

## 1.0 INTRODUCTION

The 1972 Federal Water Pollution Control Act, subsequently known as the Clean Water Act (CWA), established the 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 (all three 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 (1990-1996)	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

Each permit renewal has required the Permittees to continue to implement ongoing stormwater quality management programs and develop additional programs in order to control pollutants in stormwater discharges.

The specific water pollutant control program elements of the Orange County NPDES Stormwater Program were originally documented in the 1993 Drainage Area Management Plan (1993 DAMP), which served as the Permittees' primary policy and implementation document for compliance with the First and Second Term Permits. The main objective of the 1993 DAMP was 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. The 1993 DAMP (and subsequently the Second Term Permit) was prepared in compliance with the specific requirements of the First Term Permit and was originally completed through a process that involved public and private sector input and public review through the California Environmental Quality Act (CEQA) process. The 1993 DAMP was formally approved in June of 1994 by the Santa Ana Regional Board and in 1996 by the San Diego Regional Board.

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In compliance with the Second Term Permits, the Permittees submitted a Report of Waste Discharge (ROWD) to both Regional Boards in September 2000. The ROWD consisted of two volumes:

- Volume One - a summary of all the program activities that had been accomplished over the Second Term Permit term; and
- Volume Two - a Draft 2000 update of the DAMP (subsequently referred to as 2000 DAMP) as the proposed plan for the Third Term Permits for the 2001 – 2006 permit period.

The Draft 2000 DAMP was completed to incorporate the programs developed since 1993 and provide a programmatic foundation for future activities. The plan proposed a wide range of continuing and enhanced Best Management Practices (BMPs) and control techniques, which would be implemented and reported on as part of the Third Term Permit Annual Progress Reports.

As a result of the Third Term Permit requirements, the Permittees enhanced the existing program elements as well as developed additional ones and have updated the draft 2000 DAMP as the 2003 DAMP. 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 have significant differences for the first time.

As a result of the need to reconcile the differences between the two permits, the 2003 DAMP represents a departure from its 1993 predecessor. Previously, the 1993 DAMP constituted a self-contained 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. Now in the Third Term Permit period, the 2003 DAMP must address two permits that achieve similar objectives through different sets of requirements.

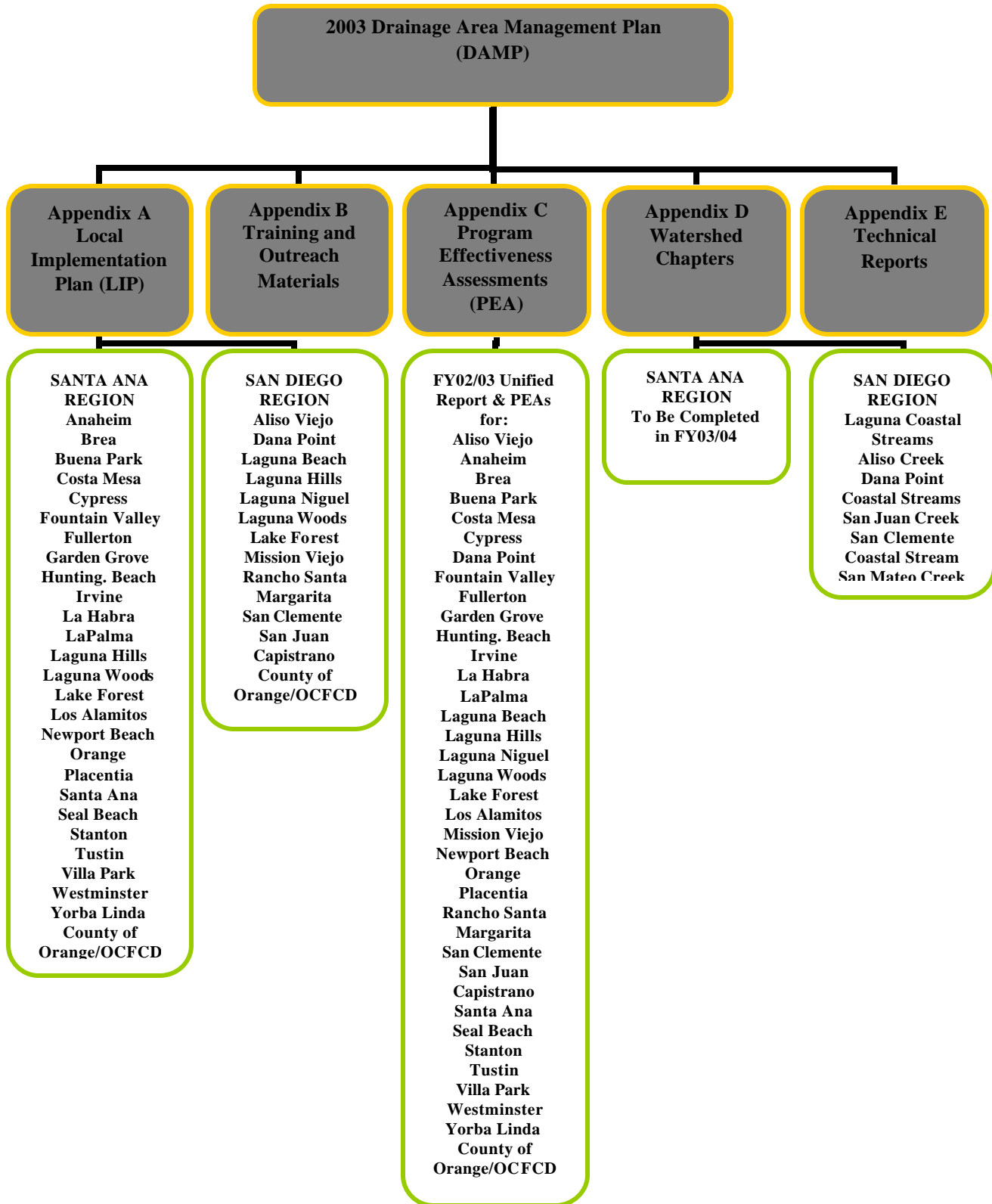
In response, the 2003 DAMP has been redesigned to serve as the foundation for a series of model programs, local implementation plans, and watershed implementation plans rather than a single document as in the past. The 2003 DAMP was developed through a process that involved public and private sector input and public review through the California Environmental Quality Act (CEQA) process.

