Example
Stormwater Control Plan
For a Commercial Project
123 Main Street
Anytown, USA

February 21, 2018

XYZ Corporation
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prepared by:

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Stormwater Control Plan Exhibit

IMP Sizing Calculator Output

This Stormwater Control Plan was prepared using the template dated February 2018.

I. PROJECT DATA

Table 1. Project Data

Project Name/Number	Example for a Commercial Project
Application Submittal Date	December 1, 2017
Project Location	123 Main Street, Anytown
Name of Developer	XYZ Corporation
Project Phase No.	Not applicable
Project Type and Description	4,680 SF Retail Building with drive-through lane and parking
Project Watershed	Pristine Creek
Total Project Site Area (acres)	0.6 acres
Total Area of Land Disturbed (acres)	0.6 acres
Total New Impervious Surface Area (sq. ft.)	0 SF
Total Replaced Impervious Surface Area	21,050 SF
Total Pre-Project Impervious Surface Area	24,000 SF±
Total Post-Project Impervious Surface Area	21,050 SF
50% Rule	Applies
Project Density	FAR = 0.2
Applicable Special Project Categories	None
Percent LID and non-LID treatment	100% LID
HMP Compliance	Exempt (less than one acre of impervious area created or replaced)

II. SETTING

II.A. Project Location and Description

This project involves the demolition of an existing restaurant building and parking lot and replacement with a new restaurant/retail building and parking lot. The parcel fronts an arterial roadway. See Figure 1.

The proposed use is consistent with current commercial zoning. The project will include a drive-through lane for a planned coffee shop, plus two additional retail spaces within the same building.

II.B. Existing Site Features and Conditions

The site is nearly square and generally flat. Most of the site is covered with buildings or is paved. The perimeter of the site (except for the frontage on Main Street) is landscaped with mature trees. See Figure 2. Soils are silty clays typical of the area (Hydrologic Soil Group "D"). Depth to groundwater is more than 25 feet. The existing drainage system is connected to a municipal storm drain in the southbound lanes of Main Street in front of the site.

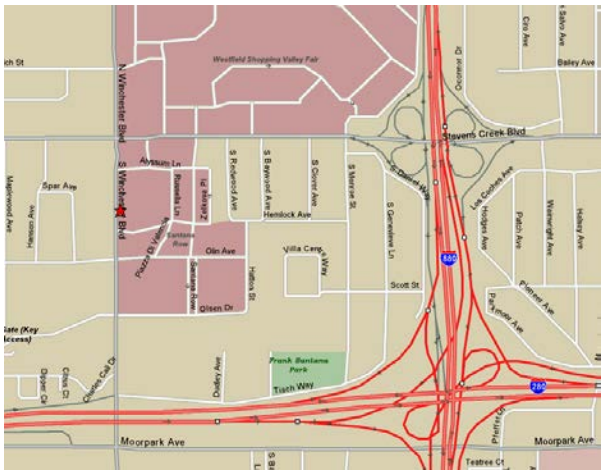


Figure 1. Location of 123 Main Street, Anytown.

II.C. Opportunities and Constraints for Stormwater Control

Constraints include low-permeability soils (hydrologic soil group D), very high intensity land use, and flat slopes. Disposal of runoff to deep infiltration is not feasible on this site due to the low permeability of the clay soils. High land values, the objective of creating a dense retail area, and parking requirements limit opportunities to reduce site imperviousness.

Setback areas—five feet on each side of the site and ten feet at the back of the site—might be usable as locations for treatment BMPs; however, these areas include significant trees which must be protected. The City storm drain system in Main Street is deep enough to provide sufficient hydraulic head to route runoff across the surface of the site to a stormwater treatment facility, through the facility, and then to drain treated runoff to the City storm drain.

III. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES

III.A. Optimization of Site Layout

III.A.1. Limitation of development envelope

The site is densely developed infill within the existing urbanized area. Future retail areas have been included in the development plan, in addition to the initial use of a portion of the building as a drive-through coffee shop.

III.A.2. Minimization of imperviousness

Existing significant trees around the perimeter of the site are to be preserved. The landscaped setback areas surrounding the trees will be expanded to the extent practicable, given project parking and circulation requirements, to reduce impervious area of the project. Landscaping in these areas will be upgraded to maximize aesthetic value and ensure the continued health of the mature trees.

Figure 2. Existing Site Conditions.

