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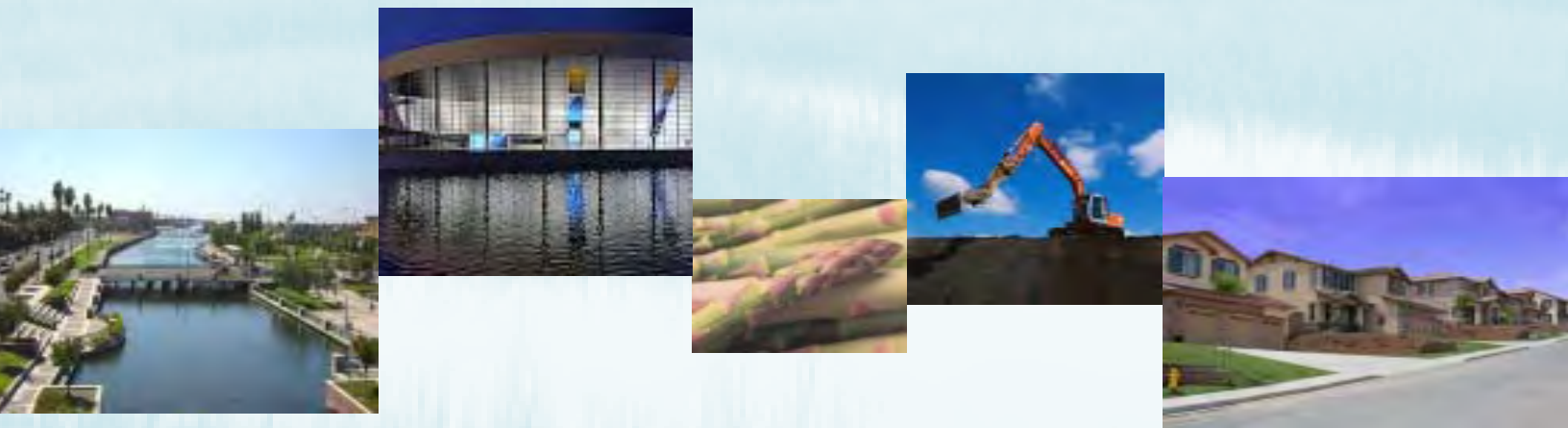
CITY OF STOCKTON

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# National Pollutant Discharge Elimination System Municipal Stormwater Program *Stormwater Management Plan*

*prepared by*

LARRY WALKER ASSOCIATES





## CITY OF STOCKTON

### DEPARTMENT OF MUNICIPAL UTILITIES

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April 15, 2009

Greg Vaughn, Chief  
Storm Water Section  
Regional Water Quality Control Board  
Central Valley Region  
11020 Sun Center Drive #200  
Rancho Cordova, CA 95670

### **CITY OF STOCKTON MUNICIPAL STORMWATER PROGRAM, STORMWATER MANAGEMENT PLAN ORDER NO. R5- R5-2007-0173, NPDES NO. CAS083470**

The City is pleased to submit the attached Final Stormwater Management Plan (SWMP) that is required as part of the City's NPDES Permit, Order No. R5-2007-0173 for the above named discharger as adopted by the Region Water Quality Control Board, Central Valley, on 6 December 2007.

If you have any questions, please contact me at (209) 937-8750 or Courtney Vasquez at (209) 937-8705.

MARK J. MADISON, P.E.  
DIRECTOR OF MUNICIPAL UTILITIES

MJM:CDV:rk

Enclosure

cc: Karen Ashby, Larry Walker Associates  
Courtney D. Vasquez, Stormwater Program Manager







# CITY OF STOCKTON

## DEPARTMENT OF MUNICIPAL UTILITIES

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### CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted.

Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

Executed on the 15<sup>th</sup> day of April 2009, at the City of Stockton.

Mark J. Madison  
Director of Municipal Utilities



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STORMWATER MANAGEMENT PLAN  
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**STORMWATER MANAGEMENT PLAN**  
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## LIST OF ACRONYMS

<b>BAT</b>	Best available technology
<b>BCT</b>	Best conventional pollutant control technology
<b>BMP</b>	Best management practice
<b>CASQA</b>	California Stormwater Quality Association
<b>CEQA</b>	California Environmental Quality Act
<b>CESQG</b>	Conditionally-exempt small quantity generator
<b>CFR</b>	Code of Federal Regulations
<b>CIP</b>	Capital improvement project
<b>COC</b>	Chain of custody
<b>CTR</b>	California Toxics Rule
<b>CVRWQCB</b>	Central Valley Regional Water Quality Control Board
<b>CWA</b>	Clean Water Act
<b>CWEA</b>	California Water Environment Association
<b>DFG</b>	Department of Fish and Game
<b>DHS</b>	Department of Health Services
<b>DO</b>	Dissolved Oxygen
<b>DRC</b>	Development Review Committee
<b>DWSC</b>	Deep Water Ship Channel
<b>EC</b>	Electrical conductivity
<b>ECG</b>	Enforcement Consistency Guide
<b>ESRI</b>	Environmental Systems Research Institute
<b>DLMOP</b>	Delta Landscape Maintenance Outreach Program
<b>DNA</b>	Deoxyribonucleic acid
<b>DRC</b>	Development Review Committee
<b>FPPP</b>	Facility Pollution Prevention Plan
<b>GIS</b>	Geographic Information Systems
<b>HAZMAT</b>	Hazardous Materials
<b>HHW</b>	Household Hazardous Waste
<b>IBI</b>	Index to Biological Integrity
<b>IC</b>	Illegal connections
<b>ID</b>	Illicit discharges

<b>IPM</b>	Integrated Pest Management
<b>LID</b>	Low impact development
<b>LPO</b>	Licensed pesticide operator
<b>MBAS</b>	Methyl Blue Activated Substances
<b>MDL</b>	Method detection limit
<b>MEP</b>	Maximum extent possible
<b>MFST</b>	Media Filter Stormwater Treatment System
<b>MOU</b>	Memorandum of Understanding
<b>MRP</b>	Monitoring and Reporting Program
<b>MS4</b>	Municipal separate storm sewer system
<b>MST</b>	Microbial source tracking
<b>MUD</b>	Municipal Utilities Department
<b>NOI</b>	Notice of Intent
<b>NONA</b>	Notice of Non-Applicability
<b>NOV</b>	Notice of Violation
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>ODS</b>	Owner/developer/successor-in-interest
<b>OES</b>	Office of Emergency Services
<b>OSHA</b>	Occupational Safety and Health Administration
<b>OP</b>	Organophosphate
<b>OWOW</b>	Our Water Our World
<b>PBO</b>	Piperonyl Butoxide
<b>PCOs</b>	Pest control operators
<b>POCs</b>	Pollutants of Concern
<b>PSAs</b>	Public service announcements
<b>QA</b>	Quality Assurance
<b>QC</b>	Quality Control
<b>RC</b>	Recorded Covenant
<b>REACON</b>	Recycling, Energy, Air, Conservation
<b>RGOs</b>	Retail Gasoline Outfits
<b>RL</b>	Reporting limit
<b>ROWD</b>	Report of Waste Discharge
<b>RPD</b>	Relative percent difference

<b>RWCF</b>	Regional Wastewater Control Facility
<b>RWQCB</b>	Regional Water Quality Control Board
<b>RWQE</b>	Reports of Water Quality Exceedances
<b>SAWS</b>	Stockton Area Water Suppliers
<b>SIC</b>	Standard Industrial Classification
<b>SJAFCA</b>	San Joaquin Area Flood Control Agency
<b>SQCCP</b>	Stormwater Quality Control Criteria Plan
<b>SSC</b>	Suspended sediment concentration
<b>SSMP</b>	Sewer System Management Plan
<b>SSO</b>	Sanitary sewer overflow
<b>SSOERP</b>	Sanitary Sewer Overflow Emergency Response Plan
<b>SUA</b>	Stockton Urbanized Area
<b>SUSMP</b>	Standard Urban Stormwater Mitigation Plan
<b>SW&amp;R</b>	Solid Waste & Recycling
<b>SWAMP</b>	Surface Water Ambient Monitoring Program
<b>SWMP</b>	Stormwater Management Plan
<b>SWQCPP</b>	Stormwater Quality Control Criteria Plan
<b>SWQCP</b>	Stormwater Quality Control Plan
<b>SWPPP</b>	Stormwater Pollution Prevention Plan
<b>SYRCL</b>	South Yuba River Citizens League
<b>TIE</b>	Toxicity Identification Evaluation
<b>TIGER</b>	Topologically Integrated Geographic Encoding and Referencing system
<b>TMDL</b>	Total maximum daily load
<b>TOC</b>	Total organic carbon
<b>TOPPS</b>	Targeted Opportunities to Prevent Pollution
<b>TRE</b>	Toxicity Reduction Evaluation
<b>US</b>	United States
<b>USEPA</b>	United States Environmental Protection Agency
<b>UWR</b>	Universal waste recycling
<b>WDID</b>	Waste Discharge Identification number
<b>WQBP</b>	Water Quality Based Program
<b>WQO</b>	Water quality objective

# Section 1

## Program Management

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### OVERVIEW

This document outlines the Stormwater Management Plan (SWMP) that has been developed for and will be implemented within the jurisdictional limits of the City of Stockton and the urbanized areas of San Joaquin County. The SWMP, which includes existing and enhanced program control measures, represents the strategy for controlling the discharge of pollutants from the municipal storm drain system to the maximum extent practicable (MEP).

The core objectives of the SWMP are to:

1. Identify and control those pollutants in urban runoff that pose significant threats to the waters of the State and waters of the U.S. and their beneficial uses;
2. Comply with the federal regulations to eliminate or control, to the MEP, the discharge of pollutants from urban runoff associated with the stormwater drainage system;
3. Achieve compliance with water quality standards;
4. Develop a cost-effective program which focuses on pollution prevention of urban stormwater;
5. Seek cost-effective alternative solutions where prevention is not a practical solution for a significant problem; and
6. Coordinate the implementation of control measures with other agencies.

An increasingly important element to consider is the protection of the Delta through the development and implementation of Total Maximum Daily Loads (TMDLs). The SWMP has been structured to include relevant TMDL needs/requirements. As such, the SWMP addresses specific pollutants of concern that have been identified as impacting or potentially impacting local receiving water quality, including that of the Delta, in the Stockton Urbanized Area (SUA). The pollutants/conditions of concern that are being addressed through the implementation of special studies include pesticides, pathogens, mercury and low dissolved oxygen. The special studies are designed to characterize the fate and transport of these pollutants and to assist with source identification and identification of control measures.

To address the core objectives and pollutants of concern, the SWMP incorporates a series of commitments and performance standards and, as a result, provides for a long-term, comprehensive, and multidisciplinary effort by the City to achieve water quality standards and protect beneficial uses.

### ENVIRONMENTAL CHARACTERISTICS

The City of Stockton (City) is located within the Central Valley and is situated along the San Joaquin Delta waterway connecting the Sacramento and San Joaquin Rivers to the San Francisco Bay. Located in San Joaquin County, the City is approximately 83 miles east of San Francisco and 45 miles south of Sacramento.<sup>1</sup> It encompasses just over 60 square miles with an average elevation of 15 feet and is home to the largest, easternmost inland seaport in California. With approximately 184 sunny days per year, an average temperature of 74.6 degrees F, and an annual precipitation of approximately 14 inches, Stockton

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<sup>1</sup> <http://www.ci.stockton.ca.us>



experiences dry hot summers and relatively wet and cool winters.<sup>2</sup> Although Stockton has historically been an agriculturally based economy, the City is now characterized by 680 miles of public streets; waterfront residential communities; more than 100,000 trees; a wide variety of recreational activities; and a large number of industrial and commercial centers. The City is the San Joaquin County Seat and is the thirteenth largest city in California with a population of approximately 286,041, nearly 44 percent of the total population of the County. An overview map of the City is provided in **Figure 1-1**.

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<sup>2</sup> <http://www.visitstockton.org>

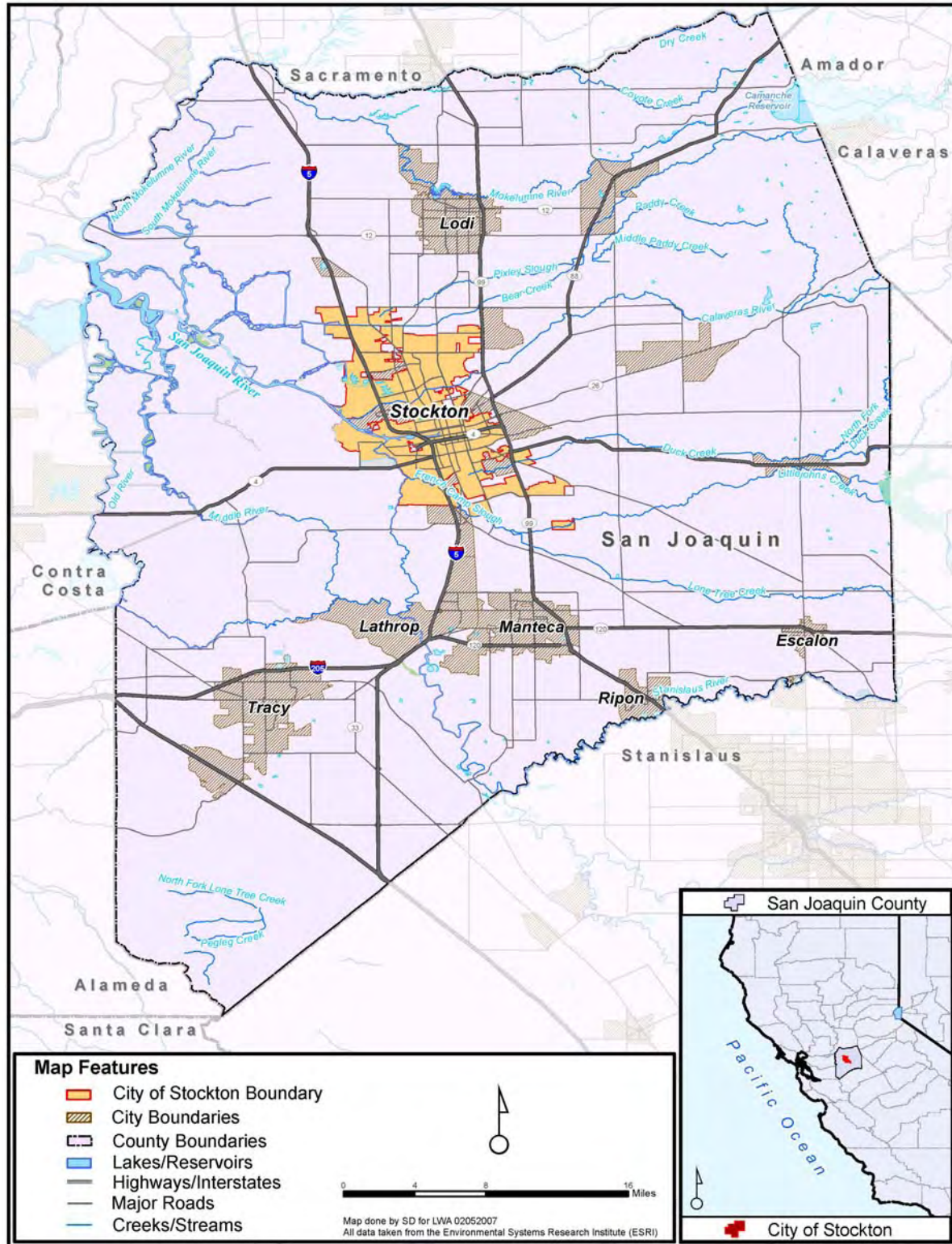


Figure 1-1. City of Stockton Area Map<sup>3</sup>

<sup>3</sup> All information was obtained from Environmental Systems Research Institute (ESRI).

## BACKGROUND

The stormwater pollution control effort, of which this SWMP is a part, is the result of over thirty years of legislative effort, beginning with the 1972 Federal Water Pollution Control Act, subsequently known as the Clean Water Act (CWA). The CWA established the NPDES program. The 1987 Federal CWA amendments created Section 402(p) of the Act, mandating, among other things, permits for municipal stormwater dischargers. Section 402(p) required that the municipal NPDES permits include:

- A requirement to effectively prohibit non-stormwater discharges into the municipal separate storm sewer systems (MS4s); and
- Controls to reduce the discharge of pollutants in stormwater discharges to the MEP, including management practices; control techniques; system, design, and engineering methods; and such other provisions as the Administrator of the State determines appropriate for the control of such pollutants.

The overarching goals of the stormwater management program are to a) reduce the degradation of waters of the State and waters of the United States (U.S.) by urban runoff and protect their beneficial uses and b) develop and implement an effective SWMP that is well-understood and broadly supported by regional stakeholders.

Subsequent regulations promulgated by the United States Environmental Protection Agency (U.S. EPA) on November 16, 1990 (40 Code of Federal Regulations (CFR) 122.26 (d)(2)(iv)) required municipal NPDES dischargers to develop and implement a management program to effectively address these requirements.

The City falls under the jurisdiction of the Central Valley Regional Water Quality Control Board (Regional Water Board) and must comply with the municipal National Pollutant Discharge Elimination System (NPDES) stormwater permit (Permit) as indicated below.

City of Stockton	
Regional Water Board Jurisdiction	Central Valley
Municipal Stormwater Permit	NPDES Municipal Permit, Order No. R5-2007-0173
Permit Adoption Date	December 6, 2007
County Area Covered by Permit	Stockton Urbanized Area (City of Stockton and County of San Joaquin)

In response to these regulations, the City developed Part I (May 1992) and Part II (May 1993) permit applications, respectively, which served as the genesis of the SWMP contained herein. In February 1995, the City of Stockton and the County of San Joaquin were named as co-permittees in their first term NPDES municipal stormwater permit. The Regional Water Board adopted Order No. 95-035 (CA0082597). In October 2002, the first term municipal stormwater Permit was replaced with a second term Permit, Order No. R5-2002-0181 (CAS083470).

In December 2002, U.S. EPA Region 9 and the Regional Board conducted a program audit of the City of Stockton and the County of San Joaquin's stormwater programs. The purpose of the audit was to determine the Permittees' compliance with the Permit and to review the overall effectiveness of the program. The audit identified program deficiencies as well as positive program attributes. The September 2003 (revised May 2004) update of the SWMP was developed in compliance with the second term Permit requirements and incorporated performance standards to address the program deficiencies identified in the 2002 U.S. EPA program audit. Since the first term Report of Waste Discharge (ROWD) assessment indicated that many of the stormwater Program Elements were effective in reducing stormwater pollution,

most of the previous programs were continued during the second term Permit. The revised SWMP included a wide range of continuing and enhanced Best Management Practices (BMPs) and control measures that were implemented over the period covered by the second term Permit (2002-2007). These additional control measures assisted the co-permittees in improving the overall effectiveness of the stormwater program. Where possible, control measures were developed to focus on specific pollutants of concern or sources to enhance pollution reduction and provide increased environmental benefit.

The second term Permit required the co-permittees to submit a ROWD 180 days prior to the expiration of the Permit. Among other things, the ROWD required the co-permittees to assess the effectiveness of their stormwater program and determine what additional efforts may be necessary. As part of the ROWD preparations, the co-permittees developed an updated SWMP for the third term Permit. This SWMP proposes a wide range of continuing, enhanced, and new BMPs and control measures that will be implemented during the third term Permit period (2007-2012). It is the intent of this SWMP to meet all Permit requirements through an iterative process. Each year, the City will review its work to date and, if appropriate, modify and/or enhance the control measures to make progress towards permit compliance.

## PERMITTED AREA

The City of Stockton is defined as a large municipality (population greater than 250,000) as described within 40 CFR 122.26 (b)(4). As such, the City is required to obtain an NPDES municipal stormwater permit for the area under its jurisdiction.

The County of San Joaquin contains urbanized areas and areas of potential growth that are either enclosed within the City limits or surround the City. Due to the proximity of the County's urbanized areas to the City, their physical interconnection with the City's storm drain system, and the locations of their discharges relative to the City's system, the County is designated as a part of the large MS4 in accordance with 40 CFR 122.26 (b)(4)(iii).

The City of Stockton, the urbanized areas of the County that are enclosed within the City, and the urbanized areas of the County which surround the City are referred to as the Stockton Urbanized Area (SUA) and are subject to the NPDES municipal permit, Order No. R5-2007-0173. This area is presented in **Figure 1-2**.

San Joaquin County traverses six watersheds<sup>4</sup>, including:

- **Middle San Joaquin-Lower Merced-Lower Stanislaus (South/South-East)**
- **San Joaquin Delta (West)**
- **Lower Calaveras-Mormon Slough (East)**
- **Lower Cosumnes-Lower Mokelumne (North)**
- Panoche-San Luis Reservoir (South)
- San Francisco Bay (West)

The first four sub-basins flow into the City of Stockton (**bold** text indicates that these watersheds are visible in **Figure 1-3**). The Stockton Urbanized Area falls within the San Joaquin River Basin. The San Joaquin River flows northward and drains the portion of the Central Valley south of the Sacramento-San Joaquin Delta and north of the Tulare Lake Basin. The principal streams in the Basin are the San Joaquin River and its larger tributaries: the Cosumnes, **Mokelumne**, **Calaveras**, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers (bold text indicates tributaries located within San Joaquin County).

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<sup>4</sup> [http://cfpub.epa.gov/surf/county.cfm?fips\\_code=06077](http://cfpub.epa.gov/surf/county.cfm?fips_code=06077)



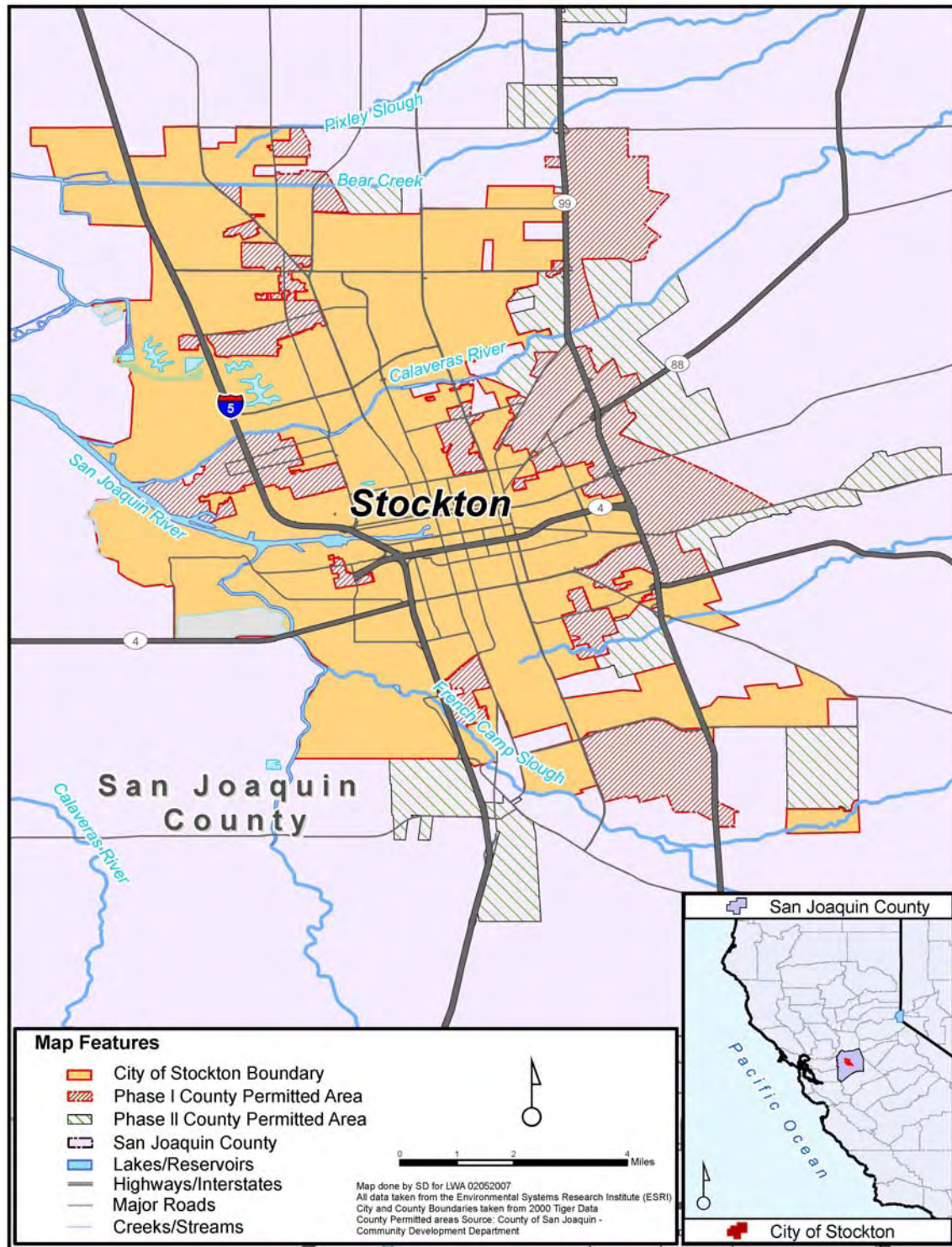
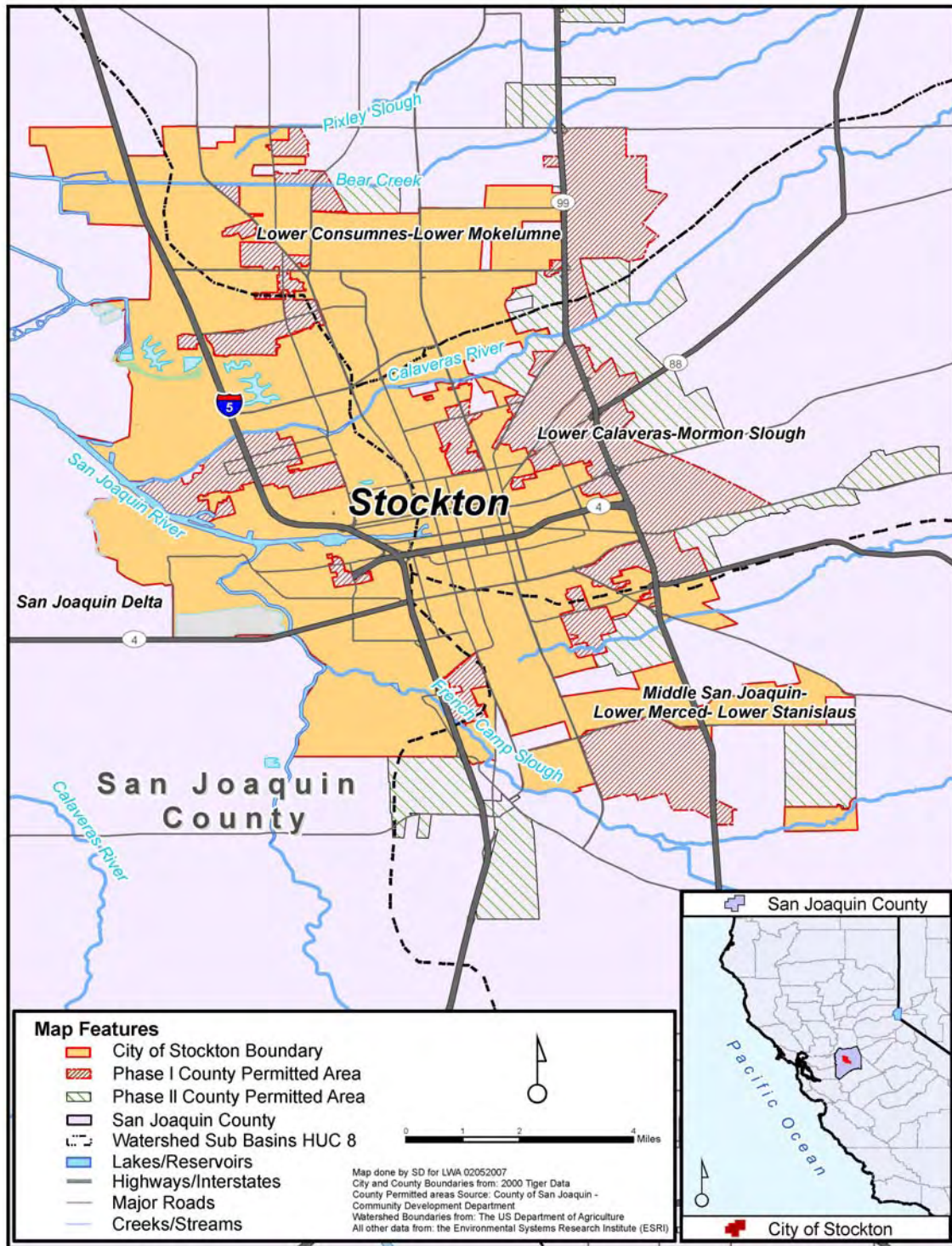


Figure 1-2. Stockton Urbanized Area Map<sup>5</sup>

<sup>5</sup> The City of SUA was obtained from the 2000 U.S. Census Bureau Topologically Integrated Geographic Encoding and Referencing system (TIGER) Data. The County Incorporated Urban areas were obtained from the County of San Joaquin – Community Development Department. All other information was obtained from ESRI.



**Figure 1-3. Stockton Urbanized Area Watersheds Map<sup>6</sup>**

<sup>6</sup> The City of Stockton Urbanized area was obtained from the 2000 U.S. Census Bureau TIGER Data. The County Incorporated Urban areas were obtained from the County of San Joaquin – Community Development Department. Watershed Boundaries were obtained from the U.S. Department of Agriculture. All other information was obtained from ESRI.



## STORMWATER MANAGEMENT PLAN (SWMP) ORGANIZATION

The SWMP provides a comprehensive approach for addressing pollutants in stormwater discharges and is organized into ten sections. Supporting guidance or implementation tools for each Program Element is provided in corresponding appendices. An overview of each section is provided in **Table 1-1**. The training performance standard, previously included in Section 10, is addressed within individual sections where applicable.

**Table 1-1. Overview of SWMP Sections**

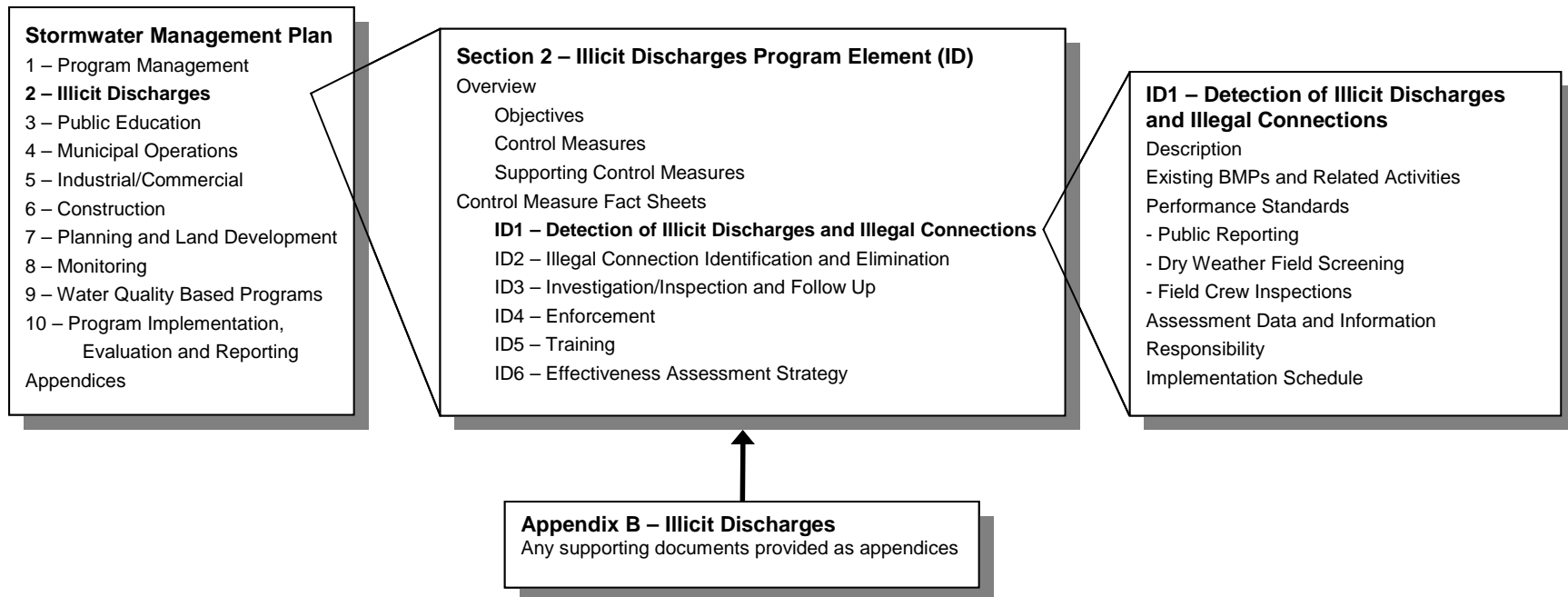
SWMP Section	Description
Section 1 Program Management	This section addresses the program overview, background, management strategy, fiscal analysis, and legal authority.
Section 2 Illicit Discharges	This section describes the program developed to detect, respond to, investigate and eliminate illicit discharges and illegal connections.
Section 3 Public Education	This section describes the public education and outreach program developed to promote change in behavior and increase the knowledge of target communities to reduce pollutants to the storm drain systems.
Section 4 Municipal Operations	This section describes the program developed to address municipal operations so they are performed in a manner that is protective of water quality and minimizes the potential for pollutants to enter the storm drain system.
Section 5 Industrial and Commercial	This section describes the program developed to inspect and outreach to industrial and commercial businesses.
Section 6 Construction	This section describes the program developed to reduce pollutants from construction sites during all phases of construction.
Section 7 Planning and Land Development	This section describes the program developed to address the reduction of pollutants in new development through better site planning, design practices, and post-construction controls.
Section 8 Monitoring	This section describes the water quality monitoring program developed to assess the health of the local water bodies, evaluate selected treatment control BMPs (e.g., detention ponds), and characterize stormwater discharges.
Section 9 Water Quality Based Programs	This section provides an overview of the various water quality based programs that are being implemented, including the Pesticide Plan, Pathogen Plan, Dissolved Oxygen Plan, and Smith Canal Study.
Section 10 Program Implementation, Assessment and Reporting	This section describes the implementation schedule and identifies methods that will be used to evaluate the overall program and reporting requirements.

## CONTROL MEASURES AND PERFORMANCE STANDARDS

Control Measures, Performance Standards, and Assessment Data and Information have been identified in order to assist the City in the implementation of the SWMP. In addition, implementation schedule tables have been included within each Control Measure to clearly identify what the performance standards are and when they are to be completed.

- Control Measure – Control Measures are programmatic actions required to meet Permit requirements. The Control Measures outlined within each section and discussed in more depth in the accompanying Fact Sheets were designed to adequately address all the applicable Permit provisions. For each Control Measure, there are accompanying Performance Standards which, once accomplished, constitute compliance with Permit requirements. The Control Measure Fact Sheets also identify assessment tools that are intended to be used to assess the status and effectiveness of program implementation and were developed as stand-alone documents so they can be individually provided to the responsible Department(s)/Division(s).
- Performance Standards – The Performance Standards included in each Control Measure Fact Sheet establish the level of effort required (i.e., the specific tasks or activities which must be completed) to comply with the Permit provision(s) related to the Control Measure.
- Assessment Data and Information – The Assessment Data and Information identify those items that should be tracked and reported as a part of the Annual Report and program effectiveness assessments. These items include information or data that allow the City to document and assess the effectiveness of the stormwater management program.
- Implementation Schedule – Implementation schedule tables are included within each Control Measure and Fact Sheet to clearly identify what the performance standards are, when they need to be completed during the five-year permit term, and who has primary and secondary responsibility for completion of these performance standards. The tables also help identify whether the performance standards constitute a new activity for the City (N), are building upon or are an enhancement of current activities (E), or are an activity that the City is already implementing and will continue (C). The implementation schedule table builds accountability into the program and will evolve slightly as the program is developed, implemented, and assessed over the next five years.

An overview of the SWMP organization is presented in **Figure 1-4**.



**Figure 1-4. SWMP Organization**

## PROGRAM COORDINATION

### Co-Permittees

The implementation of the SWMP requires a coordinated management effort by the City and County. While named as co-permittees to one permit, the City and County currently have separate programs and submit documents and reports separately to the Board. However, the programs are very similar, and the co-permittees collaborate with each other to address common issues, to plan and coordinate common activities, and to ensure consistency in program development and implementation.

In 1995, the City of Stockton and County of San Joaquin entered into a Memorandum of Understanding (MOU) for filing as co-permittees under one NPDES permit as well as the development of a receiving waters monitoring program. The MOU also provides a mechanism for the City and County to continue to work cooperatively on the development and implementation of additional NPDES programs. To facilitate the ongoing communication and coordination between the two agencies, meetings are held on an on-going basis.

The co-permittees have reviewed their existing MOU to ensure that it provides for designation of joint responsibilities, decision making, information management of data and reports, cost sharing objectives, and any other collaborative arrangements that are necessary for compliance with the Permit. The MOU (finalized September 2008) is included as **Appendix A-1** to the SWMP.

Although the co-permittees work together to coordinate the development and implementation of the program, each agency is responsible for implementing the stormwater program within their respective jurisdictions, and each has jurisdiction over and/or maintenance responsibilities for storm drains and/or watercourses in the City of Stockton and surrounding urbanized areas of San Joaquin County.

### City of Stockton

The City's Municipal Utilities Department (MUD) Stormwater Management Division has primary responsibility for the development and implementation of the SWMP. Although administered and principally staffed by MUD, the implementation of the SWMP requires the assistance of and close coordination with several other City departments as identified in **Figure 1-5**. The shaded boxes represent the primary Departments/Divisions involved in the development and implementation of the SWMP. Contact information will be provided and updated in the annual reports.

The Municipal Utilities Department has recently coordinated with the other City departments who have a primary or secondary responsibility under the stormwater program and instituted a series of internal stormwater committees in order to ensure that the program requirements are understood and effectively implemented. The coordination meetings include an overall policy management meeting and a series of subcommittees that focus on planning and land development, inspections and enforcement, public outreach, monitoring and special studies, and municipal operations. Although the structure and focus of the subcommittees may be modified over time, this internal coordination provides a solid foundation for the program and will be continued throughout the permit term. In addition, the County of San Joaquin participates in the policy management meeting and the subcommittee meetings as needed. This coordination allows the City and County to leverage resources and ensure that similar requirements are being implemented in the respective jurisdictions.

