

**PRELIMINARY
STORM WATER CONTROL PLAN
FOR
THE VERANDA AT INDIAN SPRINGS**

1502/1504/1506/1510/1522 LINCOLN AVENUE

CALISTOGA, CA

**APNs 011-340-003, -004, -006
-021, -022, -028 & -029**

FEBRUARY 2020

Owner/Developer:

Merchant Family

1712 Lincoln Avenue

Calistoga, CA 94515

PRELIMINARY

Jason Kirchmann, PE

No. C-78079

February 14, 2020

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Storm Water Control Plan Exhibit

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Bioretention Facility Sizing Calculations

Bioretention Area Maintenance Plan (Sample)

Bioretention Area Inspection and Maintenance Checklist (Sample)

This Storm Water Control Plan was prepared using the template dated July 11, 2014.

I. Project Data

Table 1. Project Data

Project Name/Number	The Veranda at Indian Springs
Application Submittal Date	February 14, 2020
Project Location	1502/1504/1506/1510 Lincoln Avenue Calistoga, CA 95415
Project Phase No.	N/A
Project Type and Description	Commercial hotel
Total Project Site Area (acres)	±6.8 acres
Total New and Replaced Impervious Surface Area	±5.7 acres
Total Pre-Project Impervious Surface Area	±5.0 acres
Total Post-Project Impervious Surface Area	±5.7 acres

II. Setting

II.A. Project Location and Description

The proposed *Veranda at Indian Springs* will include a hotel and commercial retail area, two pools, three hot tubs, a restaurant, a bar, a pool-side snack bar, and associated site improvements. The project will disturb approximately 7 acres of land on the northeast corner of Gerard Avenue and Lincoln Avenue. The site is currently developed with the Glider Port Airfield and currently has several small commercial buildings and warehouses on it; the existing improvements will be demolished to support the proposed project.



II.B. Existing Site Features and Conditions

The site in its existing condition consists of asphalt parking lots, gravel roads, and grassy areas that are often disturbed by vehicle traffic. Storm water generally flows southeast towards the drainage ditch ("Merchant Ditch") on the south of the site.

The project does not propose work offsite in environmentally sensitive areas and is properly setback from the wetlands area east of the site. Therefore, the project is not anticipated to need a "Clean Water Certification" from the Regional Water Quality Control Board.

The Geotechnical Engineer report prepared by Reese and Associates in July of 2014 reports that ground water was measured at approximately 7.5 to 9 feet below the existing ground surface. During an on-site subsurface conditions exploration in April of 2016, the geotechnical engineer reported that the soil on site was generally characterized as "Sandy Silt" and "Sandy Clay," which is typically

classified as lying in hydrologic soil group “D” having an infiltration rate of approximately 0.00 to 0.05 inches per hour.

II.C. Opportunities and Constraints for Storm Water Control

An opportunity with this project site is the relatively flat slope allows for installation of flat bioretention facilities. Constraints include limited drainage options due to the impacted ditch on the southern end of the site and limited grading options due to the built nature of most of the surrounding areas.

III. Low Impact Development Design Strategies

III.A. Optimization of Site Layout

III.A.1. Limitation of development envelope

The development envelope has been limited to the maximum extent practicable.

III.A.2. Preservation of natural drainage features

Grading on the site will continue to flow towards the drainage ditch on the southern end of the site.

III.A.3. Setbacks from creeks, wetlands, and riparian habitats

The project limit of work is properly setback from the wetlands area to the east of the site.

III.A.4. Minimization of imperviousness

Impervious surfaces have been limited to the maximum extent practicable. Significant amounts of landscaped areas are proposed with this development.

III.A.5. Use of drainage as a design element

A project Landscape Architect has been retained to design attractive water efficient landscaping best suited on the surface of storm water treatment facilities. The Storm Water Control Plan Exhibit reflects the proposed geometry and location of each storm water treatment facility. The project proposes self-retaining areas instead of bioretention areas along the emergency access road. The project proposes to offset the undersized bioretention areas in the bike plaza (Areas 18 and 19 on the Storm Water Control Plan Exhibit) with larger areas also within the bike plaza (Areas 16 and 17). Although two areas are undersized, the overall site exceeds the minimum required treatment.

III.B. Use of Permeable Pavements

The use of permeable pavements is not currently anticipated with this development.

III.C. Dispersal of Runoff to Pervious Areas

Dispersal of runoff to pervious areas is utilized to the maximum extent practicable.

