MODEL STANDARD URBAN STORM WATER MITIGATION PLAN

FOR SAN DIEGO COUNTY, PORT OF SAN DIEGO, SAN DIEGO REGIONAL AIRPORT AUTHORITY, AND CITIES IN SAN DIEGO COUNTY

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MODEL STANDARD URBAN STORM WATER MITIGATION PLAN

I. BACKGROUND

The municipal storm water National Pollutant Discharge Elimination System (NPDES) permit (Order No. R9-2007-0001, NPDES No. CAS0108758, hereinafter referred to as "Municipal Permit") issued to San Diego County, the Port of San Diego, San Diego County Regional Airport Authority and 18 cities (Copermittees) by the San Diego Regional Water Quality Control Board (Regional Board) on January 24, 2007, requires the development and implementation of a program addressing urban runoff pollution issues in development planning for public and private projects.

The requirement to implement a program for development planning is based on federal and state statutes including: Section 402 (p) of the Clean Water Act, Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 ("CZARA"), and the California Water Code. The Clean Water Act amendments of 1987 established a framework for regulating urban runoff discharges from municipal, industrial, and construction activities under the NPDES program. The Municipal Permit requires the implementation of a Jurisdictional Urban Runoff Management Program (URMP). The primary objectives of the Jurisdictional URMP requirements are to:

1. Ensure that discharges from municipal urban runoff conveyance systems do not cause or contribute to a violation of water quality standards;
2. Effectively prohibit non-storm water discharges in urban runoff; and
3. Reduce the discharge of pollutants from urban runoff conveyance systems to the Maximum Extent Practicable (MEP statutory standard).

II. SUMMARY

The Model Standard Urban Storm Water Mitigation Plan (SUSMP) was developed collectively by the Copermittees to address post-construction urban runoff pollution from new development and redevelopment projects that fall under "priority project" categories. The goal of the Model SUSMP is to develop and implement practicable policies to ensure to the maximum extent practicable that development does not increase pollutant loads from a project site and considers urban runoff flow rates, velocities, and durations. This goal may be achieved through site-specific controls and/or drainage area-based or shared structural treatment controls. This Model

SUSMP, collectively developed by the Copermittees, identified appropriate Best Management Practices (BMPs) for certain designated project types to achieve this goal. This Model SUSMP will be reviewed and approved by the Regional Board in a public process. The Copermittees are required to adopt their own Local SUSMP and ordinances consistent with the Regional Board-approved Model SUSMP within 180 days after that approval.

Under the Local SUSMP, each Copermittee will approve the SUSMP project plan(s) as part of the development plan approval process for discretionary projects, and prior to issuing permits for ministerial projects. To allow flexibility in meeting SUSMP design standards, structural treatment control BMPs may be located on- or off-site, used singly or in combination, or shared by multiple developments, provided certain conditions are met.

All new development and significant redevelopment projects that fall into one of the following "priority project" categories are subject to these SUSMP requirements, subject to the lawful prior approval provisions of the Municipal Permit. In the instance where a project feature, such as a parking lot, falls into a priority project category, the entire project footprint is subject to these SUSMP requirements. These categories are:

- Residential development of 10 units or more
- Commercial development greater than 1 acre
- Heavy industry
- Industrial development greater than 1 acre
- Automotive repair shops
- Restaurants
- Hillside development greater than 5,000 square feet
- Projects located within or directly adjacent to or directly discharging to receiving waters within Environmentally Sensitive Areas that create 2,500 square feet or more of impervious surface or increase the area of imperviousness to 10% or more of its naturally occurring condition
- Projects greater than 2,500 square feet of impervious surface that discharge to receiving waters within or adjacent to Environmentally Sensitive Areas
- Parking Lots 5,000 square feet or more impervious surface or with > 15 parking spaces and potentially exposed to urban runoff
- Streets, roads, highways, and freeways which would create a new paved surface that is 5,000 square feet or greater of impervious surface
- -Retail gasoline outlets 5,000 square feet or more or with a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

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Limited Exclusion: Trenching and resurfacing work associated with utility projects are not considered priority projects; resurfacing and reconfiguring surface parking lots and existing roadways; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damage pavement, such as pothole repair. Parking lots, buildings and other structures associated with utility projects are subject to SUSMP requirements if one or more of the criteria for the above categories are met.

III. DEFINITIONS

"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.

“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.

"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 Copermittee shall determine the definition for wetlands and the limits thereof for the purposes of this definition, provided the Copermittee 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.

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.

IV. CONFLICTS WITH LOCAL PRACTICES OR MUNICIPAL PERMIT

Where requirements of the local SUSMP conflict with established local codes, (e.g., specific language of signage used on storm drain stenciling), the Copermittee may continue the local practice and modify the SUSMP to be consistent with the code, except that to the extent that the standards in the SUSMP are more stringent than those under local codes, such more stringent standards shall apply.

This model SUSMP is based on the Municipal Permit as it was in force in January 2007, except as that Municipal Permit was directed to be revised by the State Water Resources Control Board. In January 2002 the Municipal Permit was being challenged in a court action. Two Copermittees are Petitioners in that action, and all other Copermittees have been named as Real Parties in Interest in that action. The submission of this Model SUSMP and of jurisdictional SUSMPs is not a waiver by any Copermittee of its legal rights related to that action. If as a result of that court action any part of the Municipal Permit is invalidated, stayed, or required to be revised by a final judgment, Jurisdictional SUSMPs and local ordinances may be appropriately amended despite the submission of this document.

V. IMPLEMENTATION PROCESS

Copermittees shall identify the department(s) responsible for ensuring SUSMP requirements are implemented in their Local SUSMP, and the roles and responsibilities each department possesses. In addition, Copermittees shall describe the point(s) in the development review process in which project proponents are required to incorporate SUSMP requirements into the project design. At a minimum, for discretionary projects, SUSMP requirements shall be incorporated into the project design and shown on the plans prior to decision-maker approval of discretionary permits. For projects requiring only ministerial permits, SUSMP requirements shall be incorporated into the project design and shown on the plans prior to the issuance of any ministerial permits. Copermittee departments carrying out public projects that are not required to obtain permits shall be responsible for ensuring SUSMP requirements are incorporated into the project design and shown on the plans prior to bidding for construction contracts, or

equivalent. For public projects SUSMP requirements must be incorporated into the project design and shown on the plans before allowing the project to commence.

VI. STORM WATER BMP SELECTION PROCEDURE

Section VI provides a procedure for identifying a project's pollutants and conditions of concern, and addressing these through site design, source control, and treatment control storm water BMPs. All priority projects shall implement one or a combination of storm water BMPs, including, 1) LID and site design BMPs, 2) source control BMPs and, 3) structural treatment BMPs after the pollutants and conditions of concern have been identified. Storm water BMPs, from those listed in Appendix A: "Approved Storm Water Best Management Practices", shall be considered and implemented where expressly required by the Permit and if not so required where determined applicable and feasible by the Copermittee. Additional Information on BMPs is included in the notes to Table 3 and in the references in Appendix B. The storm water BMPs shall adhere to the requirements in Section VI of this Model SUSMP, and shall be correctly designed so as to remove pollutants to the maximum extent practicable. A flow chart summarizing the storm water BMP selection procedure is provided in Figure 1.

Site Design Storm Water Treatment Credits

The Copermittees may develop and submit for public review and comment and Regional Board approval a regional Model Site Design Storm Water Treatment Credits program that allows reductions in the volume or flow of storm water that must be captured or treated on a project in return for the inclusion of specified project design features in the project. The Model Site Design Storm Water Treatment Credits program shall be deemed to be a part of this Model SUSMP following Regional Board approval. Any such model program shall specify the conditions under which project proponents can be credited for the use of site design features and low impact development techniques that can reduce the volume of storm water runoff, preserve natural areas, and minimize the pollutant loads generated and potentially discharged from the site. Any Site Design Storm Water Treatment Credits program implemented by a Copermittee within its jurisdiction shall be consistent and compliant with this model approved by the Regional Board.

Alternative Methods for Achieving Treatment Requirements (any changes to this section???)

Copermittees may implement the Local Equivalent Area Drainage (LEAD) Method, as proposed by the City of San Diego in its May 16, 2002 letter (Appendix C), for meeting the BMP requirements in Section VI.2.c, Step 8, "Design to Treatment Control BMP Standards," for inclusion in their jurisdictional SUSMP. The alternative method must minimally meet the following criteria:

- The alternative treatment area shall be located within the proximity of the project;

