PRELIMINARY STORM WATER MITIGATION PLAN

WOODMARK APARTMENTS

SEPTEMBER 2020
(REVISED DECEMBER 2020)

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

PRELIMINARY
STORM WATER MITIGATION PLAN

FOR

WOODMARK APARTMENTS

Located at
7716 & 7760 Bodega Avenue
Sebastopol, CA

APN 060-230-067
APN 004-211-007

Prepared for

Sebastopol Pacific Associates
430 E. State Street, Suite 100
Eagle, ID 83616

September 2020
(Revised December 2020)

Prepared by

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

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ATTACHMENTS

1 INTRODUCTION

The Woodmark 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 Sebastopol 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.

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 Sebastopol, 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 Woodmark Apartments project site is located at 7716 & 7760 Bodega Avenue. The property is located within the City of Sebastopol.

The Woodmark Apartments property contains an area of 3.59 acres and is the merger of two assessor parcels, APN 060-230-067 and APN 004-211-007. Each existing parcel contains a single family residence, peripheral structures and the remnants of an orchard.

The project is proposed by Sebastopol Pacific Associates as a dual-phased project. A total of 84 one-to-three bedroom units will be built in the six proposed buildings, along with a pergola, tot lot and bocce ball court.

The project will collect overland flow and route it to a series of proposed bio-retention beds with volume capture underground before entering the underground drainage 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 bio-retention beds are proposed at various locations throughout the project site, providing treatment for the on-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 “Proposed PSWMP Exhibit” shows the proposed grading pattern for the project along with the tributary drainage areas and proposed bio-retention beds. Accompanying the plan are typical storm water bio-retention with volume capture details.

3 POLLUTION PREVENTION MEASURES

The roof drains of the apartment buildings will be disconnected from the storm drain system and some will surface flow to onsite bio-retention beds.

The project will incorporate a robust Landscape plan including interceptor trees that will be planted throughout the project.

The total tributary area used for volume capture calculations has been reduced by taking credit for disconnected roof drains and interceptor trees.

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 Woodmark Apartments 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 beds.

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 with gravel storage areas will reduce runoff from the site and provide ground water recharge. For this project we have selected structural soil consisting of ¾ inch to 1-1/2 inch aggregate for the storage area which has a porosity of 30%. The structural soil will also provide an environment for landscaping to thrive. These mitigation measures provide the opportunity to reduce the peak flow in a basin. This project meets the Design Goal by achieving 100% volume capture.

5 RESPONSIBILITY FOR BMP MAINTENANCE

Treatment control devices serving the Woodmark Apartments project are located onsite. The property management company will be responsible for the surface and sub-surface oversight and maintenance of the treatment control devices located on the property.

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

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 Information

Woodmark Apartments Project Name	Caleb Roope Applicant (owner or developer) Name
7716 & 7760 Bodega Avenue Project Site Address	430 E. State Street, Suite 100 Applicant Mailing Address
Sebastopol, CA 95472 Project City/State/Zip	Eagle, ID 83616 Applicant City/State/Zip
	208-461-0022 Applicant Phone/Email/Fax
Permit Number(s) - (if applicable)	
Dennis Dalby Designer Name	2200 Range Ave, Suite 204 Designer Mailing Address
Santa Rosa, CA 95403 Designer City/State/Zip	(707) 542-4820 Designer Phone/Email

Type of Application/Project:

☐ Subdivison ☑ Grading Permit ☑ Building Permit ☐ Hillside Development

☑ DesignReview ☐ Use Permit ☑ Encroachment ☐ Time Extensions ☐ Other :_____

PART 2: Project Exemptions

1. Is this a project that creates or replaces *less than* 10,000 square feet of impervious surface[1], including all project phases and off-site improvements?

   ☐ Yes ☑ No

1 Impervious surface replacement, such as the reconstruction of parking lots or excavation 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.

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 surface[1] including all project phases and off-site improvements?

☑ Yes ☐ No

2. 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 reconstruction[3]? ☐ Yes ☑ No

3. Does this project create or replace a combined total of 1.0 acre or more of impervious surface[1] 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.**

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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 "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 "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: 3.6 ○ square feet ◉ acres

2. Existing land use(s): (check all that apply)

☐ Commercial ☐ Industrial ☑ Residential ☐ Public ☐ Other

Description of buildings, significant site features (creeks, wetlands, heritage trees), etc.:

The project site contains two assessor parcels, APN 060-230-067 and APN 004-211-007, which will be merged. Each existing parcel contains a single family residence, peripheral structures and the remnants of an orchard. Heritage oak trees along the north and northwest boundary will be preserved.

3. Existing impervious surface area: 0.27 ○ square feet ◉ acres

4. Proposed Land Use(s): (check all that apply)

☐ Commercial ☐ Industrial ☑ Residential ☐ Public ☐ Other

Description of buildings, significant site features (creeks, wetlands, heritage trees), etc.:

The project proposes to construct a total of 84 one-to-three bedroom units built in the six proposed buildings, along with a pergola, tot lot, bocce ball court, and vehicular driveway and parking spaces to support the development.

5. Existing impervious surface area: 2.5 ○ square feet ◉ acres

Project Name

2017 Storm Water LID Determination Worksheet | Woodmark 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

9/24/2020
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.

LEGEND

- EXISTING TREE CANOPY
- DISCONNECTED ROOF DRAIN
- BIO-RETENTION BED (DETAIL PROVIDED WITH SUSMP DOCUMENT)
- TRIBUTARY BOUNDARY
- TRIB-# — TRIBUTARY DESIGNATION (SEE STORMWATER CALC. SHEETS)
- INTERCEPTOR TREE

0 30 60

SCALE: 1" = 30'

