acre	Action Buttons:	UST USE the Calculate button(s) to update results!					
	BMP Design Criteria:	100% Capture &	Clear/Reset All	Clear or load default values into cells of individual section or entire					
Type of BMP Design (select from pu	ıll down):	Treatment	Inputs	page.					
Priority 3: P3-04 Roadside Bioreter			Calculate	Will load values into worksheet, calculate and displays results.					
BMP Notes:			Display Calculation	Will load the values, calculate and display the corresponding					
			Worksheet	worksheet with results.					
			Save BMP Data and	Calculates all sections before saving the BMP's design data, and					
			Results	then copies the results to the Summary worksheet by BMP ID.					
Clear/Reset	Calculate All	Save BMP Data		 Will not save BMP if error(s) are present in the Runoff Reduction Measures or selected treatment method. 					
All Inputs	Sections	and Results		modeline of collected frequency.					
Runoff Reduction Measures				Note: The maximum Runoff Reduction Measures					
				allowed is 50% of the physical tributary area.					
Interceptor Trees	n Trees that qualify as interceptor trees:	0	Interceptor Tree trunk n	aved be					
	Is Trees that qualify as interceptor trees:	0	no greater than 25 feet f						
	otage of qualifying existing tree canopy:	0 ft ²	impervious surface.						
Disconnected Roof Drains									
	Select disconnection condition:	Runoff is directed acre	oss landscape; Width of ar	ea: 5' to 9'					
Method 1									
Amount of rooftop area OR Method 2	a that drain to disconnected downspouts:	0 ft ²		INSTRUCTIONS:					
	ea to be disconnected from downspouts:	0 %		Method 1: Total Rooftop square foot area (ft ²) that is drained by the downspouts flowing to the single Tributary					
	Select Density:	1 L	nits per Acre	Area as designated. Can be from separate buildings.					
Paved Area Disconnection	d Area Type (select from drop down list):	Salact naved area type		OR Method 2: Total Rooftop percentage (%) area relating to					
	rea of alternatively designed paved area:	0.0 ft ²		the total physical Tributary Area as designated.					
	, , ,								
Buffer Strips & Bovine Terraces				Total Runoff Reduction Measures : 0 ft ²					
Area dra	ining to a Buffer Strip or Bovine Terrace:	0.0 ft ²							
			Resulting reduced	Tributary Area used for BMP sizing: 5,342 ft ²					
Reset Reduction	Display "Runoff Reduction	n	Calculate						
Measures Inputs	Measures calculation worksh		Results						
Hydromodification Control I	Requirement: 100% Volume	Capture; V _{hydrom}	od If User Con to be subm	nposite CN is used, Supporting calculations are required itted.					
Doet development	hydrologic soil type within tributary area:	D. O. O. O. in/hr infiltr	ation (transmission) rate						
-	st development ground cover description:	Residential - 1/8 acre							
	CN _{POST} =	92							
	User Composite post development CN:								
Entering a calculated composite CN w.									
,				V _{Hydromod} : 179.06 ft ³					
Reset Hydromod	Display "Hydromod"		Calculate						
Inputs	calculation worksheet		Results						
BMP Sizing Tool: Hydromod	ification Control Requireme	ent	Ponded	The above and below ground Depth, Width, and Length					
	The state of the s	BMP Volume	Water	or Areas will be summed together for the Percent of					
BMP Depth: - Measured from ground surface WITHO	UT	Below Ground	Above	Requirement Achieved calculation.					
perforrated pipe. - Measured from bottom of perforated pipers.	Imported BMP Soil Porosity:	0.30 1.50 ft	Ground Depth: 0.00	T _{ft}					
installed.	Width:	ft	Width: 0.00						
	Length:	ft	Length: 0.00	· —					
OR Enter	ring an Area information will override l			100.52 %					
	Area BMP:	400.00 ft ²	Ponded Area:	ft ² Results must be at least 100%					
		Total Volume acl	nieved in BMP: 180.00	ft ³					

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Calculate Results Select Hydromodification BMP Design when Saving?

Yes

Display "Hydromod Sizing" calculation worksheet

Reset Hydromod Sizing Inputs

klhj



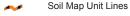
MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons



Soil Map Unit Points

Special Point Features

(c) Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

→ Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

OLIND

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20.000.

