

City of Encinitas
Storm Water Best Management Practices
Manual, Part II

STORM WATER MANUAL
FOR NEW DEVELOPMENT
AND REDEVELOPMENT

A Manual for Construction & Permanent Post Construction
Storm Water Best Management Practices Requirements

Introduced:	November 12, 2002
Adopted:	December 11, 2002
Modified:	April 9, 2003
Modified:	March 24, 2008
Modified:	February 11, 2009
Modified:	March 17, 2010

RESOLUTION 2010-18

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ENCINITAS, CALIFORNIA, APPROVING THE ENCINITAS STORMWATER MANUAL AND BEST MANAGEMENT PRACTICES MANUAL, PART II

WHEREAS, the California Regional Water Quality Control Board, San Diego Region, adopted Order No. R9 2007-0001, San Diego Municipal Stormwater Permit (Permit), on January 24, 2007; and

WHEREAS, in accordance with Order No. R9 2007-0001, the Best Management Practices Manual, Part II prescribes minimum BMPs for Land Development and Construction activities in the City of Encinitas; and

WHEREAS, in accordance with Order No. R9 2007-0001, the City of Encinitas has developed the Encinitas Stormwater Manual to serve as the City's local SUSMP; and

WHEREAS, the Encinitas Stormwater Manual and BMP Manual II are policy documents that may require amendments due to meet regulatory mandates, technical specifications, and advancements in related technology and science as determined necessary and appropriate by the Director of Engineering Services; and

NOW, THEREFORE, BE IT RESOLVED, that the City Council of the City of Encinitas does hereby approve the Encinitas Stormwater Manual and the Best Management Practices Manual, Part II on behalf of the City of Encinitas.

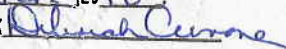
The City Council, in their independent judgment, finds that the adoption of the Best Management Practices Manual, Part II and the Encinitas Stormwater Manual will be exempt from Environmental Review pursuant to General Rule 15061 (b) (3) since there would be no possibility of a significant effect on the environment because the amendments will not directly result in development; any development as a result of the amended language will be subject to CEQA review and analysis.

PASSED AND ADOPTED by the City Council of the City of Encinitas at a regular meeting thereof, held on the 17th day of March, 2010, by the following vote to wit:

AYES: Barth, Bond, Dalager, Houlihan, Stocks.
NAYS: None.
ABSTAIN: None.
ABSENT: None.

ATTEST:


DEBORAH CERVONE, City Clerk

I, Deborah Cervone, City Clerk of the City of Encinitas, California do hereby certify under penalty of perjury that the above and foregoing is a true and correct copy of this document on file in my office. In witness whereof, I have set my hand and the Seal of the City of Encinitas this 27th day of March, 2010.
Deborah Cervone, City Clerk 

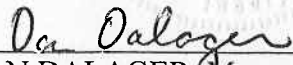

DAN DALAGER, Mayor
City of Encinitas

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PREFACE

The City of Encinitas Storm Water Best Management Practices Manual, Part II (BMP Manual II), as adopted on December 11, 2002, and consistent with all noted and subsequent modifications, effectively establishes baseline new development, significant re-development, and construction phase standards related to runoff quality and quantity in the City of Encinitas. BMP Manual II additionally outlines pertinent regulatory drivers and the legal framework from which these standards have been developed, and referentially institutes the legal authority to regulate these standards as defined in City of Encinitas Municipal Code (EMC) Section 20.08. Further, the City of Encinitas Grading Ordinance (EMC Section 23.24) identifies highlighted language in BMP Manual II to be preserved for constancy, and that this highlighted language be included in the City of Encinitas Local Coastal Program (LCP). Collectively, these administrative elements—BMP Manual II, EMC Section 20.08, EMC Section 23.24, and the LCP—establish the minimum standards related to stormwater management practices in the City of Encinitas. The highlighted portions of BMP Manual II define minimum standards related to stormwater requirements in the City of Encinitas, while non-highlighted text generally outlines design and procedure related to sizing of stormwater facilities.

In conformance with the San Diego Region Municipal Stormwater Permit (Water Quality Order No. 2007-0001), and enforceable by way of BMP Manual II, the ***City of Encinitas Stormwater Manual*** (*under separate cover*) is a policy document which defines formal process and procedure supporting a comprehensive BMP selection and design process. The Encinitas Stormwater Manual establishes a regionally consistent and systematic design procedure intended to meet complex and overlapping water quality requirements, including stormwater treatment controls, Low Impact Development (LID) standards, and control of runoff peak and duration (hydrograph management). In complement to BMP Manual II, the ESM should be used to select and design BMPs for proposed development projects to ensure compliance with local minimum standards established in BMP Manual II, including all highlighted text, and all supporting administrative provisions.

I. INTRODUCTION

I.1. Best Management Practice Manual Part II Organization

This manual describes fundamental compliance standards related to permanent improvement and construction phase storm water requirements for new and significant re-development projects in the City of Encinitas.

This manual groups development-related storm water BMPs into two categories:

1. *construction BMPs*, which are practices, procedures, devices or materials used to prevent the transport and introduction of pollutants both on and from a project site during construction; and
2. *permanent BMPs*, which are the site design features, source control features, and treatment control BMPs that become a permanent part of a project's design and remain functioning throughout the "use" phase of a project site. (See the definitions for site design, source control and treatment control BMPs in this appendix).

Section I, "Introduction," describes storm water pollution background information and legal or regulatory requirements associated with storm water pollution control.

Section II, "Project Review & Permitting Process," outlines the project plan review and approval process for all permits. Applicants should use Section II to gain a general understanding of stormwater requirements applicable to specific project types.

Section III, "Permanent Storm Water BMP Selection Procedure," lists the minimum required permanent storm water BMP requirements, which are organized into a progression intended to demonstrate a typical project planning and design process and to maximize storm water protections while minimizing project costs.

Section IV, "Construction Storm Water BMP Performance Standards," describes the minimum required City's construction storm water BMP standards.

Section V, "Operation & Maintenance of BMPs," describes how the implementation and the maintenance of construction and permanent BMPs must be assured for all permits. For permanent BMPs, this section provides a process and the requirements for executing a maintenance agreement with the City.

Section VI, "Resources & References" contains appendices to the BMP Manual II that are either necessary or designed to provide guidance in completing the storm water requirements in this manual.

I.2. Background

Urban runoff discharged from municipal storm water conveyance systems has been identified by local, regional, and national research programs as one of the principal causes of water quality problems in most urban areas. The City of Encinitas' storm water conveyance system, which collects runoff and rainwater from our streets, rooftops, driveways, parking lots, and other impervious areas and conducts flows directly to our beaches and lagoons without receiving treatment (our storm water conveyance system is separate from our sanitary sewer system). Urban runoff potentially contains a host of pollutants like trash and debris, bacteria and viruses, oil and grease, sediments, nutrients, metals, and toxic chemicals. These contaminants can adversely affect receiving and coastal waters, associated wildlife, and public health. Urban runoff pollution is a year-round problem because of the many urban water uses that discharge runoff to the storm water conveyance system.

Storm water pollution can negatively affect human health and aquatic plant and animal life. Potentially harmful viruses and bacteria are now found in our coastal waters along with soil particles, solids/debris, litter, oil, grease, and chemical compounds. Oil and grease from parking lots, pesticides, cleaning solvents, and other toxic chemicals can contaminate storm water and these contaminants can be transported into receiving waters—the beaches, lagoons, and creeks we all enjoy. Fertilizer constituents from nurseries, lawns, and golf courses or leaking septic tanks can cause algal blooms and encourage microbial growth to create an increasing spiral of biological activity known as eutrophication. Disturbances of the soil from construction can allow silt to wash into storm channels and receiving waters making them muddy, turbid, and inhospitable to natural aquatic organisms. Many artificial surface treatments such as galvanized metal, paint, or preserved wood containing metals contribute to pollution by storm water run-on or leaching by storm water as the surfaces corrode, flake, dissolve, or decay. Heavy metals, such as copper from automobile brakes and lead and chromium from paints and primer coatings, are toxic to aquatic organisms and may bio-accumulate.

Land development and construction activities significantly alter drainage patterns and contribute pollutants to urban runoff primarily through erosion, the removal or change of existing natural vegetation during construction, and the creation of new impervious surfaces such as parking lots, which often permanently contribute pollutants throughout the “use” of the project site. When homes, work places, recreational areas, roads, parking lots, and structures are built, new impervious areas are built- creating the potential for a “double-negative” impact to water quality. First, the natural landscape's ability to infiltrate and cleanse storm water and urban runoff is “capped” by the impervious surfaces. As impervious surfaces increase, water that normally would have percolated into the soil to be naturally filtered flows over the land surface directly to downstream wetlands, creeks, and eventually the Pacific Ocean. Accordingly, increases in impervious cover can increase the frequency and intensity of storm water flows. Second, new impervious surfaces often become a source of pollutants associated with development which include automotive fluids, cleaning solvents, toxic or hazardous chemicals, detergents, sediment, metals, pesticides, oil and grease, and food wastes. These pollutants, which are often temporarily captured on impervious surfaces, are transported to the storm water conveyance system by storm water and urban runoff. The pollutants flow untreated through the storm water conveyance system and ultimately into our creeks, rivers, beaches, and lagoons. With the

growing concerns of urban runoff and storm water pollution, local, state, and federal agencies devised regulations requiring development planning and construction controls to treat storm water-related pollution from new development projects before it reaches any receiving waters.