DANIEL DALBY DENNIS — REGISTERED PROFESSIONAL ENGINEER — No. 44511 — CIVIL — STATE OF CALIFORNIA

DATE

DENNIS D. DALBY
RCE 44511

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(707) 542-4820

PROPOSED PSWMP EXHIBIT

WOODMARK APARTMENTS

7716 AND 7760 BODEGA AVENUE
SEBASTOPOL, CALIFORNIA

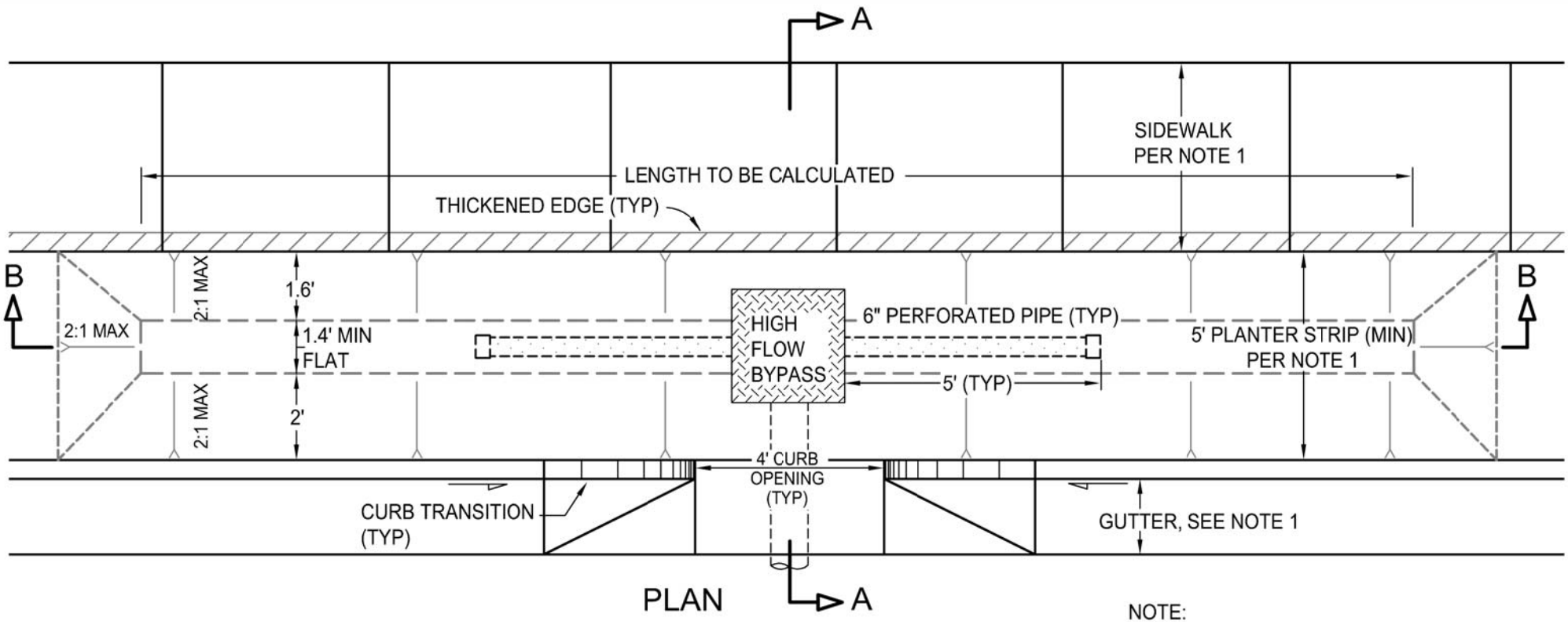
APN 060-230-067
ANP 004-211-007

DECEMBER 2020

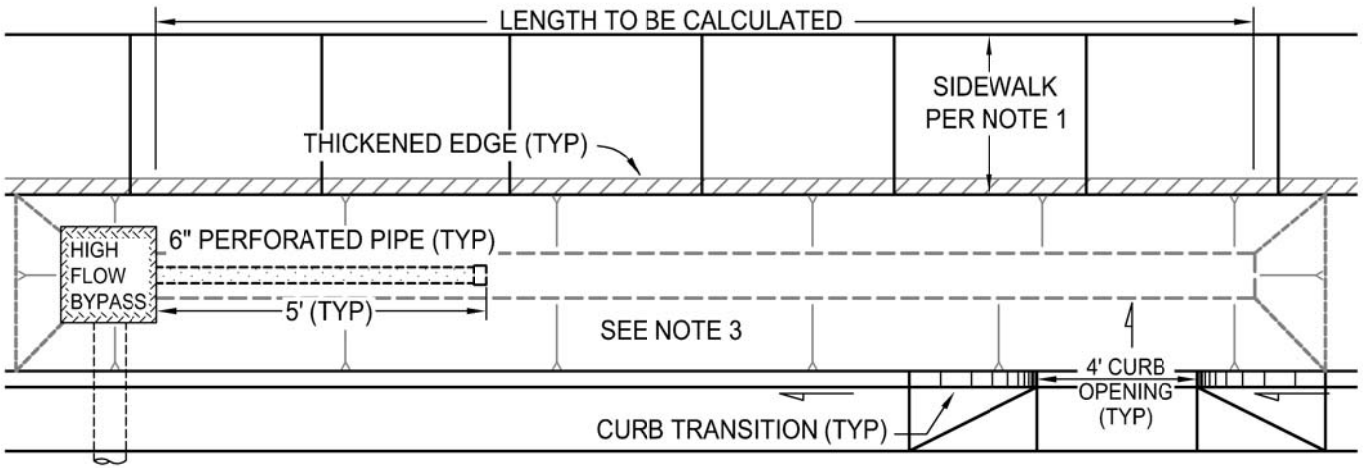
JOB NO. 19-119

SHEET NO. 1

OF 1 SHEETS



TYPE A - CURB OPENING AT LOW POINT



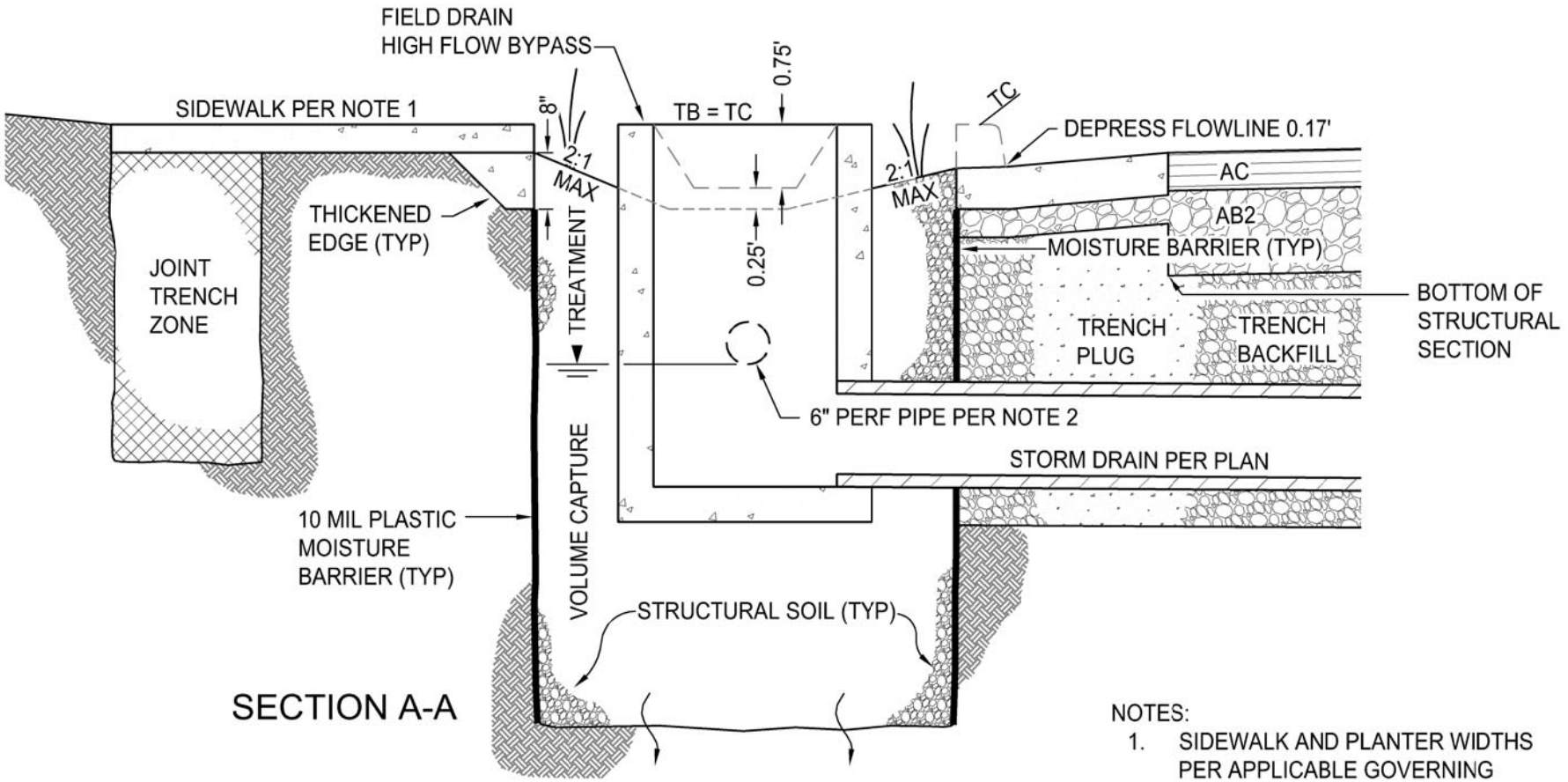
TYPE B -CURB OPENING ALONG A SLOPE

