

City of Lodi Development Standards Plan Worksheet



Project Name: _____



1 PROJECT DESCRIPTION

1.1 Project Information

Project Information:	
Name of Project:	
Address:	
General Location:	
Project Size: (indicate sq. ft. or acres)	
Anticipated Construction Start Date:	
Anticipated Construction End Date:	
Owner Information:	
Name:	
Address:	
Contact Name:	
Telephone No.:	
Developer Information:	
Name:	
Address:	
Contact Name:	
Telephone No.:	
Hydrology Information:	
Percent Impervious before Construction:	
Percent Impervious after Construction:	
Runoff Coefficient before Construction:	
Runoff Coefficient after Construction:	
Peak Runoff (cfs) before Construction:	
Peak Runoff (cfs) after Construction:	



1.2 Type of Project

Choose one of the following:

- New Development**
- Applicable Redevelopment** as defined by defined as the creation or addition of at least 5,000 sq. ft. of impervious surfaces on an already developed site. Significant redevelopment does not include replacement of impervious surfaces that is a part of routine maintenance, such as the repair and/or replacement of an asphalt parking lot; or the replacement of a building(s) or other structures where the net increase of impervious surface is less than 5,000 sq. ft.

1.3 Project Category

Check the Appropriate Project Categories

(DSP Table 2.3.3.1 – New Development Priority Categories and Pollutants of Concern¹)

Applicable Categories (Check all that apply to the proposed development)	New Development Project Category	Pollutant Category of Concern						
		Sediment	Nutrients	Metals	Trash & Debris	Oxygen Demand	Toxic Organics	Bacteria
<input type="checkbox"/>	Commercial Developments (>=100,000 sf)	X	X	X	X	X	X	X
<input type="checkbox"/>	Automotive Repair Shops	X		X	X	X	X	
<input type="checkbox"/>	Retail Gasoline Outlets	X		X	X	X	X	
<input type="checkbox"/>	Restaurants		X		X	X	X	X
<input type="checkbox"/>	Parking Lots (>=5,000 sf or 25 spaces)	X		X	X	X	X	
<input type="checkbox"/>	Home Subdivisions (>=10 units)	X	X	X	X	X	X	X

X = Pollutant likely to be present in stormwater runoff from the project area

¹ Source of the table is the Small MS4 NPDES General Permit (Water Quality Order 2003-0005-DWQ), Attachment 4, page 2 and CASQA New Development and Redevelopment Handbook, January 2003 edition, Table 2-1, page 2-7



Lodi has identified industrial activities that are common to the business within the City and have identified pollutants of concern for each of the listed activities.

Table 2.3.3.2 – Lodi Specified Industrial Activities and Pollutants of Concern

Applicable Categories (Check all that apply to the proposed development)		Toxic Organics	Sulfur, Sulfides, Sulfates	Nutrients	Metals	Trash & Debris	Oxygen Demand	Oil & Grease	Bacteria	pH	Dissolved Solids	Suspended Solids	Sediment
		<input type="checkbox"/>	Cement, Concrete, and Aggregate Operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Sulfur Distribution, Storage and Handling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Wineries, wine processing and packaging.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Agricultural Products Storage & Handling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Other Chemical Storage & Handling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Food Products Processing, Storage & Handling	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Paper and Plastic Recycling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Auto Wrecking, Dismantling, and Body Shops; Metal Salvage / Recycling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Railroad Operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Highways and Freeways	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

X = Pollutant likely to be present in stormwater runoff from the project area

1.4 Site Drainage Characteristics

Describe how the property drains prior to construction and how it will drain after the proposed construction. Identify hard connections and surface flow to the City’s storm drainage system. Describe the proposed stormwater conveyance system. Provide the pre and post construction percent impervious and runoff coefficients.



2 BEST MANAGEMENT PRACTICE SELECTIONS

This section identifies the Best Management Practices (BMPs) selected for the proposed new development to reduce predictable pollutants in runoff entering nearby storm drain systems. The control measures listed herein are taken from Section 3 of the Development Standards Plan (DSP).