The Municipal Storm Water National Pollutant Discharge Elimination System (NPDES) Permit (Municipal Permit) R9-2007-0001, issued on January 24, 2007 to the City of Encinitas, the County of San Diego, the Port of San Diego, and 17 other cities in the region by the San Diego Regional Water Quality Control Board (Regional Board), requires the development and implementation of storm water regulations addressing storm water pollution issues in development planning and construction associated with private and public development projects. Specifically, private and public development projects are required to include storm water best management practices (BMPs) both during construction, and in the projects permanent design in order to reduce pollutants discharged from the project site to the maximum extent practicable (see Appendix G for a detailed description of the various types and categories of BMPs discussed in this manual).

The primary objectives of the Best Management Practice Manual Part II requirements are to:

1. Effectively prohibit non-storm water discharges; and
2. Reduce the discharge of pollutants from storm water conveyance systems to the Maximum Extent Practicable (MEP statutory standard) both during construction and throughout the use of a developed site.

I.3. Legal Framework

The requirement to implement storm water BMP requirements for development projects is based on Section 402 (p) of the Clean Water Act. The Federal Clean Water Act amendments of 1987 established a framework for regulating storm water discharges from municipal, industrial, and construction activities under the NPDES program. Under the Federal Clean Water Act, municipalities throughout the nation are issued a Municipal NPDES Permit. The primary goal of the Municipal Permit is to stop polluted discharges from entering the storm water conveyance system and local receiving and coastal waters.

In California, the State Water Resources Control Board (SWRCB), through the nine Regional Boards, administers the NPDES storm water municipal permitting program. Based on the San Diego Municipal Permit issued by the San Diego Regional Board, the City is required to develop and implement construction and permanent storm water BMPs addressing pollution from new private and public development projects.

In order to comply with the conditions of the Municipal Permit, the City of Encinitas adopted the City of Encinitas Watercourse Protection, Storm Water Management and Discharge Control Ordinance (Storm Water Ordinance) codified in Chapter 20.08 of the Encinitas Municipal Code. This document is an uncodified ordinance adopted by reference as Part II of the City of Encinitas Storm Water Best Practices Manual. The Municipal Permit requires the City to categorize and prioritize land uses in order to establish effective BMPs. The Storm Water Ordinance authorizes the City Engineer to establish Best Management Practices (BMPs), including permanent improvements, for all types of land uses. In

addition, the Stormwater Ordinance establishes criteria to evaluate threat to water quality from various land used including land development and construction.

The City Engineer may establish alternative Best Management Practices. The allowable use of alternative BMPs at a specific site shall be determined at the sole discretion of the City Engineer. The City Engineer may establish Best Management Practices for a specific site or activity if necessary to reduce Pollutants to the Maximum Extent Practicable or to comply with an order of the San Diego Regional Water Quality Control Board. The City Engineer may also establish additional Best Management Practices for a specific site if the City Engineer determines that the Best Management Practices implemented at the site have not reduced the pollutants to the Maximum Extent Practicable.”

All requirements of BMP Manual II, as amended on March 24, 2008, and any subsequent amendments shall apply to:

- Applications for tentative maps and development permits that have not been deemed complete prior to March 24, 2008.
- Applications for extensions or time for tentative maps and development permits that have not been deemed complete prior to March 24, 2008.
- Applications for construction permits that do not require tentative maps or development permits that have not had their construction permit applications deemed complete prior to March 24, 2008.
- A permit has not already been issued and construction has not already started by March 24, 2008
- Public projects that have not begun initial design prior to March 24, 2008.

II. PROJECT REVIEW & PERMITTING

The City of Encinitas Storm Water Management Ordinance requires that all new development and redevelopment activities comply with the storm water pollution prevention requirements per the Municipal Code Chapter 20.08 and Grading and Erosion Control Chapter 23.24. These storm water pollution prevention requirements, which are described in detail in Section III, “Permanent Storm Water Best Management Practices Selection Procedure,” and Section IV, “Construction Storm Water Best Management Practices Performance Standards,” are site specific and vary based on the project’s potential impact on the quality of receiving waters.

II.1. Determine Applicable Storm Water BMP Requirements

II.1.A. Permanent Stormwater Treatment Requirements

II.1.A.i. Standard Requirements. Projects subject to standard permanent storm water requirements must incorporate the site design and source control requirements identified in Sections III.2.A and B (requirements 1 through 15) .

II.1.A.ii. Priority Project Requirements. Projects subject to priority project permanent storm water requirements must incorporate all applicable requirements in Section III.2, “Establish Permanent Storm Water Best Management Practices,” (requirements 1 through 33) into the project design.

II.1.B. Construction Storm Water BMP Requirements

Projects subject to the construction storm water best management practices requirements must comply with the standards included in Section IV, “Construction Storm Water BMP Performance Standards”, as appropriate given site conditions, season, project design, and construction methods. Refer to Section II.2.B, “Construction Storm Water BMPs”.

II.2. Prepare & Submit Appropriate Plans

II.2.A. Permanent Storm Water BMPs

Section III, “Permanent Best Management Practices Selection Procedure”, contains a process for reviewing the project site location and preliminary project design before progressively identifying and incorporating site design BMPs, source control BMPs, requirements for individual priority project types, and treatment control BMPs into the project design. The procedure is organized so that the level of analysis required is commensurate with the potential pollutant type and quantity, the location of the project relative to sensitive receiving waters, and the type of storm water requirements that apply to a particular project.

II.2.A.i. Standard Development Project - Standard Requirements. Projects subject to only standard permanent BMP requirements need only to complete the “Identify Pollutants from the Project Area” procedure (Section III.1.A) and then incorporate the requirements in Section III.2.A, “Site Design BMPs”, and Section III.2.B, “Source Control BMPs” (requirements 1-15). Applicants must incorporate all necessary permanent BMPs into

the project plans prior to submittal, regardless of project type. Analysis of the project's anticipated pollutants of concern must also be included with the project submittal.

II.2.A.ii. Priority Development Project - Priority Project Requirements. Projects subject to the priority project permanent BMP requirements must complete all of the analyses required in Section III.1, "Identify Pollutants and Conditions of Concern", and incorporate all of the applicable BMP requirements in Section III.2, "Establish Storm Water BMP Requirements" (requirements 1-33).

II.2.B. Construction Storm Water BMPs

Section IV, "Construction Storm Water BMP Performance Standards", describes the construction site management requirements with which contractors must comply. In addition, Section IV lists the performance standards that construction sites must meet and provides a list of erosion control, sediment control, and materials management BMPs for reference. Each project must be given a priority of high, medium or low. (Note: Prioritization of construction projects will determine the inspection frequency by City staff and may be changed during the construction process based on the potential for pollutants to be discharged from the site.)

II.2.B.i. Construction Projects Over 1 Acre. Those projects that have been determined to require construction BMPs in Step 1 must identify the construction BMPs to be implemented in accordance with the performance standards in Section IV, "Construction Storm Water BMP Performance Standards". If a project disturbs 1 acres or more, the applicant must provide a Storm Water Pollution Prevention Plan (SWPPP) identifying all construction BMP requirements required by Section IV, in accordance with the most current State General Permit for Storm Water Discharges Associated with Construction Activity (State General Construction Permit). Consistent with the State General Construction Permit, the City will require that BMPs be installed and maintained for all applicable projects in addition to good housekeeping and site and materials management. BMP Manual, Part I provides general guidelines and design for construction BMPs. The City requires that a copy of the NOI and SWPPP be submitted with the plan check package.

II.2.B.ii. Construction Projects Under 1 Acre. Those projects that have been determined to require construction BMPs in Step 1 must identify the construction BMPs to be implemented in accordance with the performance standards in Section IV, "Construction Storm Water BMP Performance Standards." For projects that disturb less than 1 acre and are determined to have a potential to impact water quality during construction, the applicant must provide a Local SWPPP, which identifies all construction BMP requirements required by Section IV with the project submittal. The Local SWPPP shall depict the BMPs to be implemented during construction in order to reduce/eliminate discharge of pollutants into the storm drain conveyance system. The Local SWPPP shall include but not be limited to erosion and sediment control BMPs, good housekeeping measures, and site and materials management. The City of Encinitas BMP Manual also provides general guidelines and design for construction projects.

II.3. Operation & Maintenance of BMPs

Applicants must provide assurances that permanent storm water BMPs will be constructed and permanently maintained throughout the use of a developed site, and that construction BMPs will be implemented and maintained until construction is complete.

II.3.A. Permanent Storm Water BMPs

For all projects, permanent storm water maintenance requirements shall be incorporated into the project design and be shown on the plans. No modifications of the permanent storm water BMPs are allowed unless the City Engineer has approved the modifications and a permit showing the proposed changes has been obtained from the City Engineer.

II.3.B. Construction BMPs

For projects requiring construction permits, construction BMP requirements shall be incorporated into the project design and shown on the plans prior to the issuance of any permits. Construction BMP maintenance requirements shall also be noted on the plans. Any construction BMP requirements that cannot be shown graphically must be noted on the plans.

III. PERMANENT BEST MANAGEMENT PRACTICES SELECTION PROCEDURE

All projects must review the list of potential pollutants generated by land use type in Table 1 below.

III.1. Pollutants of Concern

III.1.A. Anticipated Pollutants from the Project Area

Table 1 associates pollutants of concern with the Priority Project Categories. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern.

Table 1. Anticipated and Potential Pollutants Generated by Land Use Type.