III.D. Storm Water Control Measures

This project proposed to integrate storm water treatment facilities which capture site runoff during light precipitation events in accordance with the objectives of the Bay Area Storm Water Management Agencies Association (BASMAA) *Post Construction Manual: Design Guidance for Storm Water Treatment and Control for Projects in Marin, Sonoma, Napa, and Solano Counties (January 2019)*.

Storm water treatment facilities will double as storm water detention facilities to attenuate runoff due to the presence of impervious surface area on site. Preliminary calculation indicate that the treatment areas will be capable of storing as much as 9,790 cubic feet of storm water runoff.

IV. Documentation of Drainage Design

IV.A. Descriptions of each Drainage Management Area

See Appendix for descriptions of drainage management areas.

IV.B. Tabulation and Sizing Calculations

IV.B.1. Table 2. Information Summary for Bioretention Facility Design

Total Project Area:	±6.8 acres
Average Annual Precipitation:	±37 inches
BMPs Designed For:	Treatment Only

IV.B.2. Areas Draining to Bioretention Facilities

See Appendix for treatment calculations.

V. Source Control Measures

V.A. Site activities and potential sources of pollutants

BKF Engineers does not anticipate significant potential for pollutants on the project site. The sources listed in the table below are taken from the BASMAA *Post Construction Manual: Design Guidance for Storm Water Treatment and Control for Projects in Marin, Sonoma, Napa, and Solano Counties*

V.B. Sources and Source Control Measures

The project is not anticipated to create substantial new pollutant sources. Table 3 below summarizes the potential pollutant sources and associated control measures.

Table 3. Sources and Source Control Measures

Potential source of runoff pollutants	Permanent source control BMPs	Operational source control BMPs
On-site storm drain inlets	Mark all inlets with a “No Dumping – Flows to River” message	Maintain and periodically repaint or replace inlet markings.

V.C. Features, Materials, and Methods of Construction of Source Control BMPs

To be determined at time of construction.

VI. Storm Water Facility Maintenance

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

The applicant commits to execute any necessary agreements and/or annex into a fee mechanism in accordance with local requirements. The applicant will accept responsibility for operation and maintenance of facilities until that responsibility is formally transferred.

Storm water treatment facilities described in this report will be owned and maintained in perpetuity by the owner of the subject property. The applicant will accept responsibility for interim operation and maintenance of the facilities until such time as this responsibility is formally transferred to subsequent owners.

VI.B. Summary of Maintenance Requirements for Each Storm Water Facility

Routine maintenance is needed to ensure that flow is unobstructed, that erosion is prevented, and that soils are held together by plant roots and are biologically active. Typical maintenance may consist of the following:

- Inspect outlets/outfalls for erosion or plugging
- Inspect side slopes for evidence of instability or erosion and correct as necessary
- Examine the vegetation to ensure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary, remove fallen leaves and debris, prune large shrubs or trees, and mow turf areas. Confirm irrigation is adequate and not excessive. Replace dead plants and remove noxious and invasive vegetation.

See the attached sample *Inspection and Maintenance Checklist* for Bioretention Facilities for additional maintenance information.

VII. Construction Plan Checklist

Table 4. Construction Plan Checklist

Storm Water Control Plan Page #	Source Control or Treatment Control Measure	See Plan Sheet #s
Attachments	Best Management Practices (BMP) sizes as specified and designed to capture and route drainage from areas delineated on Exhibit.	Storm Water Control Plan Exhibit
Attachments	On-site drainage inlets to be marked with “No Dumping” message.	Storm Water Control Plan Exhibit
	Plant selection to minimize irrigation, minimize use of fertilizers and pesticides, and for pest resistance.	Refer to Landscape Drawings

