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1.0 INTRODUCTION

1.1 Background

The Drainage Area Management Plan (DAMP) is the principal policy, programmatic guidance and planning document for the Orange County Stormwater Program (the Program), a municipal regulatory compliance initiative focused on the management and protection of Orange County's streams, rivers, creeks and coastal waters. The participants in this program are the County of Orange, the Orange County Flood Control District and the cities of Orange County.

The primary focus of the DAMP is addressing the impacts of urban runoff on water quality. Urbanization creates rooftops, driveways, roads and parking lots which increase the imperviousness of the land. This imperviousness increases the timing and volume of rainfall runoff (compared to pre-development conditions) and provides a source of pollutants that are flushed or leached by rainfall runoff into aquatic systems. The potential environmental consequences of these impacts are loss or impairment of the aquatic beneficial uses of streams, rivers, creeks, and coastal waters.

The stormwater program was initiated in 1990 as a cooperative local government response to requirements stemming from the Clean Water Act regulations. The 1972 Federal Water Pollution Control Act, subsequently known as the Clean Water Act (CWA), established the National Pollutant Discharge Elimination System (NPDES) permitting program. As a result of court decisions and the overriding need to clarify stormwater permitting requirements, the CWA required the Environmental Protection Agency (EPA) to issue regulations to be effective by 1983 that included stormwater runoff from rainfall. Congress passed a Clean Water Act Amendment in 1987, the Water Quality Act, which brought stormwater discharges into the NPDES Program. EPA issued subsequent regulations on November 16, 1990.

In response to those regulations, the County of Orange (subsequently referred to as the Principal Permittee), the Orange County Flood Control District and the incorporated cities of Orange County (collectively referred to as Permittees) have obtained, renewed and complied with the following NPDES Stormwater Permits from the Santa Ana and San Diego Regional Water Quality Control Boards (subsequently referred to as the Santa Ana Regional Board, the San Diego Regional Board or collectively as the Regional Boards):

Permit term	Santa Ana Regional Board			San Diego Regional Board		
	Order No.	NPDES No.	Date Adopted	Order No.	NPDES No.	Date Adopted
First (1990-1995)	90-71	CA 8000180	July 1990	90-38	CA 0108740	July 1990
Second (1996-2002)	96-31	CAS618030	March 1996	96-03	CAS0108740	August 1996
Third (2002-2007)	R8-2002-0010	CAS618030	January 2002	R9-2002-0001	CAS0108740	February 2002
Fourth						

Each permit renewal has required the Permittees to continue to implement ongoing stormwater quality management programs and update and develop additional programs in order to control pollutants in stormwater discharges. This “iterative management” approach which is based on a continuous improvement process of implementation is a fundamental underpinning of the Orange County program and consistent with the intent of the Permits.

One of the major challenges for the Permittees in updating the programs is the reconciliation between the two Regional Board permits and the resulting program requirements that had significant differences for the first time with the issuance of the Third Term Permits. As a result of the need to reconcile the differences between the two permits, the 2003 DAMP represented a departure from its 1993 predecessor. Previously, the 1993 DAMP constituted a self-contained policy and program for reducing the discharge of pollutants from municipal storm drains to the maximum extent practicable. It addressed the requirements of permits that, although issued by two separate Regional Boards, did not differ. Under the Third Term Permit period, the 2003 DAMP addressed the two permits that achieve similar objectives through different sets of requirements.

The reconciliation between the two Third Term Permits has also been achieved through the development by each Permittee of a Local Implementation Plan (LIP) (also termed Jurisdictional Urban Runoff Management Plan or JURMP in the San Diego Regional Board Third Term Permit – **DAMP Appendix A**). The 2003 DAMP laid the detailed foundation for Permittees to develop their LIPs by establishing Model Programs and providing a measure of accountability for each of the major program areas. In developing their Local Implementation Plans, the Permittees modified the DAMP Model Programs as necessary to ensure that their local conditions were addressed and developed a plan for the implementation of the program within their jurisdiction.

1.2 Regulatory Requirements

Section 402(p) of the CWA, as amended by the Water Quality Act of 1987, requires that municipal NPDES Permits include:

1. A requirement to effectively prohibit non-storm water discharges into municipal storm sewers; and
2. Controls to reduce the discharge of pollutants from municipal storm drains to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants.

Regulations promulgated by EPA on November 16, 1990 (40 CFR 122.26 (d)(2)(iv)) require municipal NPDES permit applicants to develop a management program to effectively address these requirements.