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: Sonoma County, California Survey Area Data: Version 12, Sep 13, 2018

Soil map units are labeled (as space allows) for map scales 1:50.000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Oct 31, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
WoA	Wright loam, shallow, wet, 0 to 2 percent slopes	4.1	100.0%
Totals for Area of Interest		4.1	100.0%



The Redwood Apartments

Project Name:	Tie Redwoo	od / tpt	artificitis	J														
	Best Management	Detail			21 18 ×	ised in	ditti:					St. Rec.	o in S	Medsu	Se Leit	entire de la	pet selection	dhei natë ^s :
	Practice (BMP)	Sheet	Detail Title	_	31/×		g) '	<u> </u>	× <	% \	3)/ Pri	<u>~</u>	'u._	\$/,	MG Thirt bla	r, Étar		/ diffe
Universal BMP- to be considered on all	Living Roof	N/A	N/A	_	Х	Х	Χ			Х								
projects.	Rainwater Harvesting	N/A	N/A		Х	Х	Χ			Х								
	Interceptor Trees	N/A	N/A		х	Х	Х				Х							
Runoff Reduction	Bovine Terrace	RRM-01	Bovine Terrace		х						Х							
Measures	Vegetated Buffer Strip	RRM-02	Vegetated Buffer Strip								Х							
	Impervious Area Disconnection	N/A	N/A		х	Х	Х				Х							
Priority 1- to be installed with no underdrains or liners.	Bioretention	P1-02	Roadside Bioretention - no C & G						х	х								
Must drain all stading	Vegetated Swale- with Bioretention	P1-06	Swale with Bioretention						х	х								
water within 72 hours.	Constructed Wetlands	N/A	N/A						х	х								
		P2-02	Roadside Bioretinton - Flush Design Roadside						х	х								
Priority 2 BMPs- with subsurface drains installed above the capture volume.	Bioretention	P2-03	Roadside Bioretenion- Contiguous SW						х	х								
		P2-04	Roadside Bioretenion- Curb Opening						х	х			Y					
		P2-05	Roadside Bioretenion- No C & G						х	х			Y					
	Constructed Wetlands	N/A	N/A						Х	х								

Data	Dogo	of
Date	rage	_ 01



	Best Management Practice (BMP)	Detail Sheet	Detail Title	\(\delta\)	an de l	sed ui	gijd Jiddid		ijelej ijelej		il River	dill st	Marie of the state	Nego Strated	S Jridge 1	Land Control of School of	dree notes.
		P3-02	Roadside Bioretinton - Flush Design Roadside		х	х	х		х								
Priority 3 BMPs- installed with subdrains and/or impermeable liner.	Bioretention	P3-03	Roadside Bioretenion- Contiguous SW		х	х	х		х								
Does not achieve volume capture and		P3-04	Roadside Bioretenion- Curb Opening		х	х	х		х								
must be used as part of a treatment train.	Flow Through Planters	P3-05	Flow Through Planters		Х	х	х		Х								
	Vegetated Swale	P3-06	With Bioretention		Х	Х	х		Х	Х							
	vegetateu Swale	P3-07	Vegetated Swale		Х	Х	х		Х								
Priority 4 BMPs- does not achieve volume	Tree Filter Unit				х	х	Х		х								
capture and must be used as part of a	Modular Bioretention				х	Х	х		х								
	Chambered										-		1 1			1	
Priority 5 BMPs- does	Separator Units				Х	Х	Х		Х								
not achieve volume capture and must be	Centrifugal Separator Units				Х	Х	Х		Х								
used as part of a	Trash Excluders				х	х	Х		Х								
treatment train.	Filter Inserts				Х	Х	х		Х								
					1		1			Т	1		l [1	
Priority 6 BMPs- see the "Offset Program" chapter for details.	Offset Program							ı	1 A\N	N/A	N/A						
Other	Detention																
Other	Detention				Х												

Form A Storm Water Quality Feature Maintenance Check List - Standard Conditions -