Priority Project Categories	General Pollutant Categories								
	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P ⁽¹⁾	P ⁽²⁾	P	X
Commercial Development >1 acre	P ⁽¹⁾	P ⁽¹⁾		P ⁽²⁾	X	P ⁽⁵⁾	X	P ⁽³⁾	P ⁽⁵⁾
Heavy industry /industrial development	X		X	X	X	X	X		
Automotive Repair Shops			X	X ⁽⁴⁾⁽⁵⁾	X		X		
Restaurants					X	X	X	X	
Hillside Development >5,000 ft ²	X	X			X	X	X		X
Parking Lots	P ⁽¹⁾	P ⁽¹⁾	X		X	P ⁽¹⁾	X		P ⁽¹⁾
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	X	P ⁽¹⁾	X	X ⁽⁴⁾	X	P ⁽⁵⁾	X		

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

III.2. Establish Permanent Storm Water Best Management Practices

Projects subject to standard or priority project requirements shall implement all applicable site design and source control BMPs listed below. Projects are encouraged to address these objectives through the creation of a hydrologically functional project design that attempts to mimic the natural hydrologic regime. Mimicking a site's natural hydrologic regime can be pursued by:

- Reducing imperviousness, conserving natural resources and areas, maintaining and using natural drainage courses in the storm water conveyance system, and minimizing clearing and grading.
- Providing runoff storage measures dispersed uniformly throughout a site's landscape through the use of a variety of detention, retention, and runoff practices.
- Implementing on-lot hydrologically functional landscape design and management practices.

These design principles offer an innovative approach to urban storm water management, one that does not rely on the conventional end-of-pipe or in-the-pipe structural methods but instead uniformly or strategically integrates storm water controls throughout the urban landscape. Useful resources for applying these principles, referenced in the appendix, include *Start at the Source* (1999), and *Low-Impact Development Design Strategies* (1999) (see Appendix F). Effective source controls offer another strategy to reduce a project's need for treatment. Therefore, projects shall incorporate, where applicable, storm water BMPs into the project design, in the following progression:

- Site Design BMPs
- Source Control BMPs
- BMPs for Individual Priority Project Categories (these are site design and source control BMPs)
- Treatment Control BMPs

The series of best management practices listed in Section III.2 have been organized sequentially to allow the applicant and design professional to incorporate site design BMPs, source control BMPs, and where necessary, requirements applicable to individual priority project categories and treatment control BMPs in this progression.

Priority projects must also incorporate Low Impact Design (LID) and treatment control facilities. For detailed information regarding how to design LID and treatment control facilities for your project refer to the ***Encinitas Stormwater Manual***.

III.2.A. Site Design BMPs and Low Impact Design (LID)

Priority projects shall be designed so that all impervious areas drain to pervious areas for treatment prior to draining to the street or storm drain system; no directly connected impervious surfaces will be allowed. The following section details the City's minimum LID requirements. The ***Encinitas Stormwater Manual*** describes these requirements in more detail and provides the applicant with comprehensive guidelines on how to select, design, and implement these requirements and how to outline the proposed LIDs in your project submittal.

Maintain Pre-Development Rainfall Runoff Characteristics

Control post-development peak storm water runoff discharge rates and velocities to maintain or reduce pre-development downstream erosion by applying the following concepts:

1. Minimize impervious footprint. (1) Increase building density (number of stories above or below ground); (2) construct walkways, trails, patios, overflow parking lots and alleys, and other low-traffic areas with permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials; (3) construct streets, sidewalks, and parking lot aisles to the minimum widths necessary, provided that public safety and a walkable environment for pedestrians are not compromised; and (4) minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.
2. Conserve natural areas. (1) Concentrate or cluster development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition; and (2) Use natural drainage systems to the maximum extent practicable. Refer to the Environmentally Sensitive Lands regulations of the Land Development Code (LDC § 142.01, et. seq.) for more guidance in protecting environmentally sensitive lands.
3. Minimize Directly Connected Impervious Areas. (1) Where landscaping is proposed, drain rooftops into adjacent landscaping prior to discharging to the storm water conveyance system; and (2) where landscaping is proposed, drain impervious parking lots, sidewalks, walkways, trails, and patios into adjacent landscaping.
4. Maximize canopy interception and water conservation. (1) Preserve existing native trees and shrubs; and (2) plant additional native or drought tolerant trees and large shrubs in place of non-drought tolerant exotics.

Protect Slopes and Channels

5. Convey runoff safely from the tops of slopes.
6. Vegetate slopes with native or drought tolerant vegetation.
7. Stabilize permanent channel crossings.
8. Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.

III.2.B. Source Control BMPs

Design Outdoor Material Storage Areas to Reduce Pollution Introduction

9. Hazardous materials with the potential to contaminate urban runoff shall be: (1) placed in an enclosure such as, but not limited to, a cabinet, shed, or similar structure that prevents contact with rain, runoff, or spillage into the storm water conveyance system; and (2) protected by secondary containment structures such as berms, dikes, or curbs. The storage area shall be paved and sufficiently impervious to contain leaks and spills, and it shall have a roof or awning to minimize direct precipitation within the secondary containment area.

Design Trash Storage Areas to Reduce Pollution Introduction

10. Trash storage areas shall: (1) be paved with an impervious surface, designed not to allow run-on from adjoining areas, and screened or walled to prevent off-site transport of trash; and, (2) contain attached lids on all trash containers that exclude rain or contain a roof or awning to minimize direct precipitation.

Limited exclusion: detached residential homes.

Use Efficient Irrigation Systems & Landscape Design

11. Employ rain shutoff devices to prevent irrigation during and after precipitation.
12. Design irrigation systems to each landscape area's specific water requirements.
13. Use flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.

Limited exclusion: detached residential homes.

Provide Storm Water Conveyance System Stenciling and Signage

14. Provide concrete stamping, or the equivalent, of all storm water conveyance system inlets and catch basins within the project area with prohibitive language (e.g., "No Dumping – I Live Downstream"), satisfactory to the City Engineer. Stamping may also be required in Spanish.
15. Post signs utilizing prohibitive language and/or graphical icons prohibiting illegal dumping at public access points along channels and creeks within the project area, trailheads, parks, and building entrances.

For a more detailed process specific to the selection and required documentation of Source Control BMPs, please refer to the ***Encinitas Stormwater Manual***.

III.2.C. BMPs Applicable to Individual Priority Project Categories

Where identified in Table 1, the following requirements shall be incorporated into applicable priority projects. Projects shall adhere to each of the individual priority project category requirements that apply to the project (e.g., a restaurant with more than 15 parking spaces would be required to incorporate the requirements for "g. Equipment Wash Areas" and "h. Parking Areas" into the project design).

a. Private Roads

16. The design of private roadway drainage shall use at least one of the following (for further guidance, see Start at the Source [1999]): (1) rural swale system- street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, and culverts under driveways and street crossings; (2) urban curb/swale system- street sloping to the curb, periodic swale inlets drain to vegetated swale/biofilter; or (3) dual drainage system- precipitation up to 0.6" or rainfall intensity of up to 0.2 inch/hour captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder.

b. Residential Driveways & Guest Parking

17. Driveways shall have one of the following: (1) shared access; (2) wheel strips (paving only under tires); or (3) design allowing the drainage of runoff into landscaping prior to discharging to the storm water conveyance system.
18. Uncovered temporary or guest parking on private residential lots shall be: (1) paved with a permeable surface; or (2) designed to drain into landscaping prior to discharging to the storm water conveyance system.

c. Dock Areas

19. Loading/unloading dock areas shall include the following: (1) covered loading dock areas or design drainage to preclude urban run-on and runoff; and (2) Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.

d. Maintenance Bays

20. Maintenance bays shall include at least one of the following: (1) indoor repair/maintenance bays ; or, (2) design to preclude urban run-on and runoff.
21. Maintenance bays shall include a repair/maintenance bay drainage system to capture all wash water, leaks, and spills. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm water conveyance system is prohibited.

e. & f. Vehicle & Equipment Wash Areas

22. Areas for washing/steam cleaning of vehicles and areas for outdoor equipment/accessory washing and steam cleaning shall be self-contained to preclude run-on and run-off, covered with a roof or overhang, and equipped with a clarifier or other pretreatment facility, or properly connected to the sanitary sewer with written permission from the local sewer district.

g. Outdoor Processing Areas

23. Outdoor processing areas shall: (1) cover or enclose areas that would be the most significant source of pollutants; or,(2) slope the area toward a dead-end sump;
24. Grade or berm processing area to prevent run-on from surrounding areas.
25. Installation of storm drains in areas of equipment repair is prohibited.

h. Surface Parking Areas

26. Where landscaping is proposed in surface parking areas (both covered and uncovered), incorporate landscape areas into the drainage design.
27. Overflow parking (parking in excess of the project's minimum parking requirements) may be constructed with permeable paving.

i. Non-Retail Fueling Areas

Non-Retail fueling areas shall be designed with the following:

28. Fuel dispensing area that is: (1) paved with Portland cement concrete or equivalent smooth impervious surface (asphalt concrete is prohibited); (2) designed to extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less; (3) sloped to prevent ponding; (4) separated from the rest of the site by a grade break that prevents run-on of urban runoff; and (5) designed to drain to the project's treatment control BMP(s) prior to discharging to the storm water conveyance system.
29. Overhanging roof structure or canopy that is: (1) equal to or greater than the area within the fuel dispensing area's grade break; and (2) designed not to drain onto or across the fuel dispensing area.

j. Hillside Landscaping

30. Hillside areas disturbed by project development shall be landscaped with deep-rooted, drought tolerant plant species selected for erosion control, to the satisfaction of the City Engineer.