NOTE:

1. SIDEWALK, GUTTER AND PLANTER WIDTHS PER APPLICABLE MUNICIPAL STANDARDS (TYP).
2. TOP OF 6" PERFORATED PIPE TO BE SET 6" BELOW ROAD STRUCTURAL SECTION, MIN.
3. TYPE A MINIMUM DIMENSIONS AND GRADES APPLY TO TYPE B.

Not to Scale

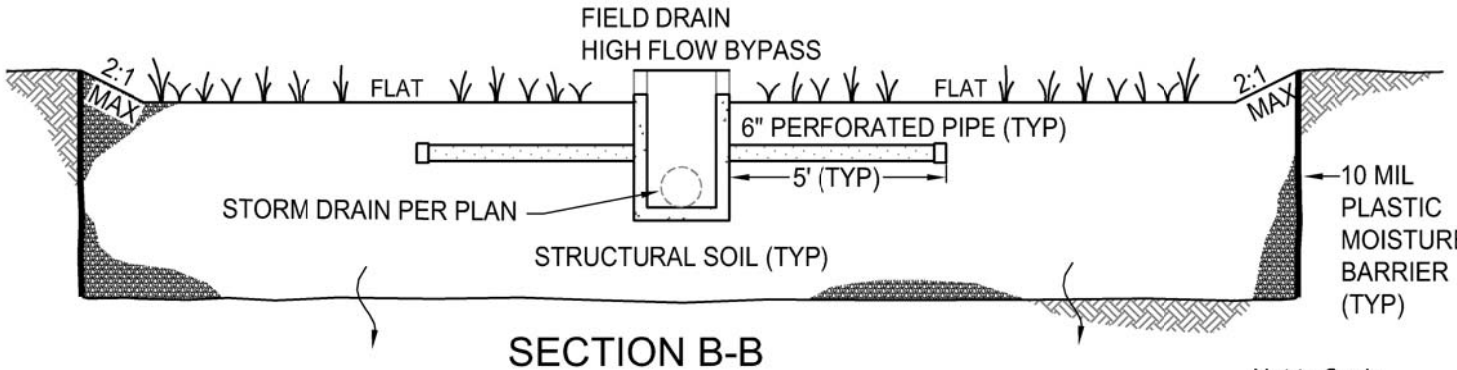
PRIORITY 2 ROADSIDE BIORETENTION - CURB OPENING		
SCALE: *NONE*	DATE: *04/06/17*	
DWN. *DIT* CHK. *HM*	SHEET 1 of 2	P2–04



SECTION A-A

NOTES:

1. SIDEWALK AND PLANTER WIDTHS PER APPLICABLE GOVERNING AGENCY STANDARDS (TYP).
2. TOP OF 6" PERFORATED PIPE TO BE SET 6" BELOW BOTTOM OF ROAD STRUCTURAL SECTION.