The federal regulations also indicate that the proposed management program, such as the DAMP, *"shall include a comprehensive planning process which involves public participation and where necessary intergovernmental coordination, to reduce the discharge of pollutants to the maximum extent practicable using management practices, control techniques and system, design and engineering methods, and such other provisions which are appropriate"*.

The First Term Permits similarly required the development of a management program to address the regulatory requirements and defined "maximum extent practicable" as follows:

"Maximum extent practicable (MEP) means to the maximum extent possible, taking into account equitable considerations of synergistic, additive, and competing factors, including but not limited to, gravity of the problem, fiscal feasibility, public health risks, societal concern, and social benefits."

This definition set the foundation for the Orange County Stormwater Program and places upon the Permittees the continuing responsibility of weighing economic, societal, and equity issues as they define the policies and standards to be employed in implementing the program.

1.3 Objectives of the Drainage Area Management Plan

The main objectives of the DAMP are to fulfill the commitment of the Permittees to present a plan that satisfies NPDES permit requirements and to evaluate the impacts of urban stormwater discharges on receiving waters. An increasingly important aspect of the DAMP is to identify additional commitments for the municipal stormwater programs that may be needed to address urban Total Maximum Daily Load requirements that are being incorporated into the NPDES permits.

There are a number of important public policy issues which have influenced the Permittees in framing this DAMP and which consequently define the objectives. Resources, both public and private, are limited and public support is essential. In implementing this program it is the intent of the Permittees to proceed in a measured, deliberate way designed to obtain the maximum

benefit for the resources expended and to secure maximum public awareness, understanding and support.

The Permittees are aware that a successful stormwater quality management program depends on the awareness, commitment, cooperation and support of the various segments of the public, including businesses, industry, development, utilities, environmental groups, institutions, homeowners and the general public. Accordingly, it is a continuing objective of the plan to assure an open planning process, with ample opportunity for public participation and meaningful consideration of the input obtained. Accomplishment of this objective will be furthered by the management structure provided herein and by public meetings, hearings, workshop, and web postings as part of the planning and decision making process. The DAMP is the principal policy, guidance and reporting document for the Orange County NPDES Stormwater Program that is implemented within each Permittee's jurisdiction as documented within its LIP.

The DAMP describes the programs that will serve to:

1. Provide the framework for the program management activities (**Section 2.0**).
2. Establish a plan for continuous program improvement and a Watershed Management context for the program (**Section 3.0**);
3. Provide the legal authority for prohibiting unpermitted discharges into the storm drain system and for requiring BMPs in new development and significant redevelopment (**Section 4.0**);
4. Improve existing municipal pollution prevention and removal BMPs to further reduce the amount of pollutants entering the storm drain system. (**Section 5.0**);
5. Educate the public about the issue of urban stormwater and non-stormwater pollution and obtain their support in implementing pollution prevention BMPs (**Section 6.0**);
6. Ensure that all new development and significant redevelopment incorporates appropriate Site Design, Source Control and Treatment Control BMPs to address specific water quality issues. (**Section 7.0**);
7. Ensure that construction sites implement control practices that address control of construction related pollutants discharges including erosion and sediment control and on-site hazardous materials and waste management (**Section 8.0**);
8. Ensure that existing development will address discharges from industrial facilities, selected commercial businesses, residential development and common interest areas/homeowner associations. (**Section 9.0**);
9. Detect and eliminate illegal discharges/illicit connections to the municipal storm drain system (**Section 10.0**);