III.B. Use of Permeable Pavements

Conventional concrete and conventional asphalt are to be used to construct the circulation and parking areas. Permeable pavements are not cost-effective for this site, in part because the pavements overlie expansive clay soils. This condition would necessitate a very deep gravel base course, which would, in turn, require large quantities of excavation and off-haul.

III.C. Dispersal of Runoff to Pervious Areas

Landscaped areas at the perimeter of the site could be used to disperse runoff from some portions of the parking lot; however, the areas are at a slightly higher elevation and can't be re-graded without removing or damaging the existing trees.

III.D. Bioretention or other Integrated Management Practices

Bioretention facilities will be integrated with the site layout to treat runoff, and infiltrate some runoff, before discharge to the municipal storm drain.

IV. DOCUMENTATION OF DRAINAGE DESIGN

IV.A. Descriptions of each Drainage Management Area

IV.A.1. Table of Drainage Management Areas

DMA Name	*Area (SF)*	*Surface Type/Description*	*DMA Type/Drains to*
DMA-1	2805	Paving	Drains to IMP #1
DMA-2	6130	Paving	Drains to IMP #2
DMA-3	4680	Roof	Drains to IMP #3
DMA-4	1770	Landscape	Self-Retaining
DMA-5	155	Landscape	Self-Retaining
DMA-6	550	Landscape	Self-Retaining
DMA-7	4285	Landscape	Self-Retaining
DMA-8	6369	Paving	Drains to IMP #3

IV.A.2. Drainage Management Area Descriptions

DMA 1, totaling 2,805 square feet, drains the northwest section of the parking area, the roof of the trash enclosure, and a portion of a paved traffic island. DMA-1 drains to Bioretention Facility #1. Runoff will enter the facility through curb cuts.

DMA 2, totaling 6,130 square feet, drains the northeast section of the parking area and a portion of the plaza surrounding the building. DMA-2 drains to Bioretention Facility #2.

DMA 3, totaling 4,680 square feet, drains the roof of the building. DMA 3 drains to Bioretention Facility #3, and will be connected via a tight-lined downspout and bubble-up.

DMA 4, totaling 1,770 square feet, is a landscaped area with existing trees. The trees will be retained and the area reconfigured. Drainage from DMA 4 will be retained by a surrounding curb.

DMA 5, totaling 155 square feet, is a landscaped area with existing trees. The trees will be retained and the area reconfigured. Drainage from DMA 5 will be retained by a surrounding curb.

DMA 6, totaling 550 square feet, is a landscaped area with some existing trees, as well as some new landscaping adjacent to Main St. Drainage from DMA 6 will be retained by a surrounding curb.

DMA 7, totaling 4,285 square feet, is a landscaped area with existing trees on the west and south sides of the site. Drainage from DMA 7 will be retained by a surrounding curb.

DMA 8, totaling 6.369 square feet, comprises the paved drive-through and travel lanes on the south side of the site and parking on the west side of the site, as well as walkway and plaza areas on the west, south, and east sides of the building. DMA 8 drains to Bioretention Facility #3, with runoff entering via curb cuts.

IV.B. Integrated Management Practices

Runoff from impervious areas on the site, including roofs and paved areas, will be routed to three bioretention facilities (see Exhibit).

Each of the facilities will be designed and constructed to the criteria in the *Stormwater C.3 Guidebook,* 7th Edition, including the following features:

- Surrounded by a concrete curb. Where adjacent to pavement, curbs will be thickened and an impermeable vertical cutoff wall will be included.
- Each layer built flat, level, and to the elevations specified in the plans:
    - Bottom of Gravel Layer (BGL)
    - Top of Gravel Layer (TGL)
    - Top of Soil Layer (TSL)
    - Overflow Grate
    - Facility Rim