III.2.D. Treatment Control BMPs

31. Where identified in Table 1, and after site design and source control BMPs have been incorporated into the project, applicants of priority projects shall design a single or combination of treatment control BMPs designed to infiltrate, filter, and/or treat runoff from the project footprint to one of the "Numeric Sizing Treatment Standards" listed in Table 3, below. Applicants must use the Structural Treatment BMP Selection Procedure outlined in Section III.2.D.i below to select appropriate treatment control BMPs. Applicants are encouraged to design projects so that runoff is treated by site design BMPs such as rooftop runoff treated in landscaping, so that it may be applied towards the numeric sizing treatment standards, satisfactory to the City Engineer. In addition, applicants are encouraged to apply a "drainage basin approach" in meeting the treatment requirements. Treating entire hydrologic sub-drainages, which often extend off-site, is an equitable, environmentally sound regional solution that applies treatment requirements to hydrologically defined areas, rather than legally defined parcels. When integrated with other projects, this approach can provide a more efficient and cost effective method of treatment by locating fewer, more effective BMPs to treat entire sub-drainages once, like pieces of a puzzle. In all instances, structural treatment BMP(s) may be located on- or off-site, used singly or in combination, or shared by multiple new developments, pursuant to the following criteria:

- (a) All structural treatment control BMPs shall infiltrate, filter, and/or treat the required runoff volume or flow prior to discharging to any receiving water body supporting beneficial uses, including, but not limited to, wetlands originally constructed as mitigation for habitat loss and receiving waters that contain structural BMPs. A BMP may not be constructed in these areas unless the use is approved by the Regional Water Quality Control Board;
- (b) Multiple post-construction structural treatment control BMPs for a single priority project shall collectively be designed to comply with the numeric sizing treatment

standards Based on 85th percentile storm event;

- (c) Shared BMPs shall be operational prior to the use of any dependent development or phase of development. The shared BMPs shall only be required to treat the dependent developments or phases of development that are in use;
- (d) Interim storm water BMPs that provide equivalent or greater treatment than is required may be implemented by a dependent development until each shared BMP is operational. If interim BMPs are selected, the BMPs shall remain in use until permanent BMPs are operational.
- e) If mechanical facilities are proposed for structural treatment of the storm water, the applicant shall provide facilities that are easy to maintain and are capable of removing all pollutants of concerns generated by the proposed priority project. At least 50% of the required structural treatment capacity shall be provided using natural treatment media such as a grassy swale or vegetated detention pond.

Limited Exclusions:

Where significant redevelopment results in an increase of less than 50 percent of the impervious surfaces of a previously existing development, and the existing development was not subject to SUSMP requirements, the numeric sizing criteria apply only to the addition, and not to the entire development.

IV. CONSTRUCTION STORM WATER BMP PERFORMANCE STANDARDS

Those projects that have been determined to require construction BMPs as required in Section II, "Project Review and Permitting" must identify the construction BMPs to be implemented in accordance with the performance standards in this section. The construction BMPs must be identified in a Storm Water Pollution Prevention Plan or Local SWPPP for projects disturbing more than or less than 1 acre, respectively. These plans must be prepared in accordance with the guidelines in Appendix D.

It is the responsibility of the property owner and/or contractor to select, install, and maintain appropriate BMPs. A list of construction BMPs is provided in Part I of the BMP Manual. BMPs must be installed in accordance with an industry recommended standard or in accordance with the requirements of the State General Construction Permit. More information about construction phase BMPs is provided in the most current California Storm Water Quality Association (CASQA) BMP Manual for Construction Activities.

This section of the BMP Manual II establishes the minimum BMPs for construction sites in the City of Encinitas. These minimum BMPs are established as directed in the City's Storm Water Municipal NPDES Permit, issued by the San Diego Regional Water Quality Control Board. In response to the Municipal NPDES Permit, the City has revised the Storm Water Ordinance (Storm Water Management Ordinance, EMC Chapter 20.08) and the Grading Ordinance (Grading, Erosion, and Sediment Control Ordinance, EMC Chapter 23.24). All sites must, at all times, comply with the requirements of both of these ordinances.

Best management practices are to be shown on building plans, grading plans, and improvement plans. They are generally presented in the form of erosion and sediment control plans. The following section presents the minimum BMPs that must be included in these plans. In addition, all projects required to comply with the most current California General Permit for Construction Activities must submit to the City a copy of their site specific SWPPP, and include a copy of the required Notice of Intent (NOI) to comply. Plans will be reviewed by Engineering staff during plan check and construction sites will be inspected in order to verify compliance with the minimum BMPs outlined herein, in the Grading Ordinance, and in the Storm Water Management Ordinance. Failure to comply with these regulations can result in Notice of Violations, Stop Work Orders, Citations, and fines.

BMP requirements differ between the wet season (Oct. 1 – April 30 of each year) and the dry season (May 1 – September 30 of each year), the type of the project and topography of the site, as described below.

IV.1. Site Management Requirements

Storm water pollution prevention site management requirements include:

- A. A qualified person who is trained and competent in the use of BMPs shall be on site daily, although not necessarily full time, to evaluate the conditions of the site with respect to storm water pollution prevention. This qualified contact person

- shall represent the contractor/ owner on storm water issues.
- B. The qualified person shall implement the conditions of the Storm Water Pollution Prevention Plan, contract documents and/or local ordinances with respect to erosion and sediment control and other waste management regulations. They shall be kept on site and available to the City inspector at all times.
 - C. The qualified person is responsible for monitoring the weather and implementation of any emergency plans as needed. The weather shall be monitored on a 5-day forecast plan and a full BMP protection plan shall be activated when there is a 40% chance of rain.
 - D. The qualified person is responsible for overseeing any site grading and operations and evaluating the effectiveness of the BMPs. This person shall modify the BMPs as necessary to keep the dynamics of the site in compliance. This person or other qualified persons are responsible for checking the BMPs routinely for maintenance and documenting the BMPs being implemented.

IV.2. Performance Standards

The City Engineer will evaluate the adequacy of the owner's/contractor's site management for storm water pollution prevention, inclusive of BMP implementation, on construction sites based on performance standards for storm water BMPs. Poor BMP practices shall be challenged. Performance standards shall include:

- A. No measurable increase of pollution (including sediment) in runoff from the site.
- B. No slope erosion.
- C. Water velocity moving offsite must not be greater than pre-construction levels and shall be discharged in a fashion that will not increase erosion potential downstream.

A site will be considered inactive if construction activities have ceased for a period of seven (7) or more consecutive calendar days. At any time of year, an inactive site must be fully protected from erosion and discharges of sediment. It is also the owner's/contractor's responsibility at both active and inactive sites to implement a plan to address all potential non-storm water discharges.

Regardless of any inspections conducted by the City, property owners or contractors are required to prevent any construction-related materials, wastes, spills or residues from entering a storm water conveyance system.

IV.3. Minimum Construction Phase Best Management Practices

Construction sites are evaluated for their threat to water quality to local receiving water bodies. This evaluation is based primarily on soil erosion potential, site slope, site size and type, the sensitivity of receiving waters and proximity to environmentally sensitive areas. Each site's threat to water quality is determined by City staff based on a review of the plans, the site, site location, or current site conditions.

Required minimum BMPs have been established for construction sites. If particular minimum BMPs are infeasible at any specific site, the City will require the implementation of other equivalent BMPs. The City may also require additional site specific BMPs as necessary to comply with the current General Municipal Stormwater Permit, and the City's

Watercourse Protection, Stormwater Management and Discharge Control Ordinance, and the Grading Ordinance.

IV.3.A. Dry Season Requirements (May 1 through September 30):

- A. Perimeter protection BMPs must be installed and maintained to comply with performance standards (above).
- B. Sediment control BMPs must be installed and maintained to comply with performance standards (above).
- C. BMPs to control sediment tracking must be installed and maintained at entrances/exits to comply with performance standards (above).
- D. Material needed to install standby BMPs necessary to completely protect the exposed portions of the site from erosion and to prevent sediment discharges, must be stored on site. Areas that have already been protected from erosion using physical stabilization or established vegetation stabilization BMPs as described below are not considered to be “exposed” for purposes of this requirement.
- E. The owner/contractor must have an approved “weather triggered” action plan and have the ability to deploy standby BMPs as needed to completely protect the exposed portions of the site within 24 hours of prediction of a storm event (a predicted storm event is defined as a forecasted, 40% chance of rain). On request, the owner/contractor must provide proof of this capability that is acceptable to the City Engineer.
- F. Deployment of physical or vegetation erosion control BMPs must commence as soon as grading and/or excavation is completed for any portion of the site. The project proponent may not continue to rely on the ability to deploy standby BMP materials to prevent erosion of graded areas that have been completed.
- G. The area that can be cleared or graded and left exposed at one time is limited to the amount of acreage that the owner/contractor can adequately protect prior to a predicted rainstorm. Requirement “G” will require grading to be phased at larger sites. For example, it may be necessary to deploy erosion and sediment control BMPs in areas that are not completed but are not actively being worked before additional grading is done.
- H. Properly protected, designated storage areas are required for materials and wastes.
- I. Non-stormwater discharges must be eliminated or controlled to the maximum extent practicable.

High Priority Sites (in addition to A. through I.):

J. Site specific BMPs that:

1. remove pollutants from the construction site discharge,
2. maintain or reduce the peak flow from the site during a rain event, and
3. comply with BMPs outlined in the project SWPPP, if applicable.