VIII. Certifications

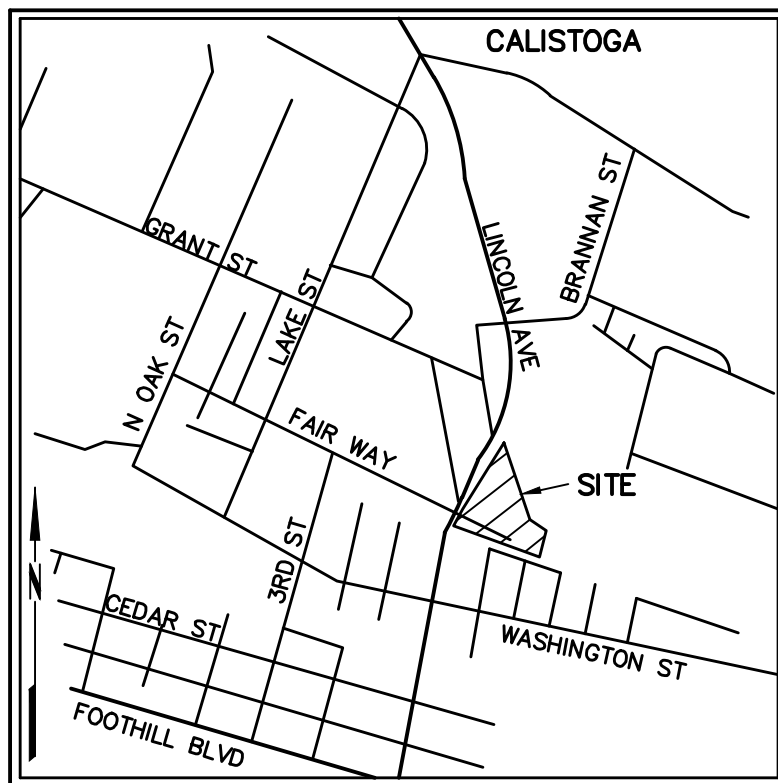
The preliminary design of storm water treatment facilities and other storm water pollution control measures in this plan are in accordance with the BASMAA *Post-Construction Manual: Design Guidance*

for Stormwater Treatment and Control for Projects in Marin, Sonoma, Napa, and Solano Counties (January 2019).