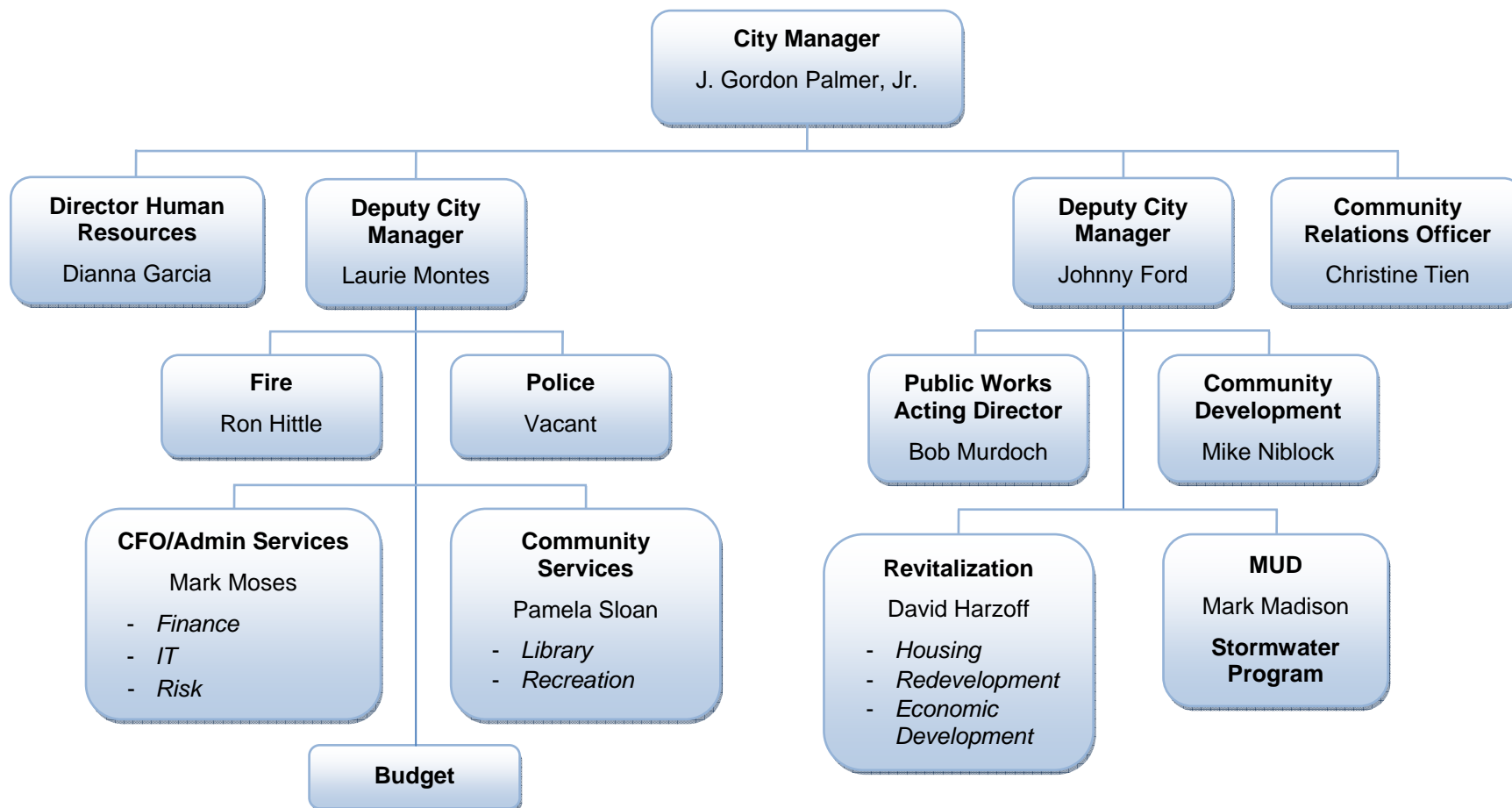


Figure 1-5. City of Stockton Organization Chart

To ensure that the various City Departments understand their roles and responsibilities and to facilitate the communication and coordination that is necessary to implement the SWMP, internal meetings and training sessions are held on an ongoing basis. In addition, upon request, the MUD Stormwater Management Program provides technical support to the other Departments. This coordination facilitates the implementation of the requirements in an efficient and cost-effective manner. A brief description of the City Department/Division responsibilities is provided in **Table 1-2**.

**Table 1-2. Primary Responsibilities of the City Departments/Divisions**

Key City Department/Division for SWMP Implementation	Primary Departmental/Division Responsibilities
Municipal Utilities Department – Stormwater Management Program	Responsible for implementing, monitoring, and/or overseeing all City activities related to stormwater management. Provide regulatory compliance review to ensure permit standards are met. Also responsible for the maintenance of the detention basins.
Municipal Utilities Department – Engineering	Has all plan review, water quality review, and approval authority. Responsible for Capital Improvement Program (CIP) project review.
Municipal Utilities Department – Environmental Control	Responsible for responding to and reporting sanitary sewer overflows (SSOs) and sharing information with MUD – Stormwater Management Program.
Municipal Utilities Department – Operations and Maintenance	Responsible for maintenance of storm/sanitary pump stations.
Municipal Utilities Department – Storm Drain Assessment District	Responsible for operation and maintenance of detention basins. Oversees O&M for the City's Consolidated Storm Drain Assessment District and ensures O&M Agreements are fully executed on private developments with post-construction permanent stormwater controls.
Community Development Department	Responsible for establishing policies and goals for long-range plans to provide for the orderly growth of the community. Manages Permit Center. Directs and coordinates the activities of the Building and Planning Divisions.
Community Services Division	Coordinates with MUD for stormwater presentations to school-age children at the After School Program and summer Day Camps. <i>(Formerly Parks and Recreation Department)</i>
Fire	Responsible for CIP project review on projects initiated by Fire Department.
Library	Responsible for CIP project review on projects initiated by the Library.
Police	Responsible for CIP project review on projects initiated by the Police Department.
Public Works – Engineering	Responsible for delivering projects included in the City's CIP for inspecting new development for compliance with City codes and standards.
Public Works – Operations and Maintenance	Responsible for maintaining 670 miles of City streets.
Public Works – Solid Waste and Recycling	Responsible for maintaining contracts with refuse haulers for street sweeping and parking lot maintenance.



Key City Department/Division for SWMP Implementation	Primary Departmental/Division Responsibilities
Public Works – Parks Division	Responsible for maintaining the City's parks and recreational areas; implementing the pesticide and fertilizer application protocol; the IPM program; and the installation of pet waste bag dispensing stations.
City Attorney	Serves as attorney for and provides legal advice and representation to City Council members, officials, boards, commissions, and City departments regarding legal and regulatory matters of concern to the City and its operations.

Each of the key Departments/Divisions has a responsibility for the day-to-day implementation of the SWMP. A general overview of the Program Elements and responsible City Departments/Divisions is presented in **Table 1-3**. For specific information regarding each Control Measure and Performance Standard, the appropriate SWMP section should be consulted.

**Table 1-3. City Departments and Divisions Responsible for Implementing the Stormwater Program<sup>1</sup>**

Department/Division	Program Management & Reporting	Illicit Discharges	Public Education	Municipal Operations <sup>1</sup>	Industrial/Commercial	Construction	Planning & Land Development	Monitoring	Water Quality Based Programs
MUD – Stormwater Management	P	P	P	P	P	P	P	P	P
MUD – Engineering	S			P			P		
MUD – Environmental Control	S	P	S		S			P	
MUD – O & M				P					
MUD – Storm Drain Assessment District				P				S	
Community Development	S	S	S		S	S	P		
Community Services			S						
Fire							S		
Library							S		
Police							S		
PW – Engineering	S			P		S	S		
PW – Operations & Maintenance		S		P					
PW – Solid Waste & Recycling				P					
PW – Parks Division	S		S	P					
City Attorney	S	S			S	S	S		

Notes:

1. Multiple departments/divisions are listed as having primary responsibility due to differing responsibilities for various control measures.

P – Primary responsibility

S – Provides support to primary department or division

MUD – Municipal Utilities Department

PW – Public Works

## FISCAL ANALYSIS

### Source of Funds

The City of Stockton funds all of its stormwater related activities through a monthly stormwater user fee of \$2.10/equivalent residential unit. The City of Stockton will undertake a Stormwater Rate Study during summer 2009 to review the current rate structure and make recommendations to increase the monthly stormwater user fees in order to adequately fund the Program.

### Reporting

As a part of the Annual Report (Section 10), the co-permittees assess the current NPDES expenditures as well as the projected expenditures for the next fiscal year. The budget summary includes the expenditures incurred to implement the SWMP and written explanations where necessary. The summary also includes a description of the source(s) of the funds including any legal restrictions on the use of the funds.

Pursuant to the second term Permit, the co-permittees reviewed the fiscal analysis reporting format so that expenditures are consistently assessed by SWMP Program Element from year to year. The City will continue to report the Fiscal Analysis within the Annual Report and revise as needed. An example of the Fiscal Analysis reporting format is provided in **Table 1-4**.

**Table 1-4. Example Fiscal Analysis Reporting Format**

<b>Program Element</b>	<b>Expenditures During Fiscal Year 20xx-20xx</b>	<b>Estimated Budget for Fiscal Year 20xx-20xx</b>
<b>Program Management</b>		
<b>Illicit Discharges</b>		
<b>Public Outreach</b>		
<b>Municipal Operations</b>		
Capital Improvement Projects – Design Review		
Maintenance and Inspection of Structural Treatment BMPs		
Pollution Prevention at City/County Facilities		
Landscape and Pest Management		
Storm Drain System Cleaning and Maintenance		
Street Cleaning and Maintenance		
Parking Lots Maintenance		
Training		
<b>Industrial and Commercial</b>		
<b>Construction</b>		
<b>Planning and Land Development</b>		
<b>Water Quality Monitoring Program</b>		
Baseline Monitoring Program		
Bioassessment Analysis		
Dry Weather Field Screening		
Detention Basin Monitoring		
BMP Effectiveness Study		
Sediment Toxicity		
Smith Canal and Mosher Slough Low Dissolved Oxygen Study		
<b>Water Quality Based Programs</b>		
Pesticide, Pathogen, Mercury, and DO Work Plans		
Implementation of Pesticide, Pathogen, Mercury, and DO Plans		
<b>Program Implementation, Assessment, and Reporting</b>		
<b>TOTAL</b>		

Notes:

Enter "U" if the information is unavailable

The costs provided should include 1) In-house and contracted Operations/Maintenance Costs and 2) Capital Costs

## LEGAL AUTHORITY

The Permit requires that the co-permittees implement a stormwater management program to reduce the pollutants in stormwater discharges to the MEP. Central to this program is the establishment and/or verification that the co-permittees have adequate legal authority to regulate the discharge of pollutants to the storm drain system.

The City of Stockton and County of San Joaquin are legal entities with the authority to administer, implement, and enforce the stormwater management program within their separate jurisdictions. The co-permittees have broad legal authority from stormwater, wastewater, solid and hazardous materials regulations, and various public nuisance ordinances to address stormwater quality issues.

The City enacted a Stormwater Management and Discharge Control Ordinance No. 013-95 (Chapter 7, Part VIII, Section 7-800 to 7-858.2) to specifically control stormwater runoff quality. This ordinance both complements and supplements the existing ordinances and establishes uniform requirements for protecting and enhancing the water quality of the City's watercourses, water bodies, and wetlands in a manner consistent with the Clean Water Act.

The City Attorney provided the Regional Water Board with a certified statement of the City's existing legal authority on September 3, 2003. The certified statement recognized that the City had adequate legal authority to implement and enforce each of the requirements contained in the second term Permit and 40 CFR 122.26 (d)(2)(i)(A-F). The City Attorney has reviewed the existing legal authority to ensure that the City has adequate legal authority to implement and enforce each of the requirements within Order No. R5-2007-0173.

An updated certified statement of legal authority (dated June 6, 2008) is included as **Appendix A-2** to the SWMP. In addition, the certified statement describes the following:

- Citation of urban runoff related ordinances adopted by the City and the reasons they are enforceable
- Progressive Enforcement Policy and how it will be effectively implemented
- Identification of the local administrative and legal procedures available to mandate compliance with urban runoff related ordinances and therefore with the conditions of the Permit
- Description of how these ordinances are implemented and how enforcement actions under these ordinances may be appealed
- Description of whether the City can issue administrative orders and injunctions or if it must go through the court system for enforcement actions

The amendments or Ordinances will be developed and adopted within one year after the adoption of the SWMP (anticipated to be mid-late 2009).

## **PROGRAM MANAGEMENT CONTROL MEASURES AND PERFORMANCE STANDARDS**

The control measures and performance standards for the overall management of the stormwater program are listed below.

### **Program Coordination**

- Review and revise the SWMP as needed
- Co-permittees (City of Stockton and County of San Joaquin) meet quarterly
- Participate in quarterly internal Stormwater Program Meetings (City Divisions and Departments)
- Participate in statewide stormwater-related meetings, conferences, and stakeholder groups as needed
- Review and revise MOUs as necessary
- Establish, review, and revise cooperative agreements as needed

### **Fiscal Analysis**

- Complete a Stormwater Rate Study to review the current rate structure and make recommendations to increase the monthly stormwater user fees in order to adequately fund the Program
- Review and revise the Fiscal Analysis reporting format as needed
- Report the Fiscal Analysis within the Annual Report

### **Legal Authority**

- Review the legal authority as needed

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments. The following data and information should be collected:

- Meeting information, including date and purpose
- Fiscal information needed to complete the Fiscal Analysis for the Annual Report, organized by Program Element

## **RESPONSIBILITY**

MUD – Stormwater Management Program has primary responsibility for all of the performance standards for this Program Element. MUD – Engineering, Community Development, Public Works – Operations & Maintenance, Public Works – Engineering, PW - Parks Division, and the City Attorney will provide support for this Program Element.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
Program Coordination																												
Review/revise the SWMP as needed	C																					P						
Co-permittees meet quarterly	C																					P						
Participate in quarterly internal Stormwater Program Meetings	E																					P	S	S	S	S	S	S
Participate in statewide stormwater-related meetings, conferences, and stakeholder groups as needed <sup>4</sup>	E																					P	S	S	S	S	S	S
Review and revise MOUs as necessary	C																					P						S
Establish, review, and revise cooperative agreements as needed	C																					P						S
Fiscal Analysis																												
Complete a Stormwater Rate Study	N									X												P						
Review and revise the Fiscal Analysis reporting format as needed	C																					P						
Report the Fiscal Analysis within the Annual Report	C					X				X				X				X				P						
Legal Authority																												
Review the legal authority as needed	C																					S	S					P

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

4. Pending budget approval, this item may be postponed in fiscal year 2009-2010 until fiscal year 2010-2011.

X = Performance Standard will be completed during this quarter.  = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

## Section 2

### Illicit Discharges Program Element (ID)

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#### OVERVIEW

An illicit discharge (ID) is defined as any discharge to the storm drain system that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations. Illicit discharges include the disposal of materials such as paint, spa water, or waste oil into the storm drain or the discharge of waste streams containing pollutants to the storm drain.

#### Illegal Connection

Undocumented and/or unpermitted physical connections from a facility to the storm drain system or receiving water.

Illegal connections (IC) are a subset of illicit discharges. Illegal Connections are defined as undocumented and/or unpermitted physical connections from a facility to the storm drain system or receiving water (e.g., a sanitary sewer connection to the storm drain).

Because illicit discharges and illegal connections can be a significant source of pollutants to the storm drain system and receiving waters, the purpose of this Program Element is to ensure implementation of a

comprehensive program for detecting, responding to, investigating and eliminating these types of discharges and connections in an efficient and effective manner.

#### Illicit Discharge

Any discharge to the storm drain system that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations.

#### OBJECTIVES

The objectives address the key components of the illicit discharges program element and identify that, in order to be effective, the program must:

- Proactively detect illicit discharges and illegal connections through a variety of mechanisms including, but not limited to, public reporting, dry weather field screening, and field crew inspections.
- Upon identification of an illegal connection, investigate and eliminate the connection through a variety of mechanisms including, but not limited to, permitting or plugging the connection.
- Upon identification of an illicit discharge, investigate the discharge and conduct any necessary follow-up actions to mitigate the impacts of the discharge.
- Maintain a database for recording the information related to illicit discharges and illegal connections and, to the extent possible, use a GIS map to assist in analyzing and reporting information including the identification of spatial or temporal trends and priority areas.
- Provide adequate legal authority to control and/or prohibit pollutants from being discharged to the municipal storm drain system and implement a progressive enforcement policy to ensure that adequate enforcement is conducted.
- Conduct training for employees who are responsible for identification, investigation, termination, cleanup, reporting, and enforcement of illicit discharges and illegal connections.
- As a part of the annual reporting process, conduct an assessment to determine the effectiveness of the program element and identify any necessary modifications.



## CONTROL MEASURES

The Control Measures outlined in **Table 2-1** and discussed in more depth in the accompanying Fact Sheets were designed to address the program objectives. In developing the Control Measures, several key factors were considered:

- Each Control Measure must address one or more of the program objectives.
- Each Control Measure must clearly identify the performance standards, timeframe for completion, and responsible Department/Division to ensure that there is accountability built into the program.
- The data and information from the previous permit term and/or reporting period must be analyzed to determine the effectiveness of each Control Measure, and the iterative process must be used to ensure that each Control Measure is effective and has a commensurate benefit for the resources expended.
- Each Control Measure must actively identify enhancements/modifications that would improve the program element and overall effectiveness of the stormwater program.

**Table 2-1. Control Measures for the Illicit Discharge Program Element**

ID	Control Measure
ID1	Detection of Illicit Discharges and Illegal Connections <ul style="list-style-type: none"><li>• Spill Response Procedures</li><li>• Public Reporting (Hotline)</li><li>• Dry Weather Field Screening</li><li>• Field Crew Inspections</li><li>• Non-Stormwater Discharges</li></ul>
ID2	Illegal Connection Identification and Elimination <ul style="list-style-type: none"><li>• Investigation and Elimination</li><li>• Enforcement</li></ul>
ID3	Investigation/Inspection and Follow Up <ul style="list-style-type: none"><li>• Response and Investigation</li><li>• Cleanup</li><li>• Recordkeeping and Tracking</li></ul>
ID4	Enforcement
ID5	Training
ID6	Effectiveness Assessment

The Control Measure Fact Sheets developed for the Illicit Discharge program element (ID1 – ID6) address the program objectives and identify assessment tools that may be used to assess the effectiveness of the program. The Fact Sheets were developed as stand-alone documents so that they can be individually provided to the responsible Department(s)/Division(s).

## Supporting Control Measures

While the individual, program-specific Control Measures are the primary focus of each program element (e.g., ID1-ID6 for Illicit Discharges), it is also important to understand how the program element fits within the overall SWMP and how each of the program elements complement and support each other. A brief summary of the program elements that support the Illicit Discharge program is provided below.

Supporting Control Measures	Program Element
---	<b>Illicit Discharges</b>
X	Public Outreach
X	Municipal Operations
X	Industrial/Commercial
X	Construction
X	Planning and Land Development

- Public Outreach (Section 3)
  - *24-hour Hotline Number* – Reporting of illicit discharges and illegal connections
  - *Household Hazardous Waste Collections* – Promotion of proper disposal for wastes, avoids illicit discharges
  - *Ask Stockton* – Interface on the City website allows the public to report problems
- Municipal Operations (Section 4)
  - *Municipal Maintenance Facilities* (Corporation Yard with fueling and washing stations) – Evaluated to prevent illicit discharges
  - *Field Crews* – “Eyes” and “Ears” in the field, report suspected illicit discharges and illegal connections
  - *Storm Drain Marking/Stenciling* – Educates the public and encourages them not to discharge pollutants to the storm drain
  - *Training* – Field crews are trained to understand the ID/IC program and what to look for
- Industrial and Commercial (Section 5)
  - *Facilities in Database* – Reports of illicit discharges or illegal connections from facilities in the industrial and commercial program database are recorded so the facility history is documented
- Construction (Section 6)
  - *Facilities in Database* – Reports of illicit discharges or illegal connections from facilities in the construction program database are recorded so the facility history is documented. This is especially important during periods of dry weather when sites may experience an increase in the washing off of construction-related materials such as concrete, paints, or plaster.
  - *Inspections* – Facilities are inspected to identify illegal connections
- Planning and Land Development (Section 7)
  - *Plan Review* – Plans are reviewed to identify potential illegal connections

# ID1 – Detection of Illicit Discharges and Illegal Connections

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## DESCRIPTION

Detection of illicit discharges through the availability of a public hotline, conducting dry weather field screening, and utilizing field crews ensures that the Illicit Discharges program is proactive in identifying and eliminating problematic discharges. This control measure reflects the City's efforts to detect and eliminate illicit discharges and illegal connections and provides several mechanisms for receiving information.

## EXISTING BMPS AND RELATED ACTIVITIES

The City conducts a number of activities that prepare staff for responding to discharges and facilitate the proactive detection of illicit discharges and illegal connections. These include the establishment of spill response procedures, public reporting, dry weather field screening, and field crew inspections and are discussed in additional detail below.

### Spill Response Procedures

The City addresses three types of spills: sewage, non-hazardous, and hazardous spills. Procedurally, the sewage and non-hazardous spills are addressed in the same manner, whereas the hazardous spills are responded to and addressed by a licensed contractor.

The sewage spills and non-hazardous spills are addressed using the process and procedures that are outlined within the Sanitary Sewer Overflow Emergency Response Plan (SSOERP). The most recent version of the SSOERP (March 2009) is included as **Appendix B-1** to the SWMP. More details on the SSOERP and the procedures the City follows in handling sewage spills are provided within Section 4 (see MO1).

Hazardous waste spills are addressed using the process and procedures outlined within the Stockton Fire Department's Hazardous Material Incidents Procedures Manual and Hazardous Materials Response – Standard Operating Procedures Manual. These documents are provided in **Appendix B-2** and **B-3**, respectively.

Although there are currently procedures that are in place for responding to spills involving hazardous and non-hazardous materials/wastes, the City will develop formal, written Spill Response Procedures, including a responsibility flow chart and outlined response steps to address emergency and non-emergency spills of both hazardous and non-hazardous materials/wastes. The procedures will also address the timeline, response, and BMPs necessary for responding to "emergency spills" versus other types of spills.

Emergency fire fighting flows may also pose a water quality threat. To address emergency fire fighting flows, a formal Fire Fighting Flow Management Plan has been developed (see MO3).

### Public Reporting

The City has established and maintains a 24-hour Hotline (**209-937-8341**) to encourage the public to report water pollution problems. The reporting program is based on a published directory that lists the telephone numbers of all City staff and departments. The directory is distributed to all City employees (office and field personnel) who are expected to keep a copy with them during business hours. The

directory is designed to facilitate the public's access to the City government by giving every City employee the ability to direct initial inquiries to the appropriate department or person.

- Business Hours – During normal business hours, City personnel are available to answer and direct calls to the appropriate department.
- Evenings and Weekends – After hours, calls are automatically deferred to 911 and the Fire Department dispatcher.

A call to the hotline or directly to staff will result in immediate action. Each complaint or spill is investigated within two (2) business days and tracked to ensure that information is not lost. Internal communication between departments has been established through a series of notification flowcharts for particular types of incidents to ensure response, adequate tracking and corrective actions.

In addition, the City has established a web-based public reporting system called Ask Stockton. Ask Stockton is a workflow database that is used to track citizen and customer inquiries related to various municipal operations and programs. Ask Stockton is not advertised as a means to report spills, SSOs, or illicit activity. Rather, it is advertised as a means for residents to ask questions about City services and to register non-urgent complaints. This database allows the user to submit a request that is then routed to the appropriate department. A due date is automatically assigned by the system when a complaint is submitted; staff must respond to a resident within approximately two (2) weeks. The City responds to all complaints submitted via Ask Stockton that are determined to be of an urgent nature within two (2) business days. The Stormwater Program uses Ask Stockton to address various stormwater related issues, questions, and concerns. This tool has allowed stormwater staff to communicate directly with citizens regarding stormwater issues. Ask Stockton is advertised through the City of Stockton's web site, utility bill inserts, and various outreach materials created throughout the City.

## **Dry Weather Field Screening**

The City has established an annual dry weather field screening program that ensures all outfalls are surveyed within 5 years (see also Section 8). The field screening program identifies new dry weather flows and provides a check on the effectiveness of the ID Program and supports this Program by identifying "hot spots" and conducting the appropriate follow-up action(s). All outfalls are sampled and tested for temperature, pH, chlorine, copper, phenols, dissolved oxygen, electrical conductivity and detergents.

## **Field Crew Inspections**

Field staff are trained to recognize illegal discharges so that, during their normal maintenance activities, they can identify signs of previous, current, or potential non-stormwater discharges/connections or illegal dumping into the storm drain system. Once they are discovered, the field staff notify the MUD – Stormwater Management Program for follow-up investigation. The City's primary spill response investigator conducts follow-up inspections and accompanies field crews during cleanup to ensure that reported spills are properly cleaned up and identified illicit connections are corrected. Follow-up activities are described in Control Measures ID2 and ID3.

## **Non-Stormwater Discharges**

Essential to identifying illicit discharges is recognizing that several categories of non-stormwater discharges are not prohibited, provided that they are not significant sources of pollutants to waters of the

United States (US)<sup>1</sup>. These conditionally allowed non-stormwater discharges are identified in the City's Ordinance<sup>2</sup>, and are listed in **Table 2-2**.

**Table 2-2. Conditionally Allowed Non-Stormwater Discharges**

Water line flushing, hydrant flushing, and other discharges from potable water sources (other than main breaks) ( <i>k, m</i> ) <sup>3</sup>	Spring water or flows from riparian habitats and wetlands ( <i>f, j</i> )
Landscape irrigation and lawn watering ( <i>n, l, q</i> )	Individual residential car washings and dechlorinated swimming pool discharges <sup>4</sup> ( <i>o</i> ), ( <i>p</i> )
Diverted stream flows or rising ground waters ( <i>a, b</i> )	Street wash water ( <i>r</i> )
Uncontaminated groundwater infiltration ( <i>c</i> )	Emergency fire fighting flows
Uncontaminated pumped ground water ( <i>d</i> )	Any discharge regulated under a NPDES permit issued to the discharger and administered by the State of California under the authority of the United States Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit and other applicable laws or regulations.
Water from foundation and footing drains, crawl space pumps, and air conditioning condensation ( <i>e, g, h, i</i> )	

The discharges in **Table 2-2** are allowed unless identified as a significant source of pollutants to waters of the US. When a discharge category is identified as a significant source of pollutants to waters of the US, the discharge is prohibited unless BMPs are implemented that will reduce pollutants to the maximum extent practicable.

To date, none of the conditionally allowed non-stormwater discharge categories have been identified as significant sources of pollutants. Dry weather field screening data (Section 8) will be evaluated to assist in the determination of whether any of the allowed discharge categories are significant sources of pollutants to waters of the US. If so determined, BMPs to reduce the pollutants to the MEP will be identified in the SWMP and will be required by the City. Should it not be possible to reduce pollutants, the City will prohibit the discharge on a case-by-case or categorical basis and update the City's Ordinance and SWMP<sup>5</sup>.

<sup>1</sup> Order No. R5-2007-1073, Section B, Discharge Prohibitions – Non-Storm Water Discharges

<sup>2</sup> General Discharge Prohibition, under Stormwater Management and Discharge Control Ordinance (PC §§ 7-800—7-858.2). Re-codification of the Stockton Municipal Code is underway as of April 2009. The relevant ordinances are available on the City of Stockton's website, <http://www.stocktongov.com>.

<sup>3</sup> (*x, x*) refer to the letters identifying non-stormwater discharges specified in 40 CFR 122.26(d)(2)(iv)(B)(1).

<sup>4</sup> Per the General Discharge Prohibition, under Stormwater Management and Discharge Control Ordinance (PC §§ 7-800—7-858.2) of the City's Ordinance, the discharge of swimming pool water, even if it is dechlorinated, is prohibited. Re-codification of the Stockton Municipal Code is underway as of April 2009. The relevant ordinances are available on the City of Stockton's website, <http://www.stocktongov.com>.

<sup>5</sup> Isolated problems will be addressed as such until the City has enough evidence to warrant designating an entire category as a source of pollutants.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this control measure.

### **Spill Response Procedures**

- Develop Spill Response Procedures which outline the steps that will be taken in the event of emergency and non-emergency spills (to be submitted with the 2008-2009 Annual Report)

### **Public Reporting**

- Facilitate reporting of illicit discharges by maintaining the Hotline/Ask Stockton and advertising it in the white pages, City Web site, and stormwater-related public education materials.
- Coordinate with other departments and agencies to ensure that all reports are appropriately received, routed, tracked, and investigated.
- Review/revise current procedures for internal communication between Departments and Divisions and modify as necessary.
- Review/revise flowchart summarizing the internal communication procedures established and to assist with the routing of calls as necessary.
- Review the form that is used to document the complaints received and modify as needed.

### **Dry Weather Field Screening**

- Conduct dry weather field screening as described in Section 8.
- Implement the action levels and protocols for source tracking that were developed for the dry weather field screening program and revise as needed.
- Develop and implement follow-up investigation plans for those sites where action levels have been exceeded and/or signs of illicit discharges/connections exist.
- By the end of the permit term, evaluate the effectiveness of the dry weather field screening program in identifying ID/IC issues and revise as needed.

### **Field Crew Inspections**

- Continue field observations as part of maintenance operations, document evidence of non-stormwater discharges/connections or illegal dumping.

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Progress Report and used within the program effectiveness assessments (see ID6). The data and information to be collected may include, but will not be limited to, the following:

- Number of water pollution complaints received and source of complaint (hotline, dry weather field screening, field staff, Ask Stockton, other)
- Number of verified complaints reported by source
- Locations of verified complaints
- Number of outfalls monitored and number of problem areas identified
- Number and locations of dry weather discharges exceeding the action levels
- Types of pollutants (materials/waste) involved
- Associated source identification activities and investigation plans developed
- Monitoring data collected as part of dry weather field screening program, source identification activities, and investigation plans.

## **RESPONSIBILITY**

The MUD – Stormwater Management Program has primary responsibility for this control measure with support from MUD – Engineering, MUD – Environmental Control, Community Development, Public Works, and PW - Parks Division.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2									
ID1 – Detection of Illicit Discharges and Illegal Connections																												
Spill Response Procedures																												
Develop Spill Response Procedures	N										X											P						
Public Reporting																												
Maintain and advertise Hotline/ Ask Stockton	C																					P						
Coordinate with other agencies and departments	C																					P	S	S	S	S	S	
• Review/revise procedures as necessary	E									X												P	S	S	S	S	S	
• Review/revise flowchart	E									X												P						
Review and revise complaint form	E									X												P						
Dry Weather Field Screening																												
Continue field screening (Section 8)	C															X						P	S					
• Implement action levels and source tracking protocols	E															X						P	S					
• Continue source identification and investigation plans	C															X						P	S					
Evaluate program and revise as needed	E																					P						
Field Crew Inspections																												
Continue field observations for ID/IC	C																					P		S	S	S		

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

X = Performance Standard will be completed during this quarter

3. P = Primary Responsibility; S = Secondary Responsibility

■ = Performance standard will be completed during this timeframe as specified.

MUD = Municipal Utilities Department



# ID2 – Illegal Connection Identification and Elimination

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## **DESCRIPTION**

Similar to the City's efforts to detect and eliminate illicit discharges, the City proactively detects illegal connections to the storm drain system. Upon identification of an illegal connection, the City investigates and eliminates illegal connections through a variety of mechanisms including, but not limited to, permitting or plugging the connection.

## **EXISTING BMPS AND RELATED ACTIVITIES**

As noted previously, the City conducts dry weather monitoring to characterize the quality of dry weather flows. The City field crews are instructed to notify MUD should they encounter a potential illegal connection that warrants further investigation. Once advised of the situation the MUD may use various methods to investigate sources of illicit discharges including dye or smoke tests, video (TV), construction certification, and an inspection program.

As described in more detail in the Planning and Land Development program element, the City's municipal code (Chapter 16) requires that tentative parcel maps be reviewed and approved consistent with City standards including storm drain standards. Plan review by the City Permit Center includes confirmation that no illegal connection is proposed. Construction inspections are conducted upon project completion to ensure that the project was built correctly.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this control measure.

- Investigate and eliminate illegal connections discovered through response to illicit discharges. Ensure that all illegal connections are investigated within 21 calendar days to determine the source of the connection, nature and volume of discharge through the connection, and the responsible party for the connection. All illegal connections shall be terminated or permitted within 180 days of completion of the investigation.
- Coordinate with the Planning and Land Development program to conduct plan reviews and identify illegal connections.
- Coordinate with the Construction program to inspect projects and identify illegal connections.

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Progress Report and used within the program effectiveness assessments (see ID6). The data and information to be collected may include, but will not be limited to, the following:

- Number of illegal connections reported
- Number and location of reported illegal connections that were verified
- Source of illegal connection identification (field staff, hotline, plan review, etc.)
- Number of illegal connections eliminated and mechanism for elimination (permitted, plugged, etc.)
- For those connections eliminated, information and data available for load reduction estimates
- Number of plans reviewed and number requiring revision due to identified illegal connections
- Number of illegal connections identified during plan review process
- Number of illegal connections identified during project construction inspections

## **RESPONSIBILITY**

The MUD – Stormwater Management Program has primary responsibility for responding to illegal connections and undertaking proper enforcement measures to eliminate these connections with support from MUD – Engineering, Community Development, and Public Works.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
ID2 – Illegal Connection Identification and Elimination																													
Investigate and eliminate illegal connections	C																						P	S		S	S		
Coordinate with Planning and Land Development program	C																						P	S		S	S		
Coordinate with Construction program	C																						P	S		S	S		

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

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## ID3 – Investigation/Inspection and Follow Up

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### **DESCRIPTION**

The investigation and inspection of potential illicit discharges and illegal connections to the storm drain system, as well as appropriate follow-up actions, are essential in order to eliminate illicit discharges and illegal connections. The response and follow-up actions may include cleanup and/or other necessary actions to mitigate the impacts of the discharge.

In addition to the investigation and follow-up activities, it is also necessary to maintain a database for recording the information related to illicit discharges and illegal connections and, to the extent possible, use a GIS map to assist in analyzing and reporting information including the identification of spatial or temporal trends and priority areas.

### **EXISTING BMPS AND RELATED ACTIVITIES**

The City has a comprehensive approach for responding to reported illicit discharges. The approach includes response, investigation, cleanup, and record keeping and tracking. Related enforcement activities are addressed in ID4.

### **Response and Investigation**

When a notification or complaint is received, the Municipal Utilities Department (MUD) provides an on-site assessment to determine the conditions of the discharge within two (2) business days (during or immediately following containment and cleanup). The investigation process includes determining whether the discharge is occurring on private or public property, whether the discharge is an authorized non-stormwater discharge, and whether the discharge is hazardous. If the illicit discharge is hazardous then City crews follow appropriate protocols in notifying State and local agencies and protecting themselves from exposure. The City has adopted two plans to facilitate consistent and coordinated response to spills and releases:

- Sanitary Sewer Overflow Emergency Response Plan - March 2009
- Hazardous Materials Management Plan – 2002

As identified in ID1, the City will also be developing formal Spill Response Procedures to outline the steps that will be taken in the event of an emergency or non-emergency spill.

The City is in the process of developing an Investigative Guidance Manual. The Manual will establish general guidelines that may be utilized to ensure that the procedures followed and information obtained during an investigation are defensible. Various techniques that can be used while investigating incidents will be identified, including record keeping; site entry; informal interviews; environmental sample collection; photographs; record reviews; report writing; and case development. The types of information that will be collected during investigations may include, but are not limited to, the following:

- Inspector and responder names
- Site entry procedures, events, and contacts, especially if there were problems
- Names, titles, and phone numbers of site contacts
- Any description of site and event
- Dates and times of specific events

- Any deviations from established protocol or procedure
- Names and contact information of everyone interviewed
- Interview notes
- Discussion of unusual conditions
- Environmental samples and all sampling log information (e.g., chain of custody form)
- Photographs and/or videos with relevant log information (e.g., when and where photo was taken and description of photo)
- Informal witness interview information

The City completes a detailed description of each report, action taken, and final resolution. A Stormwater Program Illicit Discharge Complaint Form has been developed to ensure all pertinent information is gathered (**Appendix B-4**). Information collected with the Storm Water Control Division Complaint Form includes the following items:

- Date
- Complainant information; name, address, phone number
- Location of Incident
- Details of Incident
- Actions Taken
- Amount of pollutant removed or remediated
- Response date and time
- Officer responding to incident

## Cleanup

The main objective of the cleanup effort is to restore the impacted area back to its original state and prevent further environmental degradation in the area surrounding the incident. During this phase, the MUD – Stormwater Management Program staff provides oversight to ensure that the discharge is removed and disposed of properly and to verify cleanup charges. Depending on the incident, the City may serve the owner or occupant of the property with an invoice for the cleanup cost.

The City eliminates discharges by means of appropriate actions or legal procedures, depending on the type of discharge/connection detected. Illicit discharges are eliminated by contacting the appropriate supervisor who oversees the activities that caused the discharge and notifying the individual of necessary actions. If hazardous or unknown substances are found, the City notifies Fire Dispatch to request HazMat response. Follow-up is conducted to ensure that abatement activities have been adequately implemented.

## Recordkeeping and Tracking

The City developed an Illicit Discharge Database and utilizes the information to identify and respond to areas that required focused attention. The City also maps the locations of the illicit discharges and illegal connections on a GIS-based map and uses the information to evaluate patterns and trends with the objective of identifying priority areas and tracking repeat offenders.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this control measure.

- Respond to illicit discharges. Ensure that staff respond within two business days to reports of illicit discharges, implementing activities to abate, contain, and cleanup all illicit discharges, including hazardous substances.
- Develop an Investigative Guidance Manual.
- Maintain contractual services for cleanup and removal of hazardous materials
- Maintain the Illicit Discharges Database
- Evaluate, optimize, and incorporate the waste categories used to characterize materials present in the discharges requiring a response. The waste categories currently in use (i.e., Inorganic, Paint, Petroleum Products, Sewage, Miscellaneous, and Unidentified) are broad and unassociated with particular activities. Specific categories and sub-categories will be evaluated and created to more accurately characterize the pollutants and activities involved. This will allow the City to effectively focus resources on the more prevalent types of incidents. By targeting pollutants and associated activities for additional outreach efforts, the City may be able to eliminate a large portion of the incidents that occur, thereby resulting in a more effective Illicit Discharge program.
- Identify reported illicit discharges in the database on a map using a convenient scale and in a format that is easily discernible. Evaluate the information annually for patterns and trends of illicit discharges, with the objectives of identifying priority areas and tracking repeat offenders for elimination of illicit discharges.