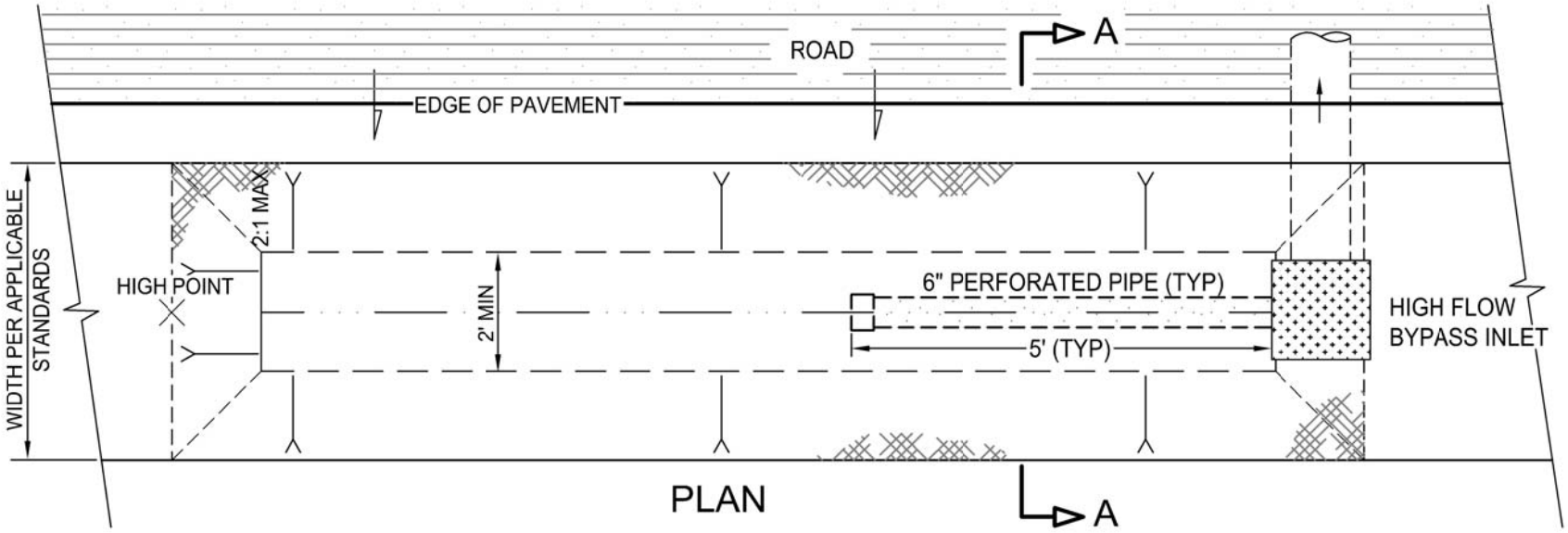


SECTION B-B

Not to Scale

PRIORITY 2
ROADSIDE BIORETENTION
- CURB OPENING
SECTION A-A & B-B

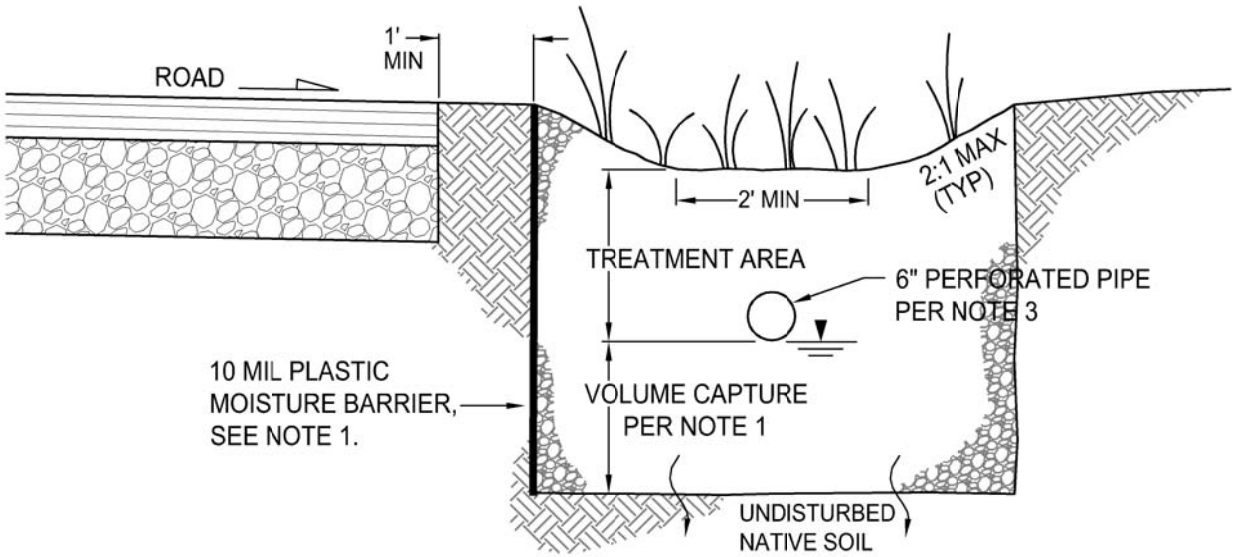
SCALE: *NONE*		DATE: *04/06/17*
DWN. *DIT* CHK. *HM*	SHEET 2 of 2	P2–04



PLAN

NOTES:

1. SOIL TO BE SPECIFIED BY DESIGN ENGINEER TO PROVIDE VOLUME CAPTURE AND MEET GOVERNING AGENCY REQUIREMENTS. IF NON STRUCTURAL SOIL IS SELECTED A CUTOFF WALL IS REQUIRED IN PLACE OF A MOISTURE BARRIER.
2. SWALE MUST CONVEY DESIGN FLOWS PER GOVERNING AGENCY DESIGN STANDARDS.
3. TOP OF 6" PERFORATED PIPE TO BE SET 6" BELOW BOTTOM OF ROAD STRUCTURAL SECTION.



SECTION A-A

SIMILAR TO P1-02 WITH A PERFORATED DRAIN PIPE

PRIORITY 2 ROADSIDE BIORETENTION - NO CURB AND GUTTER		
SCALE: *NONE*	DATE: *04/06/17*	
DWN. *DIT* CHK. *HM*		P2–05

Not to Scale

City of Santa Rosa WATER

STORM WATER CALCULATOR

LID BMP Summary Page & Site Global Values

Project Information:

Project Name:	Woodmark Apartments
Address/Location:	7716 & 7760 Bodega Avenue
Designer:	Dennis Dalby
Date:	12/4/2020

Site Information:

Mean Seasonal Precipitation (MSP) of Project Site:	30.00	(inches)
K=MSP/3(K=	1.00	
Impervious area - pre development:	11,761.0	ft^2
Impervious area - post development:	106,912.0	ft^2

Based upon the pre and post development impervious area, the post construction BMP requirement is:

100% Capture & Treatment

Summary of Saved BMP Results:

		Tributary Area		Requirements		BMP Design Results						
							Hydromodification Control		Flow Base Treatment		Delta Volume Capture	
	BMP ID:	Tributary Area (ft^2.)	Runoff Reduction Measures (Y/N)	Type of Requirement Met	Type of BMP Design	Percent Achieved	Required $V_{Hydromod}$ (ft^3)	Achieved (ft^3)	Required Q Treatment (cfs)	Achieved (ft^3)	Required Vdelta (ft^3)	Achieved (ft^3)
1	TRIB 1	13,299	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	101.2	344.2743	348.4800				
2	TRIB 2	28,779	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	100.8	698.5040	704.3400				
3	TRIB 3	11,198	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	101.4	203.3778	206.1900				
4	TRIB 4	32,501	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	101.9	762.6667	776.8531				
5	TRIB 5	3,033	Yes	Hydromod Volume Capture	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter	125.6	66.1378	83.1000				
6	TRIB 6	4,255	Yes	Hydromod Volume Capture	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter	103.3	99.3135	102.6000				
7	TRIB 7	9,178	Yes	Hydromod Volume Capture	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter	101.4	221.3135	224.4000				
8	TRIB 8	6,014	Yes	Hydromod Volume Capture	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter	104.4	144.8199	151.1250				
9	TRIB 9	3,200	Yes	Hydromod Volume Capture	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter	104.5	75.7996	79.2000				
10	TRIB 10	35,470	Yes	Hydromod Volume Capture	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter	101.6	860.5390	874.1250				
11	TRIB 11	6,978	Yes	Hydromod Volume Capture	Priority 2: P2-04 Roadside Bioretention - Curb Opening	105.5	172.8978	182.3250				
12												
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STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 1
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-04 Roadside Bioretention - Curb Opening
BMP's Physical Tributary Area:	13,299.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 12,899.0 ft^2

Total Runoff Reduction Measures = 400.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	Total Number of New trees in BMP Tributary Area: 4
Number of ***new*** interceptor ***Deciduous Trees*** :	4	
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 344.27 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 101.22 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	1.92	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	605.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 2
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-04 Roadside Bioretention - Curb Opening
BMP's Physical Tributary Area:	28,779.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 26,171.0 ft^2

Total Runoff Reduction Measures = 2,608.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	
Number of ***new*** interceptor ***Deciduous Trees*** :	11	
Square footage of qualifying **existing tree canopy**:	3,016.0 ft^2	
Total Number of New trees in BMP Tributary Area:		11