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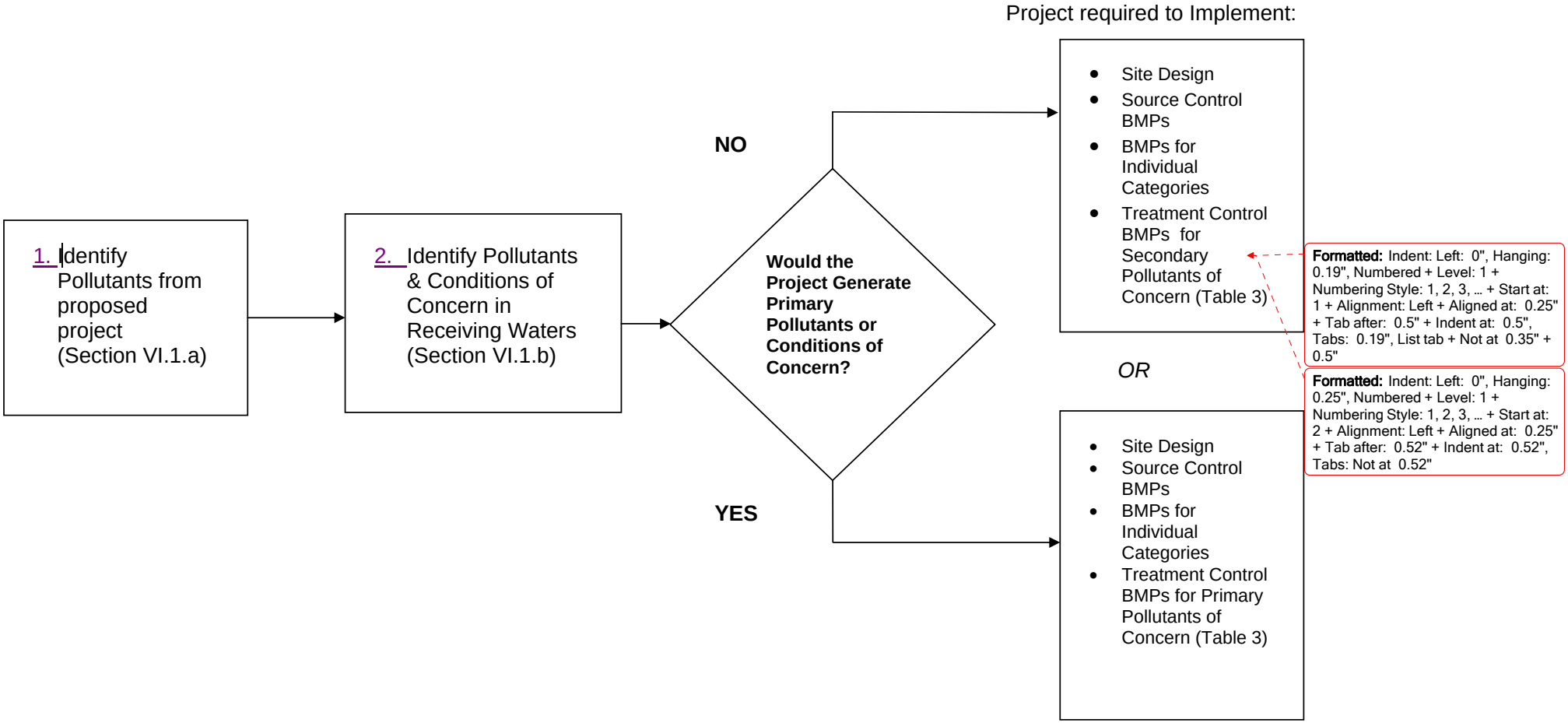
- The alternative treatment area shall discharge to the same receiving water as the project;
- The alternative treatment area shall be equivalent or greater than the project footprint;
- The alternative treatment area shall have an equivalent or greater impervious surface area than the project;
- The alternative treatment area shall have an equivalent or greater pollutant load than the project;
- Site Design and Source Control BMPs (Sections VI.2.a & b) shall be required in the project design;
- Alternative treatments shall be limited to redevelopment and/or infill projects.

Each Copermittee may implement an alternative method for no more than three pilot projects within its jurisdiction during this permit cycle. For each project where an alternative method is implemented, the effectiveness of the alternative method shall be monitored and reported on to the Regional Board by the end of the permit cycle.

Figure 1. Storm Water BMP Selection Procedure Flow Chart



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1. IDENTIFY POLLUTANTS & CONDITIONS OF CONCERN

Priority project proponents shall use this guidance to identify pollutants and conditions of concern, for which they need to mitigate or protect against. Once identified, appropriate control measures for these pollutants and conditions are specified in Section VI.2, "Establish Storm Water BMPs." Site design and source control BMPs are required based on pollutants commonly associated with the proposed project type (see Table 2, "Standard Storm Water BMP Selection Matrix"). Treatment Control BMPs are also required for the project's expected pollutants of concern (see Table 3).

Copermittees shall incorporate the requirements listed in Sections VI.1.a-c in the procedure for identifying pollutants and conditions of concern in the Local SUSMPs. For private priority projects, the Copermittee shall require the information to be provided with the project application prior to being deemed complete. For public priority projects, the Copermittee shall approve the information prior to bidding for construction contracts.

General Categories of Water Pollution

Urban runoff from a developed site has the potential to contribute pollutants, including oil and grease, suspended solids, metals, gasoline, pesticides, and pathogens to the storm water conveyance system and receiving waters. For the purposes of identifying pollutants of concern and associated storm water BMPs, pollutants are grouped in nine general categories as follows:

1. Sediments – Sediments are 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.
2. Nutrients – Nutrients are inorganic substances, such as nitrogen and phosphorus. They commonly exist in the form of mineral salts that are either dissolved or suspended in water. Primary sources of nutrients in urban runoff are fertilizers and eroded soils. Excessive discharge of nutrients to water bodies and streams can cause excessive aquatic algae and plant growth. Such excessive production, referred to as cultural eutrophication, may lead to excessive decay of organic matter in the water body, loss of oxygen in the water, release of toxins in sediment, and the eventual death of aquatic organisms.
3. Metals – Metals are raw material components in non-metal products such as fuels, adhesives, paints, and other coatings. Primary source of metal pollution in storm water are typically commercially available metals and metal products. Metals of concern include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors in primer coatings and cooling tower systems. At low concentrations naturally occurring in soil, metals are not toxic. However, at higher concentrations, certain metals can be toxic to aquatic life. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish. Environmental

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concerns, regarding the potential for release of metals to the environment, have already led to restricted metal usage in certain applications.

4. Organic Compounds – Organic compounds are carbon-based. Commercially available or naturally occurring organic compounds are found in pesticides, solvents, and hydrocarbons. Organic compounds can, at certain concentrations, indirectly or directly constitute a hazard to life or health. When rinsing off objects, toxic levels of solvents and cleaning compounds can be discharged to storm drains. Dirt, grease, and grime retained in the cleaning fluid or rinse water may also adsorb levels of organic compounds that are harmful or hazardous to aquatic life.

5. Trash & Debris – Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) are general waste products on the landscape. The presence of trash & debris may have a significant impact on the recreational value of a water body and aquatic habitat. Excess organic matter can create a high biochemical oxygen demand in a stream and thereby lower its water quality. Also, in areas where stagnant water exists, the presence of excess organic matter can promote septic conditions resulting in the growth of undesirable organisms and the release of odorous and hazardous compounds such as hydrogen sulfide.

6. Oxygen-Demanding Substances – This category includes biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. Proteins, carbohydrates, and fats are examples of biodegradable organic compounds. Compounds such as ammonia and hydrogen sulfide are examples of oxygen-demanding compounds. The oxygen demand of a substance can lead to depletion of dissolved oxygen in a water body and possibly the development of septic conditions.

7. Oil and Grease – Oil and grease are characterized as high-molecular weight organic compounds. Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids. Introduction of these pollutants to the water bodies are very possible due to the wide uses and applications of some of these products in municipal, residential, commercial, industrial, and construction areas. Elevated oil and grease content can decrease the aesthetic value of the water body, as well as the water quality.

8. Bacteria and Viruses – Bacteria and viruses are ubiquitous microorganisms that thrive under certain environmental conditions. Their proliferation is typically caused by the transport of animal or human fecal wastes from the watershed. Water, containing excessive bacteria and viruses can alter the aquatic habitat and create a harmful environment for humans and aquatic life. Also, the decomposition of excess organic waste causes increased growth of undesirable organisms in the water.

9. Pesticides – Pesticides (including herbicides) are chemical compounds commonly used to control nuisance growth or prevalence of organisms.

Excessive application of a pesticide may result in runoff containing toxic levels of its active component.

a. Identify Pollutants from the Project Area

Using Table 1, identify pollutants that are anticipated to be generated from the proposed 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.

	General Pollutant Categories								
Priority Project 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.

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b. Identify Pollutants of Concern

Pollutants generated by the proposed priority project that exhibit one or more of the following characteristics are considered primary pollutants of concern:

- Current loadings or historical deposits of the pollutant are impairing the beneficial uses of a receiving water;
- Elevated levels of the pollutant are found in water or sediments of a receiving water and/or have the potential to be toxic to or bioaccumulate in organisms therein; and
- Inputs of the pollutant are at a level high enough to be considered potentially toxic.

To identify primary pollutants of concern in receiving waters, each priority project shall, at a minimum, do the following:

1. For each of the proposed projects discharge points, identify the receiving water(s) that each discharge point proposes to discharge to, including hydrologic unit basin number(s), as identified in the most recent version of the *Water Quality Control Plan for the San Diego Basin*[1], prepared by the San Diego Regional Water Quality Control Board.
2. Identify any receiving waters, into which the developed area would discharge to, listed on the most recent list of Clean Water Act Section 303(d) impaired water bodies[2]. List any and all pollutants for which the receiving waters are impaired.
3. Compare the list of pollutants for which the receiving waters are impaired with the pollutants anticipated to be generated by the project (as identified in Table 1). Any pollutants identified by Table 1 which are also causing impairment of receiving waters shall be considered primary pollutants of concern.

For projects where no primary pollutants of concern exist, those pollutants identified through the use of Table 1 shall be considered secondary pollutants of concern.

c. Identify Conditions of Concern

Common impacts to the hydrologic regime resulting from development typically include increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration, and peaks; faster time to reach peak flow; and water quality degradation. These changes have the potential to permanently impact downstream channels and habitat integrity. A change to a priority project site's hydrologic regime would be considered a condition of concern if the change would impact downstream channels and habitat integrity.

Because of these potential impacts, municipal staff may require the following steps be followed for priority projects which, in their judgment, may impact the hydrologic regime:

1. Evaluate the project's conditions of concern in a drainage study report prepared

1. http://www.swrcb.ca.gov/~rwqcb9/Programs/Planning_and_Services/SD_Basin/sd_basin.html
2. http://www.swrcb.ca.gov/tmdl/303d_lists.html, San Diego is in Region 9

by a registered civil engineer in the State of California, with experience in fluvial geomorphology and water resources management. The report shall consider the project area's location (from the larger watershed perspective), topography, soil and vegetation conditions, percent impervious area, natural and infrastructure drainage features, wet season groundwater depth, and any other relevant hydrologic and environmental factors to be protected specific to the project area's watershed.