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Progress Report and used within the program effectiveness assessments (see ID6). The data and information to be collected may include, but will not be limited to, the following:

- Number of illicit discharges reported
- Number and location of illicit discharges verified
- Types of pollutants and activities involved in the illicit discharges verified
- Number of illicit discharges requiring clean up or follow-up activities
- For those discharges verified, information and data available for load reduction estimates

## **RESPONSIBILITY**

MUD – Environmental Control has primary responsibility for this control measure with support from MUD – Stormwater Management Program.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
ID3 – Investigation/Inspection and Follow Up																													
Respond to illicit discharges	C																						S		P				
Develop Investigative Guidance Manual	N										X												S		P				
Maintain contractual services for incident cleanup	C																						S		P				
Maintain Illicit Discharges Database	C																						S		P				
• Evaluate, optimize, and incorporate the waste categories	N										X												S		P				
• Map ID/IC incidents and locations	C					X				X				X				X					S		P				

### Notes:

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## ID4 - Enforcement

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### DESCRIPTION

The Enforcement Control Measure establishes policies and procedures and outlines the progressive levels of enforcement applied to responsible parties not complying with City ordinances. By adopting and implementing a progressive enforcement policy the City will ensure that the program is effective at reducing illicit discharges and illegal connections.

### EXISTING BMPS AND RELATED ACTIVITIES

The City has established adequate legal authority to control and/or prohibit pollutants from being discharged to the municipal storm drain system (see also SWMP Section 1). The City has also established a progressive enforcement and referral policy so that the enforcement actions match the severity of violation and include distinct, progressive steps. In general, the progressively severe corrective actions involve verbal warnings followed by written warnings and legal action, if necessary. Illicit discharges by businesses are addressed in a more formal manner through issuance of administrative citations, notices of non-compliance, cease and desist orders, and criminal enforcement, depending upon the compliance history of the facility. Corrective actions are taken in every instance where a responsible party is identified.

Relevant portions of the Stockton Municipal Code that provide the City with the authority to implement the SWMP include those under the Stormwater Management and Discharge Control Ordinance (PC §§ 7-800—7-858.2).<sup>6</sup> The City has developed a *Municipal Utilities Department Directive Prohibiting Non-Stormwater Discharges to the Storm Drainage System* (MUD Directive) for Construction Activities, Commercial/Industrial Businesses, Residential Activities, and Special Events (see **Appendix B-5**). The MUD Directive<sup>7</sup> identifies the steps that should be taken when citing violators of ordinances, allows for Citywide consistency in the enforcement of the local ordinances, and provides a mechanism for cost recovery. The progressively severe corrective actions involve verbal warnings followed by written warnings and legal action, if necessary. Illicit discharges by industrial or commercial facilities or construction sites are addressed in a formal manner through issuance of notices of violations, citations, or notices and orders (Cease and Desist) depending upon the compliance history of the facility. Corrective actions are taken in every instance where a responsible party is identified.

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<sup>6</sup> Re-codification of the Stockton Municipal Code is underway as of April 2009. The relevant ordinances are available on the City of Stockton's website, <http://www.stocktongov.com>.

<sup>7</sup> The City had planned to develop an Enforcement Consistency Guide (ECG); however, the MUD Directive and the Investigative Guidance Manual currently being developed (see ID3) together will adequately address consistency in the enforcement of the local ordinances and will provide standard guidelines and protocols for identifying, documenting, responding to, and enforcing violations.



The types of enforcement actions that may be taken include the following:

- Administrative Remedies
  - Verbal Warning
  - Notice of Violation
  - Cease and Desist Order
  - Stop Work Order
- Legal Action
  - Administrative Citation
  - Fine
  - Other

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this control measure.

- Implement the progressive enforcement policy.
- Review/revise the Illicit Discharges Database to incorporate enforcement-related information.
- Track enforcement actions using the Illicit Discharges Database.

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Progress Report and used within the program effectiveness assessments (see ID6). The data and information to be collected may include, but will not be limited to, the following:

- Number and types of enforcement actions taken
- Number of repeat offenders identified

## **RESPONSIBILITY**

The MUD – Stormwater Management Program and MUD – Environmental Control have primary responsibility for this control measure, with support from the City Attorney.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
ID4 – Enforcement																													
Implement progressive enforcement policy and procedures	C																						P		S				S
Review/revise the Illicit Discharges Database to incorporate enforcement-related information.	E										X												S		P				
Track enforcement actions in the Illicit Discharges Database	E																						P		P				

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## ID5 – Training

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### DESCRIPTION

Training is important for the implementation of the Illicit Discharges Program Element. An effective training program is one of the best pollution prevention Best Management Practices (BMPs) that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

- The City has reviewed and revised their Stormwater Program Training Strategy (Training Strategy). The updated Training Strategy is attached as **Appendix B-6**. The objectives of the training program are to:
- Increase the general awareness and understanding of the SWMP and Illicit Discharges program;
- Increase the awareness and understanding of the Illicit Discharges control measures and performance standards;
- Create a training program to increase understanding and awareness, and prompt the behavioral changes needed to protect and improve water quality; and
- Conduct training for employees responsible for identification, investigation, termination, cleanup, reporting, and enforcement of illicit discharges and illegal connections and measure the effectiveness of the training.

The Illicit Discharge Training Modules will include the following:

- **Responders Introduction** – Presents overview of ID/IC program and identifies the responsibilities including reporting, spill response, inspection, cleanup, and enforcement procedures
- **Responders Field Implementation** – Includes hands-on scenarios that may be encountered while in the field conducting inspections or responding to water pollution complaints
- **Investigative Techniques** – Identifies the fundamental techniques necessary for conducting legally defensible investigations and uses “hands on” exercises to introduce key concepts related to record keeping, hazard identification, environmental sampling, photography, and enforcement
- **Fire Department Activities** – Identifies the emergency and non-emergency activities with which fire department personnel may be involved. Provides examples of how those activities may be conducted without having an adverse impact on water quality.

Specific areas of focus for the training efforts for the Illicit Discharge Detection and Elimination program element are summarized in **Table 2-3** below.

**Table 2-3. Areas of Focus for the Illicit Discharge Detection and Elimination Program Training**

Target Audience	Format	Subject Material	Comments
<ul style="list-style-type: none"><li>• Hotline staff</li><li>• Public Works maintenance crews</li><li>• Industrial/Commercial inspectors</li><li>• Building and construction inspectors</li><li>• Police Dept.</li><li>• Fire Dept.</li><li>• Environmental Control Officers</li></ul>	<ul style="list-style-type: none"><li>• Classroom</li><li>• Field Demos</li></ul>	<ul style="list-style-type: none"><li>• Overview of stormwater management program</li><li>• Stormwater ordinance and enforcement policy</li><li>• Identification and elimination</li><li>• Conducting field inspections</li><li>• Response and notification</li><li>• Database tracking</li></ul>	<ul style="list-style-type: none"><li>• Training seminars or workshops related to ID/ICs may be made available by other organizations</li></ul>

## EXISTING BMPS AND RELATED ACTIVITIES

To ensure that the various Department and Division personnel understand their roles and responsibilities under the SWMP, the City provided a classroom training module for key staff identifying or responding to complaints. By having responsible Department and Division staff attend the training modules, the City is able to effectively implement the SWMP.

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this control measure.

- Conduct training for key staff involved in the ID program (see **Table 2-3**)
  - Responders Introduction
  - Responders Field Implementation
  - Investigative Techniques
  - Fire Department Activities

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Progress Report and used within the program effectiveness assessments (see ID6). The data and information to be collected may include, but will not be limited to, the following:

- Number and types of training sessions held
- Number of attendees at each session and the Division/Department that they work for
- Results of pre- and post-training surveys

## RESPONSIBILITY

The MUD – Stormwater Management Program has primary responsibility for Illicit Discharges Program training with support from MUD – Environmental Control.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
ID5 – Training																												
Conduct Responders Introduction Training	C									X								X				P		S				
Conduct Responders Field Implementation Training	C									X								X				P		S				
Conduct Investigative Techniques Training	C											X								X		P		S				
Conduct Fire Department Activities Training	C											X								X		P		S				

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## ID6 – Effectiveness Assessment

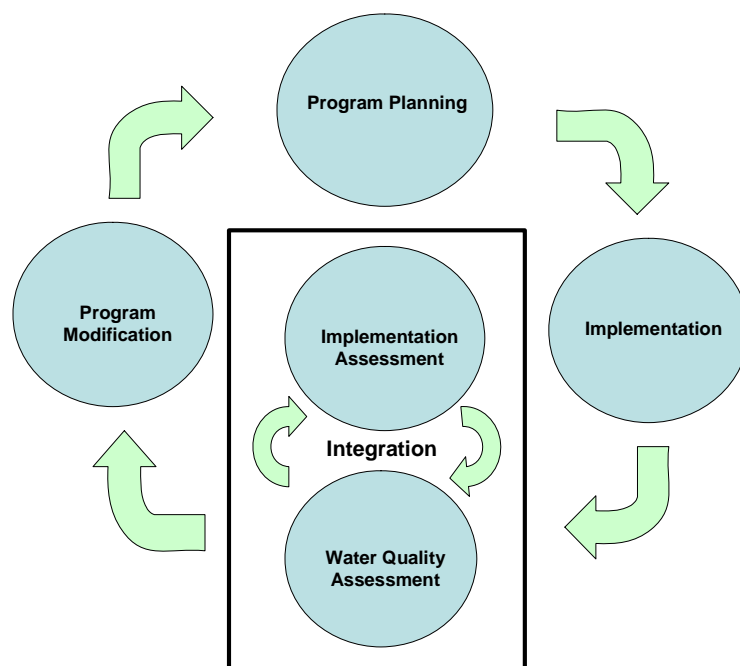
### DESCRIPTION

Effectiveness assessment is a fundamental and necessary component for developing and implementing successful stormwater programs. A well-executed assessment can provide the feedback necessary to determine whether the programs are achieving intended outcomes and, ultimately, whether continued implementation will result in maintaining or improving water quality.<sup>8</sup>

#### Effectiveness Assessment

The process that is used to evaluate if programs are resulting in desired outcomes.

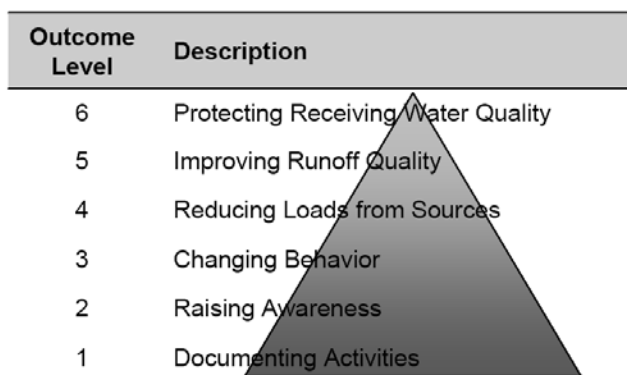
Effectiveness assessments are an integral part of the iterative process, which is the foundation for the stormwater program. By utilizing the iterative process and conducting effectiveness assessments, program managers can use the information gained to adapt their programs and ensure that the resources expended are providing commensurate benefit and are protective of water quality. The iterative process is illustrated in **Figure 2-1**; the points at which effectiveness assessments (implementation and water quality) are conducted are also identified.



**Figure 2-1. Iterative Process and Effectiveness Assessments Outcome Levels**

<sup>8</sup> California Stormwater Quality Association (CASQA), Municipal Stormwater Program Effectiveness Assessment Guidance, March 2007.

Outcome levels help to categorize and describe the desired results of the Program Elements and related Control Measures. Pursuant to the 2007 CASQA guidance, outcomes for stormwater programs have been categorized into six levels, as shown in **Figure 2-2**.



Outcome Level	Description
6	Protecting Receiving Water Quality
5	Improving Runoff Quality
4	Reducing Loads from Sources
3	Changing Behavior
2	Raising Awareness
1	Documenting Activities

**Figure 2-2. Effectiveness Assessment Outcome Levels**

The outcome levels identify the key areas that are evaluated for the program effectiveness assessment within the Annual Report. The primary questions that should be assessed for each Program Element or Control Measure include the following:

- Level 1 Outcome – Was the Program Element/Control Measure implemented in accordance with the Permit Provisions, SWMP Control Measures, and Performance Standards?
- Level 2 Outcome – Did the Program Element/Control Measure raise the target audience’s awareness of an issue?
- Level 3 Outcome – Did the Program Element/Control Measure change a target audience’s behavior, resulting in the implementation of recommended BMPs?
- Level 4 Outcome – Did the Program Element/Control Measure reduce the load of pollutants from the sources to the storm drain system?

As a part of the annual reporting process, effectiveness assessments will be conducted for the Illicit Discharge program and related Control Measures to determine their effectiveness and identify any necessary modifications. Although the effectiveness assessment may change from year to year as new information is learned, the assessment will initially focus on Outcome Levels 1-4 may include, but not be limited to, the approach outlined in **Table 2-4**. Level 5 and 6 outcomes will be assessed, to the extent possible, as a part of the water quality based programs and water monitoring program (SWMP Sections 8 and 9).

The effectiveness assessment conducted as a part of each annual report will address the following:

- Purpose or focus of the assessment –The outcome level(s) being assessed as well as the related management questions will be summarized. Where applicable, the identified goals that have or will be established for the program/activity will also be summarized.
- Baseline conditions – A baseline is a defined point or metric by which effectiveness can be measured or compared. Baselines are linked to a particular point in time and are particularly important for measuring change over time. Where feasible, the baselines that have or will be established for the program/activity will be summarized.

- Assessment methods – The assessment methods (those activities, actions, or processes used to obtain and evaluate assessment data or information) will be summarized.
- Using the information – The improvements that have been identified for the program element will be summarized.



**Table 2-4. Assessment Tasks for the Illicit Discharges Program Element**

ID1 – Detection of Illicit Discharges and Illegal Connections
<p><b>Was the program implemented in accordance with the SWMP Control Measures and Performance Standards (<i>Level 1 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Develop Spill Response Procedures</li> <li>• Hotline/Ask Stockton maintained and related advertising conducted</li> <li>• Internal procedures and complaint form reviewed and revised as needed, flowchart reviewed/revised</li> <li>• Dry weather field screening and follow-up source identification completed</li> <li>• Action levels implemented and reviewed/revised as needed</li> <li>• Investigation plans developed and implemented for problem areas identified</li> <li>• Field crews identifying, documenting, and reporting problems</li> </ul> <p><b>Did the program raise the target audience’s awareness of an issue (<i>Level 2 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Identify # of water pollution complaints, location, and % from each mechanism (hotline, Ask Stockton, dry weather field screening, field staff)</li> <li>• # and % of complaints that were verified, year to year</li> <li>• # of verified complaints year to year, total and % from each source</li> <li>• # of complaints year to year correlated with trainings/education</li> <li>• Identify # of problems reported and % verified</li> <li>• # and % of problems that were verified, year to year</li> <li>• # of problems year to year correlated with trainings/education</li> </ul> <p><b>Did the program change a target audience’s behavior which resulted in the implementation of recommended BMPs (<i>Level 3 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• # of outfalls monitored and # of problem areas identified</li> <li>• % of areas that were identified as problems from year to year and pollutants involved – action levels exceeded (totals &amp; year to year)</li> </ul> <p><b>Did the program reduce the load of pollutants from the sources to the storm drain system (<i>Level 4 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Use investigation plan and related monitoring data (from dry weather field screening) to estimate load reductions</li> </ul>

**Table 2-4. Assessment Tasks for the Illicit Discharges Program Element (continued)**

ID2 – Illegal Connection Identification and Elimination
<p><b>Was the program implemented in accordance with the SWMP Control Measures and Performance Standards (<i>Level 1 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Investigated and eliminated illegal connections discovered through response to illicit discharges.</li> <li>• Coordinated with the Planning and Land Development program to conduct plan reviews and identify illegal connections.</li> <li>• Coordinated with the Construction program to inspect projects and identify illegal connections.</li> </ul> <p><b>Did the program raise the target audience's awareness of an issue (<i>Level 2 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Identify # of plans reviewed and % requiring revision</li> <li>• # of reported illegal connections, by source, and % verified</li> </ul> <p><b>Did the program change a target audience's behavior which resulted in the implementation of recommended BMPs (<i>Level 3 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Identify # of illegal connections reported and # and location of those that were verified</li> <li>• # and % of illegal connections year to year that were verified</li> <li>• Identify # of illegal connections eliminated and mechanism (permitted, plugged, etc.)</li> <li>• # of illegal connections identified during plan review</li> <li>• % plans year to year in conformance with City standards</li> <li>• # of illegal connections identified during project construction inspections</li> <li>• # of illegal connections identified, total and year to year</li> </ul> <p><b>Did the activity reduce the load of pollutants from the sources to the storm drain system (<i>Level 4 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Use inspection and related monitoring data (if available) to estimate load reductions</li> </ul>

**Table 2-4. Assessment Tasks for the Illicit Discharges Program Element (continued)**

ID3 – Illegal Connection Identification and Elimination
<p><b>Was the program implemented in accordance with the SWMP Control Measures and Performance Standards (<i>Level 1 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Responded to reported illicit discharges</li> <li>• Developed an Investigative Guidance Manual</li> <li>• Maintained contractual services for cleanup activities</li> <li>• Maintained the Illicit Discharge Database</li> <li>• Evaluated, optimized, and incorporated waste categories</li> <li>• Mapped information to identify spatial and/or temporal trends as well as problem areas</li> </ul> <p><b>Did the program raise the target audience’s awareness of an issue (<i>Level 2 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Identify #, location, and types of illicit discharges reported and # verified</li> <li>• # of, types, and % illicit discharges year to year that were verified</li> <li>• % responses by type of pollutant and activity (source of pollutant)</li> <li>• Identify # and % illicit discharges requiring clean up or follow-up activities</li> <li>• Identify locations of problem areas by types of illicit discharges year to year that were verified</li> <li>• Identify temporal issues by types of illicit discharges by wet/dry season</li> </ul> <p><b>Did the program reduce the load of pollutants from the sources to the storm drain system (<i>Level 4 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Use investigation and related monitoring data (if available) to estimate load reductions</li> </ul>

**Table 2-4. Assessment Tasks for the Illicit Discharges Program Element (continued)**

<b>ID4 – Enforcement</b>
<p><b>Was the program implemented in accordance with the SWMP Control Measures and Performance Standards (<i>Level 1 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Conducted enforcement as needed</li> <li>• Reviewed/revised Illicit Discharges Database to incorporate enforcement related information</li> <li>• Tracked enforcement actions using the Illicit Discharges Database</li> </ul> <p><b>Did the program change a target audience’s behavior which resulted in the implementation of recommended BMPs (<i>Level 3 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• # and types of enforcement actions taken total and year to year</li> <li>• # of repeat offenders identified, total and year to year</li> <li>• % enforcement actions taken, major (court case, etc.) vs. minor (verbal warning)</li> </ul>
<b>ID5 – Training</b>
<p><b>Was the program implemented in accordance with the SWMP Control Measures and Performance Standards (<i>Level 1 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Conducted training - # training sessions held and # attendees (including Dept./Div. worked for) at each session</li> <li>• Reviewed/revised training strategy</li> </ul> <p><b>Did the program raise the target audience’s awareness of an issue (<i>Level 2 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• % increase in awareness before and after training sessions</li> </ul> <p><b>Did the program change a target audience’s behavior which resulted in the implementation of recommended BMPs (<i>Level 3 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• # of hotline calls accurately routed - % year to year</li> <li>• # of illegal connections and illicit discharges accurately reported - % year to year</li> </ul>

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
ID6 – Effectiveness Assessment																													
Revise effectiveness assessment strategy as needed	N									X				X				X					P						
Conduct effectiveness assessment on an annual basis	E					X				X				X				X					P		S	S	S	S	
Identify program modifications as a result of the assessment	C					X				X				X				X					P		S	S	S	S	
Review effectiveness assessments and identify goals, baselines, and trends.	N									X				X				X					P		S	S	S	S	

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

☐ = Performance standard will be completed during this timeframe as specified.

MUD = Municipal Utilities Department

## Section 3

### Public Outreach (PO)

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#### OVERVIEW

The purpose of the Public Outreach Program Element is to inform the public (increase knowledge) regarding the impacts of urban stormwater runoff and introduce steps the public can take (change behavior) to reduce pollutants from everyday activities. In addition, helping the public understand the problems associated with urban stormwater runoff can help build support for the stormwater program.

The Public Outreach Program Element is designed to implement and evaluate a comprehensive short- and long-term public education campaign that will inform the community about how our actions may adversely impact urban stormwater discharges and, subsequently, our local water bodies.

This Program Element is designed to maximize the use of limited resources and to develop partnerships among all stakeholders in the Stockton Urbanized Area. Local stewardship and partnerships among governmental agencies, schools, universities and private interests are vital parts of the types of involvement envisioned in this Program Element.

#### OBJECTIVES

The objectives address key components of the Public Outreach Program and identify that, in order to be effective, the program must:

- Encourage the public to actively participate in the implementation of the stormwater program as well as various outreach events.
- Promote the use of the 24-hour public reporting hotline.
- Implement a public education strategy for the overall program that includes the following efforts:
  - Develop and distribute materials (BMP fact sheets, brochures, etc.)
  - Conduct mixed media campaigns (radio, print ads, signage, etc.)
  - Participate in community outreach events
  - Conduct public opinion surveys to gauge the level of awareness and behavior change within a community and/or target audience
- Evaluate the ability to interface and coordinate with school education programs on a regional or local level.
- Implement a business outreach program.
- Conduct an assessment as part of the annual reporting process to determine the effectiveness of the Public Outreach Program Element and identify any necessary modifications.

#### CONTROL MEASURES

The six Control Measures outlined in **Table 3-1** and discussed in more depth in the accompanying Fact Sheets were designed to address the program objectives. In developing the Control Measures, several key factors were considered:

- Each Control Measure must address one or more of the program objectives.

- Each Control Measure must clearly identify the performance standards, timeframe for completion, and responsible Department/Division to ensure that there is accountability built into the program.
- The data and information from the previous permit term and/or reporting period must be analyzed to determine the effectiveness of each Control Measure, and the iterative process must be used to ensure that each Control Measure is effective and has a commensurate benefit for the resources expended.
- Each Control Measure must actively identify enhancements/modifications that would improve the Program Element and overall effectiveness of the stormwater program.

**Table 3-1. Control Measures for the Public Outreach Program Element**

PO	Control Measure
PO1	Public Participation
PO2	Hotline
PO3	Public Outreach Implementation
PO4	Public School Education
PO5	Business Outreach
PO6	Effectiveness Assessment

The Control Measure Fact Sheets developed for the Public Outreach Program Element (PO1-PO6) address the program objectives and identify assessment tools that may be used to assess the effectiveness of the program. The Fact Sheets were developed as stand-alone documents so that they may be individually provided to the responsible Department(s)/Division(s).

### Supporting Control Measures

While individual, program-specific Control Measures are the primary focus of each program, it is also important to understand how the program fits within the overall SWMP. In order to adequately cover all aspects of the Public Outreach Program, overlap between other programs in the SWMP is often necessary. A brief summary of the Program Elements that support the Public Outreach Program Element is provided below.

#### Illicit Discharges (Section 2)

- *Detection of Illicit Discharges and Illegal Connections* – Promote the public reporting hotline.

#### Industrial/Commercial (Section 5)

- *BMP Implementation* – BMP Fact Sheets developed as part of the Public Outreach Program Element are distributed during industrial and commercial site inspections.
- *Training* – The City provides external training for commercial and industrial businesses.

#### Construction (Section 6)

- *Construction Outreach* – Provide relevant outreach materials to the building community.

Supporting Control Measures	Program Element
X	Illicit Discharges
---	<b>Public Outreach</b>
---	Municipal Operations
X	Industrial/Commercial
X	Construction
---	Planning and Land Development

# PO1 – Public Participation

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## DESCRIPTION

The participation of the public in the implementation of the City's Stormwater Management Program is critical to a successful effort to protect the water resources. Therefore, active public participation is encouraged and supported by the City through a variety of mechanisms which are described in additional detail below.

## EXISTING BMPS AND RELATED ACTIVITIES

A number of public education and outreach activities involving citizen volunteers have been conducted by the City. These activities have included the Storm Drain Marker Program and stream cleanup events.

For the Storm Drain Marker Program, the City loans the supplies to volunteers and coordinates the stenciling activities with high school and college students, as well as citizen volunteers. By working with the student and citizen volunteers, the City has been able to mark storm drain catch basins throughout the community.

The City's stormwater outreach effort has also included partnering with several groups for community stream cleanup events. To date, the events have included participation in the California Coastal Cleanup Day as well as other local cleanup efforts within the Calaveras River, Duck Creek, Five Mile Slough, Mormon Slough, Mosher Slough, Smith Canal, Walker Slough, and Yosemite Lake.

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Continue implementation of the Storm Drain Marker Program
- Organize, support, and/or participate in stream cleanup events once annually, at a minimum. The annual California Coastal Cleanup Day occurs the third Saturday in September. The City may also coordinate a stream cleanup in April to coincide with Earth Day.
- Promote Used Oil and Household Hazardous Waste Programs on the City Web site, through distribution of Waste Reduction and Recycling Guides, the media, and the utility bill newsletter
- Coordinate with Household Hazardous Waste Program for pesticide disposal (Water Quality Based Programs Performance Standard)
- Update City Web site as needed:
  - Update City Web site with general stormwater information (Q1)
  - Update City Web site with pesticide disposal, IPM, and irrigation runoff information (Water Quality Based Programs Performance Standard) (Q2)
  - Update City Web site with outreach and messaging on summer activities (i.e., swimming pool/irrigation discharge, disposal of motor oil) (Q2)
  - Update City Web site with rainy season information (Q3)



## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see PO6). The data and information to be collected may include, but will not be limited to, the following:

- Identify how volunteers were solicited
- # storm drains marked by volunteers (see also MO5)
- # events and volunteers per event
- Volume and types of materials removed at cleanup events
- Amount of used oil and number of filters collected
- Types of wastes that were collected through local events or through the permanent collection site (for both the City and County)

## **RESPONSIBILITY**

The MUD – Stormwater Management Program is primarily responsible for this Control Measure, with support from PW – Solid Waste Division and PW – Parks Division.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW – Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
PO1 – Public Participation																												
Implement Storm Drain Marker Program	C																					P						
Organize, support, and/or participate in stream cleanup events once annually, at a minimum	C					x				X				X				X				P						
Promote Used Oil and Household Hazardous Waste Programs on the City Web site, through distribution of Waste Reduction and Recycling Guides, the media, and the utility bill newsletter	C																				P				S			
Coordinate with Household Hazardous Waste program for pesticide disposal ( <b>WQBP</b> )	C																				P				S			
Update City Web site general stormwater information	C			X				X				X				X				X		P				S	S	
Update City Web site with pesticide disposal, IPM, and irrigation runoff information ( <b>WQBP</b> )	C				X				X				X			X				X		P				S	S	
Update City Web site with outreach and messaging on summer activities	C				X				X				X			X				X		P				S	S	
Update City Web site with rainy season information	C					X				X				X				X				P				S	S	

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

■ = Performance standard will be completed during this timeframe as specified.

MUD = Municipal Utilities Department

**WQBP** = Water Quality Based Programs Performance Standard

## PO2 – Hotline

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### DESCRIPTION

The purpose of this Control Measure is to operate a public hotline number to facilitate public reporting of illicit discharges, illegal dumping, and other observed pollution problems. This Control Measure also ensures that through the hotline, complaint information is forwarded to the appropriate contacts for follow-up and/or investigation.

### EXISTING BMPS AND RELATED ACTIVITIES

The City has established a 24-hour hotline (209-937-8341) that will allow the general public to report illegal dumping or illicit discharges into the stormwater system. The City documents all calls and responds to all calls within two (2) business days. Once a complaint is received, staff responds using the process described within Section 2 of the SWMP. If necessary, the reporting party is updated on any actions taken. Additional information regarding the hotline is provided in Section 2 of the SWMP.

The City has established a web-based public reporting system called Ask Stockton. Ask Stockton is a workflow database that is used to track citizen and customer inquiries related to various municipal operations and programs. This database allows the user to submit a request that is then routed to the appropriate department. Once a request is reported, it is considered “open” and is assigned, and progress is tracked in the database. Based on the type of request, the appointed department is assigned an amount of time in which a response to the request must be made and the request is then “closed”. Ask Stockton also has the capability of generating various reports that can be run on a monthly basis. These reports can be used to determine the type of inquiry/request, the department the request was submitted to, and the time the request was “open”. The Stormwater Program uses Ask Stockton to address various stormwater related issues, questions, and concerns. This tool has allowed stormwater staff to communicate directly with citizens regarding stormwater issues. Ask Stockton is advertised through the City of Stockton’s web site, utility bill inserts, and various outreach materials created throughout the City.

### PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Maintain 24-hour hotline number
- Promote/publicize the 24-hour hotline number in various media, including the telephone book and City Web site

### ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see PO6). The data and information to be collected may include, but will not be limited to, the following:

- Track # of hotline calls received and verified by specific types of problems/requests (i.e., Illegal Dumping or Illicit Discharges, Faded or Missing Catch Basin Stencils)

### RESPONSIBILITY

The MUD – Stormwater Management Program is responsible for this Control Measure with assistance from the City’s Public Information Officer (in City Manager’s office).

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																		Responsibility <sup>3</sup>								
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
PO2 – Hotline																												
Maintain 24-hour hotline number	C																					P						
Promote/publicize the 24-hour hotline number in various media, including the telephone book and City Web site	C																					P						

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

■ = Performance standard will be completed during this timeframe as specified.

MUD = Municipal Utilities Department

## PO3 – Public Outreach Implementation

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### **DESCRIPTION**

The Public Outreach Implementation Control Measure provides that outreach be conducted with the residential community and general public to inform these audiences of the impacts of urban stormwater runoff and introduce steps they can take to reduce pollutants in stormwater runoff. Such outreach communicates to the City's residents and visitors the importance of stormwater quality protection and pollution prevention as it relates to the protection of the local water bodies.

### **EXISTING BMPS AND RELATED ACTIVITIES**

The City implements an extensive public outreach program through a variety of means including newsletters; newspaper, radio, and television articles/messages; participation in City-wide public events where promotional and education brochures are distributed; making presentations to various community groups; and through the Storm Drain Stenciling Program. Public outreach efforts targeting a variety of diversified public cross-sections have included the following:

- A multimedia campaign has been developed to provide stormwater education and outreach. This campaign consists of print and radio advertising in both English and Spanish. Ads have been placed with: Citadel Broadcasting, Entravision, Univision, KBTU, Latino Times, The Record, Utility bill insert, and theater slides.
- Attended and participated in community events throughout the year and distributed outreach materials. Events have included (but are not limited to) the following:
  - AgVenture
  - Black Family Day
  - California Coastal Boating Network Meeting
  - Cinco de Mayo
  - Earth Day Festival
  - Energy and Clean Air Expo
  - Family Literacy Day in the Park
  - Farm Days
  - "Keep the Delta Clean"
  - Orchard Supply Hardware – No Sales Tax Weekend
  - REXPO
  - Senior Awareness Day
  - State of the City
  - Strut Your Mutt
- Coordinated outreach efforts with watershed groups and other groups, including:
  - Greater Stockton Chamber of Commerce
  - Green Team San Joaquin
  - Keep the Delta Clean

- Master Gardeners
- Volunteer groups from Delta College, University of the Pacific, Stockton Unified School District, San Joaquin County Office of Education, and the City of Stockton Day Camp Programs
- Provided general stormwater outreach materials on the City's Web site, at civic locations, at community events, and in utility bill inserts, and provided stormwater-related articles or messages through the local media, the government access cable station, movie theatres, and in utility bill newsletters.
- Made presentations to local groups including Delta Keeper staff, City Departments/Divisions, the Pesticide Applicators Professional Association, Lions Clubs, California Water Environment Association, Adopt-A-Watershed training, the Master Gardener Program, and Friends of Smith Canal.
- Formed active partnerships by participating in the Phase II Cities group and partnering with other City and San Joaquin County departments and agencies so that resources and efforts could be shared.
- Updated the *Stockton Area Storm Water Public Outreach Program Strategic Implementation Plan* and modified it based on 2003, 2005, and 2007 Public Opinion Survey results (**Appendix C-1**).
- Modified the City's Web site to include information regarding mercury (Water Quality Based Programs Performance Standard). The City's Web site<sup>1</sup> provides links to both the USGS "Mercury in the Environment Fact Sheet"<sup>2</sup> and the San Joaquin County Household Hazardous Waste Consolidation Facility website, which provides information<sup>3</sup> on proper disposal of mercury-containing items.

As a goal for the Public Outreach Program, the City will make at least 1,000,000 impressions during the Permit term through mixed media campaigns.<sup>4</sup>

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<sup>1</sup> [http://www.stocktongov.com/MUD/General/stormwater/stormwater\\_links.cfm](http://www.stocktongov.com/MUD/General/stormwater/stormwater_links.cfm)

<sup>2</sup> <http://www.usgs.gov/themes/factsheet/146-00/>

<sup>3</sup> <http://www.co.san-joaquin.ca.us/solidwaste/pdf%20folder/HHW%20brochure.pdf>

<sup>4</sup> It should be noted that tracking the number of impressions only provides a quantitative way to identify the level of implementation and does not provide the feedback necessary to determine the impacts of the Public Outreach program. In order to provide this type of feedback to help improve the effectiveness of the Public Outreach program, the City has included a number of other performance standards within the SWMP that are aimed at identifying the changes in awareness and behavior change.

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Update Public Opinion Survey and conduct Public Opinion Survey twice during the permit term (2009 and 2011)
- Identify and/or create, revise, and distribute educational materials as needed
- Ensure that educational materials (e.g., fact sheets) address proper disposal of pet waste (Water Quality Based Programs Performance Standard) (*Annually in August*)
- Develop outreach materials specifically targeted at pet owners regarding the proper disposal of pet waste (Water Quality Based Programs Performance Standard)
- Work with the City of Stockton Animal Control and Pet Licensing to provide outreach and literature on the proper disposal of pet waste to pet owners and animal adoption agencies (Water Quality Based Programs Performance Standard)
- Implement the pet waste outreach program by providing outreach to/at the following businesses, events, or pet organizations (Water Quality Based Programs Performance Standard):
  - Kennels (during inspections, scheduled to begin Fiscal Year 2009-2010)
  - Strut Your Mutt/Dog Day Afternoon (annually in August)
  - Barkleyville Dog Park (post signage once during Permit term)
  - Other pet-related organizations/businesses (annually in August)
- Develop language for and produce Pet Waste Signs to be installed at approximately 50 existing parks (Water Quality Based Programs Performance Standard)
- Install Pet Waste Signs at approximately 50 existing parks (Water Quality Based Programs Performance Standard)
- Implement phased installation and maintenance of pet waste bag dispensing stations at new City parks as they are developed (Water Quality Based Programs Performance Standard)
- Track installation of pet waste bag dispensing stations (Water Quality Based Programs Performance Standard)
- Update audiovisual tools and Web site as needed
- Conduct mixed media campaigns (e.g., Public Service Announcements (PSAs), signage, print, radio, television, theater slides, City Web site)
- Participate in community-wide events throughout the year, including, but not limited to:
  - State of the City (February)
  - Earth Day (April)
  - Cinco de Mayo (May)
  - Senior Awareness Day (May)
  - REXPO (May)
  - Children & Youth Day in Pixie Woods (May)
  - Strut Your Mutt/Dog Day Afternoon (August)

- Family Literacy Day in the Park (September)
- Black Family Day (September)
- Stockton Energy & Clean Air Business Expo (December)
- Provide community relations
- Implement pesticide outreach effort for city staff, residents, retail stores, and pest control operators (PCOs) (Water Quality Based Programs Performance Standard)
- Conduct periodic surveys in conjunction with other regional programs regarding local or regional sales and use of residential and commercial pest control products (Water Quality Based Programs Performance Standard)

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see PO6). The data and information to be collected may include, but will not be limited to, the following:

- # and types of educational/outreach materials distributed and # impressions made
- # and types of mixed-media campaigns and # impressions made
- # community-wide events, # materials distributed, and # impressions made
- # community relations events and # attendees
- Number of and locations where pet waste bag dispensing stations have been installed
- Survey results

## **RESPONSIBILITY**

MUD – Stormwater Management Program staff are responsible for implementing the public outreach program, with support from PW – Parks Division.



## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW – Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
PO3 – Public Outreach Implementation																													
Update Public Opinion Survey and conduct Public Opinion Survey twice during the permit term <sup>4</sup>	E										X								X				P						
Identify and/or create, revise, and distribute educational materials as needed	C																						P						
Ensure that educational materials address proper disposal of pet waste (WQBP)	C									X				X					X				P					S	
Develop outreach materials specifically targeted at pet owners regarding the proper disposal of pet waste (WQBP)	N											X											P						
Work with the City of Stockton Animal Control and Pet Licensing to provide outreach and literature on the proper disposal of pet waste to pet owners and animal adoption agencies (WQBP)	N																						P						
Implement pet waste outreach program (WQBP):	N																						P					S	
• Kennels	N																						P						
• Strut Your Mutt/Dog Day Afternoon	N					X				X				X					X				P					S	
• Barkleyville Dog Park	N									X													P					S	
• Other pet-related businesses, events, or organizations	N									X				X					X				P						
Develop language for and produce Pet Waste Signs to be installed at approximately 50 existing parks (WQBP) <sup>5</sup>	N										X												P					P	

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW – Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
PO3 – Public Outreach Implementation																												
Install Pet Waste Signs at approximately 50 existing parks (WQBP) <sup>5</sup>	N																					P					P	
Implement phased installation and maintenance of pet waste bag dispensing stations at new City parks as they are developed (WQBP)	C																					S					P	
Track installation of pet waste bag dispensing stations (WQBP)	E																					S					P	
Update audiovisual tools and Web site as needed	C						X															P						
Conduct mixed media campaigns <sup>4</sup>	C																					P						
Participate in community-wide events throughout the year:	C																					P						
• State of the City	C			X				X				X				X				X								
• Earth Day	C				X				X				X				X				X							
• Cinco de Mayo	C				X				X				X				X				X							
• Senior Awareness Day	C				X				X				X				X				X							
• REXPO	C				X																							
• Children & Youth Day in Pixie Woods	C				X																							
• Strut Your Mutt/Dog Day Afternoon	C					X				X				X				X										
• Family Literacy Day in the Park	C					X				X				X				X										
• Black Family Day	C					X				X				X				X										
• Stockton Energy & Clean Air Business Expo	C						X				X				X				X									
Provide community relations	C																					P						
Implement pesticide outreach effort for city staff, residents, retail stores, and PCOs (WQBP)	C																					P					S	

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>										
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW – Parks Division	City Attorney				
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2											
PO3 – Public Outreach Implementation																																
Conduct surveys regarding sales and use of residential and commercial pest control products with other regional programs (WQBP)	N										X								X						P						S	

Notes:

1. C = Continue; E = Enhance; N = New
2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec
3. P = Primary Responsibility; S = Secondary Responsibility
4. Pending budget approval, this item may be postponed in 2009-2010 until fiscal year 2010-2011.
5. Pending budget approval, this item may be initiated in fiscal year 2010-2011.

X = Performance Standard will be completed during this quarter.