Start Time: Project: Inspection Status Codes: Stop Time: Address:	Date:				Inspector	:													
Are there any special conditions and/or maintenance requirements noted for BMP(s)? Y N (circle one) Drainage	Start Time: _												Inspe	ction S	tatus C	Codes:			
Are there any special conditions and/or maintenance requirements noted for BMP(s)? Y N (circle one) Coling	Stop Time: _			_	Address:	s:									.,, .				
Drainage There is definite to drainage shorted or potential transport of flow bypass function a butting the planter area? There debris/trash accumulation of missing or damage structural treaming or modifications or removal of BMP? There dedrition of general as pecial conditions or or removal of BMP? There dedrition a sequiment or potential transport of identee of improper modifications or removal of BMP? There dedrition or observed flowing in the planter area? There dedrition or observed or potential transport of the BMP or high flow by pass? There dedrition or observed or potential transport of identee of improper modifications or page and or curves. There dedrition or observed or potential transport of the BMP or high flow by pass? There dedrition or observed or potential transport of the BMP or high flow by pass? There dedrition or observed or potential transport of the BMP or high flow by pass? There dedrition or observed or potential transport of the BMP or high flow by pass? There dedrition or observed or potential transport of the BMP or high flow by pass? There dedrition or observed or potential transport or page: a curve, etc.) There dedrition or observed or potential transport or page: a curve, etc.) There dedrition or observed or potential transport or page: a curve, etc.) There dedrition or observed or potential transport or page: a curve, etc.) There dedrition or observed or potential transport or page: a curve, etc.) There dedrition or observed or potential transport or page: a curve, etc.) There dedrition or observed or potential transport or page: a curve, etc.) There dedrition or observed or potential transport or page: a curve, etc.) There dedrition or observed or potential or page: a curve, etc.) There dedrition or observed or potential or page: a curve, etc.) There dedrition or observed or potential or page: a curve, etc.) There dedrition or observed or potential or page: a curve, etc.) There designed or duy bass or page: a curve, etc.) There designed or duy bass or	Are there any	/ special c	onditio	ns and	l/or mainte	enance requ						e)	D = 1	- Terrore					
beevidence of standing or ponding of ter in the BMP are a after 72 hours of dry weather? Standing or ponding of ter in the BMP area after 72 hours of dry weather? Standing or ponding of ter in the BMP area after 72 hours of dry weather? Standing of dry blants or dramage structural flow by pass? Standing or damage structural flow by			Drai	nage							•,••		Veget	ation			Genera	ī	Conside
vidence of standing or ponding of ter in the BMP area after 72 hours of dry weather? es the high flow bypass function as designed? there sediment acumination in or around BMP? shong the sidewalks and/or curbs along the sidewalks and/or there accumulation of sediment and, dirt, mud) in the planter area? Is there channelization (gully) forming along the sidewalks and/or the BMP? there evidence of animal activity? there evidence of animal activity? Are there dead or dry plants or flow path? Herbicide Overuse? Are there dead or dry plants or excessive weeds? Is there an absence of correct vegetation? Wissing or damage structural features? (Grates, pipes, walls, curbs, etc.) idence of improper modifications or removal of BMP? e Additional Special Conditions or eatures Check List Requirement	Drawdown - Drainage - Vector Risk - Pump Out-						Hydraulic Fun	ction - Failur	e - Sediment Clo	ogging			_						Features
Evidence of standing or ponding of water in the BMP area after 72 hours of dry weather? Does the high flow bypass function as designed? Is there sediment acumination in or anound BMP? Has water been observed flowing in the pervious concrete section during a low intensity storm? Has water been observed flowing in the pervious concrete section during a low intensity storm? Has water been observed flowing in the peather area? Is there under cutting or washouts a both intensity storm? Is there accumulation of sediment (sand, dirt, mud) in the planter area? Observed or potential transport of mulch to drainage system? Are there voids or holes present in the BMP? Sthere devices or animal activity? Is there evidence of animal activity? Is there evidence of animal activity? Are there dead or dry plants or excessive weeds? Are there dead or dry plants or excessive weeds? Are there dead or dry plants or excessive weeds? Are there dead or dry plants or excessive weeds? Is there a absence of correct vegetation? Missing or damage structural feridence of improper modifications or removal of BMP? Evidence of improper modifications or removal of plants. Evidence of chaptic Actual structural feridence of improper modifications or removal of BMP?	Reference code	D1 D2 D3		D3	D4	E1	E2	E3	E4	E5	E6	V1			V4	G1	G2	ı	
	BMP ID:	Evidence of standing or ponding of water in the BMP area after 72 hours of dry weather?	Does the high flow bypass function as designed?	Is there sediment acumination in or around BMP?	Has water been observed flowing in the pervious concrete section during a low intensity storm?	Is there under cutting or washouts along the sidewalks and/or curbs abutting the planter area?	Is there channelization (gully) forming along the length of the planter area?	Is there accumulation of sediment (sand, dirt, mud) in the planter area ?	Observed or potential transport of mulch to drainage system?	Are there voids or holes present in the BMP?	Is there evidence of animal activity?	Is the vegetation clogging the inlet or flow path?	Evidence of Excessive Mowing and/or Herbicide Overuse?	Are there dead or dry plants or excessive weeds?	Is there an absence of correct vegetation?	Is there debris/trash accumulation in the BMP or high flow by pass?	Missing or damage structural features? (Grates, pipes, walls, curbs, etc.)	Evidence of improper modifications or removal of BMP?	See Additional Special Conditions or Features Check List Requirement Form B