IV.3.B. Rainy Season Requirements (October 1 through April 30):

- A. Perimeter protection BMPs must be installed and maintained to comply with performance standards (above).
- B. Sediment control BMPs must be installed and maintained to comply with performance standards (above).
- C. BMPs to control sediment tracking must be installed and maintained at site entrances/exits to comply with performance standards (above).
- D. Material needed to install standby BMPs necessary to completely protect the exposed portions of the site from erosion, and to prevent sediment discharges, must be stored on site. Areas that have already been protected from erosion using physical stabilization or established vegetation stabilization BMPs as described below are not considered to be “exposed” for purposes of this requirement.
- E. The owner/contractor must have an approved “weather triggered” action plan and have the ability to deploy standby BMPs as needed to completely protect the exposed portions of the site within 24 hours of prediction of a storm event (a predicted storm event is defined as a forecasted, 40% chance of rain). On request, the owner/contractor must provide proof of this capability that is acceptable to the City Engineer.
- F. Deployment of physical or vegetation erosion control BMPs must commence as soon as grading and/or excavation is completed for any portion of the site. The owner/contractor may not continue to rely on the ability to deploy standby BMP materials to prevent erosion of graded areas that have been completed.
- G. The area that can be cleared or graded and left exposed at one time is limited to the amount of acreage that the owner/contractor can adequately protect prior to a predicted rainstorm.
- H. Erosion control BMPs must be upgraded if necessary to provide sufficient protection for storms likely to occur during the rainy season.
- I. Perimeter protection and sediment control BMPs must be upgraded if necessary to provide sufficient protection for storms likely to occur during the rainy season.
- J. Adequate physical or vegetation erosion control BMPs must be installed and established for all graded areas prior to the start of the rainy season. These

BMPs must be maintained throughout the rainy season. If a selected BMP fails, it must be repaired and improved, or replaced with an acceptable alternate as soon as it is safe to do so. The failure of a BMP shows that the BMP, as installed, was not adequate for the circumstances in which it was used and shall be corrected or modified as necessary. Repairs or replacements must therefore put a more effective BMP in place.

K. All vegetation erosion control must be established prior to the rainy season to be considered as a BMP.

L. The amount of exposed soil allowed at one time shall not exceed that which can be adequately protected by deploying standby erosion control and sediment control BMPs prior to a predicted rainstorm.

M. A disturbed area that is not completed but that is not being actively graded must be fully protected from erosion if left for 7 or more calendar days. The ability to deploy standby BMP materials is not sufficient for these areas. BMPs must actually be deployed.

N. Site specific BMPs that:

1. remove pollutants from the site discharge for priority project
2. maintain or reduce the peak flow from the construction site during a rain event for priority projects, and
3. comply with BMPs outlined in the project SWPPP, if applicable.

IV.4. Advanced Treatment

Construction sites that are determined by the City Engineer to pose an exceptional threat to water quality must implement advanced treatment for sediment. In evaluating the threat to water quality, the following factors will be considered:

- a. For purposes of this section, “Exceptional Threat to Water Quality” shall be defined as a site that meets all of the following criteria:
 - i. All or part of the site is within 200 feet of waters named on the CWA Section 303(d) list of Water Quality Limited Segments as impaired for sedimentation and/or turbidity;
 - ii. The disturbance area is greater than five acres, including all phases of the development;
 - iii. The disturbed slopes are steeper than 4:1 (horizontal: vertical) with at least 10 feet of relief, and drain toward the 303(d) listed receiving water for sedimentation and/or turbidity;
 - iv. The site contains a predominance of soils with USDA-NRCS Erosion factors k_f greater than or equal to 0.4. K_f is an NRCS soil erosion factor and the table for soils and their erosion factors in the San Diego region is readily accessible from the NRCS’s web soil survey page or field office. The range of k_f in San Diego is 0.15 to 0.55. Michigan NRCS reports, “Soil erodibility factor K represents both susceptibility of soil to erosion and the rate of runoff, as

measured under the standard unit plot condition. Soils high in clay have low K values, about 0.05 to 0.15, because they are resistant to detachment. Coarse textured soils, such as sandy soils, have low K values, about 0.05 to 0.2, because of low runoff even though these soils are easily detached. Medium textured soils, such as the silt loam soils, have moderate K values, about 0.25 to 0.4, because they are moderately susceptible to detachment and they produce moderate runoff. Soils having a high silt content are most erodible of all soils. They are easily detached; tend to crust and produce high rates of runoff. Values of K for these soils tend to be greater than 0.4”.

- b. Advanced treatment may be required on sites that do not meet all four of the criteria for Exceptional Threat to Water Quality listed above at the discretion of the City based on a record of non-compliance with Stormwater regulations.
- c. Treatment effluent water quality shall meet or exceed the water quality objectives for sediment, turbidity, and pH as listed in the Water Quality Control Plan for the San Diego Basin (9) for inland surface waters, lagoons, and estuaries for the appropriate hydrologic unit.
- d. Sufficient water treatment technologies and controls to meet the above objectives and not cause any impairment to water quality due to operation of the treatment process. In addition, treatment chemicals, if used;
 - i. Must be approved by the US Environmental Protection Agency (EPA) for potable water use or by another “reputable agency” engaged in the regulation and enforcement of water quality who specifically evaluates the use of such chemicals on stormwater runoff.

IV.5. Limitation of Grading

The area that can be cleared or graded and left exposed at any one time is limited to the amount of acreage that the owner / contractor can adequately protect prior to a predicted rain event. At no time, shall disturbed soil area of a project site be more than 50 acres for an individual grading permit. The City Engineer may approve, on a site specific basis, expansions to the active disturbed soil area limit. Soil stabilization and sediment control materials shall be maintained on site sufficient to protect the disturbed soil areas.

Based upon these limitations, grading shall be phased at larger construction sites. As such, it may be deemed necessary to deploy erosion and sediment control BMPs in areas that are not completed but are actively being worked on before additional grading is done.

V. OPERATION & MAINTENANCE REQUIREMENTS

Applicants must ensure operation and maintenance of the proposed permanent BMP facilities. The following section outlines the City's minimum maintenance requirements for permanent BMPs and Construction BMPs. Refer to Chapter 5 of the Encinitas Stormwater Manual for a detailed process of how to set up your Operation and Maintenance Agreement and maintain your BMP facilities.

V.1. Permanent BMPs

V.1.i. Permanent BMP Requirements. Applicants proposing projects that include permanent BMPs must prepare a maintenance agreement, satisfactory to the City Engineer and in conformance with the program outlined in the "Permanent Storm Water BMP Maintenance Agreement Requirements". Storm Water BMP Maintenance Agreement shall be approved prior to the issuance of any permits. The permanent BMPs shall be graphically shown on the plans where possible, and made a condition of the project's permit/approval. The permanent BMPs operation and maintenance requirements (O & M plan discussed below) shall also be noted on the plans and made a condition of the project's permit/approval.

V.2. Construction Permits

V.2.i. Construction Permits for Projects Under 1 Acre. Projects proposing to disturb less than 1 acre during construction shall include construction requirements, where possible, on the plans. Any remaining construction BMPs that cannot be shown graphically on the plans shall be either noted on, or stapled to, the plans (Local SWPPP) and made a condition of the permit. The project's construction priority ranking (see Appendix D) must also be noted on the construction plans. The applicant and contractor are responsible to maintain the construction BMPs throughout the construction and any construction stoppage period. Construction BMPs maintenance as well as implementation of the SWPPP and Local SWPPP shall continue until construction is completed and post construction BMPs are well established.

V.2.ii. Construction Permits for Projects Over 1 Acre. Projects proposing to disturb more than 1 acre during construction shall include all construction BMPs in a Storm Water Pollution Prevention Plan, prepared in accordance with Appendix D, "Storm Water Pollution Prevention Plan Guidelines." The construction BMPs shall also be shown on the plans, where possible. Any remaining construction BMPs that cannot be shown graphically on the plans shall be either noted or stapled to the plans and made a condition of the permit. The project's construction priority ranking (see Appendix D) must also be noted on the construction plans. The applicant and contractor are responsible to maintain the construction BMPs throughout the construction and any construction stoppage period. Construction BMPs maintenance as well as implementation of the SWPPP and Local SWPPP shall continue until construction is completed and post construction BMPs are well established.

V.3. Permanent BMP Maintenance Agreement Requirements

Applicants shall propose a maintenance agreement assuring all permanent BMPs will be maintained throughout the “use” of a project site, satisfactory to the City Engineer (see Appendix G for a list of potential mechanisms). For discretionary projects, the City-approved method of permanent BMP maintenance shall be incorporated into the project's permit and shall be consistent with permits issued by resource agencies before decision-maker approval of discretionary actions. For projects requiring only ministerial permits, the City-approved method of permanent BMP maintenance shall be incorporated into the permit conditions before the issuance of any construction permits. In all instances, the applicant shall provide proof of execution of a City-approved method of maintenance repair and replacement before the issuance of construction approvals.

For all properties, the verification mechanism will include the project proponent's signed statement, as part of the project application, accepting responsibility for all permanent BMP maintenance, repair and replacement.

The maintenance agreement shall include the following:

1. *Operation & Maintenance (O&M) Plan:* The applicant shall include an Operation & Maintenance (O&M) plan, prepared satisfactory to the City Engineer, with the approved maintenance agreement, which describes the designated responsible party to manage the storm water BMP(s), employee's training program and duties, operating schedule, maintenance frequency, routine service schedule, specific maintenance activities (including maintenance of storm water conveyance system stamps), copies of resource agency permits, and any other necessary activities. At a minimum, maintenance agreements shall require the applicant to provide inspection and servicing of all permanent treatment BMPs on an annual basis. The project proponent or City-approved maintenance entity shall complete and maintain O&M forms to document all maintenance requirements. Parties responsible for the O&M plan shall retain records for at least 5 years. These documents shall be made available to the City Engineer for inspection upon request at any time.