☐ = Performance standard will be completed during this timeframe as specified. MUD = Municipal Utilities Department

**WQBP** = Water Quality Based Programs Performance Standard

## PO4 – Public School Education

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### DESCRIPTION

Presentations made to school-age children may be an effective outreach method because the children are asked to pass the pollution prevention information on to their families. This Control Measure provides public school districts, after school programs, day camps, and the Children's Museum within the City with outreach materials to educate school-age children about stormwater pollution.

### EXISTING BMPS AND RELATED ACTIVITIES

An interactive presentation has been developed that discusses the water cycle, wastewater, and water conservation using skits and Power Point. The program was developed to help teachers meet the science component of the California Content Standards for fifth and sixth grades. Each teacher receives a packet of information from the Department of Water Resources regarding free water, wastewater, stormwater supplies and materials available to teachers.

The Stormwater Outreach effort also partnered with the City's Parks and Recreation Department (now the Community Services Department) to make presentations as part of its After School Program. The presentations were shortened versions of the classroom presentation and included viewing the "Only Rain Down the Drain" video and demonstrations with the watershed model. Each student receives an "Only Rain Down the Drain" activity booklet and sticker.

The Stormwater Program has outreached to the schools through assembly programs including the South Yuba River Citizens League (SYRCL) to provide stormwater messages. SYRCL and the "Great Water Mystery" have been provided to the schools since 2006.

The City recently evaluated the ability to interface and coordinate with school education programs on a regional or local level. The school outreach efforts over the 2002-2007 Permit term have been successful; however, due to increased curriculum and testing requirements, stormwater program staff has found it to be progressively more difficult to gain access to schools in order to provide outreach to students. The City is continuing with the assembly program to reach a large number of students. In the past, "The Great Water Mystery" was presented; however, the City is reviewing new production companies to provide a new presentation to students.

The City has reviewed the existing program and assessed the feasibility of alternative programs. As a result, the City concluded that the most consistent mechanism for reaching out to school-aged children within the City is through an interactive stormwater exhibit at the Children's Museum, the Community Services Department's After School Program, and Day Camps.

As a goal for the Public Outreach Program, the City will make at least 3,000 impressions/year through the Public School Education Control Measure.<sup>5</sup>

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<sup>5</sup> It should be noted that tracking the number of impressions only provides a quantitative way to identify the level of implementation and does not provide the feedback necessary to determine the impacts of the Public Outreach program. In order to provide this type of feedback to help improve the effectiveness of the Public Outreach program, the City has included a number of other performance standards within the SWMP that are aimed at identifying the changes in awareness and behavior change.

## PERFORMANCE STANDARDS

The performance standard listed below establishes the level of effort required for this Control Measure.

- Send letters to 5th grade teachers and principals inviting them to take part in the City's stormwater education program
- Reach out to school age children outside of school by providing presentations through the Community Services Department's After School Program (*City anticipates providing a total of 8 presentations at 4 sites annually.*)
- Present at Day Camps sponsored by the Community Services Department (*City anticipates providing one presentation at the March Day Camp annually. City will explore possibility of providing presentation to the Summer Day Camp; however, scheduling is contingent upon the Community Services program schedule.*)
- Develop interactive exhibit for display at the Children's Museum
- Provide educational signage and displays relevant to stormwater pollution at the Children's Museum

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Progress Report and used within the program effectiveness assessments (see PO6). The data and information to be collected may include, but will not be limited to, the following:

- # and types of educational/outreach materials distributed
- Number of impressions
- Pre and post surveys to gauge the level of awareness before and after presentations

## RESPONSIBILITY

MUD – Stormwater Management Program staff are responsible for implementing this Control Measure, with support from the Community Services Department.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	Community Services	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
PO4 – Public School Education																												
Send letters to 5th grade teachers and principals inviting them to take part in the City's stormwater education program	C					X				X				X				X				P						
Reach out to school age children outside of school by providing presentations through the Community Services Department's After School Program	N							X				X				X				X		P					S	
Present at Day Camps sponsored by the Community Services Department	N							X				X				X				X		P					S	
Develop interactive exhibit for display at the Children's Museum	N									X												P						
Provide educational signage and displays relevant to stormwater pollution at the Children's Museum	N																					P						

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

■ = Performance standard will be completed during this timeframe as specified.

MUD = Municipal Utilities Department

## PO5 – Business Outreach

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### DESCRIPTION

Since commercial and industrial businesses can be sources of stormwater pollutants, this Control Measure ensures that business owners and operators are informed about stormwater quality and impacts on water resources. Efforts are primarily targeted at specific business types.

### EXISTING BMPS AND RELATED ACTIVITIES

Business outreach activities include holding workshops and distributing educational materials to selected businesses during inspections. Although efforts are described within this Control Measure, business outreach also takes place as part of the Industrial/Commercial and Construction Programs (see IC3 and CO4, respectively). Additional outreach mechanisms may be identified following the development of the mobile business pilot program (see IC1).

The City of Stockton is a partner in the Targeted Opportunities to Prevent Pollution in San Joaquin County (TOPPS) organization, a public-private partnership formed for the sole purpose of providing education on and support for pollution prevention to business, industry, and agriculture in San Joaquin County. TOPPS sponsors two major events each year: the Annual Solutions for Compliance Workshop, held in April to coincide with Earth Day, and the Mayor's Environmental Excellence Awards, held in September as part of National Pollution Prevention Week.

The City is currently working with the Greater Stockton Chamber of Commerce (Chamber) and its REACON (Recycling, Energy, Air, Conservation) team to provide stormwater pollution prevention information to both commercial and industrial businesses. The City will continue to interface with the Chamber to provide outreach to businesses. Although there are distinct business events and outreach opportunities, it should be noted that the City has educational materials for businesses available on an ongoing basis.

Educational materials have been developed for specific types of industrial and commercial businesses. The City is in the process of updating these outreach materials and will provide the updated materials to area businesses. The types of materials that are distributed to businesses include:

- Business-Specific BMP Fact Sheets for the following business types:
  - Auto Body Shops
  - Auto Dealers
  - Auto Repair Shops
  - Dry Cleaners
  - Equipment Rental
  - Kennels
  - Nurseries
  - Restaurants
  - Retail Gasoline Outlets
- Stormwater Program Information Packet, including the following:
  - What All Businesses Can Do (to prevent stormwater pollution)
  - Commercial and Industrial Inspections
  - Construction Requirements
  - New Development and Redevelopment
  - Stormwater Planning

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Conduct business workshops twice during the five-year permit term. Additional workshops may be scheduled subject to the availability of resources and public interest in the workshops. Pollutant-specific outreach shall be based upon typical pollutants (e.g., fats, oils, and grease; pesticides and fertilizers; pet waste) resulting from activities taking place at the businesses listed below. The business types targeted for workshops will include the following:
  - Auto Body Shops
  - Auto Repair Shops
  - Equipment Rental Businesses
  - Kennels
  - Nurseries
  - Restaurants
  - Retail Gasoline Outlets
- Distribute educational material to selected businesses. The City will also work with the Chamber to identify business targets to provide additional opportunities for outreach. The business types targeted for outreach will include, but are not limited to, the following:
  - Auto Body Shops
  - Auto Dealers
  - Auto Repair Shops
  - Dry Cleaners
  - Equipment Rental
  - Kennels
  - Nurseries
  - Restaurants
  - Retail Gasoline Outlets
- Ensure business workshops address the proper handling and disposal of mercury-containing products (Water Quality Based Programs Performance Standard)
- Revise business-specific fact sheets to include proper handling and disposal of mercury-containing products (Water Quality Based Programs Performance Standard). Fact sheets will be updated in Fiscal Year 2008-2009 for the high priority commercial facilities prior to commencement of inspections. Inspections for auto-related businesses will begin during Fiscal Year 2008-2009, and inspections for all other high priority commercial facilities will begin in Fiscal Year 2009-2010.



## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see PO6). The data and information to be collected may include, but will not be limited to, the following:

- Number of attendees at each business workshop
- Results of pre- and post-workshop surveys
- Number and types of educational materials distributed

## **RESPONSIBILITY**

MUD – Stormwater Management Program staff are primarily responsible for implementing this Control Measure.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW – Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
PO5 – Business Outreach																												
Conduct business workshops twice during the five-year permit term	C				X				X													P						
Distribute educational material to selected businesses	C																					P						
Ensure business workshops address the proper handling and disposal of mercury (WQBP)	N								X													P						
Revise business-specific fact sheets to include proper handling and disposal of mercury-containing products (WQBP)	N									X												P						

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

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MUD = Municipal Utilities Department

## PO6 – Effectiveness Assessment

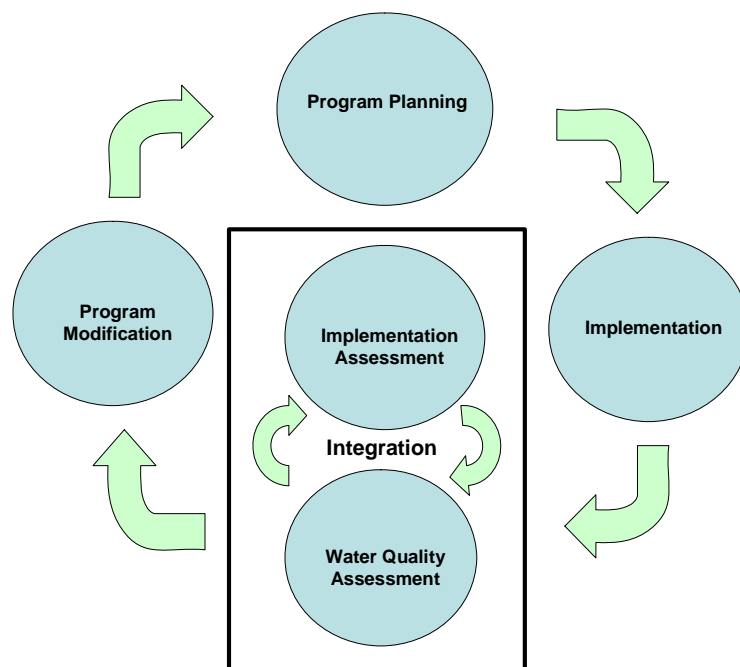
### DESCRIPTION

Effectiveness assessment is a fundamental and necessary component for developing and implementing successful stormwater programs. A well-executed assessment can provide the feedback necessary to determine whether the programs are achieving intended outcomes and, ultimately, whether continued implementation will result in maintaining or improving water quality.<sup>6</sup>

#### Effectiveness Assessment

The process that is used to evaluate if programs are resulting in desired outcomes.

Effectiveness assessments are an integral part of the iterative process, which is the foundation for the stormwater program. By utilizing the iterative process and conducting effectiveness assessments, program managers can use the information gained to adapt their programs and ensure that the resources expended are providing commensurate benefit and are protective of water quality. The iterative process is illustrated in **Figure 3-1**; the points at which effectiveness assessments (implementation and water quality) are conducted are also identified.



**Figure 3-1. Iterative Process and Effectiveness Assessments Outcome Levels**

Outcome levels help to categorize and describe the desired results of the Program Elements and related Control Measures. Pursuant to the 2007 CASQA guidance, outcomes for stormwater programs have been categorized into six levels, as shown in **Figure 3-2**.

<sup>6</sup> California Stormwater Quality Association (CASQA), Municipal Stormwater Program Effectiveness Assessment Guidance, March 2007.

Outcome Level	Description
6	Protecting Receiving Water Quality
5	Improving Runoff Quality
4	Reducing Loads from Sources
3	Changing Behavior
2	Raising Awareness
1	Documenting Activities

**Figure 3-2. Effectiveness Assessment Outcome Levels**

The outcome levels identify the key areas that are evaluated for the program effectiveness assessment within the Annual Report. The primary questions that should be assessed for each Program Element or Control Measure include the following:

- Level 1 Outcome – Was the Program Element/Control Measure implemented in accordance with the Permit Provisions, SWMP Control Measures, and Performance Standards?
- Level 2 Outcome – Did the Program Element/Control Measure raise the target audience's awareness of an issue?
- Level 3 Outcome – Did the Program Element/Control Measure change a target audience's behavior, resulting in the implementation of recommended BMPs?
- Level 4 Outcome – Did the Program Element/Control Measure reduce the load of pollutants from the sources to the storm drain system?

As a part of the annual reporting process, effectiveness assessments will be conducted for the Public Outreach Program and related Control Measures to determine their effectiveness and identify any necessary modifications. Although the effectiveness assessment may change from year to year as new information is learned, the assessment will initially focus on Outcome Levels 1-4 and may include, but not be limited to, the approach outlined in **Table 3-2**. Level 5 and 6 outcomes will be assessed, to the extent possible, as a part of the water quality based programs and water monitoring program (SWMP Sections 8 and 9).

The effectiveness assessment conducted as a part of each annual report will address the following:

- Purpose or focus of the assessment – The outcome level(s) being assessed as well as the related management questions will be summarized. Where applicable, the identified goals that have or will be established for the program/activity will also be summarized.
- Baseline conditions – A baseline is a defined point or metric by which effectiveness can be measured or compared. Baselines are linked to a particular point in time and are particularly important for measuring change over time. Where feasible, the baselines that have or will be established for the program/activity will be summarized.
- Assessment methods – The assessment methods (those activities, actions, or processes used to obtain and evaluate assessment data or information) will be summarized.

- Using the information – The improvements that have been identified for the program element will be summarized.

**Table 3-2. Assessment Tasks for Public Outreach Program Element**

<b>PO1 – Public Participation</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Implement Storm Drain Marker Program</li> <li>• Organize, support, and/or participate in stream cleanup events once annually, at a minimum</li> <li>• Organize, support, and/or participate in Adopt-a-Stream Program events</li> <li>• Promote Used Oil and Household Hazardous Waste Programs on the City Web site, through distribution of Waste Reduction and Recycling Guides, the media, and the utility bill newsletter</li> <li>• Coordinate with Household Hazardous Waste Program for pesticide disposal (<b>WQBP</b>)</li> <li>• Update City Web site with summer runoff and general stormwater information (Q1)</li> <li>• Update City Web site with rainy season information (Q2)</li> <li>• Update City Web site with pesticide disposal, IPM, and irrigation runoff information (<b>WQBP</b>) (Q3)</li> <li>• Update City Web site with outreach and messaging on summer activities (i.e., swimming pool/irrigation discharge, disposal of motor oil) (Q4)</li> </ul> <p><b>Did the activity raise the target audience's awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• # events and # volunteers per event (including how solicited), year to year, % change over time</li> <li>• # storm drains marked by volunteers</li> <li>• Volume and types of materials removed at events year to year, % change over time</li> <li>• Amount of used oil and number of filters collected, % change over time</li> <li>• Amount and types of wastes collected, % change over time</li> </ul>
<b>PO2 – Hotline</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Maintain hotline number</li> <li>• Publicize the 24-hour hotline number</li> <li>• Publicize the hotline number in various media, including the telephone book and City Web site</li> </ul> <p><b>Did the activity raise the target audience's awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Track # of calls and type of problems/requests, % change year to year</li> <li>• # calls verified, % change year to year</li> </ul>

**Table 3-2. Assessment Tasks for Public Outreach Program Element (continued)**

PO3 – Public Outreach Implementation
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Update Strategic Implementation Plan and modify based on 2003 and 2005 survey results</li> <li>• Update survey and conducted survey twice during the permit term (2009 and 2011)</li> <li>• Identify and/or created, revised, and distributed educational materials as needed</li> <li>• Ensure that educational materials (e.g., fact sheets) address proper disposal of pet waste (<b>WQBP</b>)</li> <li>• Investigate possibility of purchasing and distributing pet waste bags for pet owners (<b>WQBP</b>)</li> <li>• Implement phased installation of pet waste bag dispensing stations at new and existing City parks (<b>WQBP</b>)</li> <li>• Track installation of pet waste bag dispensing stations (<b>WQBP</b>)</li> <li>• Implement the pet waste outreach program by providing outreach to/at businesses, events, or pet organizations (<b>WQBP</b>)</li> <li>• Explore the possibility of working with City Animal Control and Pet Licensing to provide outreach and literature to pet owners (<b>WQBP</b>)</li> <li>• Update audiovisual tools and Web site as needed</li> <li>• Conduct mixed media campaigns (e.g., PSAs, signage, print, radio, television, theater slides, and City Web site).</li> <li>• Participate in community-wide events throughout the year</li> <li>• Provide community relations</li> <li>• Implement pesticide outreach effort for city staff, residents, retail stores, and PCOs (<b>WQBP</b>)</li> <li>• Investigate feasibility of conducting periodic surveys in conjunction with other regional programs regarding local or regional sales and use of residential and commercial pest control products (<b>WQBP</b>)</li> </ul> <p><b>Did the activity raise the target audience's awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• % change in survey target audience response to questions related to water quality issues (e.g., "Perceptions of the Seriousness and Impacts of Pollution", "Awareness of the Storm Drain System", and "Understanding of Major Contributors to Water Pollution")</li> <li>• % of all parks with pet waste bag dispensing stations and # installed at each, year to year</li> </ul> <p><b>Did the activity change a target audience's behavior which results in implementation of recommended BMPs (Level 3 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• % change in survey target audience response to questions related to behavior (e.g., "Use Patterns and Disposal Practices")</li> </ul>

**Table 3-2. Assessment Tasks for Public Outreach Program Element (continued)**

<b>PO4 – Public School Education</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Evaluate ability to interface and coordinate with school education programs on a regional or local level.</li> <li>• Send letters to 5th grade teachers and principals inviting them to take part in the City’s stormwater education program</li> <li>• Reach out to school age children outside of school by providing presentations through the Community Services Department’s After School Program</li> <li>• Present at Day Camps sponsored by the Community Services Department</li> <li>• Provide educational signage and displays relevant to stormwater pollution at the Children’s Museum</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Assessment data</li> <li>• % increased awareness before and after presentations</li> </ul>
<b>PO5 – Business Outreach</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Conduct business workshops twice during the five-year permit term, during 2007-2008 and 2009-2010</li> <li>• Distribute educational material to selected businesses</li> <li>• Ensure business workshops address the proper handling and disposal of mercury-containing products (WQBP)</li> <li>• Revise business-specific fact sheets to include proper handling and disposal of mercury-containing products (WQBP)</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Assessment data</li> <li>• % increased awareness before and after workshops</li> </ul>



## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW – Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
PO6 – Effectiveness Assessment																												
Revise effectiveness assessment strategy as needed	N									X				X				X				P						
Conduct effectiveness assessment on an annual basis	E					X				X				X				X				P			S			
Identify program modifications as a result of the assessment	C					X				X				X				X				P		S	S	S	S	
Review effectiveness assessments and identify goals, baselines, and trends.	N									X				X				X				P		S	S	S	S	

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter. ☐ = Performance standard will be completed during this timeframe as specified.

MUD = Municipal Utilities Department

## Section 4

# Municipal Operations (MO)

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### OVERVIEW

The City, as part of its normal operations, conducts a number of activities (e.g., catch basin cleaning, street repairs, street sweeping via a contract) that may generate or mobilize pollutants. The Municipal Operations Program Element comprises Control Measures that are designed to ensure that these operations and maintenance activities are performed using processes and procedures to minimize the pollutants generated and the potential for pollutants to enter the storm drain system.

### OBJECTIVES

The objectives address key components of the Municipal Operations Program and identify that, in order to be effective, the program must:

- Prevent sanitary sewer overflows (SSOs) from entering the storm drain system and respond quickly and appropriately if an SSO does enter the storm drain system.
- Implement Development Standards that require source and treatment control BMPs to reduce pollutants from City-owned construction projects.
- Implement pollution prevention BMPs for public facilities (e.g., corporation yards) and Facility Pollution Prevention Plans (FPPPs) for public facilities to minimize or eliminate flows to the storm drain system.
- Implement a standard protocol for storage, usage, and disposal of pesticides and fertilizers on City-owned property such as park sites, landscaped medians, and golf courses.
- Promote the use of IPM methods and less toxic alternatives.
- Clean and maintain catch basin inlets to prevent debris accumulation and flooding.
- Ensure that catch basin inlets are properly stenciled, are permanently imprinted, or have legible curb markers to discourage illicit discharges into the storm drain and promote the City's 24-hour hotline number to facilitate reporting of missing or faded catch basin stencils.
- Maintain and inspect detention basins and pump stations.
- Conduct street sweeping activities.
- Clean and inspect City-owned parking facilities to minimize build-up and discharge of pollutants to the storm drain system.
- Train employees responsible for conducting municipal operations about general stormwater issues and BMPs.
- Conduct an annual assessment for the Annual Report to determine the effectiveness of the Municipal Operations Program Element and identify any necessary modifications.

## CONTROL MEASURES

The nine Control Measures outlined in **Table 4-1** and discussed in more depth in the accompanying Fact Sheets were designed to address the program objectives. In developing the Control Measures, several key factors were considered:

- Each Control Measure must address one or more of the program objectives.
- Each Control Measure must clearly identify the performance standards, timeframe for completion, and responsible Department/Division to ensure that there is accountability built into the program.
- The data and information from the previous permit term and/or reporting period must be analyzed to determine the effectiveness of each Control Measure, and the iterative process must be used to ensure that each Control Measure is effective and has a commensurate benefit for the resources expended.
- Each Control Measure must actively identify enhancements/modifications that would improve the Program Element and overall effectiveness of the stormwater program.

**Table 4-1. Control Measures for the Municipal Operations Program Element**

MO	Control Measure
MO1	Sanitary Sewer Overflow and Spill Response
MO2	New Development and Construction Requirements for Municipal Capital Improvement Projects
MO3	Pollution Prevention at City Facilities
MO4	Landscape and Pest Management
MO5	Storm Drain System Maintenance
MO6	Street Cleaning and Maintenance
MO7	Parking Lots Maintenance
MO8	Training
MO9	Effectiveness Assessment

The Control Measure Fact Sheets developed for the Municipal Operations Program Element (MO1-MO9) address the program objectives and identify assessment tools that may be used to assess the effectiveness of the program. The Fact Sheets were developed as stand-alone documents so that they may be individually provided to the responsible Department(s)/Division(s).

## Supporting Control Measures

While individual, program-specific Control Measures are the primary focus of each program, it is also important to understand how the program fits within the overall SWMP. In order to adequately cover all aspects of the Municipal Program, overlap between other programs in the SWMP is often necessary. A brief summary of the Program Elements that support the Municipal Program Element is provided below.

Supporting Control Measures	Program Element
X	Illicit Discharges
X	Public Outreach
---	<b>Municipal Operations</b>
---	Industrial/Commercial
X	Construction
X	Planning and Land Development

- Illicit Discharges (Section 2)
  - *Detection of Illicit Discharges and Illegal Connections* – Implement the Sanitary Sewer Overflow Response Plan to minimize illicit discharges to the storm drain system.
- Public Outreach (Section 3)
  - *Hotline* – Promote the 24-hour hotline number to facilitate reporting of illegible stencils or missing or damaged curb markers at catch basin inlets.
  - *Ask Stockton* – Interface on the City website allows the public to report problems
- Construction (Section 6)
  - *BMP Implementation* – Ensure implementation of construction BMPs at City-owned development sites.
- Planning and Land Development (Section 7)
  - *New Development Standards* – Ensure implementation and maintenance of post-construction BMPs specified in the Stormwater Quality Control Criteria Plan (SWQCCP) (i.e., Site Design Control Measures, Site-Specific Source Control Measures, and Treatment Control Measures) for City-owned development projects.

# MO1 – Sanitary Sewer Overflow and Spill Response

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## DESCRIPTION

The SSOERP minimizes potential impacts to the receiving water from sanitary sewer overflows and spills. Sanitary overflow and spill response comprises three steps: investigation of complaints, containment, and notification to appropriate agencies. Follow-up to an overflow or spill includes procedures for containing and cleaning spills and leaks that enter the storm drain system.

## EXISTING BMPS AND RELATED ACTIVITIES

The most recent version of the SSOERP (March 2009) is included as **Appendix B-1** to the SWMP; the SSOERP is reviewed and revised as changes occur. The SSOERP was developed to address sewage spills and ensure that every report of an SSO is addressed by the appropriate personnel so that the impacts of the overflow on the storm drain system can be minimized. Although the SSOERP identifies and outlines the necessary actions and BMPs that should be employed to address SSOs, it is recognized that best professional judgment always needs to be used in the field to address unique issues that arise with every spill. For SSOs, MUD has primary responsibility for responding to, cleaning up, and reporting the spills.

The SSOERP includes reporting information so that the responsible agencies are notified when these spills occur. In addition, the City's current program to limit infiltration of seepage from sanitary sewers uses a combination of inspecting sanitary systems to ensure proper construction, televising existing storm drain lines, reporting by experienced maintenance personnel, and dry weather field screening. During the construction phase, regular inspection ensures verification of leak testing, no cross connections, and televised final checks of construction quality when necessary.

In addition, MUD will follow the BMPs as set forth in the SSO BMP manual currently being developed by the Bay Area Clean Water Agencies and the Central Valley Clean Water Association, once the document is finalized.

The Environmental Control Division has a cooperative relationship with the MUD – Stormwater Management Program staff and informs them whenever a spill occurs and a cleanup is necessary. They also work together to collect and record related data. In the event of a private SSO or hazardous spill, communication of both parties is essential in resolving these incidents.

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Implement the SSOERP
- Review the SSOERP and revise as changes occur

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see MO9). The data and information to be collected may include, but will not be limited to, the following:

- Number of SSOs that occur and if spills enter the storm drain system and/or receiving waters
- SSO total volume estimates; amount captured and returned to the sewer system; amount entering storm drain; and amount entering receiving waters
- Locations and frequencies of SSOs

## **RESPONSIBILITY**

MUD – Environmental Control is primarily responsible for this Control Measure with support from MUD – Stormwater Management Program.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
MO1 – Sanitary Sewer Maintenance & Overflow and Spill Response																												
Implement the SSOERP	C																					S		P				
Review the SSOERP and revise as changes occur	C																					S		P				

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

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# MO2 – New Development and Construction Requirements for Municipal Capital Improvement Projects

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## DESCRIPTION

The New Development and Construction Requirements for Municipal Capital Improvement Projects Control Measure provide protocols to be followed in the design and construction phases of capital projects undertaken by the City. In essence, the City will follow the Development Standards and Construction Program Element requirements for all CIPs, and obtain coverage under the General Construction Permit for projects greater than or equal to one acre in size.

## EXISTING BMPS AND RELATED ACTIVITIES

By City ordinance, any construction project, including a CIP, greater than or equal to one acre in size is required to submit an erosion control plan.<sup>1</sup> All plans for construction projects with erosion control plans and SWPPPs are routed through MUD – Engineering for review to ensure appropriate stormwater BMPs are specified.

A notice of intent (NOI) is prepared and submitted for each CIP greater than or equal to one acre, thereby obtaining the proper coverage under the General Construction Permit. In addition, if a CIP meets the criteria as a priority project as defined within the SWQCCP, the CIP is developed so that it conforms to the new development standards. All City CIPs have the same requirements as any other project regarding stormwater, as reflected in the approval process. Plans, specifications, and environmental documentation all must adhere to state and federal stormwater regulations. In order to ensure that CIPs follow the City's internal procedures, Stormwater Program staff work with CIP Project Managers and educate them on proper BMPs for active sites. CIP Project Managers are also required to attend pre-construction meetings and field tailgate meetings. In addition, the City issues the same enforcement actions for CIPs as it does for other projects, with the exception of the issuance of Notices of Violation (NOVs).

The City addresses sites less than one acre in size that may be a threat to water quality through several mechanisms. First, the City responds to water pollution complaints from all sites to ensure that there are no issues or illicit discharges onsite. Secondly, the City enforces the erosion and sediment control ordinance at all sites, regardless of size. Lastly, the City is evaluating the small construction site handout that the County developed to determine if a similar document should be developed for the City.

As part of its efforts to improve interdepartmental communication, the City has created several focused subcommittees to address various aspects of the stormwater program. These subcommittees began meeting in 2008 and include Program Implementation; Planning and Land Development; Municipal; Monitoring; Inspections; and Public Education. These subcommittees will continue to meet on a regular basis throughout the Permit term.

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<sup>1</sup> This ordinance, Stockton Municipal Code - Grading and Erosion Control (Title 15: Buildings and Construction), can be found online at [www.stockton.gov](http://www.stockton.gov). Other City ordinances requiring erosion and sediment control measures include the following:

- Stockton Municipal Code - Grading, Erosion, and Sediment Control (Title 15: Buildings and Construction) ([www.stockton.gov](http://www.stockton.gov))
- City of Stockton Standard Specifications (**Appendix D-1**)



As part of the Planning and Land Development Program Element, the City reviewed the CEQA checklist (*Environmental Significance Checklist*) to ensure that it adequately addresses potential impacts a proposed CIP could have on stormwater quality. A copy of the checklist is provided in **Appendix D-2**.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Review CIP designs to ensure specifications and notes are included
- Require submission of NOI for CIP greater than or equal to one acre
- If the CIP is a priority project, ensure that it is developed in conformance with the SWQCCP
- Improve interdepartmental communication to facilitate accurate recordkeeping and reporting of data

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see MO9). The data and information to be collected may include, but will not be limited to, the following:

- Total number of CIP plans reviewed
- Total number of active CIP construction sites
- Total number of active CIP construction sites that are greater than or equal to one acre
- Total number of active CIP construction sites greater than or equal to one acre that submitted an NOI
- Total number of CIP plans requiring compliance with the SWQCCP

## **RESPONSIBILITY**

The MUD – Engineering has primary responsibility for this Control Measure with support from MUD – Stormwater Management Program.

All departments (i.e., Fire; Police; Housing and Community Development; and Library) that generate CIPs have a secondary responsibility with MUD – Stormwater Management Program for tracking and reporting on these projects.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																		Responsibility <sup>3</sup>								
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2									
MO2 – Construction Requirements for Municipal Capital Improvement Projects																												
Review CIP designs to ensure specifications and notes are included	C																				S	P						
Require submission of NOI for CIP greater than or equal to one acre	C																				S	P						
If a priority project, develop in conformance with the SWQCCP	C																				S	P						
Improve interdepartmental communication to facilitate accurate recordkeeping and reporting of data	E																				S	P						

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

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## MO3 – Pollution Prevention at City Facilities

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### DESCRIPTION

The Pollution Prevention at City Facilities Control Measure addresses pollutants entering the storm drain system from City-owned facilities (e.g., corporation yard). To further the framework provided by this Control Measure, Facility Pollution Prevention Plans (FPPPs) will be developed and maintained for the City's facilities. The FPPPs include a site description and identify BMPs that address potential sources of pollutants to the storm drain system as well as procedures for addressing spills that may occur onsite. This Control Measure also addresses the City's procedures for addressing emergency and non-emergency fire fighting flows.

### EXISTING BMPS AND RELATED ACTIVITIES

#### Facility Pollution Prevention Plans

The City has developed and has been implementing BMPs for a wide variety of activities at the corporation yard, including material storage control, vehicle maintenance, spill control, and illicit discharges. The equipment wash area is currently plumbed to the sanitary sewer.

The City currently only has one facility that requires a FPPP. This site is the Corporation Yard, which was previously covered under the Industrial General Permit. When it was covered under the Industrial General Permit, the Corporation Yard had a developed Stormwater Pollution Prevention Plan (SWPPP) (see **Appendix D-3**), and the City still uses this document to manage the site. Therefore, for the time being, the SWPPP will function as the FPPP for the Corporation Yard. The City will modify the SWPPP into an FPPP and will review it on an annual basis.

The City will continue to implement the SWPPP, including routine inspections of the Corporation Yard before and after the rainy season for the purpose of assessing compliance; staff training; and monitoring. BMPs that were in place to comply with the Industrial General Permit and minimize or eliminate flows to the storm drain system will continue to be implemented.

The Corporation Yard was inspected as part of a Stormwater Program Audit conducted by the USEPA. The inspection yielded several suggested improvements to operation and management of the corporation yard. The City has incorporated each of the suggestions into a revised SWPPP.

#### Emergency and Non-Emergency Fire Fighting Flows

Although fire department activities are not generally considered significant sources of stormwater pollution, some activities can result in the discharge of water containing pollutants that pose a threat to both human health and the quality of receiving waters if it enters the storm drain system. The two main types of fire department activities that pose potential problems are:

- Emergency Fire Fighting Flows and
- Non-Emergency Fire Department Activities

Although the Permit recognizes that emergency fire fighting flows (i.e., flows necessary for the protection of life or property) can enter the storm drain system, fire department personnel should follow general BMPs in order to minimize the impact of fire fighting flows to the environment. The City has developed procedures and BMPs addressing emergency and non-emergency fire fighting flows, entitled, "Emergency and Non-Emergency Fire Department Procedures" (**Appendix D-4**).

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Assess facilities to determine if they require coverage under the General Industrial Permit
- Modify SWPPP for Corporation Yard and other facilities into an FPPP
- Implement SWPPP (FPPP) for Corporation Yard and other facilities as needed
- Update the FPPP on an annual basis
- Review CIP projects for compliance with general stormwater requirements, including review for vehicle or equipment wash areas
- Develop a fact sheet identifying the BMPs that must be incorporated for non-emergency fire fighting flows (i.e., those from controlled or practice blazes during training exercises)
- Distribute the fact sheet identifying the BMPs that must be incorporated for non-emergency fire fighting flows
- Develop procedures to address emergency events

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see MO9). The data and information to be collected may include, but will not be limited to, the following:

- Number of facilities with coverage under the General Industrial Permit or FPPP
- Number of facilities that require FPPP
- Number of facilities implementing FPPP
- Total number of CIP sites with vehicle and/or equipment wash areas
- Number of CIP sites with vehicle and/or equipment wash areas connected to the sanitary sewer or other treatment control BMP.

## **RESPONSIBILITY**

Public Works – Engineering has primary responsibility for assessing facilities for coverage under the General Industrial Permit and for implementing the FPPP at the corporation yard with support from the MUD – Stormwater Management Program, MUD – Engineering, MUD – Environmental Control, Community Development, and PW – Parks Division.

MUD – Engineering has primary responsibility for CIP review with support from the MUD – Stormwater Management Program, MUD – Engineering, Public Works, and PW – Parks Division.

MUD – Stormwater Management Program has primary responsibility for modifying the SWPPP into an FPPP; developing and distributing BMP fact sheets for non-emergency fire fighting flows; and developing Emergency Procedures.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW – Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
MO3 – Pollution Prevention at City Facilities																													
Assess facilities to determine if they require coverage under the General Industrial Permit	C																						S	S	S	S	P	S	
Modify SWPPP for Corporation Yard and other facilities into an FPPP												X											P				S		
Implement SWPPP/FPPP for Corporation Yard and other facilities as needed	C																						S	S	S	S	P	S	
Update FPPP on an annual basis	N										X				X					X			P				S		
Review CIP projects for compliance with general stormwater requirements, including review for vehicle or equipment wash areas	C																						S	P	S	S	S	S	
Develop a fact sheet identifying the BMPs that must be incorporated for non-emergency fire fighting flows	N																						P						
Distribute fact sheet identifying the BMPs that must be incorporated for non-emergency fire fighting flows	N								X				X				X						P						
Develop Procedures to address emergency events	N											X											P						

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

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MUD = Municipal Utilities Department

## MO4 – Landscape and Pest Management

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### DESCRIPTION

The Landscape and Pest Management Control Measure ensures that the discharge of pollutants from the City's use and storage of fertilizers and pesticides is reduced to the MEP. Among other things, the BMPs promote the use of integrated pest management (IPM) and retention and planting of native plant species requiring less water and chemical augmentation to remain healthy. By choosing less toxic and non-chemical landscaping methods, the City will serve as a positive example to citizens and prevent adverse impacts on the local water bodies.

### EXISTING BMPs AND RELATED ACTIVITIES

In general, the City follows these procedures:

- Chemicals are stored in a central facility, meeting Occupational Safety and Health Administration (OSHA), Hazardous Materials (HAZMAT), and County Agricultural Commissioner's requirements by providing secure storage and spill control.
- Landscaping is performed to maintain a healthy landscape, and a regular fertilizer program ensures healthy turf.
- Pesticides are used as a last resort, conforming to a sound integrated pest management program.
- To maximize the benefit of applications, all chemicals are applied at the minimum dose while avoiding runoff and wind drift.
- Native plants and trees are used whenever possible to reduce water needs while promoting resistance to disease and pests.

City Departments/Divisions are responsible for their own pesticide use, record keeping, and submission of reports to the San Joaquin County Agricultural Commissioner. Pesticide use is compiled annually by a designated Pest Control Manager, summarized, and submitted with each Annual Report.

Most, if not all, pest management for the City is handled by outside consultants who are required to hold state licenses and adhere to all policies/procedures of a licensed LPO (Licensed Pesticide Operator). Within City staff, facility supervisors are responsible for ensuring employees have the proper training and certifications to use pesticides (see also MO8). Training and outreach occur to educate employees on the proper application of both pesticides and fertilizers to ensure that application of pesticides or fertilizers does not occur before, during or immediately after a rain event; when water is flowing off the area to be applied; or when fog is present (for spray applications). Employees are responsible for adhering to the application procedures.

Pesticide spill response and notifications are discussed. Only pesticides approved by the Pest Control Manager may be used, and all pesticides may be applied only by certified pest control applicators or under the close supervision of a certified applicator. Pesticides are stored according to label requirements in designated pesticide storage areas. Mixing and loading procedures are designed to minimize the risk of spills.

MUD – Stormwater Management Program staff have attended UC Davis IPM workshops as well as the Delta Landscape Maintenance Outreach Program (DLMOP) sponsored by the San Joaquin County Department of Public Works. Membership of DLMOP includes 80 independent maintenance companies. Quarterly meetings are held to learn more about IPM and using less toxic products. Although the City is currently implementing many of the approaches that are part of an IPM program, there are currently no written policies or protocols that have been developed to document what is being implemented. The City

will develop a formal written document that outlines the policies and procedures related to the City's IPM program.