The 2003 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 Chapters
- Appendix E – Technical Reports

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

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



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**). 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.

### **1.1 DAMP Coverage**

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

Therefore, it should be noted that this DAMP is only applicable to stormwater permits issued by the Regional Boards for areas of Orange County, although certain Permittees could be impacted adversely by flows from drainage areas from neighboring counties. 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.

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

### **1.2 Description of Drainage Area and Climate**

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.

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.

### **1.3 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 NPDES 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.

### **1.4 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.

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 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 re-assess 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 complimented by the water quality planning process, which focuses resources on the impacts of urban stormwater discharges on beneficial uses, to assure that problems receive the available resources and attention. The Permittees have begun to prioritize these initiatives (**Section 3.3.1**) 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 3.3.1** and the watershed chapters **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.

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 and plan development (**Section 2.0** and **Section 3.0**);
2. 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**);
3. Improve existing municipal pollution prevention and removal BMPs to further reduce the amount of pollutants entering the storm drain system. (**Section 5.0**);
4. 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**);
5. 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**);

6. 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**);
7. Ensure that existing development will address discharges from industrial facilities, selected commercial businesses, residential development and common interest areas/homeowner associations. (**Section 9.0**);
8. Detect and eliminate illegal discharges/illicit connections to the municipal storm drain system (**Section 10.0**);
9. 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
10. Assess watersheds and manage urban runoff on a watershed basis (**Section 12.0**).

### **1.5 Development of the DAMP**

The federal regulations (40 CFR 122.26 (d)(2)(iv)(A-D)) require the implementation and maintenance of control measures to reduce pollutants in discharges from municipal separate storm sewer systems . The program must address:

- Runoff from commercial and residential areas;
- Runoff from industrial sites;
- Runoff from construction sites; and
- Non-storm water discharges.

According to the regulations, the management program shall include a comprehensive planning process incorporating public participation and intergovernmental cooperation. The program shall also meet the MEP standard for the control of pollutants in discharges and shall describe priorities for implementing controls; the program may impose controls on a system wide basis, watershed basis, jurisdiction basis, or on individual outfalls.

The resulting DAMP incorporates a wide range of BMPs, which have been implemented and reported on since the inception of the program in 1990. This section describes the emphasis and development of the NPDES Stormwater Program during each permit term and defines:

- The BMPs that were developed and implemented during the First Term Permit;
- The BMPs that were developed and implemented during the Second Term Permit; and
- The BMPs with ongoing implementation and expanded emphasis during the Third Term Permit.