Mandatory Minimum BMPs:

(Mark Yes or NA as applicable to your project)

Yes	NA	Reference No.	BMP
		SD-13	Storm drain message and signage
		SD-11	Roof drain design
		SD-34	Outdoor material storage area design
		SD-32	Outdoor trash storage area design
		SD-31	Outdoor loading / unloading dock area design
		SD-35	Outdoor repair / maintenance bay design
		SD-33	Outdoor vehicle, equipment, accessory washing area design
		LODI-01	Swimming pool and fountain filters
		LODI-02	Sample/observation box

Priority-Category BMPs:

(Mark Yes or NA as applicable to your project)

Yes	NA	DSP Section	BMP
		3.2.1	100,000 sq. ft. commercial developments
		3.2.2	Restaurants
		3.2.3	Retail gasoline outlets
		3.2.4	Automotive repair shops
		3.2.5	Parking lots

Drainage Zone Specific BMPs:

(Mark Yes or NA as applicable to your project)

Yes	NA	Reference No.	BMP
<i>Direct Discharge to Mokelumne River Zone (B-2, C-1, E, & H drainage basins)</i>			
		LODI-03	Isolation of private drainage systems
		LODI-04	Spill response measures
		LODI-05	Capture and recovery of nuisance water
<i>Discharge to Woodbridge Irrigation District Zone (A-1, A-2, B-1, & D drainage basins)</i>			
		LODI-05	Capture and recovery of nuisance water

For Additional BMP Detail Refer to the Following Reference:

CASQA Stormwater New Development BMP Handbook
<http://www.cabmphandbooks.com/Development.asp>



Treatment Control BMPs:

(Mark selection. Treatment control is mandatory for applicable new development and significant redevelopment. Refer to Section 3.4 of the DSP.)

Yes	No	Reference No.	BMP	Design Criteria
		TC-31	Vegetated buffer strips	SQDF
		TC-30	Vegetated swales	SQDF
		TC-22	Extended detention basin	SQDV
		TC-20	Wet pond	SQDV
		TC-20, MP-20	Constructed wetland	SQDV
		TC-40	Detention basin / sand filter	SQDV
		TC-40, SD-20	Porous pavement detention	SQDV
		TC-32, TC-40	Porous landscape detention	SQDV
		TC-11	Infiltration basin	SQDV
		TC-10	Infiltration trench	SQDV
		TC-40, MP-40	Media filter	SQDV
		MP-50, MP-51	Wet vaults, oil/water separators, and vortex separators	SQDF
		TC-12	Retention / irrigation	SQDV
		LODI-99	Alternative and proprietary control measures	Variable

3 Treatment Control Measure Sizing

Flow Based Sizing Calculation:

Formula:

Stormwater Quality Design Flow (SQDF) = 0.20 in/hr x C x Area

- The 85th % for hourly rainfall intensity for the Lodi area = 0.10 in/hr.
- Design rainfall intensity (I):

$$I = 0.10 \text{ (in/hr)} \times 2 = 0.20 \text{ in/hr}$$
- Determine the project drainage area (A) in ft²
- Weighted average runoff coefficient (C) for each individual area²
- SQDF = 0.20 in/hr x C x Area**

Calculate the SQDF for each of the sub-drainage areas having different coefficients and sum the SQDFs for a total site SQDF.

Type of Drainage Area	Runoff Coefficient
Business:	
Downtown areas	0.70 - 0.95
Neighborhood areas	0.50 - 0.70
Residential:	
Single-family areas	0.30 - 0.50
Multi-units, detached	0.40 - 0.60
Multi-units, attached	0.60 - 0.75
Suburban	0.25 - 0.40
Apartment dwelling areas	0.50 - 0.70
Industrial:	
Light areas	0.50 - 0.80
Heavy areas	0.60 - 0.90
Parks, cemeteries:	0.10 - 0.25
Playgrounds:	0.20 - 0.40
Railroad yard areas:	0.20 - 0.40
Unimproved areas:	0.10 - 0.30
Lawns:	
Sandy soil, flat, 2%	0.05 - 0.10
Sandy soil, average, 2-7%	0.10 - 0.15
Sandy soil, steep, 7%	0.15 - 0.20
Heavy soil, flat, 2%	0.13 - 0.17
Heavy soil, average, 2-7%	0.18 - 0.25
Heavy soil, steep, 7%	0.25 - 0.35
Streets:	
Asphaltic	0.70 - 0.95
Concrete	0.80 - 0.95
Brick	0.70 - 0.85
Drives and walks	0.75 - 0.85
Roofs:	0.75 - 0.95

² Table 819.2B taken from the Caltrans Stormwater Quality Handbooks, SWPPP/WPCP Preparation Manual Computation Sheet for Determining Runoff Coefficients, February 1, 2003



Volume Based Sizing Calculation:

Formulas:

Stormwater Quality Design Volume (SQDV) =
 Unit Basin Storage Volume for 80% Annual Capture (V_{unit}) x Total Area (A_{total})

Where V_{unit} is derived from Figure 2 using the effective imperviousness (I_{wq})
 and I_{wq} is derived from Figure 1 using the percentage of impervious area of the project.