ATTACHMENTS

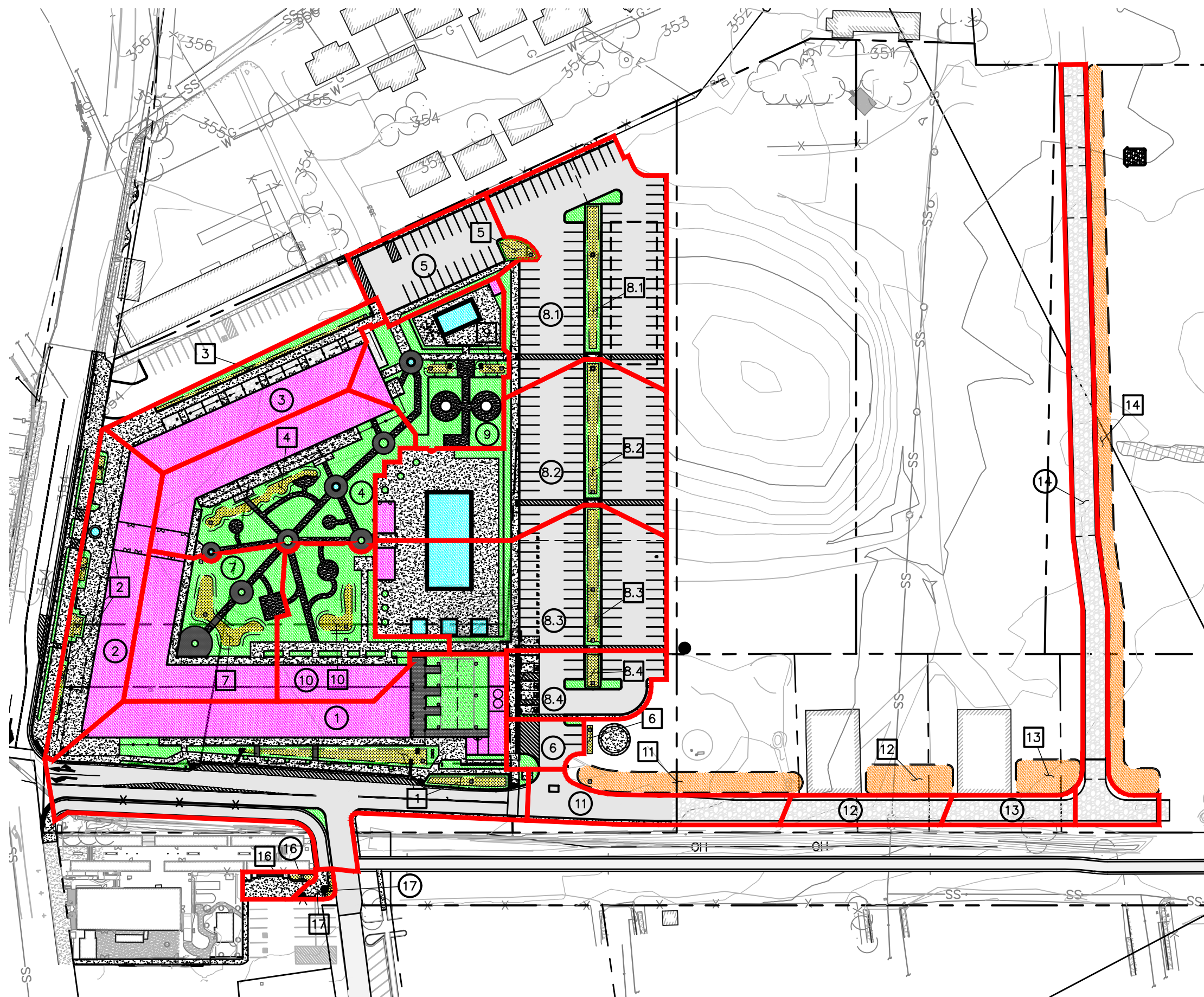
Vicinity Map

Storm Water Control Plan Exhibit



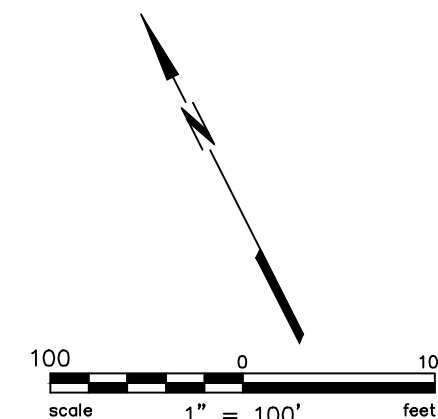
VICINITY MAP

NOT TO SCALE



LEGEND:

- ? DRAINAGE MANAGEMENT AREA (DMA)
- ? INTEGRATED MANAGEMENT PRACTICE (IMP)
- DMA BOUNDARY
- BIORETENTION AREA
- SELF-RETAINING AREA
- ROOF AREA
- LANDSCAPE AREA
- WATER FEATURE



STORM WATER CONTROL PLAN

THE VERANDA AT INDIAN SPRINGS
CITY OF CALISTOGA, CALIFORNIA
FEBRUARY 2020

PREPARED BY



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SHEET 1 OF 1 SHEETS

APPENDICES

Bioretention Facility Sizing Calculations

**Stormwater Facility Operation and Maintenance Fact Sheet
(Bioretention Areas)**

Stormwater IMP Inspection and Maintenance Log (Sample)

The Veranda at Indian Springs
 BKF Engineers
 July 2019

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 1		
Area 1	30,765	Hardscape	1	30,765	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 1	10,295	Landscape	0.1	1,030			
Area 1	13,040	Roof	1	13,040			
Total ~>				44,835	0.04	1,793	2,215

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 2		
Area 2	7,245	Hardscape	1	7,245	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 2	1,890	Landscape	0.1	189			
Area 2	8,835	Roof	1	8835			
Total ~>				16,269	0.04	651	675

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 3		
Area 3	6,225	Hardscape	1	6,225	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 3	2,145	Landscape	0.1	215			
Area 3	7,765	Roof	1	7,765			
Total ~>				14,205	0.04	568	605

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 4		
Area 4	6,865	Hardscape	1	6,865	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 4	10,045	Landscape	0.1	1,005			
Area 4	9,440	Roof	1	9,440			
Total ~>				17,310	0.04	692	940

The Veranda at Indian Springs
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DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 5		
Area 5	10,265	Hardscape	1	10,265	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 5	1,120	Landscape	0.1	112			
Area 5	0	Roof	1	0			
Total ~>				10,377	0.04	415	480

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 6		
Area 6	3,630	Hardscape	1	3,630	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 6	460	Landscape	0.1	46			
Area 6	0	Roof	1	0			
Total ~>				3,676	0.04	147	180

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 7		
Area 7	4,125	Hardscape	1	4,125	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 7	6,695	Landscape	0.1	670			
Area 7	8,845	Roof	1	8845			
Total ~>				13,640	0.04	546	1,245