No aquatic pesticide application is performed by the City. Mosquito abatement is the responsibility of the San Joaquin County Mosquito and Vector Control District.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Implement pesticide and fertilizer application protocol (Parks Division Landscape Management Procedures, Landscape Maintenance BMP MO-1) at park sites, landscaped medians, and golf courses (Water Quality Based Programs Performance Standard)
- Implement IPM program (Water Quality Based Programs Performance Standard)
- Develop a formal document describing IPM-related policies and procedures (Water Quality Based Programs Performance Standard)
- Maintain and expand internal inventory on pesticide use and track PW – Parks Division reported pesticide use (Water Quality Based Programs Performance Standard)
- Implement Landscaping Standards (Water Quality Based Programs Performance Standard)

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see MO9). The data and information to be collected may include, but will not be limited to, the following:

- Annual use of pesticides by active ingredient and total area for application
- Annual use of fertilizers by element (e.g., nitrogen) applied and total area for application
- Areas and types of IPM measures that are being implemented

## **RESPONSIBILITY**

PW - Parks Division has primary responsibility for this Control Measure with support from MUD – Stormwater Management Program and Public Works. MUD – Stormwater Management Program has primary responsibility for developing the document describing IPM-related policies/procedures, with support from PW – Parks Division.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
MO4 – Landscape and Pest Management																													
Implement pesticide and fertilizer application protocol at park sites, landscaped medians, and golf courses (WQBP)	C																						S					P	
Implement IPM program (WQBP)	C																						S				S	P	
Develop document describing IPM-related policies/procedures (WQBP)	N										X												P					S	
Maintain and expand internal inventory on pesticide use and track Parks Division reported pesticide use (WQBP)	C																						S				S	P	
Implement Landscaping Standards (WQBP)	C																						S				S	P	

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

☐ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

**WQBP** = Water Quality Based Programs Performance Standard



## MO5 – Storm Drain System Maintenance

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### DESCRIPTION

The Storm Drainage System Maintenance Control Measure provides for the long-term performance and integrity of the City's storm drain system. The City prioritizes catch basins for cleaning based on the required level of maintenance, and all catch basins are marked with a storm drain message, whether stenciled or permanently imprinted. This Control Measure includes special event requirements to prevent debris accumulation in catch basins and storm drains.

### EXISTING BMPS AND RELATED ACTIVITIES

#### Storm Drain System

The City's Municipal Utilities Department implements an aggressive maintenance program for the storm drain system, including main lines, catch basins, and catch basin laterals. Records are maintained for numbers of catch basin grates and laterals unplugged, main lines unplugged, catch basins cleaned, catch basin laterals cleaned, main lines cleaned, and lines televised.

#### Catch Basins

The City maintains the storm drain system, including all catch basins, and has established maintenance procedures for catch basins and pumps. The maintenance procedures include protocols for the prioritization of catch basins, inspection and cleaning protocols, and general information on recordkeeping of the waste that is removed. As of April 2009, the City has a total of 16,189 catch basin laterals, 15,764 catch basins, and 131.34 miles of lines (this reflects only those that are City-maintained). Of the 15,764 catch basins, 12,571 are low priority catch basins that discharge to a storm pump station and 3,193 are catch basins that discharge to direct outfalls. Catch basins are cleaned if they are at 40% capacity. Catch basins that drain to receiving waters (without the use of a pump) are inspected annually and cleaned as necessary. All pump stations are cleaned out every other year, regardless of their priority; priority for cleaning is determined by the amount of debris at each station.

Priority	Relevant Conditions	Inspection & Cleaning Frequency	Number of Catch Basins/Pump Stations
A (High)	Catch basins that discharges directly to waters of the state (direct outfalls)	Inspect annually prior to rainy season and clean if >40% debris accumulation	3,193
B (Medium)	Pump stations	Inspect annually, clean every other year	75
C (Low)	Catch basins that discharge to a pump station	Inspect every five years; more routine inspection if incident, complaint, or local flooding occurs. Clean if >40% debris accumulation	12,571

If evidence of an illicit discharge is found, the catch basin is cleaned and all information is tracked by the MUD – Stormwater Management Program.

## **Detention Basins**

Maintenance of detention basins, including removal of vegetation and debris, is performed by City contractors primarily in the summer and fall. Debris is removed and disposed of in accordance with regulatory requirements. Chemical amounts applied for each detention basin are tracked by active ingredient. Chemicals are applied only to perimeter fencing, frontage roads, and around pump houses. Slopes and drainage areas are maintained using mechanical methods to promote vegetation growth, lessen erosion, and prevent discharge of chemicals into local waterways. Maintenance of the detention basins is the responsibility of MUD –Storm Drain Assessment District.

The City is in the process of developing maintenance procedures and prioritization for cleaning detention basins that contractors are required to follow. These procedures are anticipated to be complete at the end of Fiscal Year 2008-2009 and will be provided in the Annual Report. In addition, control measure LD4 in Section 7 of the SWMP identifies that maintenance agreements and transfers are required to be executed between the City and the owner/developer/successor-in-interest for any facilities, including detention basins, where the developer is responsible for ongoing maintenance of the treatment BMPs.

## **Catch Basin Stenciling**

All catch basins are marked with a storm drain message that is either permanently imprinted in stamped concrete (new catch basins) or stenciled in the curb above the catch basin (older, existing catch basins). Some older, existing catch basins are marked with markers bonded to the concrete. To identify old or damaged storm drain markers, the markers are inspected in conjunction with routine inspections of older, existing catch basins in critical areas and are remarked as needed. Volunteers re-stencil catch basins through the Public Outreach Program Element (see PO1), and municipal staff are also responsible for re-stenciling and/or marking the catch basins with missing or faded stencils.

## **Special Use Permits**

Periodically, special events occur at City owned and operated facilities (including parks). When the City issues Special Use Permits for these events, the City includes provisions for trash and debris removal including containerization and street sweeping as appropriate. However, the Special Use Permit does not cover large events. The MUD Directive (**Appendix B-5**) does address non-stormwater discharges for Special Events, and it will be updated to include provisions for trash and debris removal at all Special Events.

## **Treatment Feasibility Study**

The City and County were required by the second term Permit (Provision D.12.b.) to evaluate the feasibility of diverting dry weather discharges from the storm drainage system to the City's Regional Wastewater Control Facility (RWCF) or, alternatively, to provide treatment of dry weather discharges using BMP treatment controls. Using a prioritization process, each outfall in the storm drain system was analyzed to determine the feasibility for dry weather discharge diversion opportunities. The prioritization effort is summarized in the table below.

Watershed	Outfall Name	Outfall ID	Outfall Type	Treatment Option	Prioritization Score
<b>Recommended for 10% design assessment</b>					
5-Mile Creek	Swenson & 5-Mile Creek P.S.	5M-27	Pump	Diversion	51
Calaveras River	Brookside & I-5 P.S.	CR-40	Pump	Diversion	53
	Sutter & Calaveras River P.S.	CR-45	Pump	Diversion	49
	Holman & Calaveras River P.S.	CR-48	Pump	Diversion	46
Mosher Slough	Mariner & Mosher Slough P.S.	MS-13	Pump	Diversion	53
	Kelly & Mosher Slough P.S.	MS-14	Pump	Diversion	49
San Joaquin River	Eighth Street & San Joaquin River P.S.	SJ-61	Pump	Diversion	47
Walker Slough	Turnpike & Walker Slough P.S.	WK-64	Pump	Diversion	50

The Treatment Feasibility Study Report describing these efforts was submitted to the Regional Water Board in April 2006.

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Implement storm drain system mapping
- Review/revise prioritization for catch basin cleaning as needed
- Maintain and annually update Catch Basin Database
- Implement catch basin maintenance program
- Implement pump station maintenance program
- Develop maintenance procedures and prioritization for cleaning detention basins
- Implement detention basin maintenance program
- Implement notification procedures for ID/IC and missing catch basin markers or illegible stencils
- Update MUD Directive (**Appendix B-5**) to include Special Use Provisions for proper management of trash and litter
- Based on the results of the Treatment Feasibility Study, prepare two preliminary design reports per year for the prioritized outfalls in the order of prioritization. The reports will be submitted as part of the Annual Report and will contain a final recommendation and schedule for implementation for outfalls considered feasible.

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see MO9). The data and information to be collected may include, but will not be limited to, the following:

- Total number of catch basins, number of high priority catch basins, and number of low priority catch basins
- Total number of catch basins stenciled/permanently imprinted with storm drain message prior to reporting period
- Total number of catch basins stenciled for first time by type (municipal/contract staff; volunteers)
- Total number of catch basins stenciled to date
- Total number of catch basins inspected or re-stenciled (municipal/contract staff)
- Total number of catch basins inspected/cleaned, number of high priority catch basins inspected/cleaned, number of low priority catch basins inspected/cleaned, and amount of material/debris removed from the storm drain system each year
- Total length of channels/pipes cleaned and amount of material/debris removed from channels/pipes each year
- Total number of pump stations
- Number of pump stations inspected/cleaned and amount of materials/debris removed from the pump station each year.
- Total number of dry detention basins
- Number of dry detention basin inspections after significant storms each year
- Number of regular dry detention basin inspections each year
- Total amount of trash, debris and sediment that was removed from the forebays and basins
- Number of Special Use Permits with special event provisions issued each year

## **RESPONSIBILITY**

MUD – Engineering has primary responsibility for storm drain mapping, with support from MUD – Stormwater Management Program.

MUD – Operations and Maintenance is primarily responsible for implementing the storm drain system maintenance program, with support from MUD – Stormwater Management.

MUD – Storm Drain Assessment District has primary responsibility for detention basin maintenance and notification procedures.

MUD – Stormwater Management has primary responsibility for updating the MUD Directive to include Special Use Provisions, with support from Public Works.

MUD – Stormwater Management and MUD – Engineering share primary responsibility for preparing the preliminary design reports (Treatment Feasibility Study).

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – O & M	MUD – Storm Drain Assessment District	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
MO5 – Storm Drain System Maintenance																												
Implement storm drain system mapping	E																						S	P				
Review/revise prioritization for catch basin cleaning as needed	E																						S		P			
Maintain and annually update Catch Basin Database	C																						S		P			
Implement catch basin maintenance program	C																						S		P			
Implement pump station maintenance program	C																						S		P			
Develop maintenance procedures and prioritization for cleaning detention basins	N									X													S		P			
Implement detention basin maintenance program	C																									P		
Implement notification procedures for ID/IC and missing catch basin markers or illegible stencils	C																									P		
Update MUD Directive ( <b>Appendix B-5</b> ) to include Special Use Provisions for proper management of trash and litter	C										X												P			S		
Based on the results of the Treatment Feasibility Study, prepare two preliminary design reports per year for the prioritized outfalls in the order of prioritization.	N									X				X					X				P	P				

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

X = Performance Standard will be completed during this quarter.

MUD = Municipal Utilities Department

3. P = Primary Responsibility; S = Secondary Responsibility

■ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

## MO6 – Street Cleaning and Maintenance

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### DESCRIPTION

The Street Cleaning and Maintenance Control Measure ensures that City streets are maintained and cleaned to reduce pollutants to the MEP. In conducting the Control Measure, the City designates the streets or segments of streets based on the required level of maintenance. Street sweeping requirements and street maintenance materials control are also components of this Control Measure.

### EXISTING BMPS AND RELATED ACTIVITIES

Public Works – Solid Waste and Recycling Division currently has long-term contracts with a refuse hauler to perform street sweeping in residential areas twice monthly. The City also maintains a program to pick up leaves in certain problem areas twice each fall and implemented a revised solid waste and recycling program on June 1, 2004. Among other things, the new program provides residents with several 90-gallon wheeled carts to use for green waste collection rather than having them place loose green waste in the street for pickup.

The City also established prioritization criteria for street sweeping and sweeps each street once per week. The City has been divided into five areas with the street sweeping occurring in each area on a designated day each week. The street sweeping occurs the day after the solid waste collection day and will be verified through a visual inspection a few hours after the route is completed in order to ensure that the streets were swept pursuant to the schedule and that the program was effective. The minimum street sweeping frequency for the City is provided in the table below:

Location	Priority	Sweeping Frequency
Downtown (including parking lots)	A	Three times per week
All Current/Future Public Streets	B	Bi-weekly

The contract that the City currently has for street sweeping activities requires that street sweeping be conducted bi-weekly (every other week) on all current and future public streets and three times per week in the downtown area (including parking lots). A list of City facilities that are part of the sweeping schedule is included as **Appendix D-5**. The contract also provides for on-call street sweeping for up to fourteen (14) municipal events per year (i.e., four special events; five neighborhood clean-ups, and five community clean-ups). In addition, the contract includes bi-weekly, seasonal leaf collection (October 1 through December 31) for residential customers, at City parks, and in City-owned parking lots (see MO7).

Public Works – Operations and Maintenance has an established pavement maintenance program that addresses the removal and proper disposal of pavement material, paint residue, and other construction waste. A street sweeper is permanently assigned to each road crew to facilitate daily clean-up of debris, at a minimum, with more frequent clean-up activities conducted as needed. The City of Stockton Maintenance Staff Guide is a guide written specifically for City staff that educates them on BMPs, pollutants of concern, and proper procedures for a wide variety of Operations and Maintenance and City Facilities maintenance activities (see **Appendix D-6**).

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Implement street sweeping program
- Review/revise prioritization of streets for street sweeping program as needed
- Implement green waste collection program (Water Quality Based Programs Performance Standard)
- Update Maintenance Staff Guide – Road Maintenance and Small Construction BMPs
- Implement Maintenance Staff Guide – Road Maintenance and Small Construction BMPs

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see MO9). The data and information to be collected may include, but will not be limited to, the following:

- Number of curb miles swept
- Estimate of waste removed through street sweeping and green waste collection program

## **RESPONSIBILITY**

Public Works has primary responsibility for this Control Measure with support from MUD – Stormwater Management Program.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
MO6 – Street Cleaning and Maintenance																												
Implement street sweeping program	C																					S				P		
Review/revise prioritization of streets for street sweeping program as needed	N																					S				P		
Implement green waste collection program (WQBP)	C																					S				P		
Update Maintenance Staff Guide -- Road Maintenance and Small Construction BMPs	E											X										S				P		
Implement Maintenance Staff Guide -- Road Maintenance and Small Construction BMPs	C																					S				P		

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

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MUD = Municipal Utilities Department

WQBP = Water Quality Based Program Performance Standard



# MO7 – Parking Lots Maintenance

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## DESCRIPTION

The Parking Lots Maintenance Control Measure ensures the City's parking lots and structures are kept clear of debris and excessive oil buildup is prevented. This Control Measure consists of a schedule of cleaning and inspections of the parking lots and structures.

## EXISTING BMPs AND RELATED ACTIVITIES

The City maintains several parking lots. All City-owned parking lots are swept to control litter as part of the street sweeping effort. Each parking lot is monitored and cleaned to prevent excessive oil or debris build-up as needed. The contract that the City currently has for street sweeping activities requires that street sweeping be conducted three times per week in the downtown area (including parking lots). In addition, the contract includes biweekly, seasonal leaf collection (October 1 through December 31) in City-owned parking lots.

The contracted waste haulers (Solid Waste & Recycling (SW&R)) are responsible for monitoring the sweeping contract. The SW&R Field Specialist does daily inspections of street sweeping and works closely with the owner of Universal Sweeping. In addition, the owner of Universal Sweeping attends the quarterly meetings held with the waste haulers and the SW&R staff.

In addition, MUD staff use vacuum trucks to clean all catch basins and laterals connected to City-owned parking lots. A Parking Lot Cleaning BMPs Fact Sheet was developed and is currently implemented by the City and its contractors (**Appendix D-7**).

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Implement BMPs for parking lot cleaning as specified in the Parking Lot Cleaning BMPs Fact Sheet
- Inspect City-owned parking lots annually

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see MO9). The data and information to be collected may include, but will not be limited to, the following:

- Total number of City-owned parking lots and structures.
- Frequency and number of parking lots swept
- Estimate of amount of waste removed, if available
- Number of inspections conducted each year.

## RESPONSIBILITY

Public Works has primary responsibility for this Control Measure with support from the MUD – Stormwater Management Program.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																		Responsibility <sup>3</sup>									
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
MO7 – Parking Lots Maintenance																													
Implement BMPs for parking lot cleaning	C																						S				P		
Inspect City-owned parking lots annually	C																						S				P		

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

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## MO8 – Training

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### DESCRIPTION

Training is important for the implementation of the Municipal Operations Program Element. An effective training program is one of the best pollution prevention BMPs that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

The City has reviewed and revised their Training Strategy. The updated Training Strategy is attached as **Appendix B-6**.

The objectives of the training program are to:

- Increase the general awareness and understanding of the SWMP and Municipal Operations program;
- Increase the awareness and understanding of the Municipal Operations Control Measures and performance standards;
- Create a training program to increase understanding and awareness and prompt the behavioral changes needed to protect and improve water quality; and
- Conduct training for employees responsible for the Municipal Operations Program Element.

The Municipal Operations Training Modules will include the following:

- **Fixed Facility Operations** – Provides an introduction to the Municipal Operations Program and the BMPs that should be utilized at fixed facilities to protect water quality
- **Field Program Operations** – Provides an introduction to the Municipal Operations Program and the BMPs that should be utilized while conducting field activities to protect water quality

Specific areas of focus for the training efforts for the Municipal Operations Program Element are summarized in **Table 4-2**.

**Table 4-2. Municipal Operations Program Element Training**

Audience	Format	Subject Material	Comments
<ul style="list-style-type: none"><li>• Public Works Maintenance crews</li><li>• Road crews</li><li>• Street sweepers</li><li>• Parking Facilities crews</li><li>• Facility Operators</li><li>• Waste Pickup</li><li>• Parks &amp; Rec crews</li><li>• Pesticide/fertilizer applicators</li><li>• Contract/lease staff involved in above activities</li></ul>	<ul style="list-style-type: none"><li>• Classroom</li><li>• Field demos</li><li>• Tailgate sessions</li></ul>	<ul style="list-style-type: none"><li>• Overview of stormwater management</li><li>• BMPs for municipal operations</li></ul>	<ul style="list-style-type: none"><li>• Pesticide applicators must also attend annual pesticide application classes</li></ul>

## **EXISTING BMPS AND RELATED ACTIVITIES**

To ensure that the various Department and Division personnel understand their roles and responsibilities under the SWMP, the City provided a classroom training module for key staff responsible for the Municipal Operations Program Element. By having responsible Department and Division staff attend the training modules, the City is able to effectively implement the SWMP.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Conduct training for key staff involved in the Municipal Operations program (see **Table 4-2**)
  - Fixed Facility Operations
  - Field Program Operations

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see MO9). The data and information to be collected may include, but will not be limited to, the following:

- Number and types of training sessions held
- Number of attendees at each session and the Division/Department that they work for
- Results of pre- and post-training surveys

## **RESPONSIBILITY**

The MUD – Stormwater Management Program has primary responsibility for this Control Measure with support from MUD – Engineering, MUD – Environmental Control, Community Development, Public Works, and PW - Parks Division.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																		Responsibility <sup>3</sup>								
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
MO8 – Training																												
Conduct Fixed Facility Operations Training	C								X							X						P	S	S	S	S	S	
Conduct Field Programs Operations Training									X							X						P	S	S	S	S	S	

Notes:

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## MO9 – Effectiveness Assessment

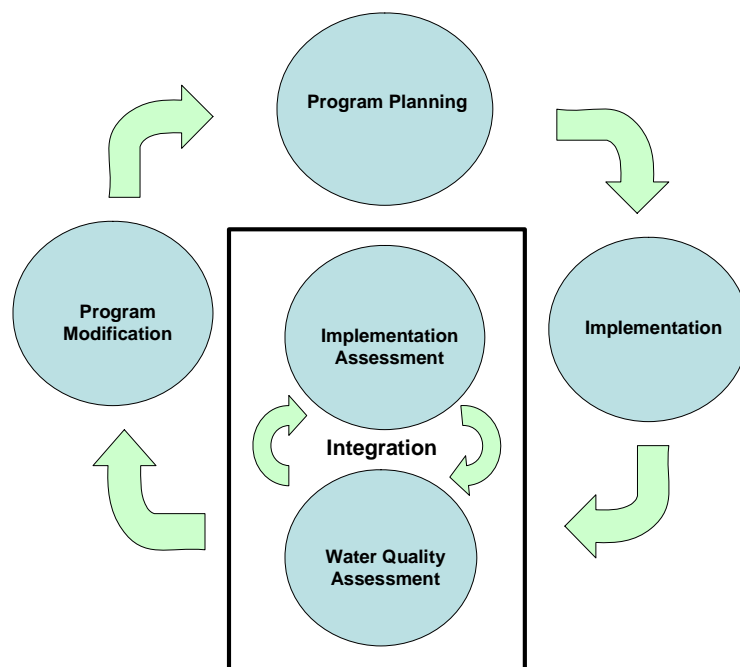
### DESCRIPTION

Effectiveness assessment is a fundamental and necessary component for developing and implementing successful stormwater programs. A well-executed assessment can provide the feedback necessary to determine whether the programs are achieving intended outcomes and, ultimately, whether continued implementation will result in maintaining or improving water quality.<sup>2</sup>

#### Effectiveness Assessment

The process that is used to evaluate if programs are resulting in desired outcomes.

Effectiveness assessments are an integral part of the iterative process, which is the foundation for the stormwater program. By utilizing the iterative process and conducting effectiveness assessments, program managers can use the information gained to adapt their programs and ensure that the resources expended are providing commensurate benefit and are protective of water quality. The iterative process is illustrated in **Figure 4-1**; the points at which effectiveness assessments (implementation and water quality) are conducted are also identified.




**Figure 4-1. Iterative Process and Effectiveness Assessments Outcome Levels**

<sup>2</sup> California Stormwater Quality Association (CASQA), Municipal Stormwater Program Effectiveness Assessment Guidance, March 2007.

Outcome levels help to categorize and describe the desired results of the Program Elements and related Control Measures. Pursuant to the 2007 CASQA guidance, outcomes for stormwater programs have been categorized into six levels, as shown in **Figure 4-2**.

Outcome Level	Description
6	Protecting Receiving Water Quality
5	Improving Runoff Quality
4	Reducing Loads from Sources
3	Changing Behavior
2	Raising Awareness
1	Documenting Activities



**Figure 4-2. Effectiveness Assessment Outcome Levels**

The outcome levels identify the key areas that are evaluated for the program effectiveness assessment within the Annual Report. The primary questions that should be assessed for each Program Element or Control Measure include the following:

- Level 1 Outcome – Was the Program Element/Control Measure implemented in accordance with the Permit Provisions, SWMP Control Measures, and Performance Standards?
- Level 2 Outcome – Did the Program Element/Control Measure raise the target audience’s awareness of an issue?
- Level 3 Outcome – Did the Program Element/Control Measure change a target audience’s behavior, resulting in the implementation of recommended BMPs?
- Level 4 Outcome – Did the Program Element/Control Measure reduce the load of pollutants from the sources to the storm drain system?

As a part of the annual reporting process, effectiveness assessments will be conducted for the Municipal Program and related Control Measures to determine their effectiveness and identify any necessary modifications. Although the effectiveness assessment may change from year to year as new information is learned, the assessment will initially focus on Outcome Levels 1-4 and will include the approach outlined in **Table 4-3**. Level 5 and 6 outcomes will be assessed, to the extent possible, as a part of the water quality based programs and water monitoring program (SWMP Sections 8 and 9).

The effectiveness assessment conducted as a part of each annual report will address the following:

- Purpose or focus of the assessment –The outcome level(s) being assessed as well as the related management questions will be summarized. Where applicable, the identified goals that have or will be established for the program/activity will also be summarized.
- Baseline conditions – A baseline is a defined point or metric by which effectiveness can be measured or compared. Baselines are linked to a particular point in time and are particularly important for measuring change over time. Where feasible, the baselines that have or will be established for the program/activity will be summarized.

- Assessment methods – The assessment methods (those activities, actions, or processes used to obtain and evaluate assessment data or information) will be summarized.
- Using the information – The improvements that have been identified for the program element will be summarized.



**Table 4-3. Assessment Tasks for Municipal Operations Program Element**

<b>MO1 – Sanitary Sewer Maintenance &amp; Overflow and Spill Response</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Implement the SSOERP</li> <li>• Review the SSOERP and revise as necessary</li> </ul> <p><b>Did the activity change a target audience’s behavior which results in implementation of recommended BMPs (Level 3 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Estimate reduction of sewage discharge from implementation of protocols</li> </ul> <p><b>Did the activity reduce the load of pollutants from the sources to the storm drain system (Level 4 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Estimate reduction of sewage discharge from implementation of protocols</li> </ul>
<b>MO2 – Construction Requirements for Municipal Capital Improvement Projects</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Review CIP designs to ensure specifications and notes are included</li> <li>• Require submission of NOI for CIPs ≥ one acre</li> <li>• If the CIP is a priority project, ensure that it is developed in conformance with the SWQCCP</li> <li>• Improve interdepartmental communication to facilitate accurate recordkeeping and reporting of data</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• % CIP plans that required revisions year to year</li> <li>• % CIP projects ≥ one acre that submitted NOIs</li> </ul>

**Table 4-3. Assessment Tasks for Municipal Operations Program Element (continued)**

<b>MO3 – Pollution Prevention at City Facilities</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Assess facilities to determine if they require coverage under the General Industrial Permit</li> <li>• Implement FPPP for Corporation Yard and other facilities as needed</li> <li>• Review CIP projects for vehicle or equipment wash areas</li> <li>• Develop and distribute fact sheets identifying the BMPs that must be incorporated for non-emergency fire fighting flows</li> </ul> <p><b>Did the activity raise the target audience's awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• # facilities that have FPPPs developed, implemented, and available on site</li> <li>• # CIP projects with vehicle wash areas connected, % year to year</li> </ul> <p><b>Did the activity change a target audience's behavior which results in implementation of recommended BMPs (Level 3 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• # facilities with BMPs implemented and maintained, % year to year</li> </ul>

**Table 4-3. Assessment Tasks for Municipal Operations Program Element (continued)**

MO4 – Landscape and Pest Management
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Implement pesticide and fertilizer application protocol at park sites, landscaped medians, and golf courses (WQBP)</li> <li>• Implement IPM program (WQBP)</li> <li>• Develop document describing IPM-related policies/procedures (WQBP)</li> <li>• Maintain and expand internal inventory on pesticide use and track Parks Division reported pesticide use (WQBP)</li> <li>• Implement Landscaping Standards (WQBP)</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• % change in amount and type of pesticides applied, year to year</li> <li>• % change in total area to which pesticides are applied, year to year</li> <li>• % change in amount and chemical element of fertilizers applied, year to year</li> <li>• % change in total area to which fertilizers are applied, year to year</li> <li>• % change in types of IPM measures that are being implemented, year to year</li> <li>• % change in total area where IPM is implemented, year to year</li> </ul> <p><b>Did the activity change a target audience’s behavior which results in implementation of recommended BMPs (Level 3 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Estimates of pesticide and fertilizer applied and reductions over time</li> </ul>

**Table 4-3. Assessment Tasks for Municipal Operations Program Element (continued)**

<b>MO5 – Storm Drain System Maintenance</b>
<p><b>Was the program implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Implement storm drain system mapping</li> <li>• Review/revise prioritization for catch basin cleaning as needed</li> <li>• Maintain and annually update Catch Basin Database</li> <li>• Implement catch basin maintenance program</li> <li>• Implement pump station maintenance program</li> <li>• Implement detention basin maintenance program</li> <li>• Implement notification procedures for ID/IC and missing catch basin markers or illegible stencils</li> <li>• Include Special Use Provisions in special use permits for proper management of trash and litter</li> </ul> <p>Based on the results of the Treatment Feasibility Study, prepare two preliminary design reports per year for the prioritized outfalls in the order of prioritization and submit as part of the Annual Report. <b>Did the activity change a target audience's behavior which results in implementation of recommended BMPs (Level 3 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Number of catch basins, pump stations, etc. cleaned, year to year</li> </ul> <p><b>Did the program reduce the load of pollutants from the sources to the storm drain system (Level 4 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Estimate of pounds of pollutants removed through cleaning of catch basins, pump stations, etc.</li> </ul>
<b>MO6 – Street Cleaning and Maintenance</b>
<p><b>Was the program implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Implement street sweeping program</li> <li>• Review/revise prioritization of streets for street sweeping program as needed</li> <li>• Implement green waste collection program (WQBP)</li> <li>• Update and implement road maintenance BMPs</li> </ul> <p><b>Did the program reduce the load of pollutants from the sources to the storm drain system (Level 4 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Estimate of waste removed through street sweeping and green waste collection program</li> </ul>

**Table 4-3. Assessment Tasks for Municipal Operations Program Element (continued)**

<b>MO7 – Parking Lots Maintenance</b>
<p><b>Was the program implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Implement BMPs for parking lot cleaning</li> <li>• Inspect City-owned parking lots annually</li> </ul> <p><b>Did the program reduce the load of pollutants from the sources to the storm drain system (Level 4 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Estimate of waste removed through parking lot cleaning</li> </ul>
<b>MO8 – Training</b>
<p><b>Was the program implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Conducted training</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Number of training sessions held and number of participants at each session</li> <li>• Percent increased awareness before and after training sessions</li> </ul>

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2									
MO9 – Effectiveness Assessment																												
Revise effectiveness assessment strategy as needed	N									X				X				X					P					
Conduct effectiveness assessment on an annual basis	E					X				X				X				X					P	S	S	S	S	S
Identify program modifications as a result of the assessment	C					X				X				X				X					P	S	S	S	S	S
Review effectiveness assessments and identify goals, baselines, and trends.	N									X				X				X					P	S		S	S	

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter. ☐ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

## Section 5

### Industrial and Commercial (IC)

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#### OVERVIEW

The purpose of the Industrial and Commercial Program Element is to effectively prohibit unauthorized non-stormwater discharges and reduce pollutants in stormwater runoff from industrial and commercial facilities to the MEP. The program for industrial and commercial facilities is accomplished by tracking, inspecting, providing outreach, and ensuring compliance at industrial and commercial facilities identified as potentially significant sources of pollutants in stormwater. Due to the similarities in the industrial and commercial programs, the two programs have been combined into one Program Element. In addition to program similarities, the industrial and commercial land uses within the City are, in general, located in close proximity to each other, often in the same watersheds or sub-watersheds.

#### State Industrial General Permit

The state Industrial General Permit (CAS No. 000001, Order No. 97-03-DWQ) was issued on April 17, 1997. In general, facilities designated by the Regional Board, facilities whose operators seek coverage, and facilities required by USEPA stormwater regulations are covered by the Industrial General Permit. Among other things the Industrial General Permit requires:

- Prohibition of unauthorized non-stormwater discharges. The authorized non-stormwater discharges are addressed in the Special Conditions section of the Industrial General Permit.
- Control of pollutant discharges using the best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT).
- All facility operators to prepare, retain on site, and implement a SWPPP. Development and implementation requirements for the SWPPPs are included in sections of the Industrial General Permit. However, SWPPPs are developed emphasizing BMP implementation and elimination of unauthorized non-stormwater discharges.
- Implementation of a monitoring program to demonstrate compliance with the Industrial General Permit. Allowances for alternative monitoring and group monitoring are also provided in the Permit.

The Industrial General Permit is similar to the City's municipal stormwater permit in that the regulatory agencies (the Regional Water Board and the City) are required to inventory and provide outreach to industrial facilities and/or enforce state and local codes and ordinances for industrial facilities that are out of compliance. As such, the City will work closely with the state in implementing the industrial program. The State Water Resources Control Board is in the process of reissuing the Industrial General Permit. Upon completion of the reissuing process, permit requirements are likely to change.

## OBJECTIVES

The objectives address the key components of the Industrial and Commercial Program Element and identify that, in order to be effective, the program must:

- Provide adequate legal authority to control pollutants from industrial and commercial facilities to the MS4 (see Section 1)
  - Develop and maintain an inventory of industrial and commercial facilities located within the City's jurisdiction.
- Prioritize the industrial and commercial facilities within the inventory based on their threat to water quality.
- Conduct inspections of the industrial and commercial facilities that pose a significant threat to water quality with an inspection frequency based on the prioritization of the facility. Conduct follow up inspections to bring the facility into compliance.
- Implement a progressive enforcement policy to ensure that adequate enforcement is conducted, and coordinate with the Regional Water Board regarding referrals of potential non-filers and inspections.
- Provide internal and external training on components of the SWMP and related Permits.
- Conduct an assessment as a part of the annual reporting process to determine the effectiveness of the Program Element and identify any necessary modifications.

## CONTROL MEASURES

The Control Measures outlined in **Table 5-1** and discussed in more depth in the accompanying Fact Sheets were designed to address the program objectives. In developing the Control Measures, several key factors were considered:

- Each Control Measure must address one or more of the program objectives.
- Each Control Measure must clearly identify the performance standards, timeframe for completion, and responsible Department/Division to ensure that there is accountability built into the program.
- The data and information from the previous permit term and/or reporting period must be analyzed to determine the effectiveness of each Control Measure, and the iterative process must be used to ensure that each Control Measure is effective and has a commensurate benefit for the resources expended.
- Each Control Measure must actively identify enhancements/modifications that would improve the Program Element and overall effectiveness of the stormwater program.



**Table 5-1. Control Measures for the Industrial and Commercial Program Element**

IC	Control Measure
IC1	Facility Inventory
IC2	Prioritization and Inspection
IC3	Industrial/Commercial Outreach
IC4	Enforcement
IC5	Training
IC6	Effectiveness Assessment

The Control Measure Fact Sheets developed for the Industrial and Commercial Program Element (IC1 – IC6) address the program objectives and identify assessment tools that may be used to assess the effectiveness of the program. The Fact Sheets were developed as stand-alone documents so that they can be individually provided to the responsible Department(s)/Division(s).

### Supporting Control Measures

While the individual, program-specific Control Measures are the primary focus of each Program Element (i.e., IC1-IC6 for Industrial and Commercial), it is also important to understand how the Program Element fits within the overall SWMP and how each of the Program Elements complement and support each other. A brief summary of the Program Elements that support the Industrial and Commercial Program is provided below.

Supporting Control Measures	Program Element
X	Illicit Discharges
X	Public Outreach
-----	Municipal Operations
-----	<b>Industrial/Commercial</b>
-----	Construction
-----	Planning and Land Development

- Illicit Discharges & Illegal Connections (Section 2)
  - *Facilities in Database* – Reports of illicit discharges or illegal connections from facilities in the industrial and commercial program database are recorded so the facility history is documented.
- Public Outreach (Section 3)
  - *Outreach Materials* – Materials are developed for industrial and commercial sites that can be distributed during inspections.

# IC1 – Facility Inventory

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## DESCRIPTION

The Facility Inventory Control Measure addresses the need to develop and maintain a complete database of industrial and commercial facilities that have a significant or potential to impact water quality. Information for the database is primarily obtained from new business licenses and sanitary sewer hook-up permits. The inventory provides the basis for prioritization of facilities within the City and serves as a repository for all outreach, inspection, and notices for each facility.

## EXISTING BMPS AND RELATED ACTIVITIES

The City maintains an inventory of industrial and commercial facilities, including those covered under the state Industrial General Permit. The City supplements its inventory by utilizing the Regional Water Board's website for all Industrial General Permit holders within its jurisdiction. The inventory/database tracks the following information:

- Name and address of the facility
- Mailing address of the facility
- Name and address of owner
- Waste Discharge Identification (WDID) number
- Due date for next inspection
- Date of most current inspection
- Date (if) a Notice of Non-Applicability (NONA) was granted to facility
- Date of most recent Annual Report
- Check boxes for SWPPP and if there is risk of exposure
- Box to indicate whether business is commercial or industrial
- Follow-up activities (industrial only)
- Additional comments

The inventory tracks the following categories of industrial and commercial facilities (only commercial facilities are tracked by type):

### ***Industrial Facilities***

- Manufacturing Facilities;
- Hazardous Waste Treatment, Storage, or Disposal Facilities;
- Solid Waste Transfer Stations;
- Recycling Facilities;
- Transportation Facilities; and
- Sewage or Wastewater Treatment Facilities

## **Commercial Facilities**

### *Significant Sources*

- Auto body shops
- Auto dealers
- Auto repair shops
- Dry cleaners
- Equipment rentals
- Kennels
- Nurseries
- Restaurants and caterers
- Retail gasoline outlets (RGOs)

### *Temporary or Intermittent Sources*

- Automotive washing and detailing
- Carpet cleaners
- Commercial pesticide applicators
- Concrete pouring contractors
- Concrete cutting contractors
- General building contractors
- Landscape installation/maintenance contractors
- Paint contractors
- Portable toilet rental and maintenance
- Pressure washers
- Street sweepers
- Swimming pool contractors
- Swimming pool maintenance

Scheduling of inspections is also an integrated component of the City's database. Queries to the database identify the facilities scheduled for inspection, sites overdue inspections, and sites requiring re-inspection.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Perform an internal audit of the database every other year to verify that the information is accurately entered.
- Maintain and annually update the industrial and commercial facility inventory.
- Map industrial and commercial facilities in the inventory/database on an annual basis using a convenient scale and an easily-discernible format.
- Develop a mobile business pilot program for one mobile business category deemed to be a potentially significant source and include all mobile business within this category in the inventory.
- Implement a mobile business pilot program for one mobile business category deemed to be a potentially significant source and include all mobile business within this category in the inventory.

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see IC6). The following data and information should be collected:

- Number and types of industrial and commercial facilities

## **RESPONSIBILITY**

The MUD – Stormwater Management Program has primary responsibility for this Control Measure with support from Community Development. The MUD – Stormwater Management Program staff are responsible for all aspects of the industrial and commercial business inventory/database including: transferring the industrial and commercial business inventory into the City's database, specifying and ensuring modifications are performed, and periodically updating the database.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2										
IC1 – Facility Inventory																													
Internal audit of database	C				X								X									X	P			S			
Maintain and annually update the inventory and database	C					X				X				X				X					P			S			
Map the industrial and commercial facilities on an annual basis	E					X				X				X				X					P						
Develop a mobile business pilot program for one mobile business category deemed to be a potentially significant source and include all mobile business within this category in the inventory.	N										X												P			S			
Implement a mobile business pilot program for one mobile business category deemed to be a potentially significant source and include all mobile business within this category in the inventory.	N																						P			S			

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

■ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

## IC2 – Prioritization and Inspection

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### DESCRIPTION

The Prioritization and Inspection Control Measure establishes procedures for prioritizing industrial and commercial facilities within the City for inspection as well as the inspection requirements associated with the site visits. The inspections ensure that the facility operator has pertinent educational materials, the operator complies with the City ordinances, and unauthorized non-stormwater discharges do not occur. Inspection of facilities covered under the state Industrial General Permit also ensure that the operator has a current Waste Discharge Identification (WDID) number, the SWPPP is available on site, and the operator is effectively implementing BMPs in compliance with City ordinances.

### EXISTING BMPS AND RELATED ACTIVITIES

#### Prioritization

During 2003-2004, the City developed procedures for prioritizing industrial and commercial facilities. The City prioritized all industrial facilities and the significant sources for commercial facilities (e.g. auto body shops, nurseries, kennels, etc.) as high priority, and each facility is inspected twice during the five-year Permit cycle. All potential sources of commercial facilities are considered low priority and inspected as needed, which typically occurs in response to a complaint. If the City encounters a new industrial or commercial facility that may pose a threat to water quality, the City will evaluate the business using the evaluation criteria and ranking system that has been developed.

#### Inspections

The City ordinance allows authorized officers to enter any property or building to perform inspections. On refusal to allow inspection by the owner, tenant, occupant, agent or other responsible party, the City may seek an Administrative search warrant.