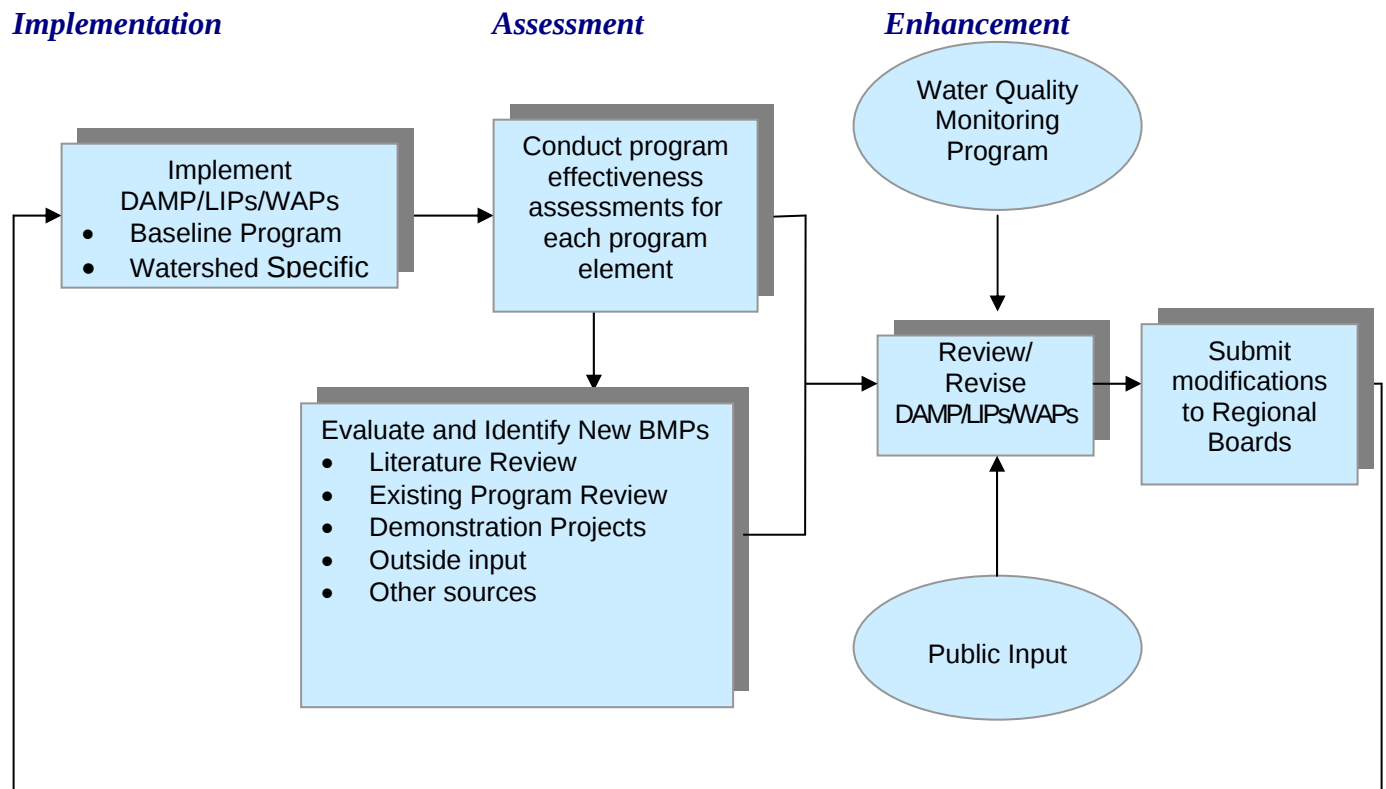
10. Conduct a stormwater monitoring program to identify impacted receiving waters to assist in the prioritization of watersheds for analysis and planning, and to assist in the prioritization of pollutants to facilitate the development of specific controls to address these problems (**Section 11.0**); and

The emphasis of the program will continue to provide for equitable consideration of all DAMP objectives. This consideration involves the use of a strategic framework of water quality planning and BMP investigation and is a systematic and iterative process of:

1. Implementing additional BMPs and revising current BMPs based upon site specific water quality problems, technical, institutional and economic feasibility, and the protection of beneficial uses of the receiving waters;
2. Monitoring to ensure that the BMPs are correctly applied and to determine BMP effectiveness in achieving water quality standards; and
3. Adjustment of BMPs if water quality standards are not being achieved or possible adjustment of water quality standards if they are not appropriate.

This approach is consistent with the intent of the Permittees to reduce the discharge of pollutants from municipal storm drains to the MEP and to commit to the 2007 DAMP as an ongoing step in a comprehensive planning process rather than its culmination (**Figure 1-1**).

Figure 1-1
Stormwater Program Iterative Process



1.4 Permittee Commitments

The Permittees are committed to implementing a strategic and comprehensive public education program as a central program component in order to continue to raise the level of public awareness and, at the same time, reduce the impacts of urban stormwater runoff.

The Permittees are also committed to maintaining the integrity of the receiving waters and their ability to sustain beneficial uses. As such, the Permittees have designed and implemented a countywide baseline stormwater management program in order to be able to continually reassess the conditions of the waters within Orange County and help determine the impact, if any, of urban stormwater discharges to the beneficial uses of those waters.

This baseline effort is informed by a water quality planning process, which focuses resources on the impacts of urban stormwater discharges on beneficial uses. The Permittees have begun to prioritize these initiatives (**Section 3**) and will continue to analyze and evaluate the existing and future baseline monitoring program data to identify those watersheds exhibiting the most urgent need for attention.