2. As part of the drainage study, a qualified, licensed professional shall provide a report on proposed infiltration techniques (trenches, basins, dry wells, permeable pavements with underground reservoir for infiltration) regarding any potential adverse geotechnical concerns. Geotechnical conditions such as: slope stability, expansive soils, compressible soils, seepage, groundwater depth, and loss of foundation or pavement subgrade strength should be addressed, and mitigation measures provided.
3. As part of the drainage study, the civil engineer shall conduct a field reconnaissance to observe and report on downstream conditions, including undercutting erosion, slope stability, vegetative stress (due to flooding, erosion, water quality degradation, or loss of water supplies) and the area's susceptibility to erosion or habitat alteration as a result of an altered flow regime.
4. The drainage study shall compute rainfall runoff characteristics from the project area including, at a minimum, peak flow rate, flow velocity, runoff volume, time of concentration, and retention volume. These characteristics shall be developed for the two-year and 10-year frequency, Type I storm, of six-hour or 24-hour duration (whichever is the closer approximation of the site's time of concentration), during critical hydrologic conditions for soil and vegetative cover[3]. The drainage study shall report the project's conditions of concern based on the hydrologic and downstream conditions discussed above. Where downstream conditions of concern have been identified, the drainage study shall establish that pre-project hydrologic conditions affecting downstream conditions of concern would be maintained by the proposed project, satisfactory to the Copermittee, by incorporating the site design, source control, and treatment control requirements identified in Section VI.2.

For Priority Development Projects that disturb 50 acres or more:

1. PDP post-project runoff flow rates and durations shall not exceed pre-project runoff flow rates and durations (Interim Hydromodification Criteria), where the increased discharge flow rates and durations will result in increased potential for erosion or other significant adverse impacts to beneficial uses, attributable to changes in flow rates and durations.

3. Design storms can be found at http://www.wrcc.dri.edu/pcpnfreq.html. The Copermittees may calculate the storm events using local rain data. In addition, isopluvial maps contained in the County of San Diego Hydrology Manual may be used to extrapolate rainfall data to areas where insufficient data exists. If isopluvial maps are selected, Copermittees shall describe their method for using isopluvial maps in their Jurisdictional SUSMP.

2. PDPs disturbing 50 acres or more shall implement hydrologic controls to manage post-project runoff flow rates and durations as required by the Interim Hydromodification Criteria.

2. ESTABLISH STORM WATER BMPs

Site design BMPs reduce the need for source and/or treatment control BMPs, and source control BMPs may reduce the amount of treatment control BMPs needed. Throughout all the following sections, all priority projects shall consider, and incorporate and implement where expressly required by the Permit and if not so required where determined applicable and feasible by the Copermittee, storm water BMPs into the project design, in the following progression:

- Site Design BMPs
- Source Control BMPs
- Treatment Control BMPs

Priority projects must implement LID site design BMPs and source control BMPs, and must also implement treatment control BMPs unless a waiver is granted based on the infeasibility of all treatment control BMPs. LID BMPs must meet minimum requirements in municipal permit section D.1.d.(4). BMPs must also achieve certain performance standards in municipal permit section D.1.d.(5) and (6) . Selection of BMPs from the menus included in this SUSMP, using the rules set out in this SUSMP, must fulfill these requirements.

In addition, runoff treated by LID and site design or source control BMPs, such as rooftop runoff treated in landscaping, may be useful in reducing the quantity of runoff required to be treated in Section VI.2.c, “Treatment Control BMPs.”

To select a structural treatment BMP using the Treatment Control BMP Selection Matrix, each priority project shall compare the list of pollutants for which the downstream receiving waters are impaired (if any), with the pollutants anticipated to be generated by the project (as identified in Table 1). Any pollutants identified by Table 1 which are also causing a Clean Water Act section 303(d) impairment of the receiving waters of the project shall be considered primary pollutants of concern. Priority projects that are anticipated to generate a primary pollutant of concern shall meet all applicable requirements in Section VI.2, and shall select a single or combination of storm water BMPs from Table 3 which maximizes pollutant removal for the particular primary pollutant(s) of concern.

Alternatively, a project proponent may elect to implement a combination of LID BMPs that either disperse and infiltrate, or direct to bioretention facilities, the flows from all impervious areas on-site. These BMPs are presumed to provide maximum extent practicable treatment for all pollutants of concern; therefore no further documentation of

the treatment BMP selection process is required.

Priority projects that are not anticipated to generate a pollutant for which the receiving water is Clean Water Act Section 303(d) impaired shall meet applicable standard requirements in Section VI.2, and shall select a single or combination of storm water BMPs from Table 3 which are effective for pollutant removal of the identified secondary pollutants of concern, consistent with the "maximum extent practicable" standard defined in Attachment C of the Municipal Permit.

Where a site generates both primary and secondary pollutants of concern, primary pollutants of concern receive priority for BMP selection. For such sites, selected BMPs must only maximize pollutant removal for the primary pollutants of concern. Where a site generates only secondary pollutants of concern, selected BMPs shall target the secondary pollutant of concern determined to be most significant for the project. Selected BMPs must be effective for the widest range of pollutants of concern anticipated to be generated by a priority project (as identified in Table 1), consistent with the maximum extent practicable standard defined in Attachment C of the Municipal Permit.

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Treatment control BMPs with a high or medium pollutant removal efficiency for the project's most significant pollutant of concern shall be selected. Treatment control BMPs with a low removal efficiency ranking shall only be approved by the Copermittee when a feasibility analysis has been conducted which exhibits that implementation of treatment control BMPs with a high or medium removal efficiency ranking are infeasible. Treatment control BMPs shall not be constructed within a receiving water. Alternative storm water BMPs not identified in Table 3 may be approved at the discretion of the Copermittee, provided the alternative BMP is as effective in removal of pollutants of concern as other feasible BMPs listed in Table 3.

Table 2. Site Design and Source Control Storm Water BMP Selection Matrix.

Priority Project Category	*Site Design BMPs*[1]	*Source Control BMPs*[2]	*Requirements Applicable to Individual Priority Project Categories*[3]										
			a. Private Roads	b. Residential Driveways & Guest Parking	c. Dock Areas	d. Maintenance Bays	e. Vehicle Wash Areas	f. Outdoor Processing Areas	g. Equipment Wash Areas	h. Parking Areas	i. Roadways	j. Fueling Areas	k. Hillside Landscaping
Detached Residential Development	R	R	R	R									R
Attached Residential Development	R	R	R										
Commercial Development >One Acre	R	R			R	R	R	R					
Industrial Development > One Acre	R	R			R	R	R	R	R			R	
Automotive Repair Shop	R	R			R	R	R		R			R	
Restaurants	R	R			R				R				
Hillside Development >5,000 ft^2	R	R	R										R
Parking Lots	R	R								R[4]			
Retail Gasoline Outlets	R	R					R					R	
Streets, Highways & Freeways	R	R									R		

R = Required; select BMPs as required from the applicable steps in Section VI.2.a & b, or equivalent as identified in Appendix A.
(1) Refer to Section VI.2.a.
(2) Refer to Section VI.2.b.
(3) Priority project categories must apply specific storm water BMP requirements, where applicable. Projects are subject to the requirements of all priority project categories that apply.
(4) Applies if the paved area totals >5,000 square feet or with >15 parking spaces and is potentially exposed to urban runoff.

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Table 3. Treatment Control BMP Selection Matrix[(1)].

Pollutants of Concern	Bioretention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	High-rate biofilters	High-rate media filters	Trash Racks & Hydro -dynamic Devices
Coarse Sediment and Trash	High	High	High	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	Medium	Low
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	Low	Low

Notes on Treatment Control BMP Categories
All rankings are relative. Ranking of all facilities assumes proper sizing, design, and periodic maintenance. Following are general descriptions of each category.

- **Bioretention Facilities** (infiltration planters, flow-through planters, bioretention areas, and bioretention swales). Facilities are designed to capture runoff and infiltrate slowly through soil media which also supports vegetation. Bioretention facilities, except for flow-through planters, effectively promote infiltration into native soils. In clay soils, facilities may capture excess treated runoff in an underdrain piped to the municipal storm drain system. Typical criteria: an infiltration surface area at least 4% of tributary impervious area, 6-inch average depth of top reservoir, 18-inch soil layer, 12-inch to 18-inch gravel subsurface storage layer.

- **Settling Basins and Wetlands** (extended detention basins, "wet" basins, decorative or recreational lakes or water features also used for stormwater treatment, constructed wetlands). Facilities are designed to capture a minimum water quality volume of 80% of total runoff and detain for a minimum of 48 hours. Some wetland designs have proven effective in removing nutrients, but performance varies.

- **Infiltration Facilities or Practices** (infiltration basins, infiltration trenches, dry wells, dispersal of runoff to landscape, pervious pavements). These facilities and landscape designs capture, retain, and infiltrate a minimum of 80% of runoff into the ground. Infiltration facilities are generally only feasible in permeable (Hydrologic Soil Group A or B) soils. Volume and area of infiltration facilities depends on soil permeability and safety factor used. Typical criteria: Infiltration facilities should have pretreatment to remove silt to prolong life of the facility. A 10-foot vertical separation from average seasonal groundwater depth is required. Dispersal to landscape may be accomplished in any soil type and generally requires a maximum 2:1 ratio impervious:pervious and concave topography to ensure the first 1 inch of rainfall is retained.