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 698.50 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.84 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	2.58	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	910.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 3
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-04 Roadside Bioretention - Curb Opening
BMP's Physical Tributary Area:	11,198.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 7,620.0 ft^2

Total Runoff Reduction Measures = 3,578.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	Total Number of New trees in BMP Tributary Area: 7
Number of ***new*** interceptor ***Deciduous Trees*** :	7	
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 2,878 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 203.38 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 101.38 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	1.58	ft	Depth: 0.00	ft
Width:	0.00	ft	Width: 0.00	ft
Length:	0.00	ft	Length: 0.00	ft
Area:	435.00	ft^2	Area: 0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 4
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-04 Roadside Bioretention - Curb Opening
BMP's Physical Tributary Area:	32,501.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 28,575.0 ft^2

Total Runoff Reduction Measures = 3,926.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	
Number of ***new*** interceptor ***Deciduous Trees*** :	12	
Square footage of qualifying **existing tree canopy**:	5,452.0 ft^2	
Total Number of New trees in BMP Tributary Area:	12	

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 762.67 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 101.86 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	1.33	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	1,947.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 5
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter
BMP's Physical Tributary Area:	3,033.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 2,478.0 ft^2

Total Runoff Reduction Measures = 555.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	
Number of ***new*** interceptor ***Deciduous Trees*** :	4	
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	
Total Number of New trees in BMP Tributary Area:		4

Disconnected Roof Drains

Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9'

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 620 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 66.14 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 125.65 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	1.00	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	277.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 6
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter
BMP's Physical Tributary Area:	4,255.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 3,721.0 ft^2

Total Runoff Reduction Measures = 534.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	
Number of ***new*** interceptor ***Deciduous Trees*** :	3	
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	
Total Number of New trees in BMP Tributary Area:		3

Disconnected Roof Drains

Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9'

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 936 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 99.31 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 103.31 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	2.00	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	171.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 7
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter
BMP's Physical Tributary Area:	9,178.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 8,291.8 ft^2

Total Runoff Reduction Measures = 886.3 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	Total Number of New trees in BMP Tributary Area: 3
Number of ***new*** interceptor ***Deciduous Trees*** :	3	
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	

Disconnected Roof Drains

Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9'

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 2,345 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 221.31 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 101.39 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	2.75	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	272.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 8
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter
BMP's Physical Tributary Area:	6,014.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 5,425.5 ft^2

Total Runoff Reduction Measures = 588.5 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	
Number of ***new*** interceptor ***Deciduous Trees*** :	2	
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	
Total Number of New trees in BMP Tributary Area:		2

Disconnected Roof Drains

Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9'

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 1,554 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 144.82 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 104.35 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	3.25	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	155.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 9
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter
BMP's Physical Tributary Area:	3,200.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 2,840.0 ft^2

Total Runoff Reduction Measures = 360.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	
Number of ***new*** interceptor ***Deciduous Trees*** :	2	
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	
Total Number of New trees in BMP Tributary Area:		2

Disconnected Roof Drains

Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9'

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 640 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 75.80 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 104.49 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	2.00	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	132.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 10
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-05 Roadside Bioretention - No Curb AND Gutter
BMP's Physical Tributary Area:	35,470.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 32,241.8 ft^2

Total Runoff Reduction Measures = 3,228.3 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	
Number of ***new*** interceptor ***Deciduous Trees*** :	18	
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	
Total Number of New trees in BMP Tributary Area:		18

Disconnected Roof Drains

Select disconnection condition: Runoff is directed across landscape; Width of area: 5' to 9'

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 5,713 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 860.54 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 101.58 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	3.75	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	777.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Woodmark Apartments**

BMP ID:	TRIB 11
BMP Design Criteria:	Delta Volume & Treatment
Type of BMP Design:	Priority 2: P2-04 Roadside Bioretention - Curb Opening
BMP's Physical Tributary Area:	6,978.0 ft^2
Description/Notes:	

Runoff Reduction Measures

Resulting reduced Tributary Area used for BMP sizing = 6,478.0 ft^2

Total Runoff Reduction Measures = 500.0 ft^2

Interceptor Trees

Number of ***new*** interceptor ***Evergreen Trees*** :	0	Total Number of New trees in BMP Tributary Area: 5
Number of ***new*** interceptor ***Deciduous Trees*** :	5	
Square footage of qualifying **existing tree canopy**:	0.0 ft^2	

Disconnected Roof Drains

Select disconnection condition: Select disconnection condition

Disconnected Roof Drains Method 1

Roof area of disconnected downspouts: 0 ft^2

Disconnected Roof Drains Method 2

Percent of rooftop area: 0 %

Select Density: 1 Units per Acre

Paved Area Disconnection

Paved Area Type:	Select paved area type
Alternatively designed paved area:	0.0 ft^2

Buffer Strips & Bovine Terraces

Area draining to a Buffer Strip or Bovine Terrace: 0.0 ft^2

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 172.90 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Residential - 1/8 acre or less (town houses)
CN_{POST} :	90
User Composite post development CN:	0.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 105.45 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.30			
Depth below perforated pipe if present:	2.75	ft		
Depth:			0.00	ft
Width:	0.00	ft	0.00	ft
Length:	0.00	ft	0.00	ft
Area:	221.00	ft^2	0.00	ft^2


122° 50' 0" W
122° 49' 50" W
38° 23' 58" N
38° 23' 53" N
514550
514570
514590
514610
514630
514650
514670
514690
514710
514730
514750
514770
4250150
4250130
4250110
4250090
4250070
4250050
4250030
4250010
Nelson Way
GdD
SbD
Bodega
Soil Map may not be valid at this scale.
Map Scale: 1:1,100 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 15 30 60 90
Feet
0 50 100 200 300
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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 14, May 29, 2020

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

Date(s) aerial images were photographed: Jul 1, 2018—Jul 31, 2018

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
GdD	Goldridge fine sandy loam, 9 to 15 percent slopes	2.0	56.5%
SbD	Sebastopol sandy loam, 9 to 15 percent slopes	1.5	43.5%
Totals for Area of Interest		**3.5**	**100.0%**

Sonoma County, California

GdD—Goldridge fine sandy loam, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: hfcz
Elevation: 200 to 2,000 feet
Mean annual precipitation: 40 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 225 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Goldridge and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Goldridge

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 24 inches: fine sandy loam
H2 - 24 to 28 inches: sandy clay loam
H3 - 28 to 72 inches: sandy clay loam

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Cotati

Percent of map unit: 5 percent
Hydric soil rating: No

Sebastopol

Percent of map unit: 5 percent
Hydric soil rating: No

Blucher

Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 14, May 29, 2020

Sonoma County, California

SbD—Sebastopol sandy loam, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: hfjd
Elevation: 100 to 1,000 feet
Mean annual precipitation: 40 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Sebastopol and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sebastopol