The Permittees presently own and operate an extensive system of flood control, drainage,

recreational, habitat and greenbelt corridor facilities. Some of these have already been modified to yield regional water quality benefits while still safely and reliably performing their primary function. The Permittees will continue to evaluate opportunities to incorporate stormwater control features into existing flood control structures in each Orange County watershed as they are designed and/or identified through the water quality planning process (**Section 3** and the watershed action plans (WAPs) **Appendix D**). The Permittees have considerable experience and expertise in the planning, design and operation of flood control and drainage systems. They are familiar with the regional watershed approach to drainage planning and they are aware of the economic benefit of regional flood control facilities. The Permittees will continue to approach the water quality management program on the same regional watershed basis, guided by the priorities as identified through the water quality monitoring program.

Research, technical and engineering design data indicate that pollution prevention and removal design parameters for stormwater are still in a developmental phase. The Permittees will continue to investigate and verify the effectiveness of the various treatment control BMP designs through experience, research and demonstration projects.

The Permittees will continue to vigorously detect and eliminate illegal discharges/illicit connections into the storm drain system.

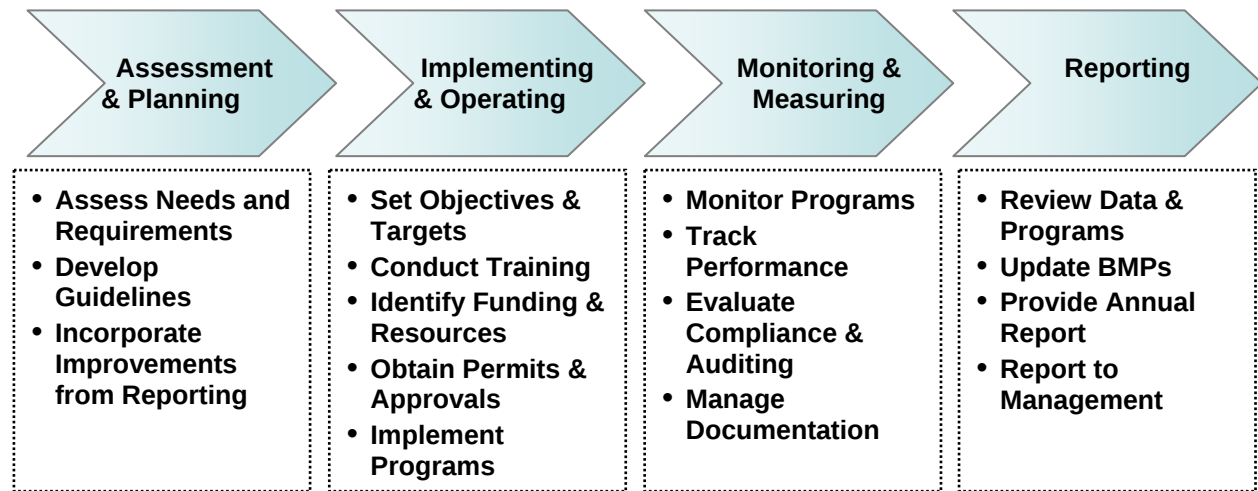
Since the majority of the aquatic resources within Orange County are in marine or estuarine habitats, the Permittees are committed to participating in various regional research and/or monitoring programs which provide unique opportunities to gather valuable information about the impact on these habitats and place them in a larger regional context.

By applying this systematic and iterative process, the Permittees intend to further improve existing stormwater management practices, better understand water quality problems and implement remedial measures in order to protect the existing water quality and improve problem areas.

Program Assessments and Modifications

In order to develop an effective program for the Fourth Term Permit period, careful consideration was given to the objectives of the program and the relative importance of each element. Within each section of the DAMP, there is a discussion regarding the foundation of each Orange County Stormwater Program element, the development of the Program and the assessment of the program's effectiveness.

The Program Effectiveness Assessment (PEA) serves as the foundation for the submittal of the Annual Progress Report that is submitted each year to the Regional Boards and serves as the basis for the evaluation of the Local Implementation Plans (LIPs) and subsequently the Watershed Action Plans. By completing the effectiveness assessment, the Permittees will each have a baseline by which they can compare subsequent evaluations and identify trends on a jurisdictional, watershed and countywide basis. This information will then be used to determine where modifications within the program may be necessary and will ensure that the iterative evaluation and improvement process is applied to each of the program components and used as an effective management tool. This approach is illustrated in the following graphic:



The current PEA approach is described in Appendix C of the DAMP. An updated PEA approach is being developed based on Environmental Management System principles.