In order to ensure that the inspectors conduct thorough and consistent inspections, industrial and commercial checklists have been developed (see **Appendices E-1** and **E-2**). In the industrial checklist, four categories are tabulated, including administrative evaluation, indoor evaluation, outdoor evaluation, and additional BMPs. Commercial checklists are used for Restaurants and Food Service facilities (including Fats, Oils, and Grease compliance); Vehicle Washing/Detailing Operations; Vehicle Maintenance/Repair facilities, and Nursery/Kennel/Dry Cleaners/Laundry facilities. The commercial checklists will be updated prior to the next round of inspections.

The City will continue to inspect industrial and commercial facilities twice during the Permit term unless there is evidence of an illicit discharge or a complaint has been filed. The City will commit to inspecting the industrial facilities that are identified via Regional Board reports as having exceeded water quality benchmarks within 90 days after receipt of such reports or complaints. Inspections for this Permit term will begin July 1, 2009. The first round of inspections will be completed by the end of fiscal year 2009-2010; the second round of inspections will be completed by the end of fiscal year 2011-2012. If the inspection reveals that there is no risk of exposure of the commercial/industrial activities to stormwater at a facility, the facility may be dropped from the high priority list. At least one year will elapse before the second inspection. Industrial and commercial facility inspections are conducted by contracted inspectors, not City staff.

City industrial inspectors receive proper training to adequately assess facilities and offer assistance in suggesting remedies. City ordinances and City Attorney's Office also provide the proper legal backing for inspections and any necessary enforcement.

## **Performance Standards**

The performance standards listed below establish the level of effort required for this Control Measure.

### **Prioritization**

- Prioritize industrial and commercial facilities as necessary
- Evaluate the prioritization criteria and incorporate exceedances of the water quality benchmarks (identified from data provided by the Regional Board) as a criterion for prioritizing the industrial facilities

### **Inspections**

- Review/revise the industrial inspection checklists as needed.
- Review/revise the commercial business-specific checklist as needed to ensure that critical areas within facilities that have a significant potential to discharge a pollutant for which there is a water quality based plan are inspected. For example, since there is a Pathogen Plan, kennels should be inspected to ensure that there is a sanitary sewer connection for the wash water from the kennel area. (Water Quality Based Programs Performance Standard)
- Revise industrial and commercial inspection evaluation checklists to include discussion of mercury-containing products, along with proper handling and disposal procedures (Water Quality Based Programs Performance Standard)
- Inspect high priority industrial and commercial facilities twice during the Permit term unless there is evidence of an illicit discharge or a complaint has been filed. The first round of inspections will be completed by the end of fiscal year 2009-2010; the second round of inspections will be completed by the end of fiscal year 2011-2012. If the inspection reveals that there is no risk of exposure of the commercial/industrial activities to stormwater at a facility, the facility may be dropped from the high priority list. At least one year will elapse before the second inspection.
- Evaluate the feasibility of developing a compliance rating system to track the effectiveness of the program and assist inspectors in defining compliance.
- Conduct follow up inspections as necessary in order to bring the facility into compliance.
- Identify how inspections may be conducted for the mobile business category identified in IC1.

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see IC6). The following data and information should be collected:

- Number of industrial and commercial inspections conducted year to year
- Number of industrial facilities with SWPPPs on site
- Number of industrial and commercial facilities adequately implementing BMPs
- Number of industrial and commercial facilities in general compliance with the County's stormwater control requirements and having submitted required filings to the state stormwater program
- Number of industrial and commercial facilities requiring follow up inspections
- Number of industrial and commercial facilities in compliance pre- and post-follow-up inspection

## **RESPONSIBILITY**

The MUD – Stormwater Management Program has primary responsibility for this Control Measure.



## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
IC2 – Prioritization and Inspection																												
Prioritization																												
Prioritize facilities as necessary	C																					P						
Evaluate the prioritization criteria and incorporate the water quality benchmark data for industrial facilities	N									X												P						
Inspections																												
Review/revise industrial inspection checklists as needed	C																					P						
Review/revise commercial inspection checklist as needed (WQBP)	E								X													P						
Revise industrial and commercial inspection evaluation checklists to include mercury handling and disposal procedures (WQBP)	N									X												P						
Inspect high priority facilities	C																					P						
Evaluate the feasibility of developing a compliance rating system	N										X											P						
Conduct follow up inspections as needed	C																					P						
Identify how inspections may be conducted for the mobile business category identified in IC1.	N									X												P						

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

X = Performance Standard will be completed during this quarter.

MUD = Municipal Utilities Department

3. P = Primary Responsibility; S = Secondary Responsibility

☐ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

WQBP = Water Quality Based Programs Performance Standard

## IC3 – Industrial/Commercial Outreach

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### **DESCRIPTION**

The Industrial/Commercial Outreach Control Measure requires industrial and commercial businesses to reduce pollutants in stormwater discharges and effectively prohibits unauthorized non-stormwater discharges to the storm drain system. Although the City may provide guidance to facility operators on appropriate Source and Treatment Control BMP selection and application, the selection of specific BMPs to be implemented is the responsibility of the discharger.

### **EXISTING BMPs AND RELATED ACTIVITIES**

Industrial/Commercial outreach activities include requiring BMPs at facilities and distributing educational materials at facilities during inspections as well as through the Chamber of Commerce. Additional outreach mechanisms may be identified with the development of the mobile business pilot program. Although efforts are described within this Control Measure, business outreach also takes place as part of the Public Outreach and Construction Programs (see PO5 and CO4, respectively).

The City has developed and maintains a manual that includes a Model SWPPP for Industrial Activities. The manual is designed to guide the development of a complete SWPPP. Examples are used throughout the manual. An electronic pdf version is available for download from the City's website at:  
[http://www.stocktongov.com/mud/General/stormwater/stormwater\\_industrial.cfm](http://www.stocktongov.com/mud/General/stormwater/stormwater_industrial.cfm).

In order to assist the industrial and commercial facilities in selecting and implementing the appropriate types of BMPs, the City developed BMP Fact Sheets for the high priority industrial and commercial businesses. The BMP Fact Sheets are distributed during the inspections and made available on the City's website. The link to the webpage containing the information is as follows:  
[http://www.stocktongov.com/MUD/General/stormwater/stormw\\_business\\_tips.cfm](http://www.stocktongov.com/MUD/General/stormwater/stormw_business_tips.cfm)

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Review/revise BMP fact sheets for high priority industrial and commercial facilities as needed.
  - Advise facilities of additional resources for BMP selection and implementation including CASQA California BMP Handbooks.
  - Ensure that facilities that have a significant potential to discharge a pollutant for which there is a water quality based plan (i.e., pesticides, pathogens, mercury) receive guidance. For example, since there is a Pathogen Plan, kennels should receive a kennel-specific BMP Fact Sheet that identifies BMPs that would reduce the pollutants of concern from being discharged (Water Quality Based Programs Performance Standard).
- Distribute appropriate BMP fact sheets during inspections.
- Based on the potential development of a compliance rating system (see IC2), target outreach efforts as needed.
- Identify BMPs for the mobile business category identified in IC1 and develop an outreach/education strategy.
- Implement outreach efforts to mobile businesses

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see IC6). The following data and information should be collected:

- Number and types of materials distributed
- Number of industrial and commercial facilities with BMP fact sheets or other stormwater-related information posted

## RESPONSIBILITY

The MUD – Stormwater Management Program has primary responsibility for this Control Measure with support from MUD – Engineering, Community Development, Public Works, and PW - Parks Division. MUD – Stormwater Management Program staff are responsible for ensuring that the other Department and Division staff receive brochures for distribution.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
IC3 – BMP Implementation																												
Review/revise BMP Fact Sheets for high priority facilities as needed (WQBP)	C																					P						
Distribute BMP Fact Sheets	C																					P	S		S	S	S	
Based on the development of a compliance rating system, target outreach efforts	N																					P						
Identify BMPs for the mobile business category identified in IC1 and develop an outreach/education strategy.	N										X											P						
Implement outreach efforts to mobile businesses	N																					P						

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WQBP = Water Quality Based Programs Performance Standard

# IC4 - Enforcement

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## DESCRIPTION

The Enforcement Control Measure outlines the progressive levels of enforcement applied to industrial and commercial facilities that are out of compliance with local ordinances and establishes the protocol for referring apparent violations of facilities subject to the Industrial General Permit to the Regional Board. The Enforcement Control Measure has been developed to address specific legal authority issues related to industrial and commercial facility discharges and should be implemented in coordination with the City's efforts to maintain adequate legal authority for the Stormwater Program in general.

## EXISTING BMPS AND RELATED ACTIVITIES

The City has a progressive enforcement and referral policy so that the enforcement actions match the severity of violation and include distinct, progressive steps. Options are available for progressive corrective actions for repeat offenders. Inspections are performed to assess compliance with City stormwater ordinances. Noncompliance may include non-submittal by an industrial facility of an NOI, failure to implement BMPs, or other violation of City ordinances.

The City has developed a *Municipal Utilities Department Directive Prohibiting Non-Stormwater Discharges to the Storm Drainage System* (MUD Directive) for Construction Activities, Commercial/Industrial Businesses, Residential Activities, and Special Events (see **Appendix B-5**). The MUD Directive<sup>1</sup> identifies the steps that should be taken when citing violators of ordinances, allows for Citywide consistency in the enforcement of the local ordinances, and provides a mechanism for cost recovery. The progressively severe corrective actions involve verbal warnings followed by written warnings and legal action, if necessary. Illicit discharges by industrial or commercial facilities or construction sites are addressed in a formal manner through issuance of notices of violations, citations, or notices and orders (Cease and Desist) depending upon the compliance history of the facility. Corrective actions are taken in every instance where a responsible party is identified.

The types of enforcement actions that may be taken include the following:

### Administrative Remedies

- Verbal Warning
- Notice of Violation
- Cease and Desist Order
- Stop Work Order

### Legal Action

- Administrative Citation
- Fine
- Other

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<sup>1</sup> The City had planned to develop an Enforcement Consistency Guide (ECG); however, the MUD Directive and the Investigative Guidance Manual being developed (see ID3) together will adequately address consistency in the enforcement of the local ordinances and will provide standard guidelines and protocols for identifying, documenting, responding to, and enforcing violations.

The City's industrial/commercial database contains a comment field for notes pertaining to a specific facility. Typically, if there is an unsatisfactory inspection, a special note is made in the comment field, and the facility is marked for reinspection. Past experience with facilities in the Stockton area has shown that facility operators are cooperative and are willing to bring facilities into compliance. However, the database will be modified as needed to allow for better tracking of enforcement actions.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Implement the progressive enforcement and referral policy.
- Track enforcement actions using the industrial/commercial database.
- Implement procedures for responding to complaints forwarded by the Regional Water Board to insure inspections occur within two business days. Inspections initiated in response to complaints will determine, at a minimum, if the facility is out of compliance with City stormwater ordinances.
- Review and modify, as necessary, the procedures for informing the Regional Board of violations at industries covered by the Industrial General Permit. Referral to the Regional Board is appropriate concurrently (within 30 days) with issuance of NOVs. The referral to the Regional Board should include:
  - Name of facility
  - Operator of facility
  - Owner of facility
  - Industrial activity or activities subject to the state Industrial General Permit conducted at the facility
  - Records of communication between the City and facility owner and operator.
- Develop an enforcement strategy that specifically addresses the mobile business category identified in IC1.

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see IC6). The following data and information should be collected:

- Number and types of enforcement actions taken
- Number of repeat offenders identified
- Number of industrial facilities referred to the Regional Water Board and types of referrals

## **RESPONSIBILITY**

The MUD – Stormwater Management Program has primary responsibility for this Control Measure with support from the City Attorney. The MUD – Stormwater Management Program staff are responsible for developing the progressive enforcement and referral policy and the City Attorney is responsible for ensuring the ordinances give the proper legal authority to implement the policy. The development of the procedures regarding inspection of Regional Board referred industrial sites is the responsibility of the MUD – Stormwater Management Program staff

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
IC4 – Enforcement																													
Implement progressive enforcement and referral policy and procedures	C																						P						S
Track enforcement actions using the industrial/commercial database	E																						P						
Implement procedures for Regional Water Board based complaints	C																						P						
Review and modify Industrial General Permit referral policy as needed	C																						P						
Develop an enforcement strategy that specifically addresses the mobile business category identified in IC1	N										X												P						

Notes:

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2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

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## IC5 – Training

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### DESCRIPTION

The Training Control Measure is important for the implementation of the Industrial and Commercial Program Element. An effective training program is one of the best pollution prevention BMPs that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

The City has reviewed and revised their Training Strategy. The updated Training Strategy is attached as **Appendix B-6**.

The objectives of the training program are to:

- Increase the general awareness and understanding of the SWMP and Industrial/Commercial program;
- Increase the awareness and understanding of the Industrial/Commercial Control Measures and performance standards;
- Create a training program to increase awareness and understanding and prompt the behavioral changes needed to protect and improve water quality; and
- Conduct training for employees responsible for inspecting industrial and commercial facilities and measure the effectiveness of the training.

The Industrial/Commercial Training Modules will include the following:

- **Industrial and Commercial Inspectors Field Implementation** – Provides overview of the program element and SWMP commitments as well as detailed information for inspections, use of forms, record keeping requirements, enforcement options, and simulated exercises.

Specific areas of focus for the training efforts for the Industrial/Commercial Program Element are summarized in **Table 5-2** below.

**Table 5-2. Areas of Focus for the Industrial/Commercial Program Training**

Target Audience	Format	Subject Material	Comments
<ul style="list-style-type: none"><li>• Industrial/Commercial inspectors (City staff, not contracted inspectors)</li><li>• Code Enforcement Officers</li></ul>	<ul style="list-style-type: none"><li>• Classroom</li><li>• Field Demos</li></ul>	<ul style="list-style-type: none"><li>• Overview of stormwater management program</li><li>• Stormwater ordinance and enforcement policy</li><li>• BMPs for facilities</li><li>• Database tracking</li></ul>	<ul style="list-style-type: none"><li>• Training seminars or workshops related to the program may be made available by other organizations</li></ul>

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### EXISTING BMPS AND RELATED ACTIVITIES

To ensure that the various Department and Division personnel understand their roles and responsibilities under the SWMP, the City provided a classroom training module for key staff identifying or responding to complaints. By having responsible Department and Division staff attend the training modules, the City is able to effectively implement the SWMP.



## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Conduct training for key City staff involved in the Industrial and Commercial program (see **Table 5-2**). The stormwater management program will work in collaboration with Human resources to offer cross departmental trainings to: Building and Public Works inspector staff, Planning staff, corporation yard staff, Redevelopment staff, and PW - Parks Division staff.
  - Industrial and Commercial Inspectors Field Implementation
- Provide trainings to businesses through partnerships with Downtown Stockton Alliance and the Greater Stockton Chamber of Commerce (Green Team San Joaquin)

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see IC6). The following data and information should be collected:

- Number and types of training sessions held
- Number of attendees at each session and the Division/Department that they work for
- Results of pre- and post-training surveys

## RESPONSIBILITY

The MUD – Stormwater Management Program has primary responsibility for Industrial/Commercial program training.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
IC5 – Training																												
Conduct Industrial and Commercial Inspectors Field Implementation training (City staff only)	C										X								X			P						
Provide trainings to businesses through partnerships with Downtown Stockton Alliance and the Greater Stockton Chamber of Commerce (Green Team San Joaquin)	C									X								X				P						

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

☐ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

## IC6 – Effectiveness Assessment

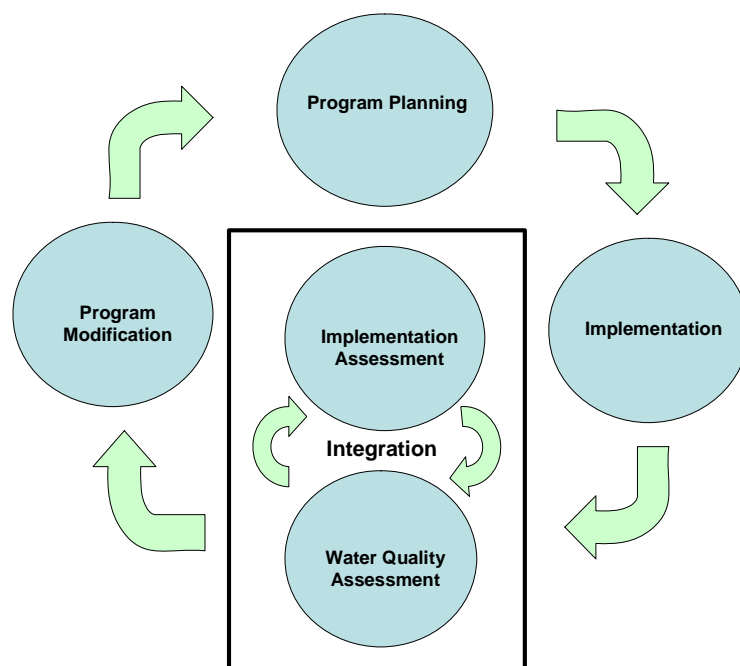
### DESCRIPTION

Effectiveness assessment is a fundamental and necessary component for developing and implementing successful stormwater programs. A well-executed assessment can provide the feedback necessary to determine whether the programs are achieving intended outcomes and, ultimately, whether continued implementation will result in maintaining or improving water quality.<sup>2</sup>

#### Effectiveness Assessment

The process that is used to evaluate if programs are resulting in desired outcomes.

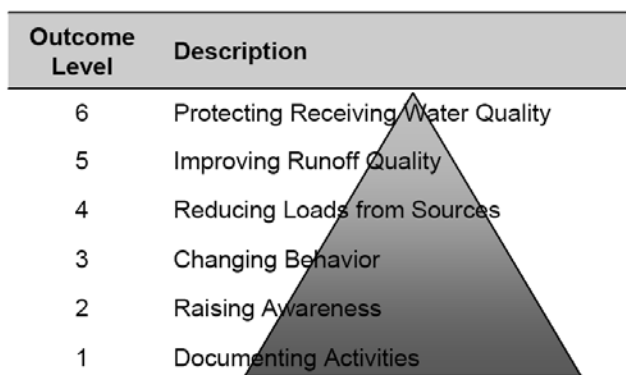
Effectiveness assessments are an integral part of the iterative process, which is the foundation for the stormwater program. By utilizing the iterative process and conducting effectiveness assessments, program managers can use the information gained to adapt their programs and ensure that the resources expended are providing commensurate benefit and are protective of water quality. The iterative process is illustrated in **Figure 5-1**; the points at which effectiveness assessments (implementation and water quality) are conducted are also identified.



**Figure 5-1. Iterative Process and Effectiveness Assessments Outcome Levels**

<sup>2</sup> California Stormwater Quality Association (CASQA), Municipal Stormwater Program Effectiveness Assessment Guidance, March 2007.

Outcome levels help to categorize and describe the desired results of the Program Elements and related Control Measures. Pursuant to the 2007 CASQA guidance, outcomes for stormwater programs have been categorized into six levels, as shown in **Figure 5-2**.



Outcome Level	Description
6	Protecting Receiving Water Quality
5	Improving Runoff Quality
4	Reducing Loads from Sources
3	Changing Behavior
2	Raising Awareness
1	Documenting Activities

**Figure 5-2. Effectiveness Assessment Outcome Levels**

The outcome levels identify the key areas that are evaluated for the program effectiveness assessment within the Annual Report. The primary questions that should be assessed for each Program Element or Control Measure include the following:

- Level 1 Outcome – Was the Program Element/Control Measure implemented in accordance with the Permit Provisions, SWMP Control Measures, and Performance Standards?
- Level 2 Outcome – Did the Program Element/Control Measure raise the target audience’s awareness of an issue?
- Level 3 Outcome – Did the Program Element/Control Measure change a target audience’s behavior, resulting in the implementation of recommended BMPs?
- Level 4 Outcome – Did the Program Element/Control Measure reduce the load of pollutants from the sources to the storm drain system?

As a part of the annual reporting process, effectiveness assessments will be conducted for the Industrial and Commercial Program and related Control Measures to determine their effectiveness and identify any necessary modifications. Although the effectiveness assessment may change from year to year as new information is learned, the assessment will initially focus on Outcome Levels 1-4 and may include, but not be limited to, the approach outlined in **Table 5-3**. Level 5 and 6 outcomes will be assessed, to the extent possible, as a part of the monitoring program and water quality based programs (SWMP Sections 8 and 9).

The effectiveness assessment conducted as a part of each annual report will address the following:

- Purpose or focus of the assessment –The outcome level(s) being assessed as well as the related management questions will be summarized. Where applicable, the identified goals that have or will be established for the program/activity will also be summarized.
- Baseline conditions – A baseline is a defined point or metric by which effectiveness can be measured or compared. Baselines are linked to a particular point in time and are particularly important for measuring change over time. Where feasible, the baselines that have or will be established for the program/activity will be summarized.

- Assessment methods – The assessment methods (those activities, actions, or processes used to obtain and evaluate assessment data or information) will be summarized.
- Using the information – The improvements that have been identified for the program element will be summarized.

**Table 5-3. Assessment Tasks for the Industrial/Commercial Program Element**

IC1 – Facility Inventory
<p><b>Was the program implemented in accordance with the SWMP Control Measures and Performance Standards (<i>Level 1 Outcome</i>)?</b></p> <ul style="list-style-type: none"><li>• Performed internal audit of the inventory/database</li><li>• Maintained and annually updated the inventory/database</li><li>• Mapped the industrial and commercial facilities on an annual basis</li><li>• Developed and implemented a mobile business pilot program for one mobile business category deemed to be a potentially significant source and include all mobile business within this category in the inventory.</li><li>• Identify # of industrial/commercial facilities in inventory by category</li></ul>

**Table 5-3. Assessment Tasks for the Industrial/Commercial Program Element**

IC2 – Prioritization and Inspection and IC3 – BMP Implementation
<p><b>Was the program implemented in accordance with the SWMP Control Measures and Performance Standards (<i>Level 1 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Prioritized facilities as necessary</li> <li>• Review/revised industrial inspection checklists as needed</li> <li>• Review/revised commercial inspection checklist as needed (<b>WQBP</b>)</li> <li>• Revised industrial and commercial inspection evaluation checklists to include mercury handling and disposal procedures (<b>WQBP</b>)</li> <li>• Inspected high priority facilities</li> <li>• Evaluated the feasibility of developing a compliance rating system</li> <li>• Conducted follow up inspections as needed</li> <li>• Identified how inspections may be conducted for the mobile business category identified in IC1.</li> <li>• Review/revised BMP Fact Sheets for high priority facilities as needed (<b>WQBP</b>)</li> <li>• Distributed BMP Fact Sheets</li> <li>• Based on the development of a compliance rating system, targeted outreach efforts</li> <li>• Identified BMPs for the mobile business category identified in IC1 and develop an outreach/education strategy.</li> <li>• Implemented outreach efforts to mobile businesses</li> </ul> <p><b>Did the program raise the target audience’s awareness of an issue (<i>Level 2 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• # inspections conducted total and year to year</li> <li>• Identify # of industrial facilities with SWPPP available onsite</li> <li>• # and types of materials distributed to industrial and commercial facilities</li> <li>• # of facilities aware of City BMP Fact Sheets or who have stormwater-related information posted/available</li> </ul> <p><b>Did the program change a target audience’s behavior which resulted in the implementation of recommended BMPs (<i>Level 3 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• # and % of industrial and commercial facilities and types adequately implementing BMPs and year to year</li> <li>• # and % of industrial and commercial facilities in compliance with local codes and ordinances</li> <li>• # and % of industrial facilities in compliance with state Industrial General Permit</li> <li>• # facilities requiring municipal stormwater follow up inspections</li> <li>• # and % industrial and commercial facilities in compliance pre- and post-follow-up inspection and year to year</li> </ul> <p><b>Did the activity reduce the load of pollutants from the sources to the storm drain system (<i>Level 4 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Use inspection and related monitoring data (if available) to estimate load reductions</li> </ul>

**Table 5-3. Assessment Tasks for the Industrial/Commercial Program Element (continued)**

<b>IC4 – Enforcement</b>
<p><b>Was the program implemented in accordance with the SWMP Control Measures and Performance Standards (<i>Level 1 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Conducted enforcement as needed</li> <li>• Reviewed/revised database to incorporate enforcement related information</li> <li>• Developed Enforcement Consistency Guide</li> <li>• Implemented procedures for referrals to and from the Regional Water Board</li> </ul> <p><b>Did the program change a target audience's behavior which resulted in the implementation of recommended BMPs (<i>Level 3 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• # and types of enforcement actions taken total and year to year</li> <li>• # of repeat offenders identified total and year to year</li> <li>• # of industrial facilities referred to Regional Water Board as potential non-filers</li> <li>• % enforcement actions taken major (court case, etc.) vs. minor (verbal warning)</li> </ul>
<b>IC5 – Training</b>
<p><b>Was the program implemented in accordance with the SWMP Control Measures and Performance Standards (<i>Level 1 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• Conducted Industrial and Commercial Inspectors Field Implementation training</li> <li>• Provided trainings to businesses through partnerships with Downtown Stockton Alliance and the Greater Stockton Chamber of Commerce (Green Team San Joaquin)</li> </ul> <p><b>Did the program raise the target audience's awareness of an issue (<i>Level 2 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• # training sessions held and # attendees at each session</li> <li>• % increase in awareness before and after training sessions</li> </ul> <p><b>Did the program change a target audience's behavior which resulted in the implementation of recommended BMPs (<i>Level 3 Outcome</i>)?</b></p> <ul style="list-style-type: none"> <li>• # facilities in compliance and implementing BMPs</li> </ul>



## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
IC6 – Effectiveness Assessment																												
Revise effectiveness assessment strategy as needed	N									X				X				X				P						
Conduct effectiveness assessment on an annual basis	E					X				X				X				X				P	S	S	S	S	S	
Identify program modifications as a result of the assessment	C					X				X				X				X				P	S	S	S	S	S	
Review effectiveness assessments and identify goals, baselines, and trends.	N									X				X				X				P	S		S	S		

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

☐ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

## Section 6

### Construction (CO)

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#### OVERVIEW

During construction projects, a number of activities may generate or mobilize pollutants. The purpose of the Construction Program Element is to coordinate City programs and resources to effectively reduce pollutants in runoff from construction sites during all construction phases.

#### OBJECTIVES

The objectives address key components of the Construction Program and identify that, in order to be effective, the program must:

- Provide adequate legal authority to control pollutants to the MS4 from construction sites with land disturbance greater than or equal to one acre in size;
- Review construction plans and issuing grading permits consistent with City requirements;
- Require BMPs to control sediment and pollutants from construction sites to the MS4;
- Maintain a tracking system (inventory) of active construction sites;
- Inspect construction sites to ensure proper BMP implementation and compliance with City requirements and all applicable Permit conditions;
- Bring forth enforcement actions for sites in violation of City requirements and advise the Regional Water Board of apparent violations of General Construction Permit requirements;
- Provide regular internal (City staff) and external (contractors, developers, etc.) training on applicable components of the SWMP and the related Permits; and
- Conduct an assessment as a part of the annual reporting process, determine the effectiveness of the construction program, and identify any necessary modifications.

#### REQUIREMENTS

##### State General Construction Activity Stormwater Permit

The State General Construction Activity Stormwater Permit (General Construction Permit), CAS000002 Order No. 99-08-DWQ, was adopted by the State Water Board on August 19, 1999. The State Water Board Resolution No. 2001-046 amended the permit on April 26, 2001. The General Construction Permit requires all dischargers where construction activity disturbs one acre or more to:

- Develop and implement a SWPPP which specifies BMPs that will prevent all construction pollutants from contacting stormwater and that have the intent of keeping all products of erosion from moving off-site into receiving waters;
- Eliminate or reduce non-stormwater discharges from storm drain systems and other waters of the US; and
- Perform inspection of all BMPs.

It is the responsibility of the landowner to obtain coverage under the General Construction Permit prior to commencement of construction activities. To obtain coverage, the landowner must file an NOI with a vicinity map and the appropriate fee with the State Water Board.

The General Construction Permit is similar to the City of Stockton Stormwater Permit in that the regulatory agencies (the Regional Water Board and the City) are required to inventory and provide outreach to construction site owners/developers and/or enforce state and local codes and ordinances for construction sites that are out of compliance. As such, the City will work closely with the State in implementing the Construction program. The State Water Resources Control Board is in the process of reissuing the General Construction Permit. Upon completion of the reissuing process, permit requirements are likely to change.

## CONTROL MEASURES

The Control Measures outlined in **Table 6-1** and discussed in more depth in the accompanying Fact Sheets were designed to address the program objectives. In developing the Control Measures, several key factors were considered:

- Each Control Measure must address one or more of the program objectives.
- Each Control Measure must clearly identify the performance standards, timeframe for completion, and responsible Department/Division to ensure that there is accountability built into the program.
- The data and information from the previous permit term and/or reporting period must be analyzed to determine the effectiveness of each Control Measure, and the iterative process must be used to ensure that each Control Measure is effective and has a commensurate benefit for the resources expended.
- Each Control Measure must actively identify enhancements/modifications that would improve the Program Element and overall effectiveness of the stormwater program.

The eight Control Measures comprising this Program Element provide mechanisms for the review and approval process, updating of the construction site inventory, outreach, site inspections, enforcement activities, training, and effectiveness assessment.

**Table 6-1. Control Measures for the Construction Program Element**

CO	Control Measure
CO1	Municipal Code for Construction Sites
CO2	Plan Review and Approval Process
CO3	Construction Projects Inventory
CO4	Construction Outreach
CO5	Construction Site Inspections & BMP Implementation
CO6	Enforcement
CO7	Training
CO8	Effectiveness Assessment

The Control Measure Fact Sheets developed for the Construction Program Element (CO1 – CO8) address the program objectives and identify assessment tools that may be used to assess the effectiveness of the program. The Fact Sheets were developed as stand-alone documents so that they can be individually provided to the responsible Department(s)/Division(s).

## Supporting Control Measures

While individual, program-specific Control Measures are the primary focus of each program, it is also important to understand how the program fits within the overall SWMP. In order to adequately cover all aspects of the Construction Program, overlap between other programs in the SWMP is often necessary. A brief summary of the Program Elements that support the Construction Program Element is provided below.

- Planning and Land Development (Section 7)
  - *New Development Standards* – Although the emphasis of the Development Standards in the SWQCCP is on post-construction BMPs, these control measures are considered during the planning process and generally included or installed during construction. During regular inspections of construction sites, inspectors can ensure that the site design control measures, source control measures, and treatment control measures included in the project plans are being properly constructed and/or installed.

Supporting Control Measures	Program Element
---	Illicit Discharges
---	Public Outreach
---	Municipal Operations
---	Industrial/Commercial
---	<b>Construction</b>
<b>X</b>	Planning and Land Development

# CO1 – Municipal Code for Construction Sites

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## DESCRIPTION

The goal of this Control Measure is to ensure that the City has adequate legal authority to control pollutants from construction sites with land disturbances greater than or equal to one acre. This authority is typically provided through the adoption of an ordinance (and resulting codification in the City's Municipal Code) and erosion and sediment control standards. This Control Measure addresses specific legal authority issues related to construction activities and should be implemented in coordination with Section 1 of the SWMP.

## EXISTING BMPs AND RELATED ACTIVITIES

The City adopted a Grading and Erosion Control Ordinance effective July 1, 1997.<sup>1</sup> Pursuant to this ordinance, construction activities (with some exclusions, such as mining and agriculture) disturbing more than 50 cubic yards of material and clearing and grubbing more than 0.5 acres are required to obtain a Grading and Erosion Control Permit. The ordinance establishes requirements for:

- Providing a copy of the local SWPPP and proof that an NOI has been filed.
- Clearing and grubbing, grading, filling, and excavation of land to minimize damage to surrounding property, public right of way, and degradation of water quality;
- Controlling the discharge of sediments and pollutant runoff from construction related activities to municipal separate storm drains; and
- Reducing pollutants in stormwater discharges to the MEP.

The Ordinance also provides authority to City inspectors to inspect construction sites and their BMPs throughout the life of the project. Inspectors may photograph any conditions thought to constitute a violation of applicable laws.

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<sup>1</sup> This ordinance, Stockton Municipal Code - Grading and Erosion Control (Title 15: Buildings and Construction), can be found online at [www.stockton.gov](http://www.stockton.gov). Other City ordinances requiring erosion and sediment control measures include the following:

- Stockton Municipal Code - Grading, Erosion, and Sediment Control (Title 15: Buildings and Construction)
- City of Stockton Standard Specifications (**Appendix D-1**)

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Review and modify the Grading and Erosion Control Ordinance and the Standard Specifications to address sites that are equal to or greater than one (1) acre in size (consistent with the State Construction General Permit (when adopted))

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see CO8). The data and information to be collected may include, but will not be limited to, the following:

- Summary of any modifications made to the Grading and Erosion Control Ordinance or the Standard Specifications

## **RESPONSIBILITY**

MUD – Engineering has primary responsibility for this Control Measure, with support from the MUD – Stormwater Management Program and the City Attorney.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
CO1 – Municipal Code for Construction Sites																													
Review and modify the Grading and Erosion Control Ordinance and the Standard Specifications, including items such as changing the Grading and Erosion Control Ordinance language stating "...Disturbances of 5 Acres or More" to "Disturbances of 1 Acre or More"	C										X												S	P					S

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

4. Date depends on renewal of General Construction Permit

X = Performance Standard will be completed during this quarter.

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MUD = Municipal Utilities Department

# CO2 – Plan Review and Approval Process

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## DESCRIPTION

Effective planning of construction site activities leads to minimizing erosion and preventing pollutants from entering the storm drain system. The City requires projects that disturb greater than or equal to one acre of land to address pollutants and activities during the construction phase of the project. Prior to issuing a grading permit, the City reviews construction drawings to ensure that erosion and sediment control BMPs and source and treatment control BMPs are identified.

## EXISTING BMPs AND RELATED ACTIVITIES

### Plan Review

The City's Grading and Erosion Control Ordinance (see Control Measure CO1) requires the submittal with grading plans of proof that a NOI has been filed and that a SWPPP has been developed. The City provides a link on its website to the State's Model SWPPP for Construction Activities for project developers.<sup>2</sup> The Model SWPPP is a five-page guidance document comprising a checklist of information required to be included in the site-specific SWPPP, as applicable. The Model SWPPP checklist should not be substituted for thorough understanding of the General Construction Permit requirements.

To ensure that site plans, improvement plans, and building plans are reviewed for stormwater requirements, all plans that are submitted to the City are routed to the MUD representative at the Permit Center for review. A plan review process flow chart is provided as **Appendix F-1**. As part of this review, the MUD representative in the Permit Center reviews project plans, as well as grading and building permit applications, to determine if a SWPPP is required and to verify the following:

- An NOI has been submitted to the State Water Resources Control Board;
- The name of and contact information for the person responsible for SWPPP implementation are provided; and
- The location of and details for all construction activity BMPs are listed.

No permit is issued until the stormwater requirements are satisfied.

### Small Site Stormwater Management Plan

The City is in the process of evaluating the *Construction Small Site Stormwater Management Plan* developed by the County to determine if a similar handbook would be warranted for the City. Smaller sites (<1 acre) are not routinely inspected by MUD Stormwater; however, all sites that have a building permit are inspected by Building Inspectors, and they conduct a Stormwater Inspection. If a site has inadequate BMPs, the site is referred to MUD Stormwater for continued follow-up.

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<sup>2</sup> [http://www.stocktongov.com/MUD/General/stormwater/stormwater\\_construction.cfm](http://www.stocktongov.com/MUD/General/stormwater/stormwater_construction.cfm)



## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Review grading and building permit applications for SWPPP requirements. Continue to check for the following requirements prior to issuing a grading permit:
  - Copy of a signed Notice of Intent form to comply with the General Construction Permit has been submitted to the State Board (if applicable) or a Waste Discharge Identification Number;
  - Submittal of a project erosion control plan showing the details of all the BMPs that will be used. The plan should include, at a minimum, the following:
    - A vicinity map showing nearby roadways, the construction site perimeter, and the geographic features and general topography surrounding the site;
    - A site map showing the construction project in detail, including the existing and planned paved areas and buildings; general topography both before and after construction; drainage patterns across the project area; and anticipated stormwater discharge locations (i.e., the receiving water, a conduit to receiving water, and/or drain inlets);
    - A description of BMPs to address contractor activities that may generate pollutants including, but not limited to, vehicle washing, equipment maintenance, and waste handling;
    - A description of the type and location of erosion and sediment control BMPs to be employed on site including, but not limited to, limited grading during the wet season, and planting and maintenance of vegetation on slopes; and
    - The name and telephone number of the qualified person responsible for implementing the SWPPP.
- Develop a Plan & Permit Application Review Procedure handout explaining the review procedure to be provided to all construction project applicants identified as having to comply with the Grading and Erosion Control Ordinance
- Distribute the Plan & Permit Application Review Procedure handout
- Evaluate the County's Construction Small Site Stormwater Management Plan to determine if a similar handbook would be warranted for the City

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see CO8). The data and information to be collected may include, but will not be limited to, the following:

- Number of grading permits issued each year
- Number of applications requiring proof of NOIs and SWPPPs
- Number of sites greater or equal to one acre that submitted proof of an NOI and that SWPPP has been developed

## **RESPONSIBILITY**

MUD – Engineering has primary responsibility for this Control Measure, with support from Community Development and MUD – Stormwater Management. MUD – Stormwater Management has primary responsibility for developing a Plan & Permit Application Review Procedure handout, with support from Community Development and MUD – Engineering.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
CO2 – Plan Review and Approval Process																												
Review grading and building permit applications for SWPPP requirements	C																						P		S			
Develop a Plan & Permit Application Review Procedure handout explaining the review procedure to be provided to all construction project applicants identified as having to comply with the Grading and Erosion Control Ordinance	N										X											P	S		S			
Distribute the Plan & Permit Application Review Procedure handout	N																					P		S				
Evaluate the County's Construction Small Site SWMP to determine if a similar handbook would be warranted for the City	N										X											S	P		S			

### Notes:

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2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

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# CO3 – Construction Projects Inventory

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## DESCRIPTION

The Construction Projects Inventory Control Measure involves tracking construction sites from the planning stage to completion. This is essential for ensuring that stormwater pollutants are reduced to the MEP. Maintaining a database to track all stages of the construction process is the foundation of construction-related source identification and helps to ensure that pollution prevention and source control are emphasized during all phases of the construction project.

## EXISTING BMPS AND RELATED ACTIVITIES

The MUD – Stormwater Management Program maintains a database system that is capable of tracking inspections that occur at each construction site. The current database fields include:

- Site owner and contact information
- Name, address, and description (type) of project
- WDID numbers
- Inspector and inspection date
- Comments on site conditions
- Notices of Violation and other letters sent

The City follows a process to ensure that MUD receives all information regarding construction project applications and that the associated WDID numbers are verified.

Applications for construction projects are routed by the Planning Division to the Building Division, who in turn routes them to MUD. All sites that are one (1) acre or greater that apply for building permits are referred to MUD Stormwater. Permit Center staff provide all pertinent database information to MUD Stormwater directly. The Construction Database is updated by MUD staff at the Permit Center and the MUD Stormwater Inspector each time a project is given a permit; thus, the database update and maintenance occurs routinely throughout the Permit term. Once a site is referred, it is added to the database and the inspection list immediately.