- **Media Filters** (sand filters). Filters designed to treat runoff produced by a rainfall of 0.2 inches per hour (or 2×85^{th} percentile hourly rainfall intensity) by slow infiltration through sand or other media. Typical criteria: Surface loading rate not to exceed 5 inches/hour. Entire surface of the sand must be accessible for maintenance.

- **High Rate Biofilters** (tree wells, typically proprietary). Biofilters with specially designed media to rapidly filter runoff while removing some pollutants. Filterra® (proprietary version) recommends surface loading rates of up to 100 inches/hour.

- **High-rate Media Filters** (typically proprietary). Vaults with replaceable cartridge filters filled with inorganic media.

- **Drainage Inserts** have low effectiveness in removing pollutants that tend to associate with fine particles and have medium effectiveness in removing coarse sediment and trash. They are sometimes used to augment more effective treatment facilities and are sometimes used alone when more effective facilities have been deemed infeasible.

Notes on Pollutants of Concern:
In Table 3, Pollutants of Concern are grouped as gross pollutants, pollutants that tend to associate with fine particles, and pollutants that remain dissolved.

Pollutant	Coarse Sediment and Trash	Pollutants that tend to associate with fine particles during treatment	Pollutants that tend to be dissolved following treatment
Sediment	X	X	
Nutrients		X	X
Heavy Metals		X	
Organic Compounds		X	
Trash & Debris	X		
Oxygen Demanding		X	
Bacteria		X	
Oil & Grease		X	
Pesticides		X	

a. **Low Impact Development (LID) and Site Design BMPs**

Priority projects shall be designed so as to minimize directly connected impervious surfaces and to promote infiltration using LID techniques. Priority projects shall, to the maximum extent practicable, minimize the introduction of pollutants and conditions of concern that may result in significant impacts, generated from site runoff to the storm water conveyance system. Priority Projects shall also control post-development peak storm water runoff discharge rates and velocities to maintain or reduce pre-development downstream erosion and to protect stream habitat. Priority projects can address these objectives through the creation of a hydrologically functional project design that attempts to mimic the natural hydrologic regime. Many of these techniques are outlined and reviewed in the County of San Diego's LID Handbook and Appendices. Mimicking a site's natural hydrologic regime can be pursued by:

1. Reducing imperviousness, conserving natural resources and areas, maintaining and using natural drainage courses in the storm water conveyance system, and minimizing clearing and grading.
2. Providing runoff storage measures dispersed throughout a site's landscape with the use of bioretention facilities and detention, retention, and infiltration 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 the County of San Diego's LID Handbook (2007), *Start at the Source* (1999), *Low-Impact Development Design Strategies* (1999), the City of Portland's Stormwater Manual (2004), and the Contra Costa Clean Water Program's *Stormwater C.3 Guidebook (2006).*

Step 1: Objective: Maintain Pre-Development Rainfall Runoff Characteristics

Priority projects shall control post-development peak storm water runoff discharge rates and velocities to maintain or reduce pre-development downstream erosion. In addition, projects should control runoff discharge volumes and durations to the maximum extent practicable using the site design, source control, and treatment control requirements identified in Section VI.2.

Design Concept 1: Minimize Project's Impervious Footprint & Conserve Natural Areas

The following site design options shall be considered and, incorporated and implemented where determined applicable and feasible by the Copermittee, during the site planning and approval process, consistent with applicable General Plan policies and other development regulations.

- Minimize and disconnect impervious surfaces. This can be achieved in

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various ways, including, but not limited to increasing building density (number of stories above or below ground) and developing land use regulations seeking to limit impervious surfaces. Decreasing the project's footprint can substantially reduce the project's impacts to water quality and hydrologic conditions. Copermittees are encouraged to develop standards for relaxing height and other zoning restrictions as incentives to achieve this design concept.

- Conserve natural areas, soils, and vegetation where feasible. This can be achieved by concentrating or clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition. The following list provides a guideline for determining the least sensitive portions of the site, in order of increasing sensitivity. Jurisdictions should also refer to their Multiple Species Conservation Plans or other biological regulations, as appropriate.
- Areas devoid of vegetation, including previously graded areas and agricultural fields.
- Areas of non-native vegetation, disturbed habitats and eucalyptus woodlands.
- Areas of chamise or mixed chaparral, and non-native grasslands.
- Areas containing coastal scrub communities.
- All other upland communities.
- Occupied habitat of sensitive species and all wetlands (as both are defined by the Copermittee).
- All areas necessary to maintain the viability of wildlife corridors.
- Within each of the previous categories, areas containing hillsides (as defined in this Model SUSMP) should be considered more sensitive than the same category without hillsides.
- Construct walkways, trails, patios, overflow parking lots and alleys and other low-traffic areas with permeable surfaces, such as pervious concrete, permeable asphalt, unit pavers, and granular materials.
- 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.
- Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.
- Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.
- Use natural drainage systems to the maximum extent practicable.
- Other site design options that are comparable, and equally effective.
- Minimize soil compaction

Design Concept 2: Minimize Directly Connected Impervious Areas (DCIAs)

Priority projects shall consider, and incorporate and implement the following design characteristics, where determined applicable and feasible by the Copermittee.

- Where landscaping is proposed, drain rooftops into adjacent landscaping prior to discharging to the storm drain.
- Where landscaping is proposed, drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.
- Other design characteristics that are comparable and equally effective.
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Step 2: Protect Slopes and Channels

Project plans shall include storm water BMPs to decrease the potential for erosion of slopes and/or channels, consistent with local codes and ordinances and with the approval of all agencies with jurisdiction, e.g., the U.S. Army Corps of Engineers, the San Diego Regional Water Quality Control Board, and the California Department of Fish and Game. The following design principles shall be considered, and incorporated and implemented where determined applicable and feasible by the Copermittee :

- Minimize disturbances to Natural Drainages
- Convey runoff safely from the tops of slopes.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize permanent channel crossings.
- 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.
- Other design principles that are comparable and equally effective.

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a. Source Control BMPs

Step 3: Provide Storm Drain System Stenciling and Signage

Storm drain stencils are highly visible source control messages, typically placed directly adjacent to storm drain inlets. The stencils contain a brief statement that prohibits the dumping of improper materials into the urban runoff conveyance system. Graphical icons, either illustrating anti-dumping symbols or images of receiving water fauna, are effective supplements to the anti-dumping message. Priority projects shall include the following requirements in the project design.

1. Provide stenciling or labeling of all storm drain inlets and catch basins within the project area with prohibitive language (such as: “NO DUMPING – I LIVE IN <<name receiving water>>”) and/or graphical icons to discourage illegal dumping.
2. Post signs and prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

3. Maintain legibility of stencils and signs.

Step 4: Design Outdoor Material Storage Areas to Reduce Pollution Introduction

Improper storage of materials outdoors may increase the potential for toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to enter the urban runoff conveyance system. Where the priority project plans include outdoor areas for storage of hazardous materials that may contribute pollutants to the urban runoff conveyance system, the following storm water BMPs are required:

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

Step 5: Design Trash Storage Areas to Reduce Pollution Introduction

All trash container areas shall meet the following requirements (limited exclusion: detached residential homes):

1. Paved with an impervious surface, designed not to allow run-on from adjoining areas, screened or walled to prevent off-site transport of trash; and
2. Provide attached lids on all trash containers that exclude rain, or roof or awning to minimize direct precipitation.

Step 6: Use Efficient Irrigation Systems & Landscape Design

Priority projects shall design the timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water conveyance system. (Limited exclusion: detached residential homes.) In compliance with the Water Conservation in Landscaping Act, the following methods to reduce excessive irrigation runoff shall be considered, and incorporated and implemented where determined applicable and feasible by the Copermittee:

1. Employing rain shutoff devices to prevent irrigation after precipitation.
2. Designing irrigation systems to each landscape area's specific water requirements.
3. Using flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.

4. Employing other comparable, equally effective, methods to reduce irrigation water runoff.

Step 7: Incorporate Requirements Applicable to Individual Priority Project Categories

Where identified in Table 2, the following requirements shall be incorporated into applicable priority projects during the storm water BMP selection and design process. 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

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, culverts under driveways and street crossings;
2. Urban curb/swale system: street slopes to curb, periodic swale inlets drain to vegetated swale/biofilter;
3. Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to storm water conveyance system.
4. Other methods that are comparable and equally effective within the project.

b. Residential Driveways & Guest Parking

The design of driveways and private residential parking areas shall use one at least of the following features;

1. Design driveways with shared access, flared (single lane at street) or wheelstrips (paving only under tires); or, drain into landscaping prior to discharging to the storm water conveyance system.
2. Uncovered temporary or guest parking on private residential lots may be: paved with a permeable surface; or, designed to drain into landscaping prior to discharging to the storm water conveyance system.
3. Other features which are comparable and equally effective.

c. Dock Areas

Loading/unloading dock areas shall include the following:

1. Cover loading dock areas, or design drainage to preclude urban run-on and runoff.

2. Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.
3. Other features which are comparable and equally effective.

d. Maintenance Bays

Maintenance bays shall include the following:

- Repair/maintenance bays shall be indoors; or, designed to preclude urban run-on and runoff; and
- Design 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 drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.

OR

- Other features which are comparable and equally effective.

e. Vehicle Wash Areas

Priority projects that include areas for washing/steam cleaning of vehicles shall use the following :

1. Self-contained; or covered with a roof or overhang;
2. Equipped with a clarifier or other pretreatment facility;
3. Properly connected to a sanitary sewer.
4. Other features which are comparable and equally effective.

f. Outdoor Processing Areas

Outdoor process equipment operations, such as rock grinding or crushing, painting or coating, grinding or sanding, degreasing or parts cleaning, landfills, waste piles, and wastewater and solid waste treatment and disposal, and other operations determined to be a potential threat to water quality by the Copermittee shall adhere to the following requirements.