The BMPs that are listed below include a reference to the section in the DAMP that provides the



basis for that activity and where it is further described.

### 1.5.1 First Term Permit: DAMP Emphasis and Accomplishments

The 1993 DAMP defined a management structure for the Permittees' compliance effort, a formal agreement to underpin cooperation, and detailed municipal efforts to develop, implement and evaluate various BMPs.

The 1993 DAMP was formulated using the accepted framework for water quality planning; specifically, a systematic and iterative process of defining goals, assessing existing conditions, setting priorities, selecting near-term BMPs, implementing a near-term program, and assessing program effectiveness. The First Term Permit schedule for completing this process reflected the congressional expectation of expeditious program implementation and was completed in two years resulting in the 1993 DAMP.

The overriding objective of DAMP development was compliance with the federal requirements and the schedule of the First Term Permits. The DAMP was thus the product of an abbreviated water quality planning effort, and control program elements were selected based upon the review of literature and other non-point source control initiatives, rather than an understanding of identified water quality problems.

The specific DAMP accomplishments achieved during the First Term Permit included the following programs which were developed and subsequently implemented. The references at the end of each item refer to the 1993 DAMP sections.

1. Establishment of a program management structure and adoption and revision of the Implementation Agreement (Section 2.0 and Appendix C and D);
2. Development of a Model Water Quality Ordinance and Enforcement Consistency Guide (Section 4.0 and Appendix E);
3. Development of a water pollution enforcement implementation plan (Appendix E);
4. Development of a public agency activity BMP program (Section 5.0);
5. Evaluation of existing litter regulations (Section 5.2.1);
6. Evaluation of existing street sweeping schedules (Section 5.2.5);
7. Development of common public pesticide and fertilizer use guidelines (Section 5.2.9 and Appendix F);
8. Development of recommended and extended conditions of approval for BMPs for new development and significant redevelopment and industrial/commercial construction sites of 1-5 acres and initial training of County and city staff in same (Section 7.0 and Appendix G). The measures consisted of:
  - a) Non-structural and structural BMPs on specified new development and significant redevelopment;
  - b) Special notes on grading and building plans for industrial/commercial construction operations (1-5 acres); and
  - c) Proof of coverage by State General Construction Permit(s) for private grading and building permit applicants (>5 acres, subsequently revised to one (1) acre);
9. Development and holding of a workshop for the development industry on Appendix G implementation (Section 7.0 and Appendix G);

10. Development of recommended BMPs for public works construction and initial training of County and city staff in same (Section 8.0 and Appendix H). The measures consisted of:
  - a) Use of “Standard Specifications for Public Works Construction” (the “Green Book”) provisions as base-line standards for public new construction less than 5 acres; and
  - b) SWPPPs for public new construction and ground surface alteration (>5 acres);
11. Completion of industrial discharger notification (Section 9.0 and Appendix I);
12. Development of criteria and performance of inspections of the separate municipal storm drain systems to identify and eliminate all illegal or illicit storm drain connections. (Section 10.0 and Appendix J); and
13. Development of a water quality monitoring program (Section 11.0 and Appendix K).

### 1.5.2 Second Term Permit: DAMP Emphasis and Accomplishments

The program management structure and the BMPs developed during the First Term Permit and subsequently incorporated into the 1993 DAMP were the basis of the compliance effort during the Second Term Permit period. In addition, the Permittees also initiated several water quality planning efforts in the Talbert-Lower Santa Ana River, Newport Bay and Aliso Creek watersheds. These priority water quality planning initiatives have helped identify and better understand site-specific water quality problems in Newport Bay (nutrients) and Aliso Creek (bacteria) and Talbert-Lower Santa Ana River (bacteria). The Permittees intend to bring the experience that is gained from these initiatives to other watersheds based on a rolling priority list.

Through the ongoing implementation of the DAMP and the initiation of water quality planning efforts, the Permittees continued to improve existing stormwater management practices, identify current water quality problems, implement remedial measures and implement new practices preventing future receiving water quality problems.

The specific DAMP accomplishments achieved during the Second Term Permit period are as follows. The references to the DAMP sections and/or appendices correspond to the draft 2000 DAMP submitted as part of the Report of Waste Discharge unless otherwise noted.