MUD Stormwater also routinely checks the Regional Water Quality Control Boards (RWQCB) website for all WDIDs issued in the City to cross-check the list against the State's database for sites that have an NOI. Sites that meet the one (1) acre or greater WDID number are added and inspected every 30 days for compliance. The WDID numbers are verified on the State's database, or a hard copy is required. If a false WDID is discovered, that project is not allowed to continue until the proper WDID number is obtained.

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Maintain and update the Construction Project Database

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see CO8). The data and information to be collected may include, but will not be limited to, the following:

- Number of active and completed public and private construction projects

## **RESPONSIBILITY**

The MUD – Stormwater Management Program is responsible for maintaining and revising the database tracking system for construction sites.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																		Responsibility <sup>3</sup>								
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
CO3 – Construction Projects Inventory																												
Maintain and update the Construction Project Database	C																					P						

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

☐ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

## CO4 – Construction Outreach

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### **DESCRIPTION**

The Construction BMP Implementation Control Measure is required to ensure that appropriate BMPs are implemented at construction sites to prevent pollutants from being discharged to the storm drain system to the MEP. Construction site BMP implementation is accomplished through a combined approach of requiring BMPs at construction sites; educating contractors about the needs and requirements to implement BMPs for different construction-related activities; reviewing grading and erosion control plans and building plans to ensure that stormwater controls have been adequately considered; and ensuring through inspection and enforcement that contractors have a construction site SWPPP and are implementing identified BMPs. This Control Measure focuses on the City's requirements for BMPs at construction sites and the associated outreach efforts to the building community.

### **EXISTING BMPS AND RELATED ACTIVITIES**

#### **Outreach**

Construction outreach activities include requiring BMPs at construction sites and distributing educational materials at construction sites during inspections. Although efforts are described within this Control Measure, business outreach also takes place as part of the Public Outreach and Industrial/Commercial Programs (see PO5 and IC3, respectively).

The City conducts education and training for construction activities through informational brochures, the City's website, and through one-on-one discussions during site inspections by MUD – Stormwater Construction staff. Experience has shown that the best environment to educate contractors is in the field, where issues, BMP implementation, and regulatory requirements can be discussed on-site. The City also provides a link on its website to the State's Model SWPPP that includes a list of BMPs applicable to construction activities.

Tailgate meetings are held on-site with the site superintendent and any of the subconsultants that are present that day. These meetings are held on an ongoing basis by the MUD Stormwater inspector as the monthly inspections are conducted.

A Pre-Construction meeting is a meeting of City staff and the developer/contractors to go over the requirements prior to the commencement of any construction activity, including grading. These meetings are scheduled based on active construction, not based on season. MUD Stormwater will attend scheduled Pre-Construction meetings and discuss proper BMP installation/maintenance.

The program sends "Rainy Season" letters prior to the wet season and discusses proper BMPs with site superintendents during routine inspections. Routine inspections occur on an as-needed basis at the start of new projects.

#### **Training**

Developers, builders, and contractors will be invited to internal construction training provided by MUD Stormwater, "Inspecting Construction Site BMPs" (see CO7), which is scheduled to be held three times during the Permit term.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Distribute appropriate BMP fact sheets during inspections.
- Conduct contractor tailgate meetings on an ongoing basis during routine, monthly inspections.  
Review the following:
  - Construction General Permit; and
  - City requirements for construction sites, including BMPs.
- Invite developers, builders and contractors to internal construction training to be held three times during the Permit term

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see CO8). The data and information to be collected may include, but will not be limited to, the following:

- Number and types of outreach materials distributed
- Number, locations, and dates of contractor tailgate meetings
- Number of attendees and active construction sites represented at each tailgate meeting
- Number of attendees at training session(s)
- Results of training evaluation forms from attendees
- Results of pre- and post-training surveys

## **RESPONSIBILITY**

The MUD – Stormwater Management Program is primarily responsible for this Control Measure with support from Public Works.



## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
CO4 – Construction Outreach																												
Distribute appropriate BMP fact sheets during inspections	C																					P				S		
Conduct contractor tailgate meetings during routine, monthly inspections	C																					P				S		
Invite developers, builders, and contractors to internal construction training to be held three times during the Permit term	N									X				X				X				P						

Notes:

1. C = Continue; E = Enhance; N = New

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# CO5 – Construction Site Inspections & BMP Implementation

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## DESCRIPTION

The Construction Site Inspection Control Measure is critical to the ultimate success of the Construction Program Element. An effective construction site inspection program requires having adequate legal authority to enforce City requirements, tracking active construction sites to identify repeat violators, and conducting inspections to ensure the sources are identified and that BMPs are being implemented and maintained. The inspection program also provides the basis for notifying the Regional Water Board when inspectors identify non-compliant sites including non-filers or repeat violators. Building and engineering inspectors should also be aware of stormwater quality issues and notify the MUD – Stormwater Management Program if any violations are noticed.

## EXISTING BMPs AND RELATED ACTIVITIES

City inspectors refer to SWPPPs and improvement/building plans to ensure that appropriate stormwater BMPs are being put into place and maintained. For a typical project, three departments are involved in providing inspection services:

- The MUD – Stormwater Management Program’s inspector provides overall coordination for construction site inspections for all projects as well as a “second check” for the other two departments.
- Community Development – Building Division carries out inspections as part of the building permit requirements.
- The Public Works Department – Engineering provides, upon notification of potential problems, secondary inspections for infrastructure improvements and improvements located within the City right-of-way.

The MUD – Stormwater Management Program’s inspector also spends time in the Permits Center, reviewing permit applications to ensure that they are complete and address the stormwater permit requirements (see CO2). Engineering staff review the plans, and the MUD – Stormwater Management Program’s inspector conducts the field inspections.

The training strategy (CO7) identifies the necessary training modules and the key target audiences for each module. The key staff involved in Construction Site Inspections will receive the necessary training so that they can conduct their job.

In addition to inter-departmental coordination and reporting, the City maintains a 24-hour hotline (**209-937-8341**) as an avenue for public reporting of problems at construction sites. All reports are recorded and responded to, as appropriate.

All construction sites greater than or equal to one (1) acre are inspected once per month (at a minimum) during the wet season and one time during the dry season until a notice of termination for coverage under the General Construction Permit is issued by the Regional Water Board.

Additional inspections are conducted as time allows or as follow-up when problems were detected in previous inspections. The inspection program ensures that the following minimum requirements are effectively implemented at construction sites:

- Sediments generated on the project site are retained using adequate source control BMPs;

- Construction-related materials, wastes, spills, or residues are retained at the project site to avoid discharges to streets, drainage facilities, receiving waters, or adjacent properties by wind or runoff;
- Non-stormwater runoff from equipment and vehicle washing and any other activity is contained at the project site; and
- Erosion from slopes and channels are controlled by implementing an effective combination of BMPs.

The MUD – Stormwater Management Program’s current construction site inspection checklist (see **Appendix F-2**) includes key fields recommended by the Regional Water Board, as well as an area for general notes. Inspection checklist fields include:

- SWPPP
- Wind & Soil Erosion/Sediment Control
- Vehicle/Equipment
- Waste Management/Tracking Controls
- Spill Control
- Other
- Deficiencies and Corrective Actions
- Specific checklist for Erosion & Sediment Control BMPs
- Specific checklist for Non-Stormwater Management Material BMPs

During the first field visit, the inspector verifies that SWPPPs are on-site and being implemented. BMP implementation is assessed at each site. If any problems are identified, the current practice is to identify the sources and conduct a comparison of on-site conditions with SWPPPs or grading plans. The MUD – Stormwater Management Program maintains a database for tracking stormwater construction inspections (see CO3).

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Review/revise Stormwater Construction Site Inspection Form as needed
- Evaluate options for a rating system for construction site compliance. The rating system may provide a way to provide consistency for the inspection program and clearly communicate the overall results. For example, a simplified rating system of A-D could be employed.
- Inspect construction sites  $\geq 1$  acre monthly during the wet season and one time during the dry season

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see CO8). The data and information to be collected may include, but will not be limited to, the following:

- Number of active construction sites of size greater than or equal to 1 acre
- Number of regular inspections conducted by MUD – Stormwater Management Program’s inspector *at each active construction site*
  - Regular inspections: Number of construction sites adequately implementing and maintaining BMPs
- Number of follow-up inspections conducted *at each active construction site*
  - Follow-up inspections: Number of construction sites adequately implementing and maintaining BMPs

## RESPONSIBILITY

The MUD – Stormwater Management Program is primarily responsible for this Control Measure.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
CO5 – Construction Site Inspections & BMP Implementation																												
Review/revise Stormwater Construction Site Inspection Form as needed	E										X											P						
Evaluate options for a rating system for construction site compliance	N										X											P						
Inspect construction sites ≥ 1 acre monthly during the wet season and one time during the dry season	C																					P						


Notes:

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## CO6 – Enforcement

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### DESCRIPTION

The Enforcement Control Measure outlines the progressive levels of enforcement applied to construction sites that are out of compliance with local ordinances and establishes the protocol for referring apparent violations of construction sites subject to the General Construction Permit to the Regional Water Board. The progressive enforcement and referral policy, as well as the accompanying legal authority to execute it, is an important tool for providing a fair and equitable approach to bringing contractors and developers into compliance with the City's municipal code requirements. Enforcement actions range from issuance of verbal warnings to stop work orders. Legal action may also be taken. For repeat offenders or contractors that have not filed appropriate applications, the referral policy includes notification to the Regional Board.

### EXISTING BMPS AND RELATED ACTIVITIES

City inspectors currently have the legal authority, under the Stormwater Management and Discharge Control Ordinance (PC §§ 7-800—7-858.2)<sup>3</sup>, to issue administrative complaints (Notice of Violation, or NOV) and, if necessary, to pursue civil actions, criminal actions, and criminal penalties, including arrests and issuance of citations. The Regional Board is routinely mailed copies of NOVs.

The City has developed a *Municipal Utilities Department Directive Prohibiting Non-Stormwater Discharges to the Storm Drainage System* (MUD Directive) for Construction Activities, Commercial/Industrial Businesses, Residential Activities, and Special Events (see **Appendix B-5**). The MUD Directive<sup>4</sup> identifies the steps that should be taken when citing violators of ordinances, allows for Citywide consistency in the enforcement of the local ordinances, and provides a mechanism for cost recovery. The progressively severe corrective actions involve verbal warnings followed by written warnings and legal action, if necessary. Illicit discharges by industrial or commercial facilities or construction sites are addressed in a formal manner through issuance of notices of violations, citations, or notices and orders (Cease and Desist) depending upon the compliance history of the facility. Corrective actions are taken in every instance where a responsible party is identified.

The types of enforcement actions that may be taken include the following:

- Administrative Remedies
  - Verbal Warning
  - Notice of Violation
  - Cease and Desist Order
  - Stop Work Order
- Legal Action
  - Administrative Citation

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<sup>3</sup> Re-codification of the Stockton Municipal Code is underway as of April 2009. The relevant ordinances are available on the City of Stockton's website, <http://www.stocktongov.com>.

<sup>4</sup> The City had planned to develop an Enforcement Consistency Guide (ECG); however, the MUD Directive and the Investigative Guidance Manual being developed (see ID3) together will adequately address consistency in the enforcement of the local ordinances and will provide standard guidelines and protocols for identifying, documenting, responding to, and enforcing violations.

- Fine
- Other

The City generally refers construction site violations to the Regional Board under two circumstances:

- If three *significant violations* have occurred; and
- If it is determined that a site should obtain coverage under the General Construction Permit (*potential non-filers*)

If a construction site has received its third notice for a significant violation of the City's Stormwater Management and Discharge Control Ordinance<sup>5</sup> within a 12-month period, the City notifies the Regional Board. The construction site referral is made in writing within 30 days of the inspection that led to the third notice. It should be noted that some referrals may vary from this schedule due to the nature of the violation and the type of response involved (i.e., an egregious violation would result in immediate notification of the Regional Board).

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Implement revised progressive enforcement policy (MUD Directive)
- Track enforcement actions using the construction database
- Review and modify, as necessary, the procedures for informing the Regional Board of violations at construction sites subject to the General Construction Permit. Referral to the Regional Board is appropriate concurrently (within 30 days) with issuance of a third citation, or immediately if violation is egregious.

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see CO8). The data and information to be collected may include, but will not be limited to, the following:

- Total number and type of violations that occur *at each active construction site*
- Number and types of enforcement actions taken *at each active construction site*
- Number of construction sites referred to the Regional Water Board as significant violators or non-filers
- Number of repeat offenders (sites) identified and actions taken

## RESPONSIBILITY

The MUD – Stormwater Management Program is primarily responsible for this Control Measure, with support from the City Attorney.

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<sup>5</sup> Re-codification of the Stockton Municipal Code is underway as of April 2009. The relevant ordinances are available on the City of Stockton's website, <http://www.stocktongov.com>.

## Implementation Schedule


Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
CO6 –Enforcement																												
Implement revised progressive enforcement policy (MUD Directive)	C																					P						S
Track enforcement actions using the construction database	C																					P						
Review and modify, as necessary, the procedures for informing the Regional Board of violations	E										X											P						S

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

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## CO7 – Training

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### DESCRIPTION

Training is important for the implementation of the Construction Program Element. An effective training program is one of the best pollution prevention BMPs that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

The City has reviewed and revised their Training Strategy. The updated Training Strategy is attached as **Appendix B-6**.

The objectives of the training program are to:

- Increase the general awareness and understanding of the SWMP and Construction program;
- Increase the awareness and understanding of the Construction control measures and performance standards;
- Create a training program to increase awareness and understanding and prompt the behavioral changes needed to protect and improve water quality; and
- Conduct training for employees responsible for the Construction Program Element (i.e., inventory, inspection, BMP implementation, and enforcement).

The Construction Training Modules will include the following:

- **Inspecting Construction Site BMPs** – Provides information on inspection frequency, minimum inspection requirements, enforcement, reporting, dry season requirements, specific BMP installation information, and maintenance of BMPs.
- **Grading Plan Review** – Provides an overview of the construction program (both municipal and state), the BMPs required, and what should be considered during the plan review process.

Specific areas of focus for the training efforts for the Construction Program Element are summarized in **Table 6-2**.

**Table 6-2. Construction Program Element Training**

<b>Audience</b>	<b>Format</b>	<b>Subject Material</b>	<b>Comments</b>
<ul style="list-style-type: none"> <li>• Stormwater construction inspectors</li> <li>• Building inspectors</li> <li>• Grading permit inspectors</li> <li>• Developers</li> <li>• Builders</li> <li>• Contractors</li> </ul>	<ul style="list-style-type: none"> <li>• Classroom</li> <li>• Field demos</li> </ul>	<ul style="list-style-type: none"> <li>• Overview of stormwater management</li> <li>• Stormwater impacts of land development</li> <li>• Stormwater ordinance and enforcement policy</li> <li>• Construction stormwater inspection training</li> <li>• BMPs for construction activities</li> <li>• Tracking database</li> </ul>	<ul style="list-style-type: none"> <li>• Training seminars or workshops related to Construction may be made available by other organizations</li> </ul>
Grading plan and SWPPP reviewers	<ul style="list-style-type: none"> <li>• Classroom</li> <li>• Field demos</li> </ul>	<ul style="list-style-type: none"> <li>• Overview of stormwater management</li> <li>• BMPs for construction activities</li> <li>• SWPPP requirements</li> <li>• Tracking database</li> </ul>	<ul style="list-style-type: none"> <li>• Training seminars or workshops related to Construction may be made available by other organizations</li> </ul>

## EXISTING BMPS AND RELATED ACTIVITIES

To ensure that the various Department and Division personnel understand their roles and responsibilities under the SWMP, the City provided a classroom training module for key staff responsible for the Construction Program Element. By having responsible Department and Division staff attend the training modules, the City is able to effectively implement the SWMP.

## PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Conduct training for key staff involved in the Construction program (see **Table 6-2**)
  - Inspecting Construction Site BMPs
  - Grading Plan Review

## ASSESSMENT DATA AND INFORMATION

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see CO8). The data and information to be collected may include, but will not be limited to, the following:

- Number and types of training sessions held
- Number of attendees at each session and the Division/Department that they work for
- Results of pre- and post-training surveys

## RESPONSIBILITY

The MUD – Stormwater Management Program has primary responsibility for Construction program training.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																		Responsibility <sup>3</sup>								
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
CO7 – Training																												
Conduct Inspecting Construction Site BMPs training	C									X				X				X				P						
Conduct Grading Plan Review training	C											X								X	P							

### Notes:

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## CO8 – Effectiveness Assessment

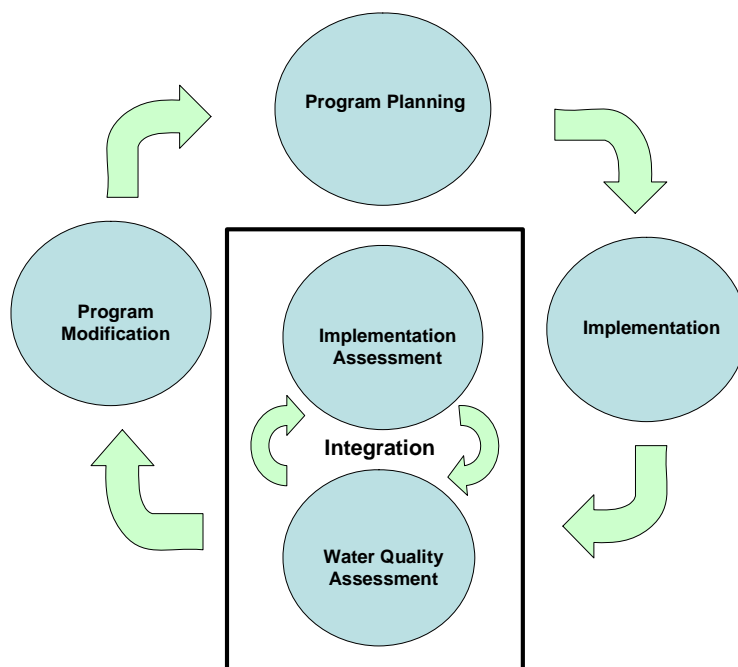
### DESCRIPTION

Effectiveness assessment is a fundamental and necessary component for developing and implementing successful stormwater programs. A well-executed assessment can provide the feedback necessary to determine whether the programs are achieving intended outcomes and, ultimately, whether continued implementation will result in maintaining or improving water quality.<sup>6</sup>

#### Effectiveness Assessment

The process that is used to evaluate if programs are resulting in desired outcomes.

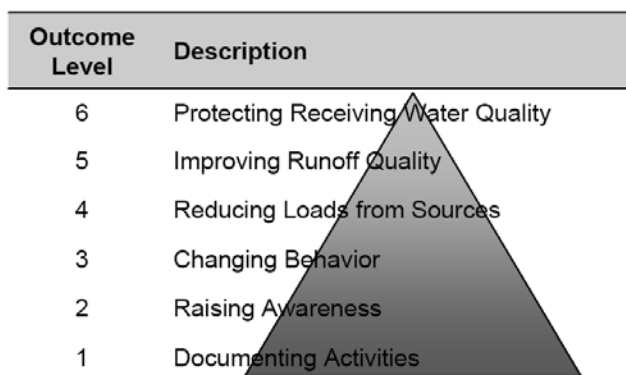
Effectiveness assessments are an integral part of the iterative process, which is the foundation for the stormwater program. By utilizing the iterative process and conducting effectiveness assessments, program managers can use the information gained to adapt their programs and ensure that the resources expended are providing commensurate benefit and are protective of water quality. The iterative process is illustrated in **Figure 6-1**; the points at which effectiveness assessments (implementation and water quality) are conducted are also identified.



**Figure 6-1. Iterative Process and Effectiveness Assessments Outcome Levels**

<sup>6</sup> California Stormwater Quality Association (CASQA), Municipal Stormwater Program Effectiveness Assessment Guidance, March 2007.

Outcome levels help to categorize and describe the desired results of the Program Elements and related Control Measures. Pursuant to the 2007 CASQA guidance, outcomes for stormwater programs have been categorized into six levels, as shown in **Figure 6-2**.



**Figure 6-2. Effectiveness Assessment Outcome Levels**

The outcome levels identify the key areas that are evaluated for the program effectiveness assessment within the Annual Report. The primary questions that should be assessed for each Program Element or Control Measure include the following:

- Level 1 Outcome – Was the Program Element/Control Measure implemented in accordance with the Permit Provisions, SWMP Control Measures, and Performance Standards?
- Level 2 Outcome – Did the Program Element/Control Measure raise the target audience's awareness of an issue?
- Level 3 Outcome – Did the Program Element/Control Measure change a target audience's behavior, resulting in the implementation of recommended BMPs?
- Level 4 Outcome – Did the Program Element/Control Measure reduce the load of pollutants from the sources to the storm drain system?

As a part of the annual reporting process, effectiveness assessments will be conducted for the Construction Program and related Control Measures to determine their effectiveness and identify any necessary modifications. Although the effectiveness assessment may change from year to year as new information is learned, the assessment will initially focus on Outcome Levels 1-4 and may include, but not be limited to, the approach outlined in **Table 6-3**. Level 5 and 6 outcomes will be assessed, to the extent possible, as a part of the water quality based programs and water monitoring program (SWMP Sections 8 and 9).

The effectiveness assessment conducted as a part of each annual report will address the following:

- Purpose or focus of the assessment – The outcome level(s) being assessed as well as the related management questions will be summarized. Where applicable, the identified goals that have or will be established for the program/activity will also be summarized.
- Baseline conditions – A baseline is a defined point or metric by which effectiveness can be measured or compared. Baselines are linked to a particular point in time and are particularly important for measuring change over time. Where feasible, the baselines that have or will be established for the program/activity will be summarized.

- Assessment methods – The assessment methods (those activities, actions, or processes used to obtain and evaluate assessment data or information) will be summarized.
- Using the information – The improvements that have been identified for the program element will be summarized.

**Table 6-3. Assessment Tasks for Construction Program Element**

<b>CO1 – Municipal Code for Construction Sites</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Reviewed and modified, as necessary, the Grading and Erosion Control Ordinance and the Standard Specifications</li> </ul>
<b>CO2 – Plan Review and Approval Process</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Review grading and building permit applications for SWPPP requirements.</li> <li>• Review/revise the permit review procedure handout as needed</li> <li>• Evaluate need for Construction Small Site Stormwater Management Plan</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Compare # erosion and sediment control plans reviewed vs. # requiring revisions</li> <li>• % plans year to year incorporating controls and not requiring revisions</li> <li>• Compare # applications requiring NOIs and SWPPPs to the # applications submitting NOIs and SWPPPs</li> <li>• % sites year to year submitting NOIs and SWPPPs</li> </ul>
<b>CO3 – Construction Projects Inventory</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Maintain and update the Construction Project Database</li> <li>• Identify # sites in inventory and # subject to General Permit and local erosion and sediment controls</li> </ul>

**Table 6-3. Assessment Tasks for Construction Program Element (continued)**

<b>CO4 – Construction Outreach</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Distribute appropriate BMP fact sheets during inspections.</li> <li>• Conduct contractor tailgate meetings.</li> <li>• Invite developers, builders, and contractors to internal construction training to be held three times during the Permit term</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• % increase in awareness before and after the training</li> <li>• % awareness from year to year</li> </ul>
<b>CO5 – Construction Site Inspections &amp; BMP Implementation</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Review/revise Stormwater Construction Site Inspection Form as needed</li> <li>• Evaluate options for a rating system for construction site compliance</li> <li>• Inspect construction sites &gt; 1 acre monthly during the wet season and one time during the dry season</li> </ul> <p><b>Did the activity change a target audience’s behavior which results in implementation of recommended BMPs (Level 3 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• # active construction sites</li> <li>• % sites adequately implementing BMPs</li> <li>• Compare follow-up inspection results to original inspection results</li> <li>• % sites originally not implementing or maintaining BMPs during first inspection vs. the sites that are implementing and maintaining BMPs after the follow-up inspection</li> </ul> <p><b>Did the program reduce the load of pollutants from the sources to the storm drain system (Level 4 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Use monitoring and inspection data, if available, to estimate load reductions and/or determine if additional controls are necessary</li> </ul>



**Table 6-3. Assessment Tasks for Construction Program Element (continued)**

<b>CO6 – Enforcement</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Implement progressive enforcement and referral policy</li> <li>• Track enforcement actions using the construction database</li> <li>• Develop an Enforcement Consistency Guide for inspectors</li> <li>• Review and modify, as necessary, the procedures for informing the Regional Board of violations at construction sites subject to the General Construction Permit</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Identify # and types of enforcement actions taken at each active construction site</li> <li>• Identify % enforcement actions and major vs. minor, year to year</li> <li>• Identify # referrals made to Board and repeat offenders/problem areas identified</li> </ul>
<b>CO7 – Training</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Conduct training for key staff involved in the Construction program</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• % increase in awareness before and after the training</li> <li>• % awareness from year to year</li> </ul>

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
CO8 – Effectiveness Assessment																												
Revise effectiveness assessment strategy as needed	N									X				X				X				P						
Conduct effectiveness assessment on an annual basis	E					X				X				X				X				P	S		S	S		
Identify program modifications as a result of the assessment	C					X				X				X				X				P	S		S	S		
Review effectiveness assessments and identify goals, baselines, and trends.	N									X				X				X				P	S		S	S		

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter. ☐ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

# Section 7

## Planning and Land Development (LD)

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### OVERVIEW

The addition of impervious areas for homes, industrial and commercial businesses, parking lots, and streets and roads increases the amount of stormwater runoff, as well as the potential for pollution. The Planning and Land Development Program Element ensures that the impacts on stormwater quality from new development and redevelopment are limited through implementation of General Site Design Control Measures, Site-Specific Source Control Measures, and Treatment Control Measures. The general strategy for development is to avoid, minimize, and mitigate (in that order) the potential adverse impacts to stormwater. The potential for long-term stormwater impacts from development is also reduced by requiring ongoing operation and maintenance of post-construction treatment controls selected for a site.

### OBJECTIVES

The objectives address key components of the Planning and Land Development Program and identify that, in order to be effective, the program must:

- Incorporate water quality and watershed protection principles into the City's policies and planning procedures.
- Ensure that selected post-construction stormwater controls will remain effective upon project completion by requiring a maintenance agreement and transfer or establishing a maintenance district zone for all priority development projects.
- Provide a comprehensive review of development plans to ensure that stormwater quality controls are properly selected to minimize stormwater quality impacts.
- Provide training for employees who are responsible for Planning and Land Development activities about general stormwater issues, plan review, development standards (SWQCCP), and relevant sections of the SWMP.
- Conduct an assessment as part of the annual reporting process to determine the effectiveness of the Planning and Land Development Program Element and identify any necessary modifications.

### CONTROL MEASURES

The six Control Measures outlined in **Table 7-1** and discussed in more depth in the accompanying Fact Sheets were designed to address the program objectives. In developing the Control Measures, several key factors were considered:

- Each Control Measure must address one or more of the program objectives.
- Each Control Measure must clearly identify the performance standards, timeframe for completion, and responsible Department/Division to ensure that there is accountability built into the program.
- The data and information from the previous permit term and/or reporting period must be analyzed to determine the effectiveness of each Control Measure, and the iterative process must be used to ensure that each Control Measure is effective and has a commensurate benefit for the resources expended.
- Each Control Measure must actively identify enhancements/modifications that would improve the Program Element and overall effectiveness of the stormwater program.

**Table 7-1. Control Measures for the Planning and Land Development Program Element**

LD	Control Measure
LD1	Incorporation of Water Quality Protection Principles into City Procedures and Policies
LD2	New Development Standards
LD3	Plan Review Sign-Off
LD4	Maintenance Agreement and Transfer
LD5	Training
LD6	Effectiveness Assessment

The Control Measure Fact Sheets developed for the Planning and Land Development Program Element (LD1-LD6) address the program objectives and identify assessment tools that may be used to assess the effectiveness of the program. The Fact Sheets were developed as stand-alone documents so that they may be individually provided to the responsible Department(s)/Division(s).

### Supporting Control Measures

While individual, program-specific Control Measures are the primary focus of each program, it is also important to understand how the program fits within the overall SWMP. In order to adequately cover all aspects of the Planning and Land Development Program, overlap between other programs in the SWMP is often necessary. A brief summary of the Program Elements that support the Planning and Land Development Program Element is provided below.

Supporting Control Measures	Program Element
---	Illicit Discharges
---	Public Outreach
---	Municipal Operations
---	Industrial/Commercial
X	Construction
---	<b>Planning and Land Development</b>

- Construction (Section 6)
  - *Construction Outreach* – Although the emphasis of the Development Standards in the SWQCCP is on post-construction BMPs, these control measures are considered during the planning process and generally included or installed during construction. During regular inspections of construction sites, inspectors can ensure that the site design control measures, site-specific source control measures, and treatment control measures included in the project plans are being properly constructed and/or installed.

# LD1 – Incorporation of Water Quality Protection Principles into City Procedures and Policies

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## DESCRIPTION

Traditional methods of land development tend to increase stormwater discharge volumes and flow velocities. These alterations to the natural hydrologic regime may lead to increased erosion and flooding and decreased habitat integrity. Water quality and watershed protection principles and policies such as minimization of impervious areas, pollutant source controls, preservation of natural areas, and peak runoff controls can help to minimize the impacts of urban development on the local hydrology and aquatic environment. Integration of stormwater quality and watershed principles into the City's General Plan will serve as the basis for directing future planning and development in order to minimize these adverse effects. In addition, the CEQA process provides for consideration of water quality impacts and appropriate mitigation measures.

## EXISTING BMPs AND RELATED ACTIVITIES

The City's policies, goals, and objectives for new development are established in the *Stockton General Plan 2035*, adopted in December 2007.<sup>1</sup> These policies address how the City should direct development efforts, with consideration for social, economic, and environmental impacts. The *Stockton General Plan 2035* includes the *Goals & Policies Report*, which refers generally to stormwater quality and watershed protection principles and implementation measures within its Section 9.4 (**Appendix G-1**). The *Stockton General Plan 2035* and the SWQCCP serve as the basis for directing future planning and development in order to minimize the negative impacts of urban development on the aquatic environment. The 2009 SWQCCP was revised to reflect water quality planning and design principles.

The City's Stormwater Management and Discharge Control Ordinance No. 010-97 (Chapter 7, Part VIII, Section 7-859) serves as the enforcement mechanism to ensure new development and redevelopment projects comply with the General Plan and City policies, including the SWQCCP requirements for post-construction BMPs.

The CEQA review process is necessary for determining what impacts a proposed development project could have on the environment. The City's current CEQA review process includes procedures for considering potential stormwater quality impacts and providing for appropriate mitigation. The Stormwater Management Division reviews all CEQA documents, responding to checklist items under the Hydrology and Water Quality section.

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<sup>1</sup> Available at: <http://www.stocktongov.com/CD/2035GeneralPlan/index.cfm>

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Review and revise CEQA review documents as needed for consistency with p. 53 of the Permit. The CEQA review process shall require consideration of the following:
  - Potential impact of project construction on stormwater runoff;
  - Potential impact of project post-construction activity on stormwater runoff;
  - Potential for discharge of stormwater from areas from material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas;
  - Potential for discharge of stormwater to impair the beneficial uses of the receiving waters or areas that provide water quality benefit;
  - Potential for the discharge of stormwater to cause significant harm on the biological integrity of the waterways and water bodies;
  - Potential for significant changes in the flow velocity or volume of stormwater runoff that can cause environmental harm; and
  - Potential for significant increases in erosion of the project site or surrounding areas.
- Revise municipal code for enforcing standards as needed

## **RESPONSIBILITY**

MUD – Engineering, Community Development, and Public Works share primary responsibility for this Control Measure, with support from the MUD –Stormwater Management Program and the City Attorney.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																		Responsibility <sup>3</sup>								
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
LD1 – Incorporation of Water Quality Protection Principles into City Procedures and Policies																												
Review and revise CEQA review documents as needed	C																					S	P		P	S		S
Revise municipal code for enforcing standards as needed	C																					S	P		S	P		S

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

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## LD2 – New Development Standards

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### DESCRIPTION

Post-construction BMPs, including those for site design, source control, and treatment, are necessary for development and redevelopment projects in order to mitigate potential water quality impacts. In addition, priority projects identified within the Permit require specific mitigation measures. In order to assist developers in meeting these requirements, the City developed a guidance manual for stormwater quality control measures for new development and redevelopment, the SWQCCP.

### EXISTING BMPS AND RELATED ACTIVITIES

The City of Stockton and the County of San Joaquin updated the 2005 SWQCCP to reflect new permit requirements with a special emphasis on the implementation of low impact development (LID) strategies. The 2009 SWQCCP revisions encompass guidelines and provide recommendations encouraging the use of LID/ hydromodification strategies for the development community in the Stockton Urbanized Area by March 31, 2009. The City requested and received an extension of the due date for submission of the revised SWQCCP from December 6, 2008 to March 31, 2009. The revised version of the SWQCCP was submitted to the Regional Board on March 31, 2009 and complies with the Permit requirements for updating the SWQCCP. Stakeholder participation and input was solicited through a three stakeholder meetings and three rounds of public comment. The SWQCCP was made available to stakeholders through the City website and can be downloaded at:

[www.stocktongov.com/MUD/General/stormwater/SQCCP.cfm](http://www.stocktongov.com/MUD/General/stormwater/SQCCP.cfm). A summary of modifications made to the SWQCCP is provided below:

- Added language explaining the objectives of LID strategies.
- Created a Volume Reduction Requirement to provide a measureable criterion for achievement of LID. The Volume Reduction Requirement:
  - Is defined as the post-project runoff volume minus the pre-project runoff volume for the 0.51” rainfall event (~85<sup>th</sup> percentile, 24 hour storm depth).
  - Applies to all Priority New Development Projects.
  - Significant Redevelopment Projects also adhere to the Volume Reduction Requirement with reduction incentives built in. A reduction of 0.05” may be applied to any of the following types of redevelopment: significant redevelopment, brownfield redevelopment, high density, vertical density, mixed use and transit oriented development.
  - Must be met through the application of Volume Reduction Measures and LID Treatment Controls.
  - Encourages the use of multiple BMPs.
- Added Volume Reduction Measures (i.e., non-structural BMPs such as rain gardens and rain barrels).
- Classified Treatment Controls as either LID Treatment Controls (BMPs that have the ability to reduce stormwater volume) and Conventional Treatment Controls.
- Added LID Treatment Controls (e.g., bioretention and tree-well filters).
- Required that projects that cannot fully meet the Volume Reduction Requirement and are located in a watershed with a 303(d) listed waterbody must select Treatment Controls with a medium to high removal efficiency for the listed pollutant.



- Required the following priority projects to comply with the revised SWQCCP:
  - 1) **Significant redevelopment** - Significant redevelopment is defined as the creation or addition of at least 5,000 square feet of impervious surfaces on an already developed site. Significant redevelopment includes, but is not limited to, expansion of a building footprint or addition or replacement of a structure; structural development including an increase in gross floor area and/or exterior construction or remodeling; replacement of impervious surface that is not part of a routine maintenance activity; and land disturbing activities related with structural or impervious surfaces. Where significant redevelopment results in an increase of less than fifty percent of the impervious surfaces of a previously existing development, and the existing development was not subject to the Development Standards, the numeric sizing criteria discussed below applies only to the addition, and not the entire development.
  - 2) **Home subdivision of 10 housing units or more** – This category includes single-family homes, multi-family homes, condominiums, and apartments.
  - 3) **Commercial developments greater than or equal to 5,000 square feet** – This category is defined as any development on private land that is not for heavy industrial or residential uses, where the land area for development is greater than or equal to 5,000 square feet of impervious area (not including the parking lot, see separate parking lot requirement below). The category includes but is not limited to hospitals, laboratories and other medical facilities, educational institutions, recreational facilities, commercial retail nurseries, multi-apartment buildings, car wash facilities, mini-malls, and other business complexes, shopping malls, hotels, office buildings, public warehouses, and other industrial facilities.
  - 4) **Automotive repair shops** – This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539, where the total impervious area for development is greater than or equal to 5,000 square feet.
  - 5) **Restaurants** – This category is defined as 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 total impervious area for development is greater than or equal to 5,000 square feet.
  - 6) **Parking lots 5,000 square feet or more or with 25 or more parking spaces and potentially exposed to urban runoff** – Parking lot is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.
  - 7) **Street and roads** – This category includes any paved surface equal to or greater than one acre of impervious area used for the transportation of automobiles, trucks, motorcycles, and other vehicles.
  - 8) **Retail Gasoline Outlets** – An RGO is defined as any facility engaged in selling gasoline with 5,000 square feet or more of impervious surface area.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Require priority projects to implement the 2009 SWQCCP
- Review local development standards for compatibility with the 2009 SWQCCP

## **RESPONSIBILITY**

The MUD – Stormwater Management Program, MUD – Engineering, and Community Development share primary responsibility for performance standards under this Control Measure, with support from Public Works.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
LD2 – New Development Standards																													
Require priority projects to comply with the revised SWQCCP	E																						P	P		P	S		
Review local development standards for compatibility with the 2009 SWQCCP	E																						P	P		P	S		

Notes:

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2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

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## LD3 – Plan Review Sign-Off

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### DESCRIPTION

Stormwater quality controls should be considered throughout the development plan review and approval process. Comprehensive review by the City of development plans must be provided in order to ensure that stormwater controls minimize stormwater quality impacts.

### EXISTING BMPS AND RELATED ACTIVITIES

The City's Development Review Committee (DRC), which is made up of representatives from various City departments, primarily reviews and approves larger projects and sub-divisions and ensures that the erosion control, SWPPP requirements, and post-construction controls are identified and included on the tentative map. A MUD representative is on the DRC to ensure that post-construction stormwater quality controls are addressed and included during the planning of new development projects. If there are any issues identified by the DRC, they are resolved with the developer prior to project approval.

Projects that are subject to the requirements of the Stormwater Quality Control Criteria Plan (SWQCCP) are required to submit a Project Stormwater Quality Control Plan (SWQCP) that adequately demonstrates that the proposed new development or redevelopment project will conform to all requirements of the SWQCCP. The SWQCP must be approved by the City of Stockton Department of Municipal Utilities before building permits or use permits will be issued for the project. The SWQCP must be submitted in addition to the SWPPP required for all construction projects. The City's SWQCP review process is illustrated in **Figure 7-1**.

### PERFORMANCE STANDARDS

The performance standards listed below establish the level of effort required for this Control Measure.