1. Cover or enclose areas that would be the most significant source of pollutants; or, slope the area toward a dead-end sump; or, discharge to the sanitary sewer system following appropriate treatment in accordance with conditions established by the applicable sewer agency.
2. Grade or berm area to prevent run-on from surrounding areas.
3. Installation of storm drains in areas of equipment repair is prohibited.
4. Other features which are comparable or equally effective.

g. Equipment Wash Areas

Outdoor equipment/accessory washing and steam cleaning activities at priority projects shall use the following:

1. Be self-contained; or covered with a roof or overhang;
2. Be equipped with a clarifier, grease trap or other pretreatment facility, as appropriate;
3. Be properly connected to a sanitary sewer.
4. Other features which are comparable or equally effective.

h. Parking Areas

To minimize the offsite transport of pollutants from parking areas, the following design concepts shall be considered, and incorporated and implemented where determined applicable and feasible by the Copermittee:

1. Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.
2. Overflow parking (parking stalls provided in excess of the Copermittee's minimum parking requirements) should be constructed with permeable paving.
3. Other design concepts that are comparable and equally effective.

i. Roadways

Priority roadway projects shall select treatment control BMPs following the treatment control selection procedure identified in Section VI.2, "Establish Storm Water BMPs."

j. Fueling Area

Retail and non-retail fuel dispensing areas shall contain the following:

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1. Overhanging roof structure or canopy. The cover's minimum dimensions must be equal to or greater than the area within the grade break. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. The fueling area shall drain to the project's treatment control BMP(s) prior to discharging to the storm water conveyance system.
2. Paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete shall be prohibited.
3. Have an appropriate slope to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of urban runoff.
4. At a minimum, the concrete fuel dispensing area must extend 6.5 feet (2.0

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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.

k. Hillside Landscaping

1. Hillside areas, as defined in this Model SUSMP, that are disturbed by project development shall be landscaped with deep-rooted, drought tolerant plant species selected for erosion control, satisfactory to the Copermittee.

b. Treatment Control BMPs

Minimizing a development's detrimental effects on water quality can be most effectively achieved through the use of a combination of site design, source and treatment control storm water BMPs. Where projects have been designed to minimize, to the maximum extent practicable, the introduction of anticipated pollutants of concern that may result in significant impacts to the receiving waters through the implementation of site design and source control storm water BMPs, the development would still have the potential for pollutants of concern to enter the storm water conveyance system. Therefore, priority projects shall be designed to remove pollutants of concern from the storm water conveyance system to the maximum extent practicable through the incorporation and implementation of treatment control BMPs.

In meeting the requirements in this section, priority projects shall implement a single or combination of storm water BMPs that will remove anticipated pollutants of concern, as identified by the procedure in Section VI.1, in site runoff to the maximum extent practicable. Treatment control BMPs with a high or medium pollutant removal efficiency for the project's most significant pollutant of concern shall be selected. Treatment control BMPs with a low removal efficiency ranking shall only be approved by the Copermittee when a feasibility analysis has been conducted which exhibits that implementation of treatment control BMPs with a high or medium removal efficiency ranking are infeasible.

Treatment control BMPs must be implemented unless a waiver is granted to the project by the Copermittee based on the infeasibility of any treatment control BMP.

Step 8: Design to Treatment Control BMP Standards

All priority projects shall design, construct and implement structural treatment control BMPs that meet the design standards of this section, unless specifically exempted by the limited exclusions listed at the end of Step 8. Structural treatment control BMPs required by this section shall be operational prior to the use of any dependent development, and shall be located and designed in accordance with the requirements here in Step 8 and below in Step 9. Copermittees may choose to eliminate one or more of the numeric sizing methods listed below in the Jurisdictional SUSMPs.

Volume

1. Volume-based BMPs shall be designed to mitigate (infiltrate, filter, or treat) either:

   i. The volume of runoff produced from a 24-hour 85th percentile storm event, as determined from the local historical rainfall record (0.6 inch approximate average for the San Diego County area)[4]; or

   ii. The volume of runoff produced by the 85th percentile 24-hour runoff event, determined as the maximized capture urban runoff volume for the area, from the formula recommended in *Urban Runoff Quality Management, WEF Manual of Practice No. 23/ ASCE Manual of Practice No. 87, (1998*); or

   iii. The volume of annual runoff based on unit basin storage volume, to achieve 90 percent or more volume treatment by the method recommended in *California Stormwater Best Management Practices Handbook – Industrial/ Commercial, (1993)*, or

   iv. The volume of runoff, as determined from the local historical rainfall record, that achieves approximately the same reduction in pollutant loads and flows as achieved by mitigation of the 85th percentile 24-hour runoff event,[5]

OR

Flow

2. Flow-based BMPs shall be designed to mitigate (infiltrate, filter, or treat) either:

   i. The maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour for each hour of a storm event; or

   ii. The maximum flow rate of runoff produced by the 85th percentile hourly rainfall intensity, as determined from the local historical rainfall record, multiplied by a factor of two, for each hour of a storm event; or

   iii. The maximum flow rate of runoff, as determined from the local historical rainfall record, that achieves approximately the same reduction in pollutant loads and

4. This volume is not a single volume to be applied to all of San Diego County. The size of the 85th percentile storm event is different for various parts of the County. The Copermittees may calculate the 85th percentile storm event using local rain data. In addition, isopluvial maps contained in the County of San Diego Hydrology Manual may be used to extrapolate rainfall data to areas where insufficient data exists. If isopluvial maps are selected, Copermittees shall describe their method for using isopluvial maps in their Jurisdictional SUSMP.

5. Under this volume criterion, hourly rainfall data may be used to calculate the 85th percentile storm event, where each storm event is identified by its separation from other storm events by at least six hours of no rain. If hourly rainfall data is selected, the Copermittees shall describe the method using hourly rainfall data in their Jurisdictional SUSMPs.

flows as achieved by mitigation of the 85th percentile hourly rainfall intensity multiplied by a factor of two, for each hour of a storm event.

Limited Exclusions:

1. Proposed restaurants, where the land area for development or redevelopment is less than 5,000 square feet, are excluded from the numerical sizing criteria requirements listed in Section VI.2.c, Step 8.
2. 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 discussed in Section VI.2.c, Step 8 apply only to the addition, and not to the entire development.

Step 9: Locate BMPs Near Pollutant Sources

Structural treatment control storm water BMPs should be implemented close to pollutant sources to minimize costs and maximize pollutant removal prior to runoff entering receiving waters. Such BMPs may be located on- or off-site, used singly or in combination, or shared by multiple new developments, pursuant to the following requirements:

1. All structural treatment control BMPs shall be located so as to infiltrate, filter, and/or treat the required runoff volume or flow prior to its discharge to any receiving water body supporting beneficial uses;
2. Multiple post-construction structural treatment control BMPs for a single priority development project shall collectively be designed to comply with the design standards of Step 8;
3. Shared storm water 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;
4. Interim storm water BMPs that provide equivalent or greater treatment than is required by Step 8 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.

Step 10: Restrictions on Use of Infiltration BMPs

Three factors significantly influence the potential for urban runoff to contaminate ground water. They are (i) pollutant mobility, (ii) pollutant abundance in urban runoff, (iii) and soluble fraction of pollutant. The risk of contamination of groundwater may be reduced by pretreatment of urban runoff. A discussion of limitations and guidance for infiltration practices is contained in, *Potential Groundwater Contamination from Intentional and Non-Intentional Stormwater Infiltration, Report No. EPA/600/R-94/051, USEPA (1994).*

To protect groundwater quality, each Copermittee shall apply restrictions to the use of any BMPs that are designed to primarily function as infiltration devices (such as infiltration trenches and infiltration basins). As additional ground water basin data is obtained, Copermittees may develop additional restrictions on the use of any BMPs that allow incidental infiltration. At a minimum, use of structural treatment BMPs that are designed to primarily function as infiltration devices shall meet the following conditions[6]:

1. Urban runoff from commercial developments shall undergo pretreatment to remove both physical and chemical contaminants, such as sedimentation or filtration, prior to infiltration.
2. All dry weather flows shall be diverted from infiltration devices except for those non-storm water discharges authorized pursuant to 40 CFR 122.26(d)(2)(iv)(B)(1): diverted stream flows, rising ground waters, uncontaminated ground water infiltration [as defined at 40 CFR 35.2005(20)] to storm water conveyance systems, uncontaminated pumped ground water, foundation drains, springs, water from crawl space pumps, footing drains, air conditioning condensation, flow from riparian habitats and wetlands, water line flushing, landscape irrigation, discharges from potable water sources other than water main breaks, irrigation water, individual residential car washing, and dechlorinated swimming pool discharges.
3. Pollution prevention and source control BMPs shall be implemented at a level appropriate to protect groundwater quality at sites where infiltration structural treatment BMPs are to be used.
4. The vertical distance from the base of any infiltration structural treatment BMP to the seasonal high groundwater mark shall be at least 10 feet or as determined on an individual, site-specific basis by the Copermittee. Where groundwater does not support beneficial uses, this vertical distance criterion may be reduced, provided groundwater quality is maintained.
5. The soil through which infiltration is to occur shall have physical and chemical characteristics (such as appropriate cation exchange capacity, organic content, clay content, and infiltration rate) that are adequate for proper infiltration durations and treatment of urban runoff for the protection of groundwater beneficial uses.
6. Infiltration structural treatment BMPs shall not be used for areas of industrial or light industrial activity; areas subject to high vehicular traffic (25,000 or greater average daily traffic on main roadway or 15,000 or more average daily traffic on any intersecting roadway); automotive repair shops; car washes; fleet storage areas (bus, truck, etc.); nurseries; and other high threat to water quality land uses and activities as designated by each Copermittee in their Local SUSMP.
7. The horizontal distance between the base of any infiltration structural BMP and any water supply wells shall be 100 feet or as determined on an

6. These conditions do not apply to structural treatment BMPs which allow incidental infiltration and are not designed to primarily function as infiltration devices (such as grassy swales, detention basins, vegetated buffer strips, constructed wetlands, etc.)

individual, site-specific basis by the Copermittee.