2. *Access Easement/Agreement:* As part of the maintenance mechanism selected below, the applicant shall execute an access easement that shall be binding on the land throughout the life of the project, until such time that the permanent treatment BMP requiring access is replaced, satisfactory to the City Engineer.

For a more detailed process specific to the preparation and execution of required maintenance agreements related to permanent BMP facilities, please refer to the ***Encinitas Stormwater Manual***.

VI. RESOURCES & REFERENCES

APPENDIX A, B, C, E, omitted on March 17, 2010.

APPENDIX D

STORM WATER POLLUTION PREVENTION PLAN/LOCAL SWPPP GUIDELINES

At a minimum, the Storm Water Pollution Prevention Plan (SWPPP) or Local SWPPP, whichever is required, must cover the areas listed below. These requirements do not relieve the owner of the state SWPPP requirement; owners should also follow all applicable state SWPPP guidelines. The SWPPP must be kept on site and made available upon request of a representative of the City of Encinitas. Projects that are also required to obtain a general construction National Pollutant Discharge Elimination System (NPDES) Permit are encouraged to visit the State Water Resource Control Board's website for permit application instructions, NOI and NOT forms and guidance in preparing a Storm Water Pollution Prevention Plan (go to: www.swrcb.ca.gov).

Planning and Organization

- Identify the pollution prevention team members who will maintain and implement the SWPPP or Local SWPPP.
- If applicable, incorporate or reference the appropriate elements of other regulatory requirements.

Site Map

Features displayed on the map must include:

- An outline of the entire property
- Drainage areas on the property and direction of flow
- Areas of soil erosion
- Nearby water bodies and municipal storm drain inlets
- Location of storm water conveyance systems (ditches, inlets, storm drains, etc.)
- Location of existing storm water controls (oil/ water separators, sumps, etc.)
- Location of "impervious" areas- paved areas, buildings, covered areas
- Locations where materials are directly exposed to storm water
- Locations where toxic or hazardous materials have spilled in the past
- Location of building and activity areas (e.g. fueling islands, garages, waste container area, wash racks, hazardous material storage areas, etc.)

List of Significant Materials

List materials stored and handled at the site. Include the location and typical quantities.

Description of Potential Pollutant Sources

- Provide a narrative description of the site's activities and list the potential pollutant sources and the potential pollutants that could be discharged in storm water discharges from each activity.
- List non-storm water discharges including the source, quantity, frequency, and characteristics of the discharges and drainage area.

Assessment of Potential Sources

Describe which activities are likely to be sources of pollution in storm water and which pollutants are likely to be present in storm water discharges.

Best Management Practices

Describe the BMPs that will be implemented at the site for each potential pollutant and its source.

APPENDIX F

SUGGESTED RESOURCES

SUGGESTED RESOURCES	HOW TO GET A COPY
<p><i>County of San Diego Low Impact Development Handbook</i> (2007)</p> <p>Presents guidance for LID stormwater planning and management techniques. Fact Sheets on LID BMPs are provided in the Appendices.</p>	<p>County of San Diego Department of Planning and Land Use 5201 Ruffin Road, Suite B San Diego, CA 92123 http://www.sdcountry.ca.gov/</p>
<p><i>Better Site Design: A Handbook for Changing Development Rules in Your Community</i> (1998)</p> <p>Presents guidance for different model development alternatives.</p>	<p>Center for Watershed Protection 8391 Main Street Ellicott City, MD 21043 410-461-8323 www.cwp.org</p>
<p><i>California Urban Runoff Best Management Practices Handbooks</i> (2003)</p> <p>Presents a description of a large variety of Structural BMPs, Treatment Control, BMPs and Source Control BMPs</p>	<p>Los Angeles County Department of Public Works Cashiers Office 900 S. Fremont Avenue Alhambra, CA 91803 626-458-6959 www.cabmphandbooks.org</p>
<p><i>Caltrans Urban Runoff Quality Handbook: Planning and Design Staff Guide (Best Management Practices Handbooks)</i> (1998)</p> <p>Presents guidance for design of urban runoff BMPs</p>	<p>California Department of Transportation P.O. Box 942874 Sacramento, CA 94274-0001 916-653-2975</p>
<p><i>Bioretention Manual</i> (2002)</p> <p>Presents guidance for designing, building, and maintaining bioretention facilities.</p>	<p>Prince George's County Watershed Protection Branch 9400 Peppercorn Place, Suite 600 Landover, MD 20785 http://www.co.pg.md.us/</p>
<p><i>Stormwater C.3 Guidebook</i> Contra Costa Clean Water Program</p> <p>Includes an integrated design approach to meet California Stormwater NPDES treatment and hydrograph modification management requirements using Low Impact Development site design techniques and facilities.</p>	<p>Contra Costa Clean Water Program 255 Glacier Drive Martinez, CA 94553 www.cccleanwater.org/</p>
<p><i>Design of Stormwater Filtering Systems</i> (1996) by Richard A. Clayton and Thomas R. Schuler</p> <p>Presents detailed engineering guidance on ten different urban runoff-filtering systems.</p>	<p>Center for Watershed Protection 8391 Main Street Ellicott City, MD 21043 (410) 461-8323 www.cwp.org</p>
<p><i>Development Planning for Stormwater Management, A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP)</i> (May 2000)</p>	<p>Los Angeles County Department of Public Works http://dpw.co.la.ca.us/epd/ http://www.888cleanLA.com</p>

SUGGESTED RESOURCES	HOW TO GET A COPY
<p><i>Florida Development Manual: A Guide to Sound Land and Water Management</i> (1988)</p> <p>Presents detailed guidance for designing BMPs</p>	<p>Florida Department of the Environment 2600 Blairstone Road, Mail Station 3570 Tallahassee, FL 32399 (850) 921-9472</p>
<p><i>Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters</i> (1993) Report No. EPA-840-B-92-002</p> <p>Provides an overview of, planning and design considerations, programmatic and regulatory aspects, maintenance considerations, and costs.</p>	<p>National Technical Information Service U.S. Department of Commerce Springfield, VA 22161 (800) 553-6847</p>
<p><i>Guide for BMP Selection in Urban Developed Areas</i> (2001)</p>	<p>ASCE Environment and Water Resources Inst. 1801 Alexander Bell Dr Reston, VA 20191-4400 (800) 548-2723</p>
<p><i>Low-Impact Development Design Strategies, An Integrated Design Approach</i> (1999)</p>	<p>Prince George's County, Maryland Department of Environmental Resource Programs and Planning Division 9400 Peppercorn Place Largo, Maryland 20774 http://www.co.pg.md.us/</p>
<p><i>Maryland Stormwater Design Manual</i> (1999)</p> <p>Presents guidance for designing urban runoff BMPs</p>	<p>Maryland Department of the Environment 2500 Broening Highway Baltimore, MD 21224 (410) 631-3000</p>
<p><i>National Stormwater Best Management Practices (BMP) Database, Version 1.0</i></p> <p>Provides data on performance and evaluation of urban runoff BMPs</p>	<p>American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191 (703) 296-6000</p>
<p><i>National Stormwater Best Management Practices Database</i> (2001)</p>	<p>Urban Water Resources Research Council of ASCE Wright Water Engineers, Inc. (303) 480-1700</p>
<p><i>Operation, Maintenance and Management of Stormwater Management</i> (1997)</p> <p>Provides a thorough look at storm water practices including, planning and design considerations, programmatic and regulatory aspects, maintenance considerations, and costs.</p>	<p>Watershed Management Institute, Inc. 410 White Oak Drive Crawfordville, FL 32327 (850) 926-5310</p>
<p><i>Portland Stormwater Management Manual</i> (2004)</p> <p>Includes design illustrations and criteria for bioretention facilities.</p>	<p>Environmental Services 1120 SW 5th Ave., Rm. 1000 Portland, OR 97204 (503) 823-7740 http://www.portlandonline.com/bes/index.cfm?c=35122&</p>
<p><i>Potential Groundwater Contamination from Intentional and Non-Intentional Stormwater Infiltration</i> (1994) USEPA Report No. EPA/600/R-94/051</p>	<p>http://www.p2pays.org/ref/07/06744.pdf</p>

SUGGESTED RESOURCES	HOW TO GET A COPY
<p><i>Preliminary Data Summary of Urban runoff Best Management Practices</i> (1999) USEPA Report No. EPA-821-R-99-012</p>	<p>http://www.epa.gov/ost/stormwater/</p>
<p><i>Reference Guide for Stormwater Best Management Practices</i> (2000)</p>	<p>City of Los Angeles Urban runoff Management Division 650 South Spring Street, 7th Floor Los Angeles, California 90014 http://www.lacity.org/</p>
<p><i>Second Nature: Adapting LA's Landscape for Sustainable Living</i> (1999) by Tree People</p> <p>Detailed discussion of BMP designs presented to conserve water, improve water quality, and achieve flood protection.</p>	<p>Tree People 12601 Mullholland Drive Beverly Hills, CA 90210 (818) 623-4848</p>
<p><i>Start at the Source</i> (1999)</p> <p>Detailed discussion of permeable pavements and alternative driveway designs presented.</p>	<p>Bay Area Stormwater Management Agencies Association 2101 Webster Street, Suite 500 Oakland, CA (510) 286-1255 www.basmaa.org</p>
<p><i>Stormwater Management in Washington State, Volumes 1-5</i> (1999)</p> <p>Presents detailed guidance on BMP design for new development and construction.</p>	<p>State of Washington Department of Ecology Department of Printing P.O. Box 798 Olympia, WA 98507-0798 (360) 407-7529</p>
<p><i>Stormwater, Grading and Drainage Control Code, Seattle Municipal Code Section 22.800-22.808, and Director's Rules, Volumes 1-4. (Ordinance 119965, effective July 5, 2000)</i></p>	<p>City of Seattle Department of Design, Construction & Land Use 700 5th Avenue, Suite 1900 Seattle, WA 98104-5070 (206) 684-8880 http://www.ci.seattle.wa.us/</p>
<p><i>The Practice of Watershed Protection</i> by Thomas R. Shchuler and Heather K. Holland</p>	<p>Center for Watershed Protection 8391 Main Street Ellicott City, MD 21043 (410) 461-8323 www.cwp.org</p>
<p><i>Urban Storm Drainage, Criteria Manual – Volume 3, Best Management Practices</i> (1999)</p> <p>Presents guidance for designing BMPs</p>	<p>Urban Drainage and Flood Control District 2480 West 26th Avenue, Suite 156-B Denver, CO 80211 (303) 455-6277</p>