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 8		
Area 8	28,090	Hardscape	1	28,090	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 8	3,555	Landscape	0.1	356			
Area 8	0	Roof	1	0			
Total ~>				28,446	0.04	1,138	1,695

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DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 9		
Area 9	8,380	Hardscape	1	8,380	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 9	7,375	Landscape	0.1	738			
Area 9	1,385	Roof	1	1,385			
Total ~>				10,503	0.04	420	425

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 10		
Area 10	4,320	Hardscape	1	4,320	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 10	7,430	Landscape	0.1	743			
Area 10	3,885	Roof	1	3885			
Total ~>				8,948	0.04	358	645

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 11		
Area 11	8,025	Hardscape	1	8,025	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 11	0	Landscape	0.1	0			
Area 11	0	Roof	1	0			
Total ~>				8,025	0.5	4,013	4,025

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 12		
Area 12	4,415	Hardscape	1	4,415	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 12	0	Landscape	0.1	0			
Area 12	0	Roof	1	0			
Total ~>				4,415	0.5	2208	2,210

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DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 13		
Area 13	3,565	Hardscape	1	3,565	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 13	0	Landscape	0.1	0			
Area 13	0	Roof	1	0			
Total ~>				3,565	0.5	1,783	1,835

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 14		
Area 14	19,410	Hardscape	1	19,410	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 14	0	Landscape	0.1	0			
Area 14	0	Roof	1	0			
Total ~>				19,410	0.5	9705	9,805

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 15		
Area 15	840	Hardscape	1	840	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 15	50	Landscape	0.1	5			
Area 15	0	Roof	1	0			
Total ~>				845	0.04	34	40

DMA Name	DMA Area (sf)	Post-project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	Facility Name		
					IMP 16		
Area 16	825	Hardscape	1	825	Sizing Factor	Minimum Facility Size (sf)	Proposed Facility Size (sf)
Area 16	270	Landscape	0.1	27			
Area 16	0	Roof	1	0			
Total ~>				852	0.04	34	125

Stormwater Facility Operation and Maintenance Fact Sheet

► BIORETENTION AREAS

These facilities remove pollutants primarily by filtering runoff slowly through an active layer of soil. Routine maintenance is needed to ensure that flow is unobstructed, that erosion is prevented, and that soils are held together by plant roots and are biologically active. Typical maintenance consists of the following:

- Inspect **inlets** for channels, exposure of soils, or other evidence of erosion. Clear any obstructions and remove any accumulation of sediment. Examine rock or other material used as a splash pad and replenish if necessary.
- Inspect **outlets** for erosion or plugging.
- Inspect **side slopes** for evidence of instability or erosion and correct as necessary.
- Observe soil at the bottom of the swale or filter for uniform **percolation** throughout. If portions of the swale or filter do not drain within 48 hours after the end of a storm, the soil should be tilled and replanted. Remove any debris or accumulations of sediment.
- Confirm that **check dams** and **flow spreaders** are in place and level and that channelization within the swale or filter is effectively prevented.
- Examine the **vegetation** to ensure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary, remove fallen leaves and debris, prune large shrubs or trees, and mow turf areas. When mowing, remove no more than 1/3 height of grasses. Confirm that irrigation is adequate and not excessive. Replace dead plants and remove noxious and invasive vegetation.
- Abate any potential **vectors** by filling holes in the ground in and around the swale and by insuring that there are no areas where water stands longer than 48 hours following a storm. If mosquito larvae are present and persistent, contact the Marin/Sonoma Mosquito and Vector Control District for information and advice. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.

Stormwater IMP Inspection and Maintenance Log

Facility Name	
Address	
Begin Date	End Date

Date	IMP ID#	IMP Description	Inspected by:	Cause for Inspection	Exceptions Noted	Comments and Actions Taken

Instructions: Record all inspections and maintenance for all treatment IMPs on this form. Use additional log sheets and/or attach extended comments or documentation as necessary. Submit a copy of the completed log with the annual independent inspectors' report to the municipality, and start a new log at that time.

- IMP ID# — Always use ID# from the Operation and Maintenance Manual.
- Inspected by — Note all inspections and maintenance on this form, including the required independent annual inspection.
- Cause for inspection — Note if the inspection is routine, pre-rainy-season, post-storm, annual, or in response to a noted problem or complaint.
- Exceptions noted — Note any condition that requires correction or indicates a need for maintenance.
- Comments and actions taken — Describe any maintenance done and need for follow-up.