Where infiltration BMPs are authorized, their performance shall be evaluated for impacts on groundwater quality. In developing the Jurisdictional SUSMPs, Copermittees may develop additional restrictions on the use of treatment control BMPs that are designed to primarily function as infiltration devices. Copermittees shall consider the Permit Section D.1.g. requirements to control the contribution of pollutants from one portion of the watershed to another portion of the watershed through interagency agreements among the Copermittees. In those instances where a Copermittee determined that implementation of proposed infiltration BMPs within their jurisdiction has a potential impact to groundwater quality in another jurisdiction, Copermittees may include a notification requirement be placed upon those proposing such use in addition to the above protection measures.

3. PROVIDE PROOF OF ONGOING STORM WATER BMP MAINTENANCE

Copermittees shall not consider structural BMPs "effective," and therefore shall not accept storm water BMPs as meeting the MEP standard, unless a mechanism is in place that will ensure ongoing long-term maintenance of all structural BMPs. This mechanism can be provided by the Copermittee or by the project proponent. As part of project review, if a project proponent is required to include interim or permanent structural BMPs in project plans, and if the Copermittee does not provide a mechanism for BMP maintenance, the Copermittee shall require that the applicant provide verification of maintenance requirements through such means as may be appropriate, at the discretion of the Copermittee, including, but not limited to covenants, legal agreements, maintenance agreements, and/or conditional use permits.

Deleted: '

Maintenance Mechanisms

1. Public entity maintenance: The Copermittee 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 BMP. Unless acceptable to individual Copermittees, 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 Copermittees may seek protection from liability by appropriate releases and indemnities. The Copermittee shall have the authority to approve storm water BMPs proposed for transfer to any other public entity within its jurisdiction before installation. The Copermittees 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 Copermittee must be identified as a third party beneficiary

empowered to enforce any such maintenance agreement within their respective jurisdictions.

2. Project proponent agreement to maintain storm water BMPs: The Copermittee 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.
3. Assessment districts: The Copermittee 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.
4. Lease provisions: In those cases where the Copermittee holds title to the land in question, and the land is being leased to another party for private or public use, the Copermittee may assure storm water BMP maintenance, repair and replacement through conditions in the lease.
5. Conditional use permits: For discretionary projects only, the Copermittee may assure maintenance of storm water BMPs through the inclusion of maintenance conditions in the conditional use permit. Security may be required. Deleted:
6. Alternative mechanisms: The Copermittee may accept alternative maintenance mechanisms if such mechanisms are as protective those listed above.

Verification Mechanisms

For discretionary projects, the Copermittee-approved method of storm water 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 permits. For projects requiring only ministerial permits, the Copermittee-approved method of storm water BMP maintenance shall be incorporated into the permit conditions before the issuance of any ministerial permits. In all instances, the project proponent shall provide proof of execution of a Copermittee-approved method of maintenance repair and replacement before the issuance of construction approvals. Copermittees carrying out public projects that are not required to obtain permits shall be responsible for ensuring that a Copermittee-approved method of storm water BMP maintenance repair and replacement is executed prior to the commencement of construction. For all properties, the verification mechanism will include the project proponent's signed statement, as part of the project application, accepting responsibility for all structural BMP maintenance, repair and replacement, until a Copermittee-approved entity agrees to assume responsibility for structural BMP maintenance, repair and replacement.

Maintenance Requirements

1. Operation & Maintenance (O&M) Plan: The Copermittee shall ensure that a copy of an Operation & Maintenance (O&M) plan, prepared by the project proponent satisfactory to the Copermittee, is attached to 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, copies of resource agency permits, and any other necessary activities. At a minimum, maintenance agreements shall require the inspection and servicing of all structural BMPs on an annual basis. The project proponent or Copermittee-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 Copermittee for inspection upon request at any time.

2. Access Easement/Agreement: As part of the maintenance mechanism selected above, the Copermittee shall require the inclusion of a copy of an executed access easement that shall be binding on the land throughout the life of the project, until such time that the storm water BMP requiring access is replaced, satisfactory to the Copermittee.

4. WAIVER OF STRUCTURAL TREATMENT BMP REQUIREMENTS

Copermittees may provide for a project to be waived from the requirement of implementing structural treatment BMPs (Section VI.2.c, "Design to Treatment Control BMP Standards") if infeasibility can be established. A Copermittee shall only grant a waiver of infeasibility when all available structural treatment BMPs have been considered and rejected as infeasible. Copermittees shall notify the Regional Board within 5 days of each waiver issued and shall include the name of the person granting each waiver.

Waivers may only be granted from structural treatment BMP and structural treatment BMP sizing requirements. Priority development projects, whether or not granted a waiver may not cause or contribute to an exceedance of water quality objectives. Pollutants in runoff from projects granted a waiver must still be reduced to the maximum extent practicable.

Each Copermittee that implements a waiver program may at its option also develop a SUSMP waiver impact fee program, to require project proponents who have received waivers to transfer the savings in cost, or a proportionate share thereof, as determined by the Copermittee, to a storm water mitigation fund. Each Copermittee shall notify the RWQCB if a SUSMP waiver impact fee program is developed pursuant to this model SUSMP. Further details for any SUSMP waiver impact fee program may be set out in jurisdictional SUSMP submissions, or in supplemental submissions if multiple Copermittees establish a joint mitigation fund program for that watershed.

This model SUSMP does not preclude Copermittees or groups of Copermittees from imposing any other fees or charges on development projects that are permitted by law, or from managing or expending the monies received from such non-SUSMP programs in any manner authorized by law.

VII. RESOURCES AND REFERENCES

APPENDIX A

STORMWATER BEST MANAGEMENT PRACTICES

The following are a list of BMPs may be used to minimize the introduction of pollutants of concern that may result in significant impacts to receiving waters. Other BMPs approved by the Copermittee as being equally or more effective in pollutant reduction than comparable BMPs identified below are acceptable. See Appendix B: *Suggested Resources* for additional sources of information. All BMPs must comply with local zoning and building codes and other applicable regulations.

Site Design BMPs

1. Minimizing Impervious Areas.
2. Reduce sidewalk widths.
3. Incorporate landscaped buffer areas between sidewalks and streets.
4. Design residential streets for the minimum required pavement widths.
5. Minimize the number of residential street cul-de-sacs and incorporate landscaped areas within cul-de-sac centers with curb-cuts to reduce their impervious cover.
6. Use open space development that incorporates smaller lot sizes.
7. Increase building density while decreasing the building footprint.
8. Reduce overall lot imperviousness by promoting alternative driveway surfaces and shared driveways that connect two or more homes together.
9. Reduce overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in spillover parking areas.
10. Increase Rainfall Infiltration.
11. Use permeable materials for private sidewalks, driveways, parking lots, and interior roadway surfaces (examples: hybrid lots, parking groves, permeable overflow parking, etc.).
12. Use curb-cuts to direct pavement runoff into swales, landscaping, and natural areas prior to entering the MS4.
13. Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated areas, and avoid routing rooftop runoff to the roadway or the urban runoff conveyance system.
14. Pitch driveways and parking areas toward yards and vegetated areas prior to draining into the MS4.
15. Conserve and utilize natural soils and/or use amended soils to encourage light infiltration/ percolation.
16. Minimize disturbances to natural drainages
17. Minimize soil compaction in planned green space (landscaped areas, lawns,

etc.) and re-till soils when compacted by grading/construction equipment.
18. Maximize Rainfall Interception.
19. Maximizing canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.
20. Cisterns / Rain barrels.
21. Foundation landscaping.

Minimize Directly Connected Impervious Areas (DCIAs):

1. Draining rooftops into adjacent landscaping prior to discharging to the storm drain.
2. Use curb-cuts to allow parking lots to drain into landscape areas co-designed as biofiltration areas and/or swales prior to draining into the MS4.
3. Draining roads, sidewalks, and impervious trails into adjacent landscaping.
4. Slope and Channel Protection.
5. Use of natural drainage systems to the maximum extent practicable.
6. Stabilized permanent channel crossings.
7. Planting native or drought tolerant vegetation on slopes.
8. Energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels.