APPENDIX G

POTENTIAL PERMANENT TREATMENT BMP MAINTENANCE MECHANISMS

1. Project proponent agreement to maintain storm water BMPs: The City may enter into a contract with the project proponent obliging the project proponent to maintain, repair and replace the storm water BMP as necessary into perpetuity. Security may be required.
2. Assessment districts: The City may approve an Assessment District or other funding mechanism created by the project proponent to provide funds for storm water BMP maintenance, repair and replacement on an ongoing basis. Any agreement with such a District shall be subject to the Public Entity Maintenance Provisions above.
3. Lease provisions: In those cases where the City holds title to the land in question, and the land is being leased to another party for private or public use, the City may assure storm water BMP maintenance, repair and replacement through conditions in the lease.
4. Public entity maintenance: The City may approve a public or acceptable quasi-public entity (e.g., the County Flood Control District, or annex to an existing assessment district, an existing utility district, a state or federal resource agency, or a conservation conservancy) to assume responsibility for maintenance, repair and replacement of the permanent treatment BMP. Unless acceptable to the City, public entity maintenance agreements shall ensure estimated costs are front-funded or reliably guaranteed, (e.g., through a trust fund, assessment district fees, bond, letter of credit or similar means). In addition, the City may seek protection from liability by appropriate releases and indemnities. The City shall have the authority to approve storm water BMPs proposed for transfer to any other public entity within its jurisdiction before installation. The City shall be involved in the negotiation of maintenance requirements with any other public entities accepting maintenance responsibilities within their respective jurisdictions; and in negotiations with the resource agencies responsible for issuing permits for the construction and/or maintenance of the facilities. The City must be identified as a third party beneficiary empowered to enforce any such maintenance agreement within their respective jurisdictions.

The City may accept alternative maintenance mechanisms if such mechanisms are as protective as those listed above.

APPENDIX H

DEFINITIONS

“Advanced Treatment” means to use mechanical or chemical means to flocculate and remove suspended sediment from runoff from construction sites prior to discharge. Advanced treatment is required when an exceptional threat to water quality has been determined.

“Attached Residential Development” means any development that provides 10 or more residential units that share an interior/exterior wall. This category includes, but is not limited to: dormitories, condominiums and apartments.

“Automotive Repair Shop” means a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.

“Commercial Development” means any development on private land that is not exclusively heavy industrial or residential uses. The category includes, but is not limited to: mini-malls and other business complexes, shopping malls, hotels, office buildings, public warehouses, hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, plant nurseries, car wash facilities, automotive dealerships, commercial airfields, and other light industrial complexes.

“Commercial Development greater than 1 acre” means any commercial development that result in the disturbance of one acre or more of land.

“Detached Residential Development” means any development that provides 10 or more freestanding residential units. This category includes, but is not limited to: detached homes, such as single-family homes and detached condominiums.

“Directly Connected Impervious Area (DCIA)” means the area covered by a building, impermeable pavement, and/ or other impervious surfaces, which drains directly into the storm drain without first flowing across permeable vegetated land area (e.g., lawns).

“Environmentally Sensitive Areas” means areas that include, but are not limited to, all Clean Water Act 303(d) impaired water bodies (“303[d] water bodies”); areas designated as an “Area of Special Biological Significance” (ASBS) by the State Water Resources Control Board (*Water Quality Control Plan for the San Diego Basin* (1994) and amendments); water bodies designated as having a RARE beneficial use by the State Water Resources Control Board (*Water Quality Control Plan for the San Diego Basin* (1994) and amendments), or areas designated as preserves or their equivalent under the Multiple Species Conservation Program (MSCP) within the Cities and County of San Diego. The limits of Areas of Special Biological Significance are those defined in the *Water Quality Control Plan for the San Diego Basin* (1994 and amendments). Environmentally sensitive area is defined for the purposes of implementing SUSMP

requirements, and does not replace or supplement other environmental resource-based terms, such as “Environmentally Sensitive Lands,” employed by Copermittees in their land development review processes. As appropriate, Copermittees should distinguish between environmentally sensitive area and other similar terms in their Local SUSMPs.

“Hillside” means lands that have a natural gradient of 25 percent (4 feet of horizontal distance for every 1 foot of vertical distance) or greater and a minimum elevation differential of 50 feet, or a natural gradient of 200 percent (1 foot of horizontal distance for every 2 feet of vertical distance) or greater and a minimum elevation differential of 10 feet.

“Hillside development greater than 5,000 square feet” means any development that would create more than 5,000 square feet of impervious surfaces in hillsides with known erosive soil conditions.

“Hydromodification” means the change in the natural hydrologic processes and runoff characteristics (i.e. interception, infiltration, overland flow, interflow and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and changes in sediment transport. In addition, alternation of stream and river channels, installation of dams and water impoundments, and excessive streambank and shoreline erosion are also considered hydromodification, due to their disruption of natural watershed hydrologic processes....

“Infiltration” means the downward entry of water into the surface of the soil.

“Low Impact Development (LID)” means a stormwater management and land development strategy that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

“Maximum Extent Practicable (MEP)” means the technology-based standard established by Congress in the Clean Water Act 402(p)(3)(B)(iii) that municipal dischargers of urban runoff must meet. MEP generally emphasizes pollution prevention and source control BMPs primarily (as the first line of defense) in combination with treatment methods serving as a backup (additional lines of defense).

“Natural Drainage” means a natural swale or topographic depression which gathers and/or conveys runoff to a permanent or intermittent watercourse or waterbody.

“New Development” means land disturbing activities; surface grading for structural development, including construction or installation of a building or structure, the creation of impervious surfaces; and land subdivision.

“Pollutant” is any agent that may cause or contribute to the degradation of water quality such that a condition or pollution or contamination is created or aggravated.

“Parking Lot” means land area or facility for the temporary parking or storage of motor vehicles used personally, or for business or commerce.

“Projects Discharging to Receiving Waters within Environmentally Sensitive Areas” means all development and significant redevelopment that would create 2,500 square feet of impervious surfaces or increase the area of imperviousness of a project site to 10% or more of its naturally occurring condition, and either discharge urban runoff to a receiving water within or directly adjacent (where any portion of the project footprint is located within 200 feet of the environmentally sensitive area) to an environmentally sensitive area, or discharge to a receiving water within an environmentally sensitive area without mixing with flows from adjacent lands (where the project footprint is located more than 200 feet from the environmentally sensitive area).

“Project Footprint” means the limits of all grading and ground disturbance, including landscaping, associated with a project.

“Post Project Flows” means the peak runoff flows and runoff volume anticipated after the project has been constructed, taking into account all permeable and impermeable surfaces, soil and vegetation types and conditions after landscaping is complete, detention or retention basins or other water storage elements incorporated into the site design, and any other features that would affect runoff volumes and peak flows.

“Pre-Development Hydrologic Conditions” means hydrologic conditions that would exist assuming no pavement, structures or hardened surfaces, site vegetation typical of native conditions in the climate and ecological zone of the site, topography similar to current conditions without structures, pavements, or artificially hardened surfaces, and soil types similar to current conditions without structures, pavements, or artificially hardened surfaces. The terms “pre-development runoff”, “pre-development flow”, or “pre-development volume”, are the quantitative measures associated with this definition.

“Receiving Waters” means surface bodies of water, which directly or indirectly receive discharges from urban runoff conveyance systems, including naturally occurring wetlands, streams (perennial, intermittent, and ephemeral (exhibiting bed, bank, and ordinary high water mark)), creeks, rivers, reservoirs, lakes, lagoons, estuaries, harbors, bays and the Pacific Ocean. The Copermitttee shall determine the definition for wetlands and the limits thereof for the purposes of this definition, provided the Copermitttee definition is as protective as the Federal definition utilized by the United States Army Corps of Engineers and the United States Environmental Protection Agency. Constructed wetlands are not considered wetlands under this definition, unless the wetlands were constructed as mitigation for habitat loss. Other constructed BMPs are not considered receiving waters under this definition, unless the BMP was originally constructed in receiving waters.

“Retail Gasoline Outlets (RGO)” This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 vehicles per day.

Construction of treatment control BMPs is prohibited in “Receiving Waters” may not be

used to satisfy SUSMP requirements

“Residential Development” means any development on private land that provides living accommodations for one or more persons. This category includes, but is not limited to: single-family homes, multi-family homes, condominiums, and apartments.

“Restaurant” means a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except for structural treatment BMP and numeric sizing criteria requirement and hydromodification requirement.