Setting

Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 8 inches: sandy loam
H2 - 8 to 12 inches: sandy clay loam
H3 - 12 to 43 inches: clay
H4 - 43 to 62 inches: clay loam
H5 - 62 to 72 inches: sandy clay loam

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Blucher
Percent of map unit: 4 percent
Hydric soil rating: No

Goldridge
Percent of map unit: 4 percent
Hydric soil rating: No

Cotati
Percent of map unit: 4 percent
Hydric soil rating: No

Pajaro
Percent of map unit: 3 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 14, May 29, 2020

BMP Selection Table

	Best Management Practice (BMP)	Detail Sheet	Detail Title	Can be used with...	High Ground Water	Contamination	Slope Constraints	Achieves...	Treatment	Volume Capture	Pollution Prevention Credit	BMP in priority selected?	Yes	No	Explanation of selection	Other notes:
Universal LID Features- to be considered on all projects.	Living Roof	N/A	N/A		x	x	x		x	x						
	Rainwater Harvesting	N/A	N/A		x	x	x			x						
	Interceptor Trees	N/A	N/A		x	x	x				x					
	Vegetated Buffer Strip	UN-01	Vegetated Buffer Strip								x					
	Bovine Terrace	UN-02	Bovine Terrace		x						x					
	Impervious Area Disconnection	N/A	N/A		x	x	x				x		✓			

BMP Selection Table

	Best Management Practice (BMP)	Detail Sheet	Detail Title	Can be used with...	High Ground Water	Contamination	Slope Constraints	Achieves...	Treatment	Volume Capture	Pollution Prevention Credit	BMP in this priority selected?	Yes	No	Explanation of selection	Other notes:
Priority 2 BMPs- with subsurface drains installed above the capture volume.	Rain Garden	P2-01	Rain Garden						x	x						
	Roadside Bioretention	P2-02	Roadside Bioretinton - Flush Design Roadside						x	x						
		P2-03	Roadside Bioretenion- Contiguous SW						x	x						
		P2-04	Roadside Bioretenion- Curb Opening						x	x			✓			
		P2-05	Roadside Bioretenion- No C & G						x	x			✓			
	Pervious Pavement	P2-06	Vegetated Buffer Strip						x	x						
	Constructed Wetlands	N/A	N/A						x	x						

FACT SHEET- IMPERVIOUS AREA DISCONNECTION

Runoff Reduction Measure

IMPERVIOUS AREA DISCONNECTION

Including: splash blocks, rain chains, bubble up emitters, and pavement disconnection.

OVERVIEW

Impervious area disconnection allows storm water from impervious areas, such as rooftops and pavement, to be directed to pervious natural or landscaped areas and infiltrate into the soil. Impervious surfaces that drain directly to catch basins or storm drains are a directly connected impervious area. These areas prevent storm water infiltration into the soil or filtering through vegetation and soil. Impervious areas also increase the speed and amount of runoff from a site, which may contribute to peak flows and scour in downstream creeks and waterways.

This BMP addresses these issues by disconnecting direct discharges by using: splash blocks, bubble-up emitter, and paved area disconnection.

DOWNSPOUT DISCONNECTION- DESCRIPTION

Disconnecting downspouts and using splash blocks or rain chains is a low tech option to hard piped downspout systems. Existing downspouts can be retrofitted.

ADVANTAGES

- Reduces the size of downstream storm water BMPs.
- Can be used on sloped sites.
- Increases infiltration potential.
- Increases time of concentration.

- Can be used as a retrofit BMP.

LIMITATIONS

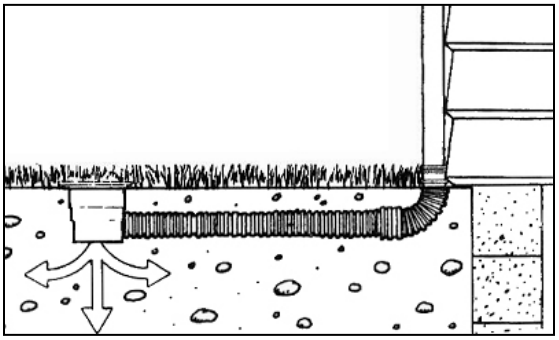
- Adjacent buildings need to be considered in design.
- Ultimate storm water collection needs to be considered in design.
- May not be appropriate on all sites due to space constraints.

KEY DESIGN FEATURES

- Sites should be evaluated to ensure disconnecting downspouts won't have negative impacts.
- Rain water must be directed away from foundations and footings.
- Downspouts should not be directed to paved areas or across sidewalks.
- Landscaped areas receiving roof water should be adequately sized to prevent runoff or erosion and to allow for infiltration.
- All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID.

BUBBLE-UP EMITTER-DESCRIPTION

Bubble-up emitters work very much like disconnected downspouts with splash blocks, but allow for storm water to be released further from the building or into landscape areas that are not directly adjacent to the building.



ADVANTAGES

- Reduces the size of downstream storm water BMPs.
- Takes water away from buildings.
- Increases infiltration potential.
- Increases time of concentration.
- Can be used as a retrofit BMP.

LIMITATIONS

- Adjacent buildings need to be considered in design.
- Ultimate storm water collection needs to be considered in design.
- May not be appropriate on all sites due to space constraints.

KEY DESIGN FEATURES

- Rain water must be directed away from foundations and footings.
- Downspouts should not be directed to paved areas or across sidewalks.
- 4" diameter SDR-35 pipe required as a minimum.

FACT SHEET- IMPERVIOUS AREA DISCONNECTION

Runoff Reduction Measure

- Distance and location of emitter relative to the building must be approved by a Licensed Geotechnical Engineer.
- Landscaped areas receiving roof water should be adequately sized to prevent runoff or erosion and allow for infiltration.
- Landscaped areas receiving roof water need to be designed to ensure proper drainage and to prevent ponding water.
- May be installed with a bottomless emitter to allow for infiltration. Bottom of emitter should be placed over drain rock to prevent sedimentation of pipe.
- Emitter should be equipped with "pop up" cover to prevent mosquito breeding.
- All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID.

PAVED AREA DISCONNECTION-DESCRIPTION

Paved areas that can be graded so that they drain onto pervious area, such as landscape or natural area can increase the opportunity for infiltration and minimize the size of downstream treatment.

ADVANTAGES

- Reduces the size of downstream storm water BMPs.
- Increases infiltration potential.
- Increases time of concentration.

LIMITATIONS

- Areas receiving flow need to be adequately sized and stabilized.
- Ultimate storm water collection needs to be considered in design.
- May not be appropriate on all sites due to space constraints.
- May be limited by site slopes.

KEY DESIGN FEATURES

- Rain water must be directed away from foundations and footings.
- Downspouts should not be directed to paved areas or across sidewalks.
- Landscaped areas receiving roof water should be adequately sized to prevent runoff or erosion and to allow for infiltration.
- All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID.