Source Control BMPs

1. Storm drain system stenciling and signage
2. Outdoor material and trash storage area designed to reduce or control rainfall runoff
3. Efficient irrigation system

Treatment Control BMPs

1. Biofilters
2. Bioretention Swale (detains and infiltrates water through soil)
3. Stormwater Planter Box (open-bottomed)
4. Stormwater Flow-Through Planter (sealed bottom)
5. Vegetated filter strip
6. Bioretention Area
7. Vegetated Roofs / Modules / Walls
8. Detention Basins
9. Extended/dry detention basin with grass / vegetated lining
10. Extended/dry detention basin with impervious lining

Infiltration Facilities

1. Infiltration basin
2. Infiltration trench

3. Dry well
4. Permeable Paving
5. Gravel
6. Permeable asphalt
7. Pervious concrete
8. Unit pavers, ungrouted, set on sand or gravel
9. Subsurface Reservoir Bed

Wet Ponds and Wetlands

1. Wet pond (permanent pool)
2. Constructed wetland

Filtration Systems

1. Media filtration
2. Sand filtration

Hydrodynamic Separation Systems

1. Swirl Concentrator
2. Cyclone Separator

Trash Racks and Screens

APPENDIX B

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

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

SUGGESTED RESOURCES	HOW TO GET A COPY
Preliminary Data Summary of Urban runoff Best Management Practices (August 1999) EPA-821-R-99-012	*http://www.epa.gov/ost/stormwater/*
Reference Guide for Stormwater Best Management Practices (July 2000)	City of Los Angeles Urban runoff Management Division 650 South Spring Street, 7th Floor Los Angeles, California 90014 *http://www.lacity.org/san/swmd/*
Second Nature: Adapting LA's Landscape for Sustainable Living (1999) by Tree People Detailed discussion of BMP designs presented to conserve water, improve water quality, and achieve flood protection.	Tree People 12601 Mullholland Drive Beverly Hills, CA 90210 (818) 623-4848 Fax (818) 753-4625
Start at the Source (1999) Detailed discussion of permeable pavements and alternative driveway designs presented.	Bay Area Stormwater Management Agencies Association 2101 Webster Street Suite 500 Oakland, CA 510-286-1255 www.basmaa.org
Stormwater Management in Washington State (1999) Vols. 1-5 Presents detailed guidance on BMP design for new development and construction.	Department of Printing State of Washington Department of Ecology P.O. Box 798 Olympia, WA 98507-0798 360-407-7529
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)	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/dclu/Codes/sgdccode.htm*
Texas Nonpoint Source Book – Online Module (1998)www.txnpsbook.org Presents BMP design and guidance information on-line	Texas Statewide Urban runoff Quality Task Force North Central Texas Council of Governments 616 Six Flags Drive Arlington, TX 76005 817-695-9150
The Practice of Watershed Protection by Thomas R. Shchuler and Heather K. Holland	Center for Watershed Protection 8391 Main Street Ellicott City, MD 21043 410-461-8323 www.cwp.org
Urban Storm Drainage, Criteria Manual – Volume 3, Best Management Practices (1999) Presents guidance for designing BMPs	Urban Drainage and Flood Control District 2480 West 26th Avenue, Suite 156-B Denver, CO 80211 303-455-6277

APPENDIX C

City of San Diego
Localized Equivalent Area Drainage Method
Pilot Study Proposal

I. Introduction

The San Diego National Pollutant Discharge Elimination System Municipal Storm Water Permit (Municipal Permit) contains requirements for certain new development and redevelopment projects to comply with Standard Urban Storm Water Mitigation Plans (SUSMPs). SUSMPs include requirements to implement pollutant source controls, to incorporate site design features, and to infiltrate or treat using structural control measures a portion of the storm water runoff to be generated by the new development or redevelopment project. The City of San Diego's Storm Water Pollution Prevention Program (Storm Water Program) developed, through collaboration with the Regional Water Quality Control Board (Regional Board), the development industry, and environmental organizations, a process designed to provide more efficient, integrated storm water treatment, resulting in water quality improvements more quickly. This process is called the Localized Equivalent Area Drainage method or "LEAD" method. Fundamental to the LEAD method is the protection of receiving water quality and support of designated beneficial uses through implementation of structural treatment control measures, also known as Best Management Practices (BMPs), to the maximum extent practicable. The LEAD method provides numerous benefits:

- Promotes an integrated, watershed-based storm water treatment by treating runoff from entire sub-drainages once.

- Protects receiving water quality and supports designated beneficial uses through implementation of structural BMPs to the maximum extent practicable.

- Provides for accelerated benefits to receiving waters through implementation of structural BMPs in advance of new development or redevelopment projects.

- Provides the flexibility required for projects being implemented in developed areas of the City where existing infrastructure limits opportunities for efficient BMP implementation.

- Provides increased and more cost-effective opportunities for BMPs to reside in the public domain where BMP operation and maintenance can be assured.

- Promotes efficient and integrated implementation of regional solutions in lieu of end-of-pipe solutions.

II. LEAD Method – Overview

Key aspects for consideration of the LEAD method include the following:

- The LEAD method is applicable to infill development and redevelopment projects located within existing developed areas.

- The LEAD method is applicable when implementation of BMPs to treat the runoff from an entire watershed or drainage area that would not otherwise require treatment is more feasible, practical, or beneficial to receiving waters than implementation of BMPs to treat the runoff from an individual project's footprint.

- The LEAD method drainage area must be treated prior to discharging to a receiving water supporting beneficial uses.

- All development and redevelopment projects subject to regulation under the SUSMP and which are qualified for the LEAD method must continue to address pollutants and conditions of concern at the project site through site design and source control: only the treatment control BMP requirements would be met at the alternative LEAD watershed.

All development and redevelopment projects subject to regulation under the SUSMP are required to assess the pollutants and conditions of concern associated with the proposed project, and to address these pollutants and conditions through site design, source control, and treatment control BMPs.

When the LEAD method is elected, estimates of pollutant load reductions obtained by treating the runoff from the project footprint in accordance with the SUSMP are made to quantify the reduction goal for the project. Then, an alternative treatment area is identified where an equivalent or greater pollutant load reduction can be obtained. The alternative treatment areas must meet the following requirements:

- Located within the proximity of the project.

- Discharge to the same receiving water as the project.

- Provide for equivalent or greater pollutant load reduction than at the project site.

- Located in a drainage basin where no other requirement for treatment exists and treat the entire flow from the drainage basin.
- BMPs must be implemented and operational before the project is complete.
- Treat runoff from an area equivalent or greater than the project footprint.
- Treat runoff from an equivalent or greater impervious area than the project.

In all cases, the pollutant load reductions obtainable at the alternative LEAD method treatment area must be greater than that obtained at the project site.

III. LEAD Method Pilot Study

The City of San Diego proposes to conduct a pilot study to test the LEAD method and to determine the ability of the LEAD method to promote and to achieve the pollution control objectives of the Municipal Permit. The City of San Diego's Storm Water Pollution Prevention Program is proposed as the pilot study lead agency and will be responsible for carrying out all elements of the study. Key attributes of the pilot study include the following:

- Eligible projects would be limited to areas located within existing developed areas of the City of San Diego. Projects would be limited to urbanized areas to ensure potential LEAD watersheds would not drain into receiving waters supporting beneficial uses prior to treatment at the LEAD method BMP location.
- Eligible projects will be limited to projects permitted by the City of San Diego to ensure adequate oversight by the City of San Diego.
- A LEAD method pilot study annual report will be submitted to the Regional Board each year of the study. The annual report will include a summary of progress of the pilot study over the previous year, changes proposed for the next year, and lists of projects where the method was applied, including a discussion of the results for each project. The annual report will keep the Regional Board apprised of the progress and results of the pilot study.

The remainder of this pilot study proposal describes a proposed methodology that would be used to develop a project under the LEAD method. The document also presents a proposed methodology for completing the details of the methodology through collaboration between the City, the Regional Board, the development industry, and environmental organizations.

IV. LEAD Methodology

The general methodology for developing a project under the LEAD method is described in this section and illustrated in Figure 1.

Step 1 – Determine Project Pollutant Reduction Treatment Goal

1a – Identify Pollutants and Conditions of Concern

Using the process identified in the Final Model SUSMP and repeated in the City's Local SUSMP,

determine whether the project would generate pollutants and/or conditions of concern. This step includes:

- Identify proposed project type or category and anticipated and potential pollutants generated (SUSMP Section VI.1.a).
- Identify pollutants of concern in the receiving waters to which the project would discharge (SUSMP Section VI.1 b and c).
- Identify those constituents that are potentially generated from the project or land use type and are pollutants of concern in the receiving waters. These are the pollutants of concern for this project. If project would discharge to receiving water that does not have specific listed pollutants of concern, select representative pollutants for the project category as shown in Table 1 of the SUSMP.

Determine if project qualifies for the LEAD method. For a project to qualify for the LEAD method, it must meet all of the following criteria:

- The LEAD method is applicable to infill development and redevelopment projects located within existing developed areas of the City of San Diego where acceptable potential LEAD sub-drainages are located in the project's immediate vicinity.
- The LEAD method is applicable when implementation of BMPs to treat the runoff from an entire watershed or drainage area that would not otherwise require treatment is more feasible, practical, or beneficial to receiving waters than implementation of BMPs to treat the runoff from an individual project's footprint.
- The LEAD method is limited to projects within and permitted by the City of San Diego.
- The project must propose adequate site design and source controls in the original project design.

1b – Estimate Project Site Pollutant Loading

Estimate the pollutant loading for the developed qualifying project based on proposed site land use, characterization data, and water quality design volume. This includes:

- Delineate project drainage area into land use types.
- Determine the water quality design volume for each land use type based on drainage areas, impervious factors, runoff coefficient, and the methods prescribed in the SUSMP.
- Determine representative pollutant event mean concentration for each pollutant of concern and land use type using Table A (to be developed). Calculate Average Pollutant Loading = Event Mean Concentration x Water Quality Design Volume (repeat for each pollutant of concern).

1c – Determine Candidate Treatment Control BMPs for Project

Using the process identified in the SUSMP, and the pollutants of concern identified in Step 1a, select

appropriate BMPs from either Table 2 - Standard Storm Water BMP Selection Matrix, or Table 3 – Enhanced Treatment Control BMP Selection Matrix. The BMP selection should take into account both the pollutants of concern and site factors.

1d – Determine Pollutant Reductions

Calculate the pollutant load reduction resulting from the selected BMPs for each of the pollutants for which pollutant loadings were determined under Step 1b. This includes:

- Determine the average percentage pollutant reduction for the BMPs using Table B (to be developed).
- Apply the pollutant load percent reduction to the average pollutant load estimate developed under Step 1b to determine the average load reduction with BMPs.