“Sediment” means soils or other surficial materials eroded and then transported or deposited by the action of wind, water, ice, or gravity. Sediments can increase turbidity, clog fish gills, reduce spawning habitat, lower young aquatic organisms survival rates, smother bottom dwelling organisms, and suppress aquatic vegetation growth.

“Significant Redevelopment” means development that would create, add, or replace at least 5,000 square feet of impervious surfaces on an already developed site that falls under a priority development project categories. Where redevelopment results in an increase of less than 50% of the impervious surfaces of a previously existing development, and the existing development was not subject to SUSMP requirements, the numeric sizing criteria identified in Section 2, Step 8 apply only to the addition, and not to the entire development. When redevelopment results in an increase of more than 50% of the impervious surfaces of a previously existing development, the numeric sizing criteria applies to the entire development. Significant redevelopment includes, but is not limited to: the expansion of a building footprint; addition to or replacement of a structure; replacement of an impervious surface that is not part of a routine maintenance activity; and land disturbing activities related with structural or impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Significant redevelopment does not include trenching and resurfacing associated with utility work; resurfacing and reconfiguring surface parking lots; new sidewalk construction, pedestrian ramps, or bikelane on existing roads; and replacement of damaged pavement.

“Site Design BMP” also known as a significant part of Low Impact Development (LID), means any project design feature that reduces the amount of impervious surfaces, disconnects impervious surfaces, reduces creation or severity of potential pollutant sources, and/or reduces the alteration of the project site’s natural flow regime. Redevelopment projects that are undertaken to remove pollutant sources (such as existing surface parking lots and other impervious surfaces) or to reduce the need for new roads and other impervious surfaces (as compared to conventional or low-density new development) by incorporating higher densities and/or mixed land uses into the

project design, are also considered site design BMPs.

“Source Control BMP (both structural and non-structural)” means land use or site planning practices, or structures that aim to prevent urban runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff. Examples include roof structures over trash or material storage areas, and berms around fuel dispensing areas.

“Storm Water Best Management Practice (BMP)” means any schedules of activities, prohibitions of practices, general good house keeping practices, pollution prevention and educational practices, maintenance procedures, structural treatment BMPs, and other management practices to prevent or reduce to the maximum extent practicable the discharge of pollutants directly or indirectly to receiving waters. Storm Water BMPs also include treatment requirements, operating procedures and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. This SUSMP groups storm water BMPs into the following categories: site design, source control, and treatment control (pollutant removal) BMPs.

“Storm Water Conveyance System” means private and public drainage facilities by which storm water may be conveyed to Receiving Waters, such as: natural drainages, ditches, roads, streets, constructed channels, aqueducts, storm drains, pipes, street gutters, or catch basins.

“Streets, Roads, Highways, and Freeways” means any project that is not part of a routine maintenance activity, and would create a new paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles and other vehicles. For the purposes of SUSMP requirements, Streets, Roads, Highways and Freeways do not include trenching and resurfacing associated with utility work; applying asphalt overlay to existing pavement; new sidewalk, pedestrian ramps, or bikelane construction on existing roads; and replacement of damaged pavement.

“Treatment Control (Structural) BMP” means any engineered system designed and constructed to remove pollutants from urban runoff. Pollutant removal is achieved by simple gravity settling of particulate pollutants, filtration, biological uptake, media adsorption or any other physical, biological, or chemical process.

APPENDIX I

INTERIM HYDROMODIFICATION CRITERIA – PROJECTS > 50 ACRES

Regional Water Quality Control Board Order R9-2007-0001 Provision D.1.g (6) (Municipal Permit) requires the County of San Diego and its NPDES Co-permittees to identify Interim Hydromodification Criteria (IHC) within 365 days of Order adoption (i.e., January 24, 2008). The interim criteria will apply until the final Hydrograph Modification Management Plan (HMP) is implemented. The IHC is described in the order “as an interim range of runoff flow rates for which Priority Development Project post-project runoff flow rates and durations shall not exceed pre-project runoff flow rates and durations.” The purpose of the IHC is to prevent development-related changes in stormwater runoff from causing, or further accelerating, stream channel erosion or other adverse impacts to beneficial stream uses. This memorandum provides background on fluvial geomorphology and hydro graph modification management, describes flow control criteria applied in other HMPs, and provides a recommendation for developing the San Diego IHC.

GEOMORPHIC CONTEXT

Stream channels form in response to the sediment and runoff delivered from the watershed, in combination with channel slope and underlying geology. In a stable stream channel, water and sediment are in balance so that the channel neither aggrades nor erodes over time, though the channel may adjust dynamically to individual storm events. There are environmental influences that alter channel geomorphology including fire, landslides and tectonic uplift or subsidence. When these changes occur, stream channels adjust over time to achieve a new dynamic equilibrium under the altered conditions.

Anthropogenic land use changes have altered the balance of runoff and sediment supply in many Southern California watersheds, beginning with the introduction of cattle grazing in the 19th century. Modern land development tends to increase the rate and volume of runoff delivered to stream channels, due to the increase in impervious surfaces and drainage efficiency. In the Southern and Central coast regions of California, these anthropogenic changes have caused degradation of many stream channels, and the magnitude and rate of these changes has not allowed for adjustment to a new equilibrium state.

HYDROGRAPH MODIFICATION

Hydrograph modification refers to changes in the magnitude and frequency of stream flows as a result of urbanization, and the resulting impacts on the receiving channels in terms of erosion, sedimentation and degradation of in stream habitat. The degree to which a channel will erode is a function of the increase in driving forces (shear stress), the resistance of the channel (critical shear stress), the change in sediment delivery, and the geomorphic condition of the channel. Critical shear stress is the stress threshold above which erosion occurs. Not all flows cause erosion -- only those that generate shear stress in excess of the critical shear stress of the bank and bed materials. Urbanization increases the shear stress exerted on the channel by stream flows and can trigger erosion in the form of incision (channel downcutting) or widening (bank erosion) or both. Increases in flow below critical shear stress levels have little or no effect on the channel.

The existing (pre-project) geomorphic condition of the receiving channel is important because it influences the response of the channel to the imposed stresses. Stream

channels that have been previously impacted by earlier land use changes or direct interventions may not be in equilibrium with existing conditions, and these instabilities can influence channel response to hydrograph modification. For example, in an aggrading channel an increase in effective stress may increase channel stability by bringing sediment transport capacity closer to sediment load, while in an eroding channel a small increase in effective stress may cause a large increase in erosion. Changes in sediment or water delivery can also cause fundamental geomorphic thresholds to be crossed, for example by converting a wide and shallow braided channel into a narrow and deep single thread channel.

The standard for hydrograph modification management is to meet pre-project conditions. Where receiving stream channels are already unstable, it can best be thought of as a method to avoid accelerating or exacerbating existing problems. Where receiving stream channels are in a state of dynamic equilibrium, hydrograph modification management may prevent the onset of erosion or other problems.

HYDROLOGIC CRITERIA

It is well established that watershed urbanization tends to increase the frequency and duration of stormwater runoff and the effect is most dramatic for smaller, more frequent runoff events (Beighley et al., 2003, Hollis 1975). Rainfall events that may have been absorbed or retained by a natural ground surface produce runoff when those surfaces are paved. These smaller events are also associated with stream flows that are most important for erosion, due to the combination of their magnitude and frequency. The most geomorphically-effective flows are those that are both large enough to move an appreciable amount of sediment and frequent enough to have a significant cumulative impact, generally around the 1- to 5-year recurrence interval (Q1-Q5) (Wolman & Miller, 1960). Much of the impact of hydrograph modification is an increase in the frequency of geomorphically effective flows.

INTERIM HYDROMODIFICATION CRITERIA (IHC)

The range of flows to be managed under the curve-matching option is expressed as a percentage of the 5-year peak flow (Q5) based on the understanding that dominant discharge for Southern CA streams is in the vicinity of Q5. The curve-matching range is presented as an estimate at this time and may be refined prior to adoption of the final IHC.

1. Estimated post-project runoff durations and peak flows do not exceed pre-project durations and peak flows. The project proponent must use a continuous simulation hydrologic computer model such as USEPA's Hydrograph Simulation Program-Fortran (HSPF) to simulate pre-project and post-project runoff, including the effect of proposed IMPs, detention basins, or other stormwater management facilities. To use this method, the project proponent shall compare the pre-project and post-project model output for a rainfall record of at least 30 years, and shall show the following criteria are met:

- a. For flow rates from 20% of the pre-project 5-year runoff event (0.2Q5) to the pre-project 10-year runoff event (Q10), the post-project discharge rates and durations shall not deviate above the pre-project rates and durations by more than 10% over more than 10% of the length of the flow duration curve. (Note that the 0.2Q5 end of the range may be modified).

- b. For flow rates from 0.2Q5 to Q5, the post-project peak flows shall not exceed pre-project peak flows. For flow rates from Q5 to Q10, post-project peak flows may exceed pre-project flows by up to 10% for a 1-year frequency interval. For example, post-project flows could exceed pre-project flows by up to 10% for the interval from Q9 to Q10 or from Q5.5 to Q6.5, but not from Q8 to Q10. (Note that the 0.2Q5 end of the range may be modified).

- c. Implementation of Low Impact Development Integrated Management Practices (LID IMPs). The project proponent may implement LID IMPs to manage hydrograph modification impacts, using design procedures, criteria, and sizing factors (ratios of LID IMP volume or area to tributary area) specified by the Co-permittees. The Co-permittees' LID IMP designs and sizing factors shall be determined using continuous simulation of runoff from a long-term rainfall record.