1. Coordination of activities with other public agencies within and adjacent to Orange County having programs or activities that have an impact on stormwater discharges and water quality (state and regional transportation agencies, cities, counties, flood control districts, water districts, sanitation districts, etc.) (Section 2.2.9);
2. Modification of existing flood control facilities in order to provide additional water quality benefits. Implemented retrofits include channel stabilization, sediment basins and debris booms (Section 3.2 and Section 12.0);
3. Certification that the Permittees have adopted and are implementing the Water Quality Ordinance and accompanying Enforcement Consistency Guide (Section 4.3 and Appendix E);
4. Investigator training on the Water Quality Ordinance and Enforcement Consistency Guide (Appendix E).
5. Review of street sweeper effectiveness studies and provided a recommendation that all Permittees apply a standard of pollutant removal effectiveness to the purchase of any new equipment (Section 5.3.5);

6. Development, implementation and provision of training for an environmental performance reporting program for fixed public facilities (initially those facilities whose operations include hazardous materials storage, waste storage and vehicle and equipment maintenance) (Section 5.3.6);
7. Development of a long term public and business education strategy (Section 6.3.2 and Appendix L);
8. Development of BMP guidance for the control of those potentially polluting activities not otherwise regulated by any agency (mobile detailing, automotive service centers, restaurants, pool maintenance activities) (Section 6.3.1);
9. Establishment and promotion of a single phone line for all county public water pollution phone calls (Section 6.3.1);
10. Implementation of a joint outreach program with Orange County Sanitation District, Orange County Health Care Agency and Orange County Integrated Waste Management, to ensure that a consistent message on stormwater pollution prevention is brought to the public (Section 6.3.1);
11. Certification that Appendix G was being implemented (Section 7.0);
12. Development and implementation of training for city planners on Appendix G implementation (Section 7.0 & Appendix G);
13. Certification that Appendix H was being implemented (Section 8.0);
14. Development and implementation of training for grading, building and public works construction inspectors (Section 8.0 & Appendix H);
15. Submittal of a report of the findings and schedule for elimination for the detection/elimination of illicit connections (Section 10.4.1);
16. Development and implementation of a training program for staff of existing industrial inspection programs (Section 10.3.1);
17. Submittal of an evaluation report to the Santa Ana Regional Board addressing the urban nutrients in the Newport Bay Watershed (Section 12.0 and Appendix N);
18. Participation with neighboring counties in the regional Southern California Coastal Water Research Project (SCCWRP) 1998 Southern California Bight Study (Section 11.3.3); and
19. Completion of a revised water quality monitoring program to meet new monitoring objectives (Section 11.3.3 and Appendix K).