FACT SHEET- INTERCEPTOR TREES

Runoff Reduction Measure

INTERCEPTOR TREES

Also known as: Tree Credits

DESCRIPTION

Interceptor trees are new or existing trees with their trunks located within 25’ of impervious areas. Trees intercept rain water on their leaves and branches, allowing rain water to evaporate or run down the branches and trunk of the tree where it readily infiltrates into the soil. Tree roots also increase infiltration. Trees also provide shade over impervious surfaces which reduce peak flow in streams and provide shade which reduces the “heat island” effects of urban areas.

Interceptor tree credits are calculated into the site design by reducing the amount of tributary area that must be used to calculate treatment and volume capture. New deciduous trees provide a credit of 100 ft², new evergreen trees provide 200 ft², and existing trees provide one half of the existing canopy. The total area reduction credit due to the use of interceptor trees cannot exceed one half of the total physical tributary area. All calculations shall be completed using the “Storm Water Calculator” available at www.srcity.org/stormwaterLID.

FACT SHEET- INTERCEPTOR TREES

ADVANTAGES

- Reduces the size of downstream storm water BMPs.
- Enhances water quality of downstream water bodies through natural processes.
- Aesthetically pleasing.
- Provides shade to cool pavement and reduces surface runoff temperatures.
- Aids in removal of air pollutants and noise reduction.
- Trees required by the permitting agency may be counted as interceptor trees.
- Establishes habitat for birds and other pollinators like butterflies and bees.

KEY DESIGN FEATURES

- Appropriate new trees must be selected from the approved **Tree List** included in Appendix G.
- Existing trees must be adequately protected during construction.
- Only tree that overhang impervious areas or who's trunks are within 25' of impervious areas can qualify as interceptor trees.
- All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID.

INSPECTION AND MAINTENANCE REQUIREMENTS

A maintenance plan shall be provided with the Final SWLID Submittal. The maintenance plan shall include recommended maintenance practices, state the parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary, and provide site specific inspection checklist.

At a minimum inspection and maintenance shall include the following:

- Annual inspection prior to the rainy season.
- Annual proper watering and application of mulch.
- Routine pruning and weeding as needed.
- Replacement of trees as needed.

FACT SHEET- BIORETENTION

BIORETENTION

Also know as: Rain garden, roadside bioretention, and bioretention cell

DESCRIPTION

The bioretention area best management practice (BMP) functions as a soil and plant-based filtration and infiltration feature that removes pollutants through a variety of natural physical, biological, and chemical treatment processes.

ADVANTAGES

- Can be designed to achieve Treatment, Delta Volume Capture, or Hydromodification requirements.
- Enhances water quality of downstream water bodies through natural processes.
- Aesthetically pleasing.
- The vegetation can provide shade and wind breaks, absorbs noise, reduces heat island effects and improves an area's landscape.
- Provides habitat for birds and attracts other pollinators like butterflies and bees.
- Does not interrupt utility installation.
- Does not interfere with tree planting.

FACT SHEET- BIORETENTION

LIMITATIONS

- Specialized design is required for areas where street slopes exceed 10%.
- Should not be used in areas of know contamination. If soil and/or groundwater contamination is present on the site or within a 100' radius of the proposed BMP location, the North Coast Regional Water Quality Control Board will need to be contacted and the site reviewed.
- Should not be used in areas of high groundwater. In general a minimum of 2' of clearance should be provided between the bottom of the bioretention cell and seasonal high groundwater.
- Should not be used in areas of slope instability where infiltrated storm water may cause failure. Slope stability should be determined by a licensed geotechnical engineer.
- Do not use in locations that can negatively impact building foundation or footings. Location shall be approved by a licensed Geotechnical Engineer.

KEY DESIGN FEATURES

ALL BIORETENTION

- Structural soil should be used within the bioretention area requiring load bearing capacity (adjacent to roadways and/or buildings).
- Structural soil, if used, shall be installed as described in Appendix E.
- Some BMPs may not require the use of structural soil and a more organic type planting soil and/or treatment media may be used in its place. It may be possible in some cases to use native soil or to amend the native soil so that it is suitable. Use of non-structural soil will depend on evaluation of the criteria in "Chapter 4-Site Assessment" as well as consideration of structural needs and may require evaluation by a licensed Geotechnical Engineer.
- Underlining native soil should remain un-compacted to preserve infiltration capacity. Fence off the area during construction to protect it from compaction.
- Bottom of bioretention should be un-lined to allow infiltration into native soil.
- Moisture barrier must be installed vertically to protect road sub-base and any trenches adjacent to the bioretention area.
- If used, pervious concrete shall be designed and installed as described in Appendix E and protected during construction to prevent sediment loading.
- If the porous gutter design option is used additional trash and sediment capture BMPs is required.
- A curb opening type design may be used in place of a porous gutter if appropriate for the project and does not require additional trash capture.
- Bioretention areas shall be planted with plants from the approved **Plant List** and **Tree List** included in Appendix F and shall be planted to achieve 51% cover.
- All bioretention areas shall be designed with a designated high flow bypass inlet for storms larger than the design storm.

- For designs that include perforated pipe, the 6" perforated pipe must be installed a minimum of 6" below the adjacent road structural section.
- Perforated pipe shall be installed in straight runs only.
- The volume below the perforated pipe must be sufficient to hold and infiltrate the design volume.

SIZING DESIGN- GOAL AND REQUIREMENTS

- **For all projects:** The treatment component requires that all of the runoff generated by this water quality design storm from impermeable surfaces must be treated on site for the pollutants of concern.
- ***For projects that increase the amount of impervious surface, but create or replace less than a total of one acre:*** The **Delta Volume Capture** component requires that any increase in volume due to development for the water quality design storm must be infiltrated and/or reused on site. Further discussion of the Treatment and Delta Volume Capture requirements and the accompanying formulas can be found in Chapter 6.
- ***For projects that create or replace one acre or more of impervious surface*:** These larger projects must mitigate their impacts by meeting the **Hydromodification Requirement** by capturing 100% of the post development volume generated by the water quality rain event.
- All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID.

INSPECTION AND MAINTENANCE REQUIREMENTS

A maintenance plan shall be provided with the Final SWLID Submittal. The maintenance plan shall include recommended maintenance practices, state the parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary and provide site specific inspection checklist.

At a minimum maintenance shall include the following:

- Dry street sweeping upon completion of construction
- Dry street sweeping annually, and
    - When water is observed flowing in the gutter during a low intensity storm.
    - Algae is observed in the gutter.
    - Sediment/debris covers 1/3 of the gutter width or more.
- Inspect twice annually for sedimentation and trash accumulation in the gutter. Obstructions and trash shall be removed and properly disposed of.
- Inspect twice during the rainy season for ponded water.
- Pesticides and fertilizers shall not be used in the bioretention area.
- Plants should be pruned, weeds pulled and dead plants replaced as needed.

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

Date: _____ Inspector: _____

Start Time: _____ Project: _____

Stop Time: _____ Address: _____

Inspection Status Codes:
S = Satisfactory
D = Deficient
***** = Refer to Form B (Specials) and/or Form C (Notes).