Re-Inspection Required:

Page _

Complete:

Issues Corrective Action:

Storm Water Quality Special Feature Maintenence Check List

Date:		-		Inspector:				Inspection St	atus Codes:			
Start Time:				Project:				S = Satisfac	tory	* - See Notes	on Form C	
Stop Time:								D = Deficient				
					Special F	eature or	Conditio	ns				
Reference code	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	
Additional Special Maintenance Inspection Criterial	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	Add special inspection requirements in addition to Form A here.	
BMP ID:	4	A	V	A	V	V	4	4	A	A	Ac	
Office Use: Complete:			Issues Corre	ctive Action: _				Re-Inspection	n Required: _			

Form C Storm Water Quality Feature Maintenence Check List - Inspection Notes -

Date:	Inspector:
	Project:
	Address:

	Reference	
BMP ID:	Code	Notes

	RDING REQUESTED BY VHEN RECORDED MAIL TO:
Storm 69 Sto	Santa Rosa- Utilities Department Water & Creeks Section- Supervising Engineer ny Circle Rosa CA 95401
	t/Property: :):
Santa	Rosa, California
	DECLARATION OF COVENANTS REGARDING MAINTENANCE OF STORM WATER BMP FACILITIES
his D "Declai	peclaration of Covenants Regarding Maintenance of Storm Water BMP Facilities ration") is made on this day of, 20, by
	RECITALS
A.	Landowner is the fee simple owner of certain real property located in the City of Santa Rosa ("City"), Sonoma County, California, APN 134-132-070 and more fully described in Exhibit A to this Declaration ("Property").
B.	The City's National Pollutant Discharge Elimination System ("NPDES") Municipal Separate Storm Sewer System ("MS4") Permit, Order number R1-2009-0050, issued by the North Coast Regional Water Quality Control Board, requires the City to implement and enforce specific requirements for the construction and maintenance of onsite storm water management facilities/best management practices (collectively, "BMP") for development, redevelopment, and other applicable projects with the goal of mitigating impacts to storm water quality and runoff volume discharges into the MS4.
C.	Provisions of Chapter 17-12 and other applicable sections of the Santa Rosa City Code shall apply to the construction, inspection and maintenance of BMP facilities and the enforcement of MS4 Permit requirements.
D.	On INSERT DATE , WHO (City Engineer OR Chief Building Official) approved Landowner's (MPROVEMENT PLANS or BUILDING PERMIT SITE PLAN) ("Plan") and a Final Standard Urban Stormwater Mitigation Plan (SUSMP") for the Property which require the construction and maintenance of BMP facilities on the Property (the "BMP Facilities") by Landowner. The BMP Facilities required under the SUSMP may include both built and

	landscaping features. The Si	USMP				
	may be inspected at the City Creeks Section, 69 Stony Circ	•	•	of Utilities	s, Storn	า Water &
Ε.	The SUSMP		re	quires	that L	_andowner
	make and execute this Declara	ation				

DECLARATION OF COVENANTS

NOW, THEREFORE, in consideration of the foregoing recitals, Landowner hereby covenants, agrees and declares as follows:

- Landowner shall, at Landowner's sole cost and expense, construct, inspect, and maintain the BMP Facilities in accordance with the Plan and the SUSMP. Landowner shall assure that all BMPs remain fully functional and that all areas identified in the Plan and SUSMP for treatment and/or volume capture discharge to the specified BMP as designed.
- Landowner shall keep all records related to annual inspections of BMP's by City and all records related to BMP maintenance for a period of at least five years. The records shall include records of any BMP Facilities corrections, repairs, and replacements. Landowner shall make these records available to the City upon request.
- 3. In the event Landowner fails to maintain the BMP Facilities in good working condition as solely determined by the City, the City may enter upon the Property and take whatever steps it deems reasonably necessary to maintain and/or make in good working condition, such BMP Facilities. It is expressly understood that the City is under no obligation to maintain or repair the BMP Facilities, and in no event shall this Declaration be construed to impose such an obligation on the City.
- 4. In the event that the City performs work of any nature, or expends any funds in the performance of such work for labor, use of equipment, supplies, materials, or the like, due to failure of the Landowner to perform its maintenance obligations under this Declaration, as solely determined by City, Landowner shall reimburse the City within 60 days of receipt of notice for all costs incurred by the City to undertake such work. Costs shall include, but are not limited to, the actual cost of construction, maintenance and/or repair, and administrative costs directly related to such work.
- 5. Any violation of the Plan or SUSMP by Landowner shall be deemed a public nuisance under Chapter 1-30 of the Santa Rosa City Code and City shall be entitled to the remedies available to it under Chapter 1-30 in addition to those available to it under Chapter 17-12. The remedies identified herein shall be in addition to and cumulative of all other remedies, criminal or civil, which may be pursued by the City.

- 6. Landowner shall indemnify, defend and hold harmless the City and its employees, officials, and agents, from and against any liability, (including liability for claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged or threatened, interest, defense costs, and expert witness fees), where the same relates to, or arises out of, the construction, presence, existence, inspection, or maintenance of BMP Facilities on the Property or the performance of the covenants underlying this Declaration by Landowner, its officers, employees, agents, contractors or subcontractors, excepting only that resulting from the sole, active negligence or intentional misconduct of the City, its employees, officials, or agents. This indemnification obligation is not limited in any way by any limitation on the amount or type of damages or compensation payable to or for the Landowner or its agents under workers' compensation acts, disability benefits acts or other employees' benefits acts. If any judgment or claim against the City, its officials, agents, or employees, shall be entered, Landowner shall pay all cost and expenses in connection therewith.
- 7. If any provisions of this Declaration shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.
- 8. This Declaration shall be governed according to the laws of the State of California. The parties hereto agree that the forum for the adjudication of any dispute related to this Declaration shall be brought exclusively and solely in Sonoma County, California.
- Landowner shall not assign this Declaration to a third party without the express prior
 written consent of the City, provided that such consent will not be unreasonably
 withheld and that such consent shall not be required for Landowner to sell or lease
 the property to a third party.
- 10. Landowner binds itself, its partners, successors, legal representatives and assigns to the City, and to the partners, successors, legal representatives and assigns of the City with respect to all promises and agreements contained herein.
- 11. This Declaration shall be recorded by Landowner, and shall: a) constitute a "covenant running with the land;" b) be binding upon Landowner and Landowner's successors, heirs, and assigns in perpetuity; and, 3) benefit the City of Santa Rosa, its successors, and assigns. Any breach of this Declaration shall render Landowner

or Landowner's heirs, successors or assigns liable pursuant to the provisions of the Santa Rosa City Code.

12. Any notice, submittal or communication required or permitted to be served on Landowner or City may be served by personal delivery to the person or the office of the person identified below. Service may also be made by mail, by placing first-class postage, and addressed as indicated below, and depositing in the United States mail to:

City Representative: Landowner or Landowner Representative:

City of Santa Rosa
Utilities Department
Storm Water & Creeks Section
Supervising Engineer
69 Stony Circle
Santa Rosa CA 95401

Name: Pacific West Communities

Address: 430 E. State Street, Suite 100

Eagle, Idaho 83616

Executed as of the day and year first above stated.

LANDOWNER:

Name: Pacific West Communities
Signatures of Authorized Persons:
Ву:
Print Name:
Title:
Ву:
Print Name:
Title:
ATTACHMENTS: Exhibit A- Property Description Notary Acknowledgment