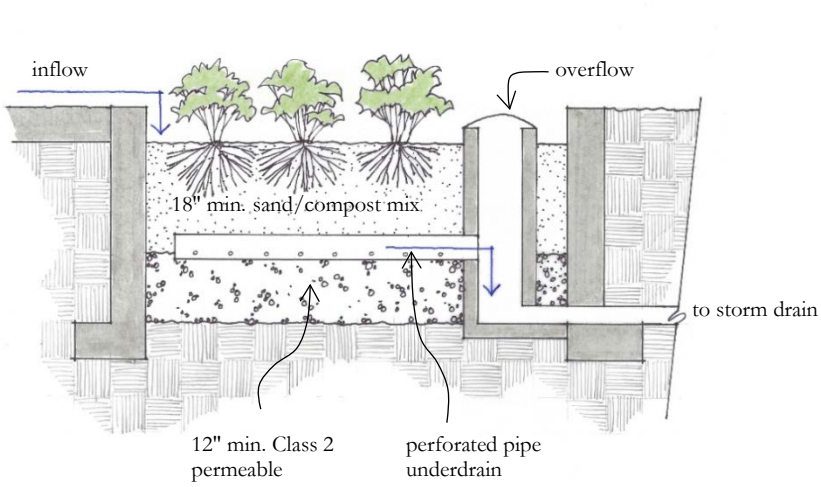


Figure 3. Bioretention Facility Illustrative Cross-section

- 12 inches Class 2 permeable, Caltrans specification 68-2.02F(3).
- 18 inches sand/compost mix meeting the specifications approved by the Regional Water Quality Control Board in April 2016.
- 4 in. dia. PVC SDR 35 perforated pipe underdrain, installed with the invert at the top of the Class 2 permeable layer with holes facing down, and connected to the overflow structure at that same elevation
- 6-inch-deep reservoir between top of soil elevation and overflow grate elevation

- Concrete drop inlet with frame overflow structure, with grate set to specified elevation, connected to storm drain in Main Street
- Vertical cutoff walls to protect adjacent pavement
- Plantings selected for suitability to climate and location, bioretention soil media (well-drained, low-fertility), and for water conservation
- Irrigation system on a separate zone, with drip emitters and "smart" irrigation controllers

Bioretention Facility #1 will be located near the northwest corner of the site, and will integrate visually with existing trees and new landscaping along the northern perimeter. The facility is adjacent to parking and to the refuse area.

Bioretention Facility #2 will be located adjacent to the sidewalk surrounding the building and adjacent to the parking area north of the building. This facility is visible from the interior of the retail space and from the outdoor seating area, and will be planted to provide a visual amenity.

Bioretention Facility #3 will be located within the narrow median separating the drive-through lane from the parking area. It will be connected to the building roof (DMA #3) via a tightlined bubble-up.

IV.C. Tabulation and Sizing Calculations

See Attachment 1, "Output from the IMP Sizing Calculator."

V. SOURCE CONTROL MEASURES

V.A. Site activities and potential sources of pollutants

On-site activities that could potentially produce stormwater pollutants include:

- Driveways and parking lots
- Food Service
- Trash Management

V.B. Source Control Table

Table 3. Source Control Table

Potential source of runoff pollutants	*Permanent source control BMPs*	*Operational source control BMPs*
Inlets (bioretention overflows)	All inlets will be marked with "No Dumping! Flows to Local Waterways" or similar	Markings will be regularly inspected and repainted or replaced as needed. Lessees will receive stormwater pollution prevention brochures. Lease agreements will include the following provision: "Tenant shall not allow anyone to discharge anything to storm drains or to store

		or deposit materials so as to create a potential discharge to storm drains."
Landscape maintenance	Existing mature trees to be retained. Landscaping will minimize irrigation and runoff and be selected for pest resistance, and will minimize the need for fertilizers and pesticides. Plants will be selected appropriate to site soils, slopes, climate, sun, wind rain, land use, air movement, ecological consistency, and plant interactions.	Landscaping will be maintained using minimum or no pesticides. IPM information will be provided to new owners, lessees, and operators.
Food service.	Coffee shop will include a floor sink for cleaning floor mats, containers, and equipment. The floor sink will be connected to a grease interceptor before discharging to the sanitary sewer.	
Refuse area.	Refuse and recycled materials will be handled in the refuse area shown on the Exhibit. This area is to be roofed, bermed, and equipped with a drain to a grease interceptor and then to the sanitary sewer.	All dumpsters will be posted with signs stating "Do not dump hazardous materials here" or similar.
Plazas, sidewalks, and parking lots		Trash receptacles to be provided in plaza area and on drive-through and emptied daily. Site to be policed at least twice daily for trash. Plazas, sidewalks, and parking lots will be swept regularly. Debris and washwater from periodic pressure washing will be collected and disposed of to the sanitary sewer.