1.5 DAMP Coverage

This DAMP is applicable to stormwater permits issued by the Regional Boards for areas of Orange County. The non-topographic boundary between Orange County and adjoining counties could result in certain Permittees being subjected to flows originating from or discharging to areas that are subject to separate NPDES municipal stormwater permits issued by the Regional Boards.

The common drainage issues with Orange, Riverside and San Bernardino counties began to be addressed during the Second Term Permit period through joint participation in integrated monitoring and research programs. Conversely, some drainage in the northwest portion of the county is tributary to the San Gabriel River watershed which is within the Los Angeles Regional Board's area.

The countywide drainage maps, which are used by the Permittees for most of the stormwater program components, have been included as **Exhibit 1.I**.

1.6 Description of Drainage Area and Climate

Drainage Area

Orange County has an area of 500,000 acres, beginning on a coastal plain and rising to an elevation of over 5,000 feet in the Puente Hills and Santa Ana Mountains to the north and east. Before urbanization, which began in the early 1950s, Orange County was drained by ephemeral streams and agricultural drainage ditches which were dry most of the year and carried measurable flow primarily during short duration flash floods and longer duration general winter storms.

As urbanization progressed, man-made agricultural drainage ditches were enlarged to flood control channels and the few natural streams such as Santa Ana River, San Diego Creek and San Juan Creek were constrained within levees to provide flood protection. Ephemeral flows in some of the man-made and natural channels have been replaced with continuous low flows from urban and agricultural irrigation.

Since the 1950's the population of Orange County has grown approximately 20% per year, so that now Orange County is predominantly an urban county encompassing 34 cities and a total population of 3 million people. Population growth has slowed as the County has become largely built out, and is projected at approximately 1% per year for the next 20 years.

Climate

Orange County's climate has hot dry summers and mild winters. Nearly all the annual precipitation falls in only a few storm events between October and April. During times of drought, it is not unusual for years to pass between major rainfalls. Precipitation results from three distinct mechanisms. The most important is the convergence mechanism associated with general winter storms originating in Alaska and picking up moisture as they travel south and east.

The second major precipitation mechanism is orographic lifting where moist air masses are deflected upward by local mountains, releasing rain. Orographic rainfall is also associated with winter rainfall. The third precipitation mechanism, which can cause extremely intense local precipitation, is the convective thunderstorm. One of the most intense convective rainfall events of record in Southern California dropped 11 inches of rainfall in about 80 minutes. On occasion, unstable tropical air masses move in from the south and produce rainfall. These tropical air masses combine convergence mechanisms with convective mechanisms to produce intense thunderstorms.

It is common for successive storms of varying durations and intensities to compound their effects, with the heavy rainfall of the second or third storm creating the most severe flood conditions. Regardless of the source of precipitation, Orange County only receives an average of 12 to 13 inches of rain per year. The present urban and former agricultural lifestyles are made possible only by large quantities of water imported from the Colorado River and Northern California.

This climate pattern creates unique challenges for stormwater quality program management. The extended dry periods result in a typical pattern of continuous base flow in most local storm drains, channels and creeks that is composed entirely of urban runoff with certain common pollutants from such activities as over-irrigation from landscaping, car washing and other routine uses of water. The more limited wet weather runoff periods and storm events result in rapidly rising and falling receiving water flows that can bring large quantities of water and associated pollutants over relatively short time periods. This can result in significant cost and land implications to manage or treat even relatively small storm events.

1.7 Model Programs

As noted above, the 2003 DAMP was redesigned to provide a series of model programs, local implementation plans, and watershed action plans rather than a single document as in the past. The 2003 DAMP was developed through a process that involved public and private sector input and public review through the California Environmental Quality Act (CEQA) process.

In 2006, the Permittees again undertook an update of the DAMP in response to anticipated requirements of fourth term permits that are expected to be issued by the two Regional Boards in early 2007.

The proposed 2007 DAMP includes the following program components:

- DAMP Model Programs
- Appendix A – Local Implementation Plans
- Appendix B – Training and Outreach Programs
- Appendix C – Program Effectiveness Assessments
- Appendix D – Watershed Action Plans
- Appendix E – Technical Reports

The following **Figure 1-2** shows this organizational layout:

**Figure 1-2
Drainage Area Management Plan Structure**