Are there any special conditions and/or maintenance requirements noted for BMP(s)? Y N (circle one)
If Yes, attach Form B for Project.

	Drainage				Erosion						Vegetation				General			Special Features
	Drawdown - Drainage - Vector Risk - Pump Out-Blockage				Hydraulic Function - Failure - Sediment Clogging						Excessive Mowing - Herbicide Overuse - Health of Desired Vegetation -				Trash and Debris - Improper Modifications - Damage			
Reference code	D1	D2	D3	D4	E1	E2	E3	E4	E5	E6	V1	V2	V3	V4	G1	G2	G4	S
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**

Office Use:
Complete: _____ Issues Corrective Action: _____ Re-Inspection Required: _____

Storm Water Quality Special Feature Maintenence Check List

Date: _____

Start Time: _____

Stop Time: _____

Inspector: _____

Project: _____

Address: _____

Inspection Status Codes:

S = Satisfactory * - See Notes on Form C

D = Deficient

Special Feature or Conditions

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:											

Office Use:

Complete: _____ Issues Corrective Action: _____ Re-Inspection Required: _____

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

Date: _____

Inspector: _____

Project: _____

Address: _____

BMP ID:	Reference Code	**Notes**

RECORDING REQUESTED BY
AND WHEN RECORDED MAIL TO:

City of Sebastopol

Attn:

Sebastopol, California

STANDARD MAINTENANCE AND MONITORING AGREEMENT
STORMWATER BMP FACILITIES MAINTENANCE/MONITORING AGREEMENT

THIS AGREEMENT is made and entered into this day of 20 , by and between Sebastopol Pacific Associates (Landowner), and City of Sebastopol (City)

RECITALS

WHEREAS, Landowner is the owner of certain real property described in Exhibit A, attached hereto and incorporated as though fully set forth herein (Property); and

WHEREAS, Landowner has submitted an application and development plan (Plan) for the Property within the City of Santa Rosa, for which Landowner has received final approval from the City, which Plan is incorporated as though fully set for the herein; and

WHEREAS, The North Coast Regional Water Quality Control Board NPDES Permit, Order #31-2009-0050, requires City to implement and enforce specific requirements for construction and maintenance of onsite stormwater management/Best Management Practices (BMP) for public and private construction; and

WHEREAS, City requires that on-site stormwater management/BMP facilities shall be constructed and maintained by Landowner in accordance with Plan specifications.

WHEREAS, the Plan provides for Bio-retention and Volume Capture BMP's; and

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals, the mutual covenants contained herein, and the following terms and conditions, the parties agree as follows:

1. The on-site stormwater management/BMP facilities shall be constructed by Landowner in accordance with the Plan specifications.

2. Landowner shall maintain the stormwater management/BMP facilities in good work condition acceptable to the City.

3. Landowner hereby grants permission to City, its authorized agents and employees, to enter upon the property and to inspect the stormwater management/BMP facilities whenever City deems necessary. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, including any berms, inlet and outlet structures, vegetation, infiltration media, pond areas, access roads, et cetera. If deficiencies are noted, City shall notify Landowner and provide the inspection findings and evaluations. (and cure requirements?)

4. Landowner hereby grants permission to City, its authorized agents, employees, and consultants to enter upon the property to install, operate and maintain equipment to monitor the flow characteristics and pollutant content of the influent, effluent and intermediate points in the facilities. Landowner further agrees to design and construct the facility to provide access for monitoring as outlined in Storm Water Mitigation Plan and/or in the manufacturer manual for the BMP.

5. Landowner will perform maintenance and an annual maintenance inspection in accordance with the maintenance schedule for the stormwater management/BMP facilities, including sediment removal, as outlined in the Plan and the following specific requirements:

   Maintenance of the following BMP(s)

   Shall conform to the approved Plan's maintenance requirements, all requirements contained in (cite handbooks) and/or specific maintenance requirements established by the manufacturer as approved by (City dept.) prior to the release of the final plans. Specific manufacturer maintenance requirements for the BMP will be submitted to the City.

6. In the event Landowner fails to maintain the stormwater management/BMP facilities in good working condition acceptable to City, City may enter upon the Property and take whatever steps it deems reasonably necessary to maintain the stormwater management/BMP facilities. This provision shall not be construed to allow City to erect any structure of a permanent nature on the Property outside of an easement in favor of City. It is expressly understood and agreed that City is under no obligation to maintain or repair facilities, and in no event shall this Agreement be construed to impose such an obligation on City.

7. In the event that City, pursuant to this Agreement, performs work of any nature, or expends any funds in the performance of such work for labor, use of equipment, supplies, materials, and the like, due to the failure of Landowner to perform such maintenance or work, Landowner shall reimburse City within 30 days of receipt of notice of all costs incurred by the City to undertake such work. If Landowner fails to reimburse City for these costs within 30 days, City shall have a lien against the property in the amount of such costs, plus the legal rate of interest for judgments, and

may enforce the lien in the same manner a lien for real property taxes may be enforced.

8. Landowner shall indemnify, defend and hold harmless City and its employees, officials, and agents, from and against any liability, (including liability for claims, suits, actins 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 same results from or arises out of the construction, presence existence, or maintenance of the stormwater management/BMP facilities or the performance of this Agreement by Landowner, its officers, employees, agents, and sub-contractors, excepting only that resulting from the sole, active negligence or intentional misconduct of 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 Landowner or its agents under workers' compensation acts, disability benefits acts or other employees' benefits acts. In the event a claim is asserted against City, its agents or employees', City shall promptly notify landowner. Thereafter, Landowner shall defend at its own expense any suite based upon such claim. If any judgment or claim against the City, its agents or employees', shall be entered, Landowner shall pay all costs and expenses in connection therewith.

9. If any provisions of the Agreement shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provision shall not in anyway be affected or impaired thereby.

10. This Agreement shall be governed according to the laws of the State of California. Because this Agreement is to be performed in the County of Sonoma, the parties hereto agree that the forum for the adjudication of any dispute regarding the Agreement or enforcement shall be brought exclusively and solely in Sonoma County, California.

11. City and Landowner each binds itself, its partners, successors, legal representatives and assigns to the other party to this Agreement and to the partners, successors, legal representatives and assigns of such other parties with respect to all promises and agreements contained herein.

12. This Agreement shall be recorded, and shall constitute a covenant running with the land, or equitable servitude, and shall be binding upon and insure to the benefit of Landowner's successors and assigns.

THE CITY OF SEBASTOPOL

By: _____

ATTEST: _____
Assistant City Clerk

APPROVED AS TO FORM

By: _____
City Attorney's Office

LANDOWNER:

_____,
a _____

By: _____
Name: _____
Title: _____

By: _____
Name:_____
Title: _____

By: _____
Name: _____
Title: _____

Attachments:

Exhibit A – Property Description
Notary Acknowledgment