VI. STORMWATER FACILITY MAINTENANCE

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

Maintenance of stormwater facilities will be the responsibility of the property owner and will be performed by the owner's contractors or employees as part of routine maintenance of buildings, grounds, and landscaping. The applicant has reviewed the Anytown, USA, standard agreement

regarding the maintenance of stormwater facilities and commits to execute any necessary agreements prior to completion of construction. The applicant accepts responsibility for interim operation and maintenance of stormwater treatment and flow-control facilities until that responsibility is formally transferred to a subsequent owner.

VI.B. Summary of Maintenance Requirements for Each Stormwater Facility

The three bioretention facilities will be maintained on the following schedule at a minimum. Details of maintenance responsibilities and procedures will be included in a Stormwater Facility Operation and Maintenance Plan to be submitted for approval as required in the conditions of approval.

At no time will synthetic pesticides or fertilizers be applied, nor will any soil amendments, other than aged compost mulch or sand/compost mix, be introduced.

Daily: The facilities will be examined for visible trash during regular policing of the site, and trash will be removed.

After Significant Rain Events: A significant rain event is one that produces approximately a half-inch or more rainfall in a 24-hour period. Within 24 hours after each such event, the following will be conducted:

The surface of the facility will be observed to confirm there is no ponding.

- Inlets will be inspected, and any accumulations of trash or debris will be removed.
- The surface of the mulch layer will be inspected for movement of material. Mulch will be replaced and raked smooth if needed.

Prior to the Start of the Rainy Season: In September or each year, the facility will be inspected to confirm there is no accumulation of debris that would block flow, and that growth and spread of plantings does not block inlets or the movement of runoff across the surface of the facility.

Annual Landscape Maintenance: In December – February of each year, vegetation will be cut back as needed, debris removed, and plants and mulch replaced as needed. The concrete work will be inspected for damage. The elevation of the top of soil and mulch layer will be confirmed to be consistent with the 6-inch reservoir depth.

VII. CONSTRUCTION PLAN C.3 CHECKLIST

Table 4. Construction Plan C.3 Checklist

Stormwater Control Plan Page #	*BMP Description*	*See Plan Sheet #s*
4 and Exhibit	Drainage from DMAs 4, 5, 6, and 7 is retained by surrounding curbs.	
3, 4 and Exhibit	DMA 1 drains to Bioretention Facility #1; facility is designed as specified	
3, 4 and Exhibit	DMA 2 drains to Bioretention Facility #2; facility is designed as specified	

3, 4 and Exhibit	DMA 3 is connected via tight-lined downspout to Bioretention Facility #3	
3, 4 and Exhibit	DMA 8 drains to Bioretention Facility #3; facility is designed as specified	
5	Bioretention Facility #1, #2, #3 overflows are marked with "No Dumping" message	
6	Existing mature trees are preserved	
6	Coffee shop/food service facility is equipped with a floor sink connected to a grease interceptor and then to sanitary sewer	
6	Trash receptacles are located in plaza area and are accessible to drive-through lane	

VIII. CERTIFICATIONS

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R2-2015-0049.