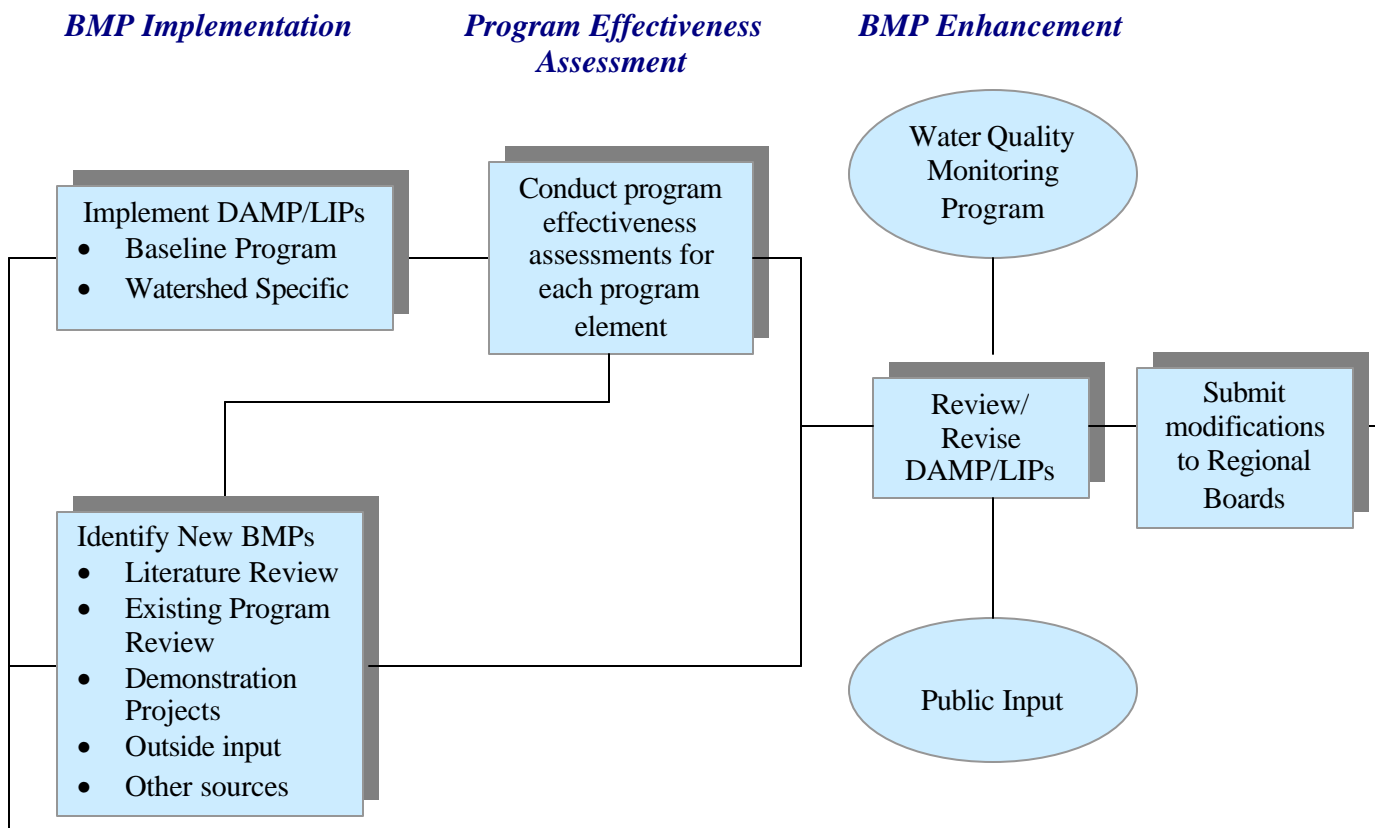
### 1.5.3 Third Term Permits: DAMP Emphasis

During the Third Term Permit period 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 that the 2003 DAMP represents a further step in a comprehensive planning process rather than its culmination (**Figure 1-2**).

**Figure 1-2**  
**Stormwater Program Iterative Process**



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. The comprehensive planning approach for the Third Term Permit period therefore consists of:

- Continuing the effective stormwater control programs already established and implemented during the First and Second Term Permits (**Sections 1.4.1 and 1.4.2**);
- Making revisions to specific BMPs that were developed or implemented during the First and Second Term Permits; and

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- Developing additional BMPs and/or expanding the emphasis of current BMPs during the Third Term Permit.

### *Continuation of First and Second Term BMPs*

The BMPs that were developed during the First and Second Term Permits that will be carried forth into the Third Term Permit period are as listed below:

1. Coordination of activities with other public agencies within Orange County having programs or activities that have an impact on stormwater discharges and water quality (state and regional transportation agencies, cities, counties, flood control districts, water districts, sanitation districts, etc.) (**Section 2.0**)
2. Evaluation of existing flood control facilities for modification to provide water quality benefits (**Section 3.0** and **Appendix E**);
3. Implementation of the long term public and business education strategy elements (**Section 6.0**);
4. Development of BMP guidance for the control of those potentially polluting activities from non-fixed facility businesses not otherwise regulated by any agency. These businesses include, but are not limited to, mobile detailers, carpet cleaners, commercial landscapers and general contractors (**Section 6.0**);
5. Evaluation of cost-effective BMPs that may help further reduce levels of nutrients and bacteriological indicators as identified by the water quality planning process in the Talbert-Lower Santa Ana River, Newport Bay and Aliso Creek watersheds (**Section 3.0** and **Appendix D**); and
6. Continuing participation in the Regional Research/Monitoring program that is being conducted with the neighboring counties, Southern California Coastal Waters Research Project (SCCWRP) and three Southern California Regional Boards (**Section 2.0**, **Section 3.0** and **Section 11.0**)

### *Program Assessments and Modifications*

In order to develop an effective program for the Third 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 NPDES Stormwater Program element, the development of the program and the assessment of the program's effectiveness.

The Program Effectiveness Assessments (**Appendix C**) serve 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 Chapters). By utilizing the 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.