This average load reduction is the minimum pollutant reduction treatment goal for an alternative LEAD method treatment area.

Step 2 – Evaluate LEAD Method Treatment Area

2a – Determine LEAD Project Characteristics

Locations for candidate LEAD method BMPs will be identified in master drainage plans and will drain to the same receiving water as the qualifying project(s). Once the LEAD method treatment area is selected from the master drainage plan, key characteristics of the LEAD method treatment area watershed/sub-watershed must be determined. This includes:

- Existing land use(s) and area(s) and impervious factor.
- Drainage area.
- Rainfall characteristics.

2b – Determine Water Quality Design Volume

Estimate the water quality design volume for the LEAD method treatment area using the methods prescribed in the SUSMP. This includes:

- Delineate project drainage area into land use types.
- Determine the water quality design volume for each land use type based on drainage areas, impervious factors, runoff coefficient, and the methods prescribed in the SUSMP.

2c – Determine Loading for LEAD Method Treatment Area Pollutants of Concern

Determine representative pollutant event mean concentration for each pollutant of concern and land use type using Table A (to be developed). Calculate Average Pollutant Loading = Event Mean Concentration x Water Quality Design Volume (repeat for each pollutant of concern). This calculation must be made for the potential LEAD method treatment area for the same pollutants of

concern identified in Step 1a for the project site.

2d – Determine Candidate Treatment Control BMPs for LEAD Method Treatment Area

LEAD method treatment area BMPs will be identified in master drainage plans. The BMPs identified in the master drainage plans will take into account the pollutants of concern identified in Step 1a, and will have been selected from either Table 2 - Standard Storm Water BMP Selection Matrix, or Table 3 – Enhanced Treatment Control BMP Selection Matrix.

2e – Determine Pollutant Reductions

Calculate the pollutant load reduction resulting from the selected LEAD method treatment area BMPs for each of the pollutants for which average pollutant loadings were determined under Step 2c. This includes:

- Determine the average percentage pollutant reduction for the BMPs using Table B (to be developed).
- Apply the pollutant load percent reduction to the average pollutant load estimate developed under Step 2c to determine the average load reduction with the BMPs for each of the pollutants.

2f – Compare LEAD Method Treatment Area with Qualifying Project Requirements

Compare the pollutant load reduction for the LEAD method treatment area with the pollutant reduction treatment goal for the qualifying project determined under Step 1d:

- If LEAD method Treatment Area Pollutants of Concern Load < Project Pollutants of Concern Load, repeat process with another LEAD site.
- If LEAD method Treatment Area Pollutants of Concern Load = Project Pollutants of Concern Load, LEAD method Treatment Area is acceptable – Implement BMPs at LEAD method treatment area.
- If LEAD method Treatment Area Pollutants of Concern Load > Project Pollutants of Concern Load, LEAD method Treatment Area is acceptable – Implement BMPs at LEAD method treatment area.

While the comparison must be made for all pollutants of concern, there will typically be one pollutant of concern that will govern the comparison for any given combination of qualifying and LEAD project characteristics.

V. LEAD Method Pilot Study Evaluation

Fundamental to the LEAD method pilot study is the annual evaluation of the program. The City of San Diego proposes to develop the monitoring and evaluation methodology with San Diego BayKeeper, the American Public Works Association, and technical experts. The methodology would include a descriptive, qualitative component to evaluate indirect measures, which would minimally include the factors listed below. If funding becomes available, the evaluation methodology would

include monitoring of the LEAD watershed and a similar watershed with treatment of an individual project site. As lead agency responsible for carrying out the pilot study, the City of San Diego's Storm Water Pollution Prevention Program will report the results of the program evaluation in an annual report to the Regional Board.

The annual program report will include the following elements:

- Listing and description of project(s) to date where the LEAD method was applied. The listing will include the name and location of each project site and associated LEAD method treatment area. The description will include for each project site and associated LEAD method treatment area: identification of receiving waters; identification of pollutants and conditions of concern; a tabulation of post-project land use; a tabulation of pollutant loading estimates for each pollutant of concern, both without and with BMPs; a listing of the maintenance requirements and evaluation of how effectively the requirements have been fulfilled; and a listing of site design, source control, and structural treatment control BMPs implemented at the project site or LEAD method treatment area.

- Listing and description of projects currently in the planning stage that are being evaluated for application of the LEAD method during the next 12-month period, where these are known at the time the annual report is submitted.

- Proposed changes in the LEAD method to be implemented during the next 12-month period.

The primary criterion for evaluating the effectiveness of the LEAD method will be to compare the loading of pollutants of concern that are removed at LEAD method treatment areas compared to pollutants of concern that would have been removed at the project site. A secondary criterion for evaluating the effectiveness of the LEAD method will be to compare the timing of BMPs implemented under the LEAD method with the timing under which BMPs might have been implemented outside the program. In general, the LEAD method will be considered to be effective when, 1) pollutant of concern loadings removed as a result of application of the LEAD method exceed loadings that would have been removed at the project site, and 2) BMPs are implemented in advance of the timing that would have been required without the LEAD method.

Additional criteria for evaluating the effectiveness of the LEAD method will be developed as part of the pilot study and will be discussed in the first annual report.

VI. LEAD Method Issues to be Further Developed

This LEAD method pilot study proposal provides a detailed framework for discussion between the City, the Regional Board, the development industry, and environmental organizations toward creating an acceptable LEAD method program. In addition to reaching agreement on the overall framework, several key issues will require significant additional development during the initial implementation of the pilot study. Several specific topics include:

- Establishing land use or project category based event mean concentrations.

- Establishing BMP performance standards for common BMP types.

- Determining how to compare a LEAD method treatment area with a qualifying project when one or both projects propose a flow-based BMP methodology.

Each of these is briefly discussed further.

Establishing Event Mean Concentrations for Calculating Pollutant Loads

In order to calculate pollutant loads, typical event mean concentrations for the potential pollutants of concern must be established for land uses and/or project categories to populate a table such as the suggested Table A.

- For a number of the common land uses, sufficient land-use based monitoring has been conducted within San Diego County and throughout Southern California (e.g., data compiled by the Southern California Coastal Watershed Research Project) that a set of reasonable values for use in equivalent calculations can be established for a number of the potential pollutants of concern. This is true for such pollutants as total suspended sediment, nutrients, heavy metals, oxygen demanding substances (e.g., biological oxygen demand or carbonaceous oxygen demand), oil and grease, and certain indicator bacteria.

    - Data on other organic compounds is by and large below detection limits and it would be difficult to establish meaningful factors, so it is recommended that this not be included in an analysis.

    - Data on pesticides is highly variable and often non-detectable and would be difficult to establish meaningful values.

Data on trash is just now beginning to be compiled and will be highly variable. It is assumed that both a qualifying project and a LEAD method treatment area would incorporate trash/debris removal as part of the overall plan, and therefore calculating trash loads is also not recommended.

Establishing BMP Performance

In order to calculate pollutant loads, removal performance data for the potential pollutants of concern must be established for BMP categories to populate a table such as the suggested Table B.

- Sufficient data has been published for both operating BMPs and pilot plant research from a number of sources throughout the country that a set of reasonable values for use in equivalent calculations can be established for a number of the potential pollutants of concern. This is true for such pollutants as total suspended sediment, nutrients, heavy metals, oxygen demanding substances (e.g., biological oxygen demand and carbonaceous oxygen demand), oil and grease and to a lesser extent certain indicator bacteria.

- BMP performance data for removal of other organic compounds suggests performance is by and large below detection limits and it would be difficult to establish meaningful factors, so it is recommended that this not be included in an analysis.

- BMP performance data for the removal of low levels of pesticides is generally not available.

- Data on trash removal through BMPs is just now beginning to be compiled and will be highly variable. It is assumed that both a qualifying project and a LEAD method treatment area

would incorporate trash/debris removal as part of the overall plan, and therefore calculating trash loads is also not recommended.

Comparing Flow-Based BMPs

If a flow-based BMP approach (e.g. vegetated swales, biofilters, hydrodynamic separator) is proposed for either the qualifying project or the LEAD method treatment area, a direct calculation of volume of runoff treated and pollutant load reduced is substantially more complex than for volume-based BMPs (e.g., detention, retention). Methods can be established by evaluating hydrologic data and to develop an approximate relationship between maximum flow treatment capacity and estimated volume treated or continuous simulation models such as the Storage Treatment Overflow Model could be run for each site.

Table A
Pollutant Event Mean Concentrations

Land Use Priority Project Categories	Pollutant Event Mean Concentrations								
	Sediments	**Nutrients**	**Heavy Metals**	**Organic Compounds**	**Trash & Debris**	**Oxygen Demanding Substances**	**Oil & Grease**	**Bacteria & Viruses**	**Pesticides**
Detached Residential Development									
Attached Residential Development									
Commercial Development > 100,000 ft^2									
Automotive Repair Shops									
Restaurants									
Hillside Development > 5,000 ft^2									
Parking Lots									
Streets, Highways & Freeways									

Note: This table will be populated with information developed through collaboration between the City, the Regional Board, the development industry, environmental organizations, and technical experts.

Table B
BMP Performance % Removal

Pollutant of Concern	Treatment Control BMP Categories						
	Biofilters	Detention Basins	Infiltration Basins	Wet Ponds or Wetlands	Drainage Inserts	Filtration	Continuous Flow Deflection Systems
Sediments							
Nutrients							
Heavy Metals							
Organic Compounds							
Trash & Debris							
Oxygen Demanding Substances							
Oil & Grease							
Bacteria & Viruses							
Pesticides							

Note: This table will be populated with information developed through collaboration between the City, the Regional Board, the development industry, environmental organizations, and technical experts.