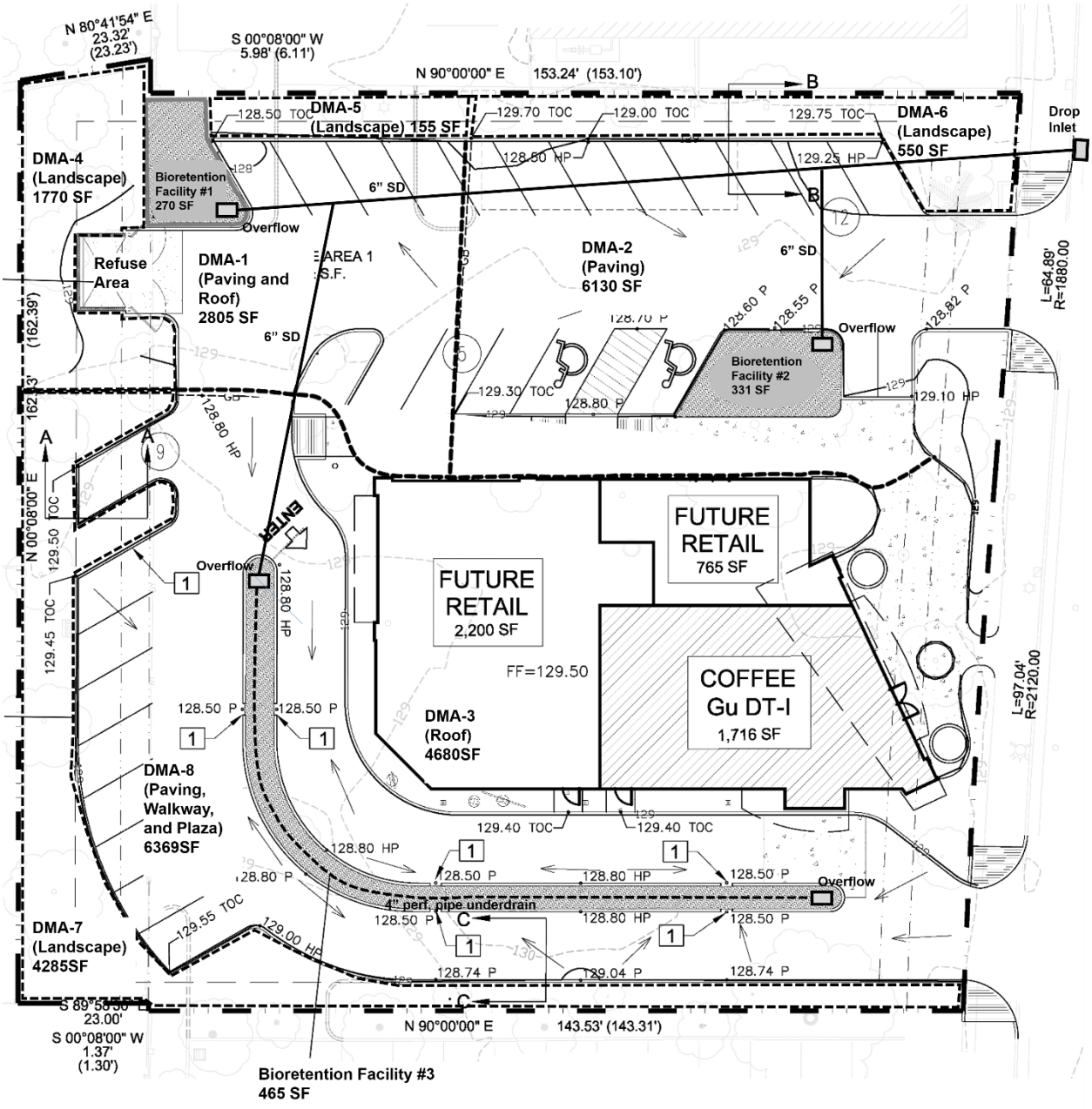
EXHIBIT

Example Commercial Site

123 Main Street

Anytown, USA

No Scale



Project Name: Example for a Commercial Project
Project Type: Treatment Only
APN: 00-123-4567
Drainage Area: 27,810
Mean Annual Precipitation: 20.0

II. Self-Retaining Areas

Self-Retaining DMA	
DMA Name	**Area (sq ft)**
DMA4	1,770
DMA5	155
DMA6	550
DMA7	4,285

IV. Areas Draining to IMPs

IMP Name: IMP1
IMP Type: Bioretention Facility
Soil Group: IMP1

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA1	2,805	Concrete or Asphalt	1.00	2,805
			Total	2,805
			Area	

IMP Sizing			
IMP Sizing Factor	**Rain Adjustment Factor**	**Minimum Area or Volume**	**Proposed Area or Volume**
0.040	1.000	112	270

IMP Name: IMP2
IMP Type: Bioretention Facility
Soil Group: IMP2

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA2	6,130	Concrete or Asphalt	1.00	6,130
			Total	6,130
			Area	

IMP Sizing			
IMP Sizing Factor	**Rain Adjustment Factor**	**Minimum Area or Volume**	**Proposed Area or Volume**
0.040	1.000	245	331

IMP Name: IMP3
IMP Type: Bioretention Facility
Soil Group: IMP3

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA3	4,680	Conventional	1.00	4,680

IMP Sizing			
IMP Sizing	**Rain**	**Minimum**	**Proposed**

					Factor	Adjustment Factor	Area or Volume	Area or Volume
		Roof						
DMA8	6,369	Concrete or Asphalt	1.00	6,369				
			Total	11,049				
				Area	0.040	1.000	442	465

Report generated on 11/27/2017 12:00:00 AM by the Contra Costa Clean Water Program IMP Sizing Tool software (version 1.3.1.0).