Percentage of impervious area = (area impervious)/ A_{total} x 100

1. Determine total drainage area (A_{total})
2. Determine the percentage of impervious area (I_a):
 $I_a = \text{Impervious area}/100$
3. Determine the Effective imperviousness (I_{wq}) using **Figure 1**³.
4. Determine the appropriate drawdown period for the selected BMP.
5. Determine the unit basin storage volume (V_u) using **Figure 2**⁴.
6. Calculate SQDV

$$\begin{aligned}
 \text{SQDV} &= V_u \times A_{total} \\
 &= (V_u \text{ "inches"}) \times (1 \text{ ft}/12 \text{ inches}) \times \\
 &\quad (A_{total} \text{ "acres"}) \times (43,560 \text{ ft}^2/\text{acre}) \\
 &= \text{ft}^3
 \end{aligned}$$

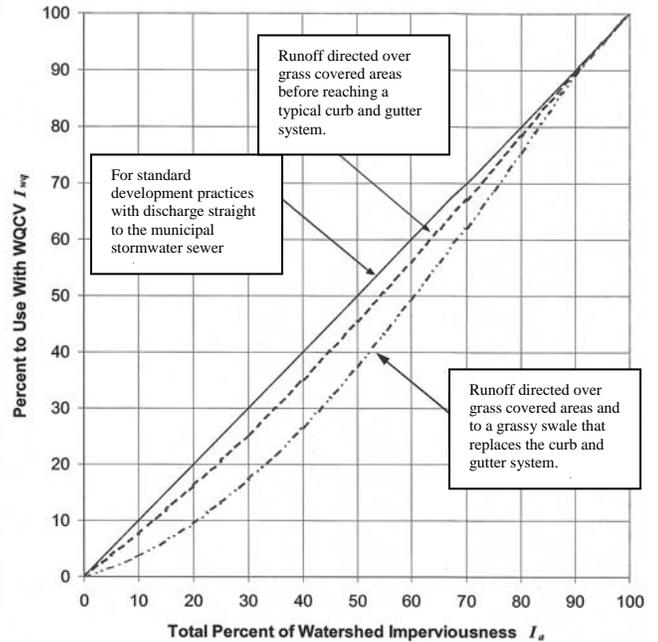


Figure 1³

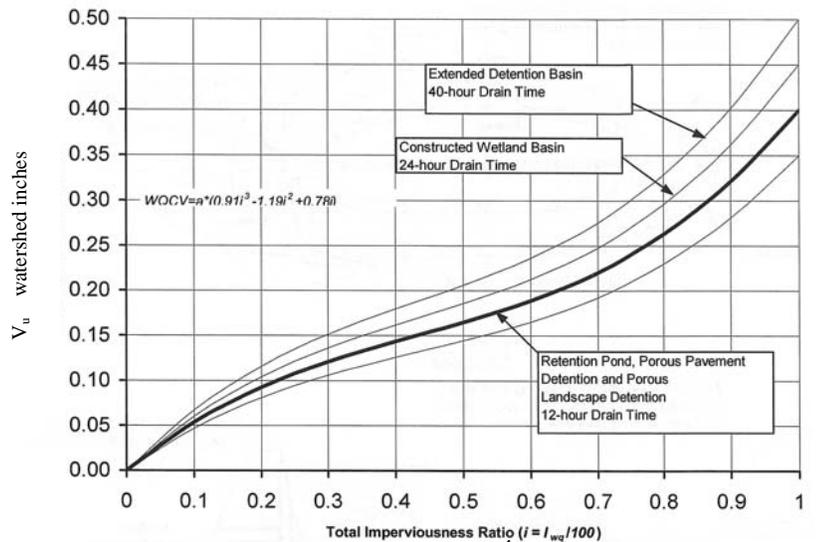


Figure 2⁴

³ Figure 1 is adapted from Urban Drainage and Flood Control District Figure ND-1 of the Drainage Criteria Manual (Volume 3), Revised August 2006, page ND-9

⁴ Figure 2 is adapted from Urban Drainage and Flood Control District Figure RP-2 of the Drainage Criteria Manual (Volume 3), Revised August 2006, page S-102



Reference Resources:

1. CASQA Stormwater BMP Handbook for New Development and Redevelopment
<http://www.cabmphandbooks.com/Development.asp>
2. Urban Drainage and Flood Control District (UDFCD) Drainage Criteria Manual Volume 3,
Revised August 2006
<http://www.udfcd.org/index.html>
3. EPA Stormwater Best Management Practice Design Guide (EPA/600/R-04/121)
September 2004
www.epa.gov/nrmrl/pubs/600r04121/600r04121sect4.pdf

Exhibits to Attach to this Worksheet:

Exhibit A – Vicinity Map

Exhibit B – Site Map

Exhibit C – Treatment Control Specifications

Exhibit D – Treatment Control Sizing Calculations

Exhibit E – Access and Maintenance Agreement