- Review and revise the Post-Construction Plan Review Checklist to be in conformance with the 2009 SWQCCP (see **Appendix G-2** for current version of the Post-Construction Plan Review Checklist)
- Revise Post-Construction Plan Review Checklist as needed
- Use Post-Construction Plan Review Checklist
- Participate on the DRC (MUD staff)
- Review project plans and grading plans for stormwater BMPs
- Explore options for a GIS or other electronic system for tracking projects with post-construction treatment control BMPs
- Implement a GIS or other electronic system for tracking projects that have been conditioned for post-construction treatment control BMPs. The electronic system, at a minimum, should contain the following information:
  - Municipal Project ID
  - State WDID No.
  - Project Acreage
  - BMP Type and Description
  - BMP Location (coordinates)

- Date of Acceptance
- Date of O&M Certification
- Inspection Date and Summary
- Corrective Action
- Date Certificate of Occupancy Issued
- Conduct inspections of completed priority projects to ensure that all approved control measures have been implemented and are being maintained

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see LD6). The following data and information should be collected:

- # priority development projects approved
- # acres covered by approved priority development projects
- # and type of post-construction BMPs approved for priority development projects
- # and type of post-construction BMPs implemented and maintained by priority development projects
- # and type of proprietary control measures approved for priority development projects
- # and type of proprietary control measures implemented and maintained by priority development projects
- # priority development projects draining to regional treatment facility

## **RESPONSIBILITY**

MUD – Engineering is primarily responsible for this Control Measure, with support from MUD – Stormwater Management Program, Community Development, and Public Works

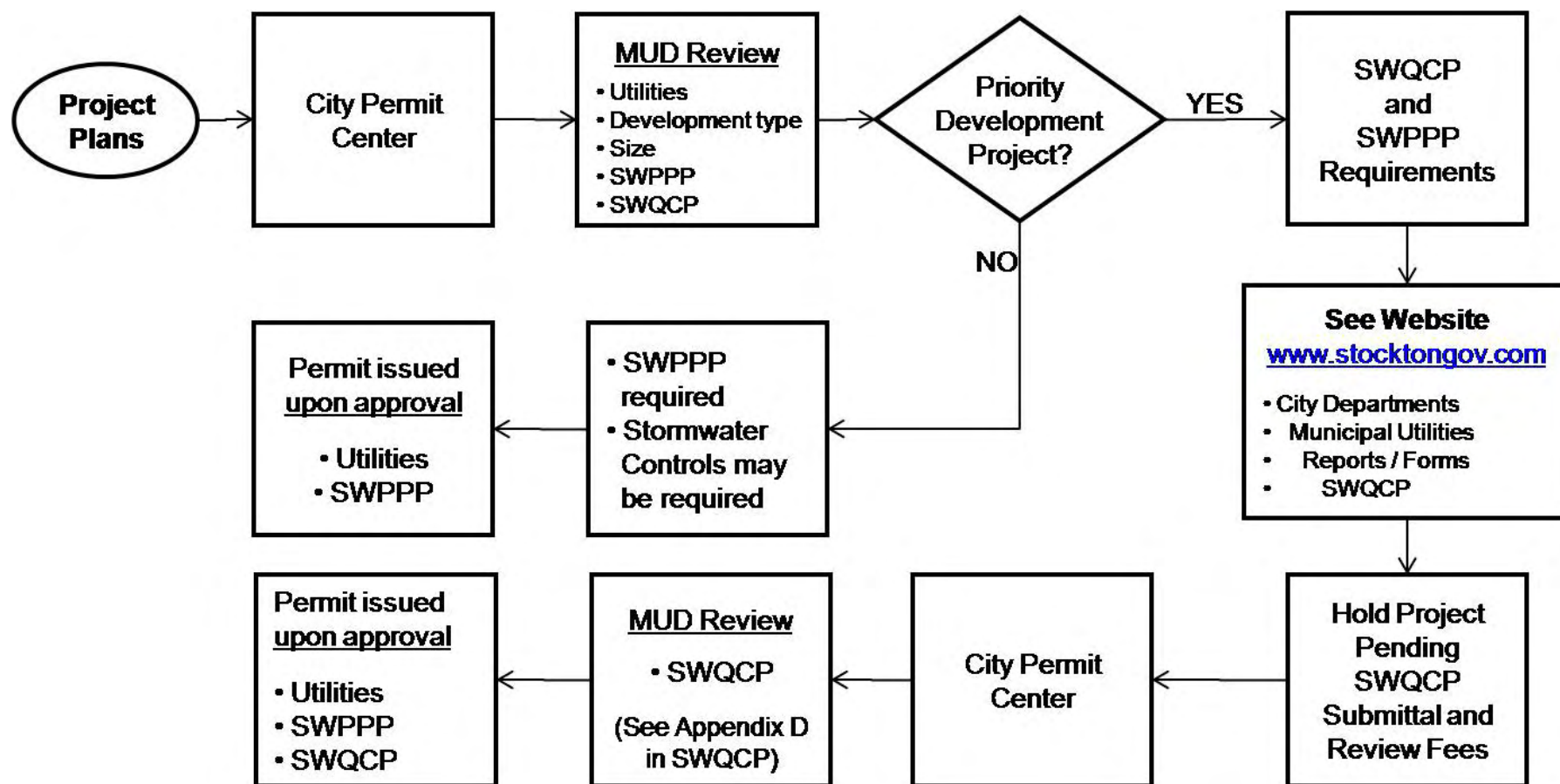


Figure 7-1. City of Stockton Stormwater Quality Control Plan (SWQCP) Review Process Flowchart

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
LD3 – Plan Review Sign-off																													
Review and revise Post-Construction Plan Review Checklist to be in conformance with the 2009 SWQCCP	E										X												S	P		S	S		
Revise Post-Construction Plan Review Checklist as needed	C																						S	P		S	S		
Use Post-Construction Plan Review Checklist	C																						S	P		S	S		
Participate on the DRC (MUD staff)	C																						S	P		S	S		
Review project plans and grading plans for stormwater BMPs	C																						S	P		S	S		
Explore options for a GIS or other electronic system for tracking projects with post-construction treatment control BMPs	N										X												S	P		S	S		
Implement a GIS or other electronic system for tracking projects with post-construction treatment control BMPs	N																						S	P		S	S		
Conduct inspections of completed priority projects to ensure that all approved control measures have been implemented and are being maintained	N																						S	P		S	S		

Notes:

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## LD4 – Maintenance Agreement and Transfer

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### **DESCRIPTION**

Maintenance agreement and transfers ensure that selected post-construction stormwater control measures will remain effective upon project completion. As a condition of approval for all priority development projects, the City requires the owner/developer/successor-in-interest (ODS) of stormwater control measures to provide proof of control measure maintenance in the form of a Stormwater Treatment Device Access and Maintenance Agreement and a Maintenance Plan. Alternatively, a maintenance district zone may be established by the City.

### **EXISTING BMPS AND RELATED ACTIVITIES**

The City integrated the development/submittal of a stormwater maintenance agreement as a condition within the project approval process for priority projects. To enforce the requirements of post-construction BMPs, a Maintenance Agreement is required to be executed between the City and the ODS for any private facilities who remain the responsible party in operating and maintaining the post-construction treatment control measures. However, when the project is a residential subdivision project and is annexed to the City, the Stockton Consolidated Storm Drainage Maintenance Assessment District No. 2005-1, established on July 26, 2005, is responsible for operation and maintenance of all post-construction treatment control measures built within each subdivision zone. Funding to provide O&M services will be provided through an annual tax roll levied upon the ODS of the property in the subject district.

The SWQCCP addresses the City's Development Standards (see LD2) as well as the need for the development and submittal of Maintenance Agreements when a developer is responsible for ongoing maintenance of on-site treatment BMPs.

The City maintains oversight and tracking of post-construction BMPs as follows:

When a developer submits a Stormwater Quality Control Criteria Plan for review it identifies if the property owner will retain possession of the selected BMP and full responsibility of its maintenance in which case a maintenance agreement with the City will be executed and recorded against the title of the property. Letters will be mailed each year to property owners reminding them of their inspection and maintenance responsibilities prior to the start of the rainy season. They will be required to retain and provide records of any inspection and servicing on the improvement to be made available upon request or site visit by City staff. Staff is presently working on a legal "self-certification" letter that they can submit annually if they inspect, clean and maintain the improvement themselves. If upon site inspection by City staff the improvement does not appear to be properly operating, City can have the improvement serviced and invoice the property owner for reimbursement. All post construction permanent stormwater treatment control devices and/or basins are tracked on a draft spreadsheet, which includes fields for location, owner, type/size of unit, project runoff acreage, and operation and maintenance contact name and phone number.

If the BMP will be transferred to the City for maintenance, the ownership title is transferred and the assessment district establishment process is completed before final inspections are completed and construction permits are closed. As new stormwater quality treatment improvements are installed/developed, a separate new zone is established and annexed to the Stockton Consolidated Storm Drainage Maintenance Assessment District No. 2005-1 to collect annual funds for its inspection, operation and maintenance. An inventory is maintained of all improvements maintained by this assessment district.

Private property owners are responsible for maintaining BMPs for approved for non-priority projects. All permanent stormwater treatment control devices and/or basins have either signed maintenance agreements



in effect or mechanisms (tax assessment districts) established to collect the funds that are needed for on-going maintenance.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Require Stormwater Treatment Device Access and Maintenance Agreement as part of project approval process
- Finalize and populate post-construction BMP tracking spreadsheet
- Finalize and implement Post Construction BMP Maintenance Oversight Protocols

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see LD6). The following data and information should be collected:

- # maintenance agreements executed; will differentiate between City maintained BMPs and publically maintained BMPs

## **RESPONSIBILITY**

The MUD – Stormwater Management Program is primarily responsible for this Control Measure, with support from MUD – Engineering, Community Development and Public Works.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
LD4 – Maintenance Agreement and Transfer																												
Require Stormwater Treatment Device Access and Maintenance Agreement as part of project approval process	C																					P	S		S	S		
Finalize and populate post-construction BMP tracking spreadsheet	E									X												P	S					
Finalize Post-Construction BMP Maintenance Oversight Protocols	N									X												P	S		S	S		
Implement Post-Construction BMP Maintenance Oversight Protocols	N																					P	S		S	S		

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## LD5 – Training

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### DESCRIPTION

Training is important to the successful implementation of the Planning and Land Development Program Element. An effective training program is one of the best pollution prevention BMPs that can be implemented because it prompts behavioral changes that are fundamentally necessary to protect water quality.

The City has reviewed and revised their Training Strategy. The updated Training Strategy is attached as **Appendix B-6**.

The objectives of the training program are to:

- Increase the general awareness about the SWMP and Planning and Land Development program;
- Increase the awareness of the Planning and Land Development Control Measures and performance standards;
- Create a cohesive training program that will, based on the increased awareness, prompt the behavioral changes needed to protect and improve water quality; and
- Conduct training for employees who are responsible for the Planning and Land Development Program Element (i.e., plan review and approval, project tracking database).

The Planning and Land Development Training Modules will include the following:

- **Project Planning & Design** – Provides overview of the laws and regulations applicable to new development and significant redevelopment, the connection between the program and water quality, how to develop and review a plan for a high priority project, how to design and incorporate site design, source control, and treatment control BMPs into a project.
- **Project Inspection** – Provides an overview of the SWQCCP process and the inspections that must occur for high priority projects. Identifies the types of site design, source control and treatment control BMPs that may be incorporated into a project and what to inspect for.

Specific areas of focus for the training efforts for the Planning and Land Development Program Element are summarized in **Table 7-2**.

**Table 7-2. Planning and Land Development Program Element Training**

Audience	Format	Subject Material
<ul style="list-style-type: none"><li>• Plan Checkers</li><li>• Engineers</li><li>• Building and Construction Inspectors</li></ul>	<ul style="list-style-type: none"><li>• Classroom</li></ul>	<ul style="list-style-type: none"><li>• Overview of storm water management</li><li>• Stormwater Ordinance</li><li>• Enforcement policy</li><li>• SWQCCP and overview of post-construction control measures</li><li>• Project tracking database</li></ul>

## **EXISTING BMPS AND RELATED ACTIVITIES**

To ensure that the various Department and Division personnel understand their roles and responsibilities under the SWMP, the City provided a classroom training module for key staff responsible for the Planning and Land Development Program Element. By having responsible Department and Division staff attend the training modules, the City is able to effectively implement the SWMP.

In addition, the City has recognized the need to provide internal, hands-on training and improve interdepartmental communication. As a result, the City hosted a Design Charrette on February 17, 2009. City Redevelopment and Public Works staff attended the Design Charrette and reviewed the Volume Reduction Requirement in the context of the common site constraints they run into as staff on a day to day basis. Staff walked through the calculations associated with Volume Reduction Requirement using a case study development and discussed how different BMPs might be applied to the site and the advantages and disadvantages of each. Additionally, staff reviewed an actual City road widening project and discussed what the options would be to incorporate LID strategies given severe space constraints.

## **PERFORMANCE STANDARDS**

The performance standards listed below establish the level of effort required for this Control Measure.

- Conduct training for key staff involved in the Planning and Land Development program (see **Table 7-2**)
  - Project Planning & Design
  - Project Inspection

## **ASSESSMENT DATA AND INFORMATION**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments (see LD6). The following data and information should be collected:

- Number and types of training sessions held
- Number of attendees at each session and the Division/Department that they work for
- Results of pre- and post-training surveys

## **RESPONSIBILITY**

The MUD – Stormwater Management Program is primarily responsible for this Control Measure, with support from MUD – Engineering, Community Development and Public Works.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
LD5 – Training																												
Conduct Project Planning & Design training	C									X				X				X				P	S		S	S		
Conduct Project Inspection training	C											X				X				X	P	S		S	S			

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

☐ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

## LD6 – Effectiveness Assessment

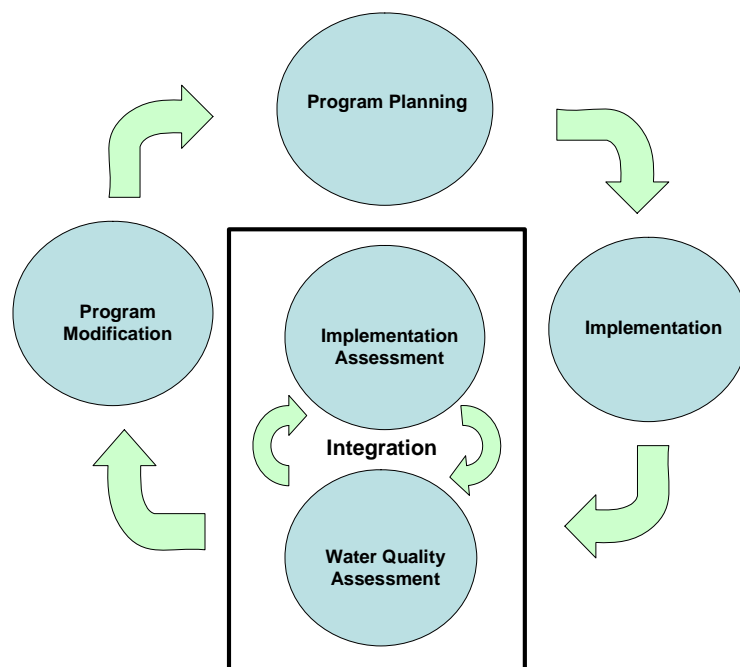
### DESCRIPTION

Effectiveness assessment is a fundamental and necessary component for developing and implementing successful stormwater programs. A well-executed assessment can provide the feedback necessary to determine whether the programs are achieving intended outcomes and, ultimately, whether continued implementation will result in maintaining or improving water quality.<sup>2</sup>

#### Effectiveness Assessment

The process that is used to evaluate if programs are resulting in desired outcomes.

Effectiveness assessments are an integral part of the iterative process, which is the foundation for the stormwater program. By utilizing the iterative process and conducting effectiveness assessments, program managers can use the information gained to adapt their programs and ensure that the resources expended are providing commensurate benefit and are protective of water quality. The iterative process is illustrated in **Figure 7-2**; the points at which effectiveness assessments (implementation and water quality) are conducted are also identified.



**Figure 7-2. Iterative Process and Effectiveness Assessments Outcome Levels**

Outcome levels help to categorize and describe the desired results of the Program Elements and related Control Measures. Pursuant to the 2007 CASQA guidance, outcomes for stormwater programs have been categorized into six levels, as shown in **Figure 7-3**.

<sup>2</sup> California Stormwater Quality Association (CASQA), Municipal Stormwater Program Effectiveness Assessment Guidance, March 2007.

Outcome Level	Description
6	Protecting Receiving Water Quality
5	Improving Runoff Quality
4	Reducing Loads from Sources
3	Changing Behavior
2	Raising Awareness
1	Documenting Activities

**Figure 7-3. Effectiveness Assessment Outcome Levels**

The outcome levels identify the key areas that are evaluated for the program effectiveness assessment within the Annual Report. The primary questions that should be assessed for each Program Element or Control Measure include the following:

- Level 1 Outcome – Was the Program Element/Control Measure implemented in accordance with the Permit Provisions, SWMP Control Measures, and Performance Standards?
- Level 2 Outcome – Did the Program Element/Control Measure raise the target audience's awareness of an issue?
- Level 3 Outcome – Did the Program Element/Control Measure change a target audience's behavior, resulting in the implementation of recommended BMPs?
- Level 4 Outcome – Did the Program Element/Control Measure reduce the load of pollutants from the sources to the storm drain system?

As a part of the annual reporting process, effectiveness assessments will be conducted for the Planning and Land Development Program and related Control Measures to determine their effectiveness and identify any necessary modifications. Although the effectiveness assessment may change from year to year as new information is learned, the assessment will initially focus on Outcome Levels 1-4 and will include the approach outlined in **Table 7-3**. Level 5 and 6 outcomes will be assessed, to the extent possible, as a part of the water quality based programs and water monitoring program (SWMP Sections 8 and 9).

The effectiveness assessment conducted as a part of each annual report will address the following:

- Purpose or focus of the assessment – The outcome level(s) being assessed as well as the related management questions will be summarized. Where applicable, the identified goals that have or will be established for the program/activity will also be summarized.
- Baseline conditions – A baseline is a defined point or metric by which effectiveness can be measured or compared. Baselines are linked to a particular point in time and are particularly important for measuring change over time. Where feasible, the baselines that have or will be established for the program/activity will be summarized.
- Assessment methods – The assessment methods (those activities, actions, or processes used to obtain and evaluate assessment data or information) will be summarized.
- Using the information – The improvements that have been identified for the program element will be summarized.

**Table 7-3. Assessment Tasks for Planning and Land Development Program Element**

<b>LD1 – Incorporation of Water Quality Protection Principles into City Procedures and Policies</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Reviewed &amp; revised CEQA review documents as needed</li> <li>• Revised municipal code for enforcing standards as needed</li> </ul>
<b>LD2 – New Development Standards</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Required priority project to implement the 2009 SWQCCP</li> <li>• Reviewed local development standards for compatibility with the 2009 SWQCCP</li> </ul>



**Table 7-3. Assessment Tasks for Planning and Land Development Program Element (continued)**

LD3 – Plan Review Sign-Off
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Review and revise the Post-Construction Plan Review Checklist to be in conformance with the 2009 SWQCCP</li> <li>• Revised Post-Construction Plan Review Checklist as needed</li> <li>• Used Post-Construction Plan Review Checklist</li> <li>• Participated on the DRC (MUD staff)</li> <li>• Reviewed project plans and grading plans for stormwater BMPs</li> <li>• Explored options for a GIS or other electronic system for tracking projects with post-construction treatment controls BMPs</li> <li>• Implemented a GIS or other electronic system for tracking projects that have been conditioned for post-construction treatment control BMPs</li> <li>• Conducted inspections of completed priority projects to ensure that all approved control measures have been implemented and are being maintained</li> </ul> <p><b>Did the activity raise the target audience’s awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• # priority projects approved, year to year</li> <li>• # acres covered by approved priority development projects, year to year</li> <li>• # and type of post-construction BMPs approved for priority development projects, year to year</li> <li>• # and type of proprietary control measures approved for priority development projects, year to year</li> <li>• # of priority development projects draining to a regional treatment facility</li> </ul> <p><b>Did the activity change a target audience’s behavior which results in implementation of recommended BMPs (Level 3 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• # and type of post-construction BMPs implemented and maintained by priority development projects, year to year</li> <li>• # and type of proprietary control measures implemented and maintained by priority development projects, year to year</li> </ul>

**Table 7-3. Assessment Tasks for Planning and Land Development Program Element (continued)**

<b>LD4 – Maintenance Agreement and Transfer</b>
<p><b>Was the activity implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Required Stormwater Treatment Device Access and Maintenance Agreement as part of project approval process</li> <li>• Finalized and populated post-construction BMP tracking spreadsheet</li> <li>• Finalized and Implemented Post-Construction BMP Maintenance Oversight Protocols</li> </ul> <p><b>Did the activity raise the target audience's awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• % of total priority development projects with maintenance agreements executed, year to year; will sub-divide into City maintained BMPs and publically maintained BMPs</li> </ul>
<b>LD5 – Training</b>
<p><b>Was the program implemented in accordance with the NPDES permit provisions, SWMP Control Measure, and performance standards (Level 1 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Conducted Project Planning and Design training</li> <li>• Conducted Project Inspection Training</li> </ul> <p><b>Did the activity raise the target audience's awareness of an issue (Level 2 Outcome)?</b></p> <ul style="list-style-type: none"> <li>• Number of training sessions held and number of participants at each session</li> <li>• Percent increased awareness before and after training sessions</li> </ul>

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
LD6 – Effectiveness Assessment																													
Revise effectiveness assessment strategy as needed	N									X				X				X					P						
Conduct effectiveness assessment on an annual basis	E					X				X				X				X					P	S		S	S		
Identify program modifications as a result of the assessment	C					X				X				X				X					P	S		S	S		
Review effectiveness assessments and identify goals, baselines, and trends.	N									X				X				X					P		S	S	S	S	

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter.

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MUD = Municipal Utilities Department

## Section 8

# Water Quality Monitoring Program

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### OVERVIEW

The SUA stormwater NPDES Permit requires monitoring of urban runoff and receiving waters from 2007-2012 as detailed in the Monitoring and Reporting Program (MRP). The MRP includes the characterization of runoff and receiving water quality and toxicity as well as an assessment of the effectiveness of control measures. Monitoring elements are designed to characterize trends over long-term periods and to identify specific pollutants of concern (POCs). The most fundamental aspect of the stormwater monitoring effort is urban discharge and receiving water monitoring, which has historically occurred along four urbanized, tidally-influenced tributaries to the San Joaquin River. Other components of the MRP, including dry weather field screening and detention basin monitoring are used to further develop “baseline” water quality datasets. In conjunction with the MRP, the Water Quality Based Programs (see **Section 9**) are studies that are designed to evaluate spatial and temporal trends in POCs in local waterbodies.

#### **Pollutants of Concern (POCs)**

Pollutants that warrant special attention due to their potential impacts on local waterbodies

**Section 8** outlines MRP efforts to be conducted from 2007-2012.

### OBJECTIVES

The 2007-2012 MRP is designed to:

- Assess compliance with the Permit
- Characterize urban runoff
- Identify sources of pollutants and POCs
- Assess the chemical, physical, and biological impacts on receiving waters resulting from urban runoff
- Assess the overall health and evaluate the long-term trends in receiving water quality
- Provide information for the development and implementation of the SWMP

Elements of the MRP are explained in the following section.

### 2007-2012 PERMIT MONITORING AND STUDY REQUIREMENTS

Pursuant to the MRP Section I.A, the Program is required to submit an annual work plan that supports the development, implementation, and effectiveness evaluation of the SWMP. The work plan comprises several integrated studies. Each study is designed to conform to the sampling protocol and standard monitoring provisions set forth in the MRP. The monitoring program collectively characterizes the quality and quantity of urban runoff, receiving water quality, and the effectiveness of control measures (both structural and programmatic).

The following “baseline” monitoring studies are included in the MRP for the 2007-2012 Permit period:

- Urban Discharge Monitoring
- Receiving Water Monitoring
- Water Column Toxicity Monitoring

- Dry Weather Field Screening

Baseline monitoring is used to characterize long-term trends in urban discharge and receiving water quality. Details of the program are outlined in **Table 8-1**. In addition, the following supplemental studies are included in the MRP:

- Bioassessment Analysis
- Detention Basin Monitoring (see **Appendix H-5**)
- Best Management Practice (BMP) Effectiveness Studies (see **Appendices H-6** and **Appendix H-7**)
- Sediment Toxicity (see **Appendix H-8**)

Each of the supplemental MRP elements is summarized in **Table 8-2**. As part of the previous 2002-2007 permit, bioassessment monitoring characterized habitat and species in the receiving water to identify potential impairment. The 2007-2012 Permit requires a Bioassessment Analysis report of these results to be included with the 2007/2008 Annual Report. Detention basin monitoring allows the Program to gauge the effectiveness of basins in removing pollutants and examines variables that control methylmercury production. The BMP Effectiveness Study is designed to allow the Program to evaluate BMPs for their effectiveness in removing pathogens, nutrients, metals, and pesticides from stormwater runoff. Sediment toxicity monitoring allows the Program to identify toxicity due to pesticides and pyrethroids.

Monitoring is also conducted for four studies under the Water Quality Based Program (see Section 9). The studies are used to target specific waterbodies, evaluate the spatial and temporal trends in POCs, and identify appropriate POC-control measures. During the 2007-2012 Permit period, these studies, which are described in **Table 8-3**, include the following:

- Pesticide Plan
- Pathogen Plan
- Mercury Plan
- Low Dissolved Oxygen Plan

The goals and objectives of the Water Quality Based Program are detailed in **Section 9** of this SWMP.

**Table 8-1. Baseline MRP Monitoring for 2007-2012**

Monitoring Activity	Summary
<b>Urban Discharge Monitoring</b>	<ul style="list-style-type: none"> <li>• Four waterbodies monitored</li> <li>• One outfall site on each waterbody</li> <li>• Two wet weather events per Permit year at each site, including an event that will target the first qualifying storm event of the season</li> <li>• Two dry weather events per Permit year at each site</li> <li>• Samples collected during each event are tested for constituents listed in <b>Appendix H-1</b></li> <li>• <b>Appendix H-2</b> shows which samples are composite samples and which samples are grab samples</li> <li>• All urban discharge monitoring coordinated with receiving water monitoring</li> </ul>
<b>Receiving Water Monitoring</b>	<ul style="list-style-type: none"> <li>• Same four waterbodies monitored as in urban discharge monitoring</li> <li>• Two sampling sites on each waterbody: one directly downstream of the urban discharge monitoring site and one upstream of the SUA boundary (except for Smith Canal which does not have a location upstream of the SUA boundary)</li> <li>• Two wet weather events per Permit year at each site, including an event that will target the first qualifying storm event of the season</li> <li>• Two dry weather events per Permit year at each site</li> <li>• Grab samples collected during each event are tested for constituents in <b>Appendix H-1</b></li> <li>• All events coordinated with urban discharge water monitoring</li> </ul>
<b>Water Column Toxicity</b>	<ul style="list-style-type: none"> <li>• Same urban discharge and receiving water sites as listed above (four urban discharge and seven receiving water sites)</li> <li>• Two wet weather events and two dry weather events during two non-consecutive Permit years at each receiving water station</li> <li>• Toxicity tests performed on grab samples from each event</li> <li>• Events coordinated where possible with urban discharge and receiving water monitoring</li> </ul>
<b>Dry Weather Field Screening</b>	<ul style="list-style-type: none"> <li>• Dry weather monitoring of 20% of outfalls each year so that all outfalls are monitored once in Permit term</li> <li>• 46 outfalls in total</li> <li>• Grab samples collected during each event tested for limited constituents if sufficient flow exists (see section on Dry Weather Field Screening)</li> </ul>

**Table 8-2. Supplemental MRP Monitoring Activities for 2007-2012**

Monitoring Activity	Summary
<b>Bioassessment Analysis</b>	<ul style="list-style-type: none"> <li>• Report on data collected in 2004 and 2005 was submitted with 2007/2008 Annual Report and recommended continued monitoring</li> <li>• Sampling and Analysis Plan will be developed by 2009/2010</li> <li>• Bioassessment monitoring to take place during 2010-2012</li> </ul>
<b>Detention Basin Monitoring</b>	<ul style="list-style-type: none"> <li>• One basin with mixed land use monitored</li> <li>• Influent and effluent monitoring during two wet weather events in two Permit years (total four wet weather events)</li> <li>• Sediment monitoring during one dry weather event in two Permit years (total two dry weather events)</li> <li>• Grab samples of influent and effluent tested for limited constituents</li> <li>• Toxicity testing as well as tests for pesticides, pyrethroids, and mercury performed on sediment samples</li> </ul>
<b>BMP Effectiveness Studies</b>	<ul style="list-style-type: none"> <li>• Assessment of two BMPs: Legion Park media filter and Morelli Park swale</li> </ul>
<b>Sediment Toxicity</b>	<ul style="list-style-type: none"> <li>• Staggered sampling of eight sites over the five-year Permit term</li> <li>• One post first flush<sup>1</sup> and one dry weather monitoring event will be sampled at each site</li> <li>• Sediment samples undergo toxicity testing with <i>Hyaella azteca</i> and are analyzed for grain size and total organic carbon.</li> <li>• Follow-up testing including “targeted” sediment Phase 1 TIE approaches and chlorpyrifos/pyrethroid analyses required if statistically significant toxicity is detected (see <b>Appendix H-4</b>)</li> </ul>

<sup>1</sup> Post first flush timeframe is within two weeks of the qualifying storm event.

**Table 8-3. Water Quality Based Monitoring To Be Conducted under the 2007-2012 Permit Term**

<b>Monitoring Activity</b>	<b>Summary (see Section 9)</b>
<b>Pesticide Plan</b>	<ul style="list-style-type: none"> <li>• Four waterbodies monitored during dry and wet weather</li> <li>• Urban discharge, receiving water, and rainwater monitored</li> <li>• Annual monitoring of one storm event during the dormant spray season, one storm event following the dormant spray season, and once during the dry season</li> <li>• Analyze water samples for diazinon, chlorpyrifos, and pyrethroids</li> <li>• Use GIS tool to evaluate spatial trends</li> </ul>
<b>Pathogen Plan</b>	<ul style="list-style-type: none"> <li>• Focus on six waterbodies that are impaired by fecal indicator bacteria</li> <li>• Three-Phase monitoring approach, comprising characterization monitoring, source identification monitoring, and BMP effectiveness monitoring</li> <li>• Two sets of waterbodies during each of three phases</li> <li>• Phase I waterbodies included Mormon Slough and Smith Canal (Monitoring began in 2004)</li> <li>• Phase II waterbodies are Five Mile Slough and Mosher Slough (Monitoring began in 2007)</li> <li>• Phase III waterbodies are Lower Calaveras River and Walker Slough</li> <li>• Characterization monitoring conducted for each waterbody monitored over one year, followed by source identification and BMP effectiveness studies</li> <li>• Five wet weather events in characterization monitoring year</li> <li>• Two dry weather samples per month in characterization monitoring year</li> </ul>
<b>Mercury Plan</b>	<ul style="list-style-type: none"> <li>• Monitor a combination of discharge outfalls, upstream tributaries, downstream locations, detention basins and sediments</li> <li>• Three wet weather events per Permit year at eight stations over a three year duration</li> <li>• Two dry weather events per Permit year at eight stations over a three year duration</li> <li>• Total mercury, methylmercury, and suspended sediment monitoring; along with flow estimates</li> </ul>
<b>Low Dissolved Oxygen Plan</b>	<ul style="list-style-type: none"> <li>• Six waterbodies monitored over the course of the Permit term</li> <li>• Each waterbody monitored for two years, with the exception of Smith Canal</li> <li>• Two urban discharge and two receiving water stations on each waterbody with the exception of Smith Canal and Mormon Slough</li> <li>• Two wet weather events during monitoring year</li> <li>• Monthly grab samples for selected constituents at both urban discharge and receiving water monitoring sites</li> <li>• Continuous monitoring of dissolved oxygen, pH, turbidity, and electrical conductivity at receiving water stations</li> <li>• Monitoring of Smith Canal began in November 2008. Monitoring of the remaining waterbodies is anticipated to commence during 2009/2010 and continue through the 2011/2012 permit term.</li> <li>• Monitoring of DWSC used to assess effectiveness of Bubbler System BMP</li> </ul>



## **BASELINE MONITORING PROGRAM**

The baseline monitoring program elements are designed to be complementary, in order to provide a comprehensive evaluation of the health of SUA waterways. Urban discharge and corresponding receiving waters on some waterbodies have been sampled for over fifteen years creating long term data sets on watersheds representing various land uses. Dry weather field screening samples outfalls throughout the SUA evaluating a broader area and detecting any illicit connections. Finally, detention basin monitoring samples treated stormwater to evaluate efforts to decrease the pollutant loads entering the local waterbodies.

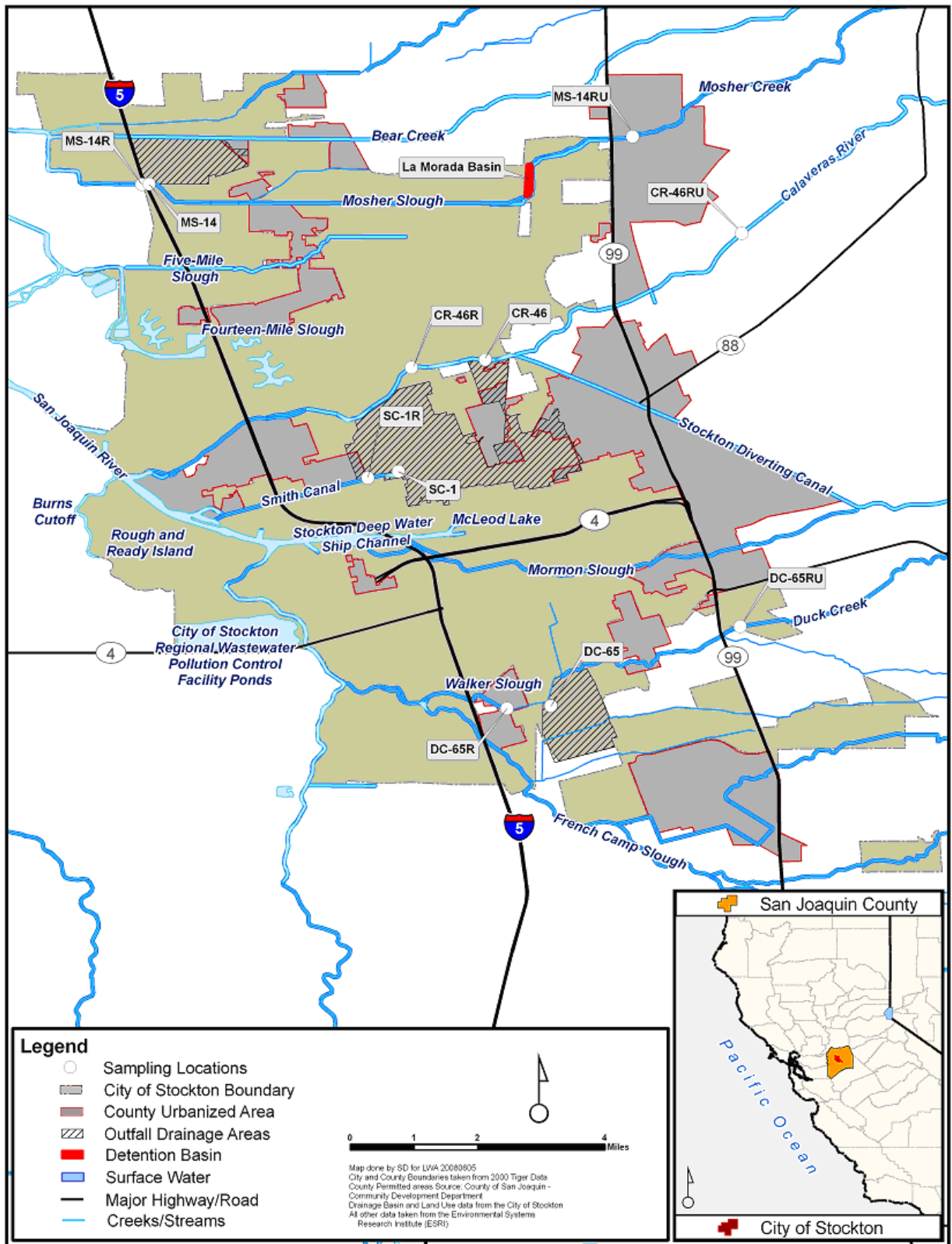
### **Urban Discharge and Receiving Water Monitoring**

All baseline urban discharge and receiving water monitoring stations are sampled in conjunction and are sampled during two wet weather events and two dry weather events each Permit year. Urban discharge monitoring characterizes the quantity and quality of urban runoff discharged directly to receiving waters within the SUA. Receiving water monitoring is used to evaluate the health of SUA waterbodies, and used to identify POCs. A pair of receiving water sites is sampled on each monitored waterbody (with the exception of Smith Canal). One receiving water site is located upstream of the SUA to characterize the water before contributions from urban discharges. Another receiving water site is located just downstream of the urban discharge location, and is sampled on the same day as urban discharge monitoring and only after discharges have occurred.

The locations of both receiving water and urban discharge baseline sites are shown in **Figure 8-1**. The watersheds included in the monitoring program are:

- Mosher Slough (MS)
- Calaveras River (CR)
- Duck Creek (DC)
- Smith Canal (SC)

In the 2002-2007 permit term, baseline monitoring consisted of urban discharge sites CR46, DC65, MS14, and SC1 as well as downstream receiving water sites which have corresponding labels ending in an R for receiving water. In the 2007-2012 Permit, upstream receiving water sites were added on Mosher Slough, Calaveras River, and Duck Creek. These sites have labels ending in RU or RUS for receiving water, upstream.



**Figure 8-1. Baseline Monitoring Locations and Detention Basin Monitored in Stockton Urbanized Area**

Most watersheds in the SUA are tidally-influenced tributaries to the San Joaquin River. The urban discharge monitoring locations shown in **Figure 8-1** were chosen to be representative of the various land uses within the urbanized area. The selected monitoring stations are located at sites with primarily commercial, industrial, residential, or mixed land use drainages; these sites are listed in **Table 8-4**. Except for the Duck Creek site DC-65, each monitoring site includes a lift station discharging directly to receiving water. The DC-65 site is an outfall discharging to a detention basin.

**Table 8-4. Urban Runoff Discharge and Receiving Water Monitoring Sites**

Monitoring Program	Station ID	Monitoring Site Location	Predominant Land Use	Watershed Area (acres)
Urban Discharge	MS-14	9211 Kelly Drive	Residential	533
	CR-46	4250 North West Lane	Commercial	169
	DC-65	555 Zephyr Drive	Industrial	343
	SC-1	840 Baker Place	Mixed use	1,866
Receiving Water	MS-14RUS	Mosher Slough at North Cole Drive	Residential	NA
	MS-14R	Mosher Slough at Mariners Drive Bridge	Residential	NA
	CR-46RU	Calaveras River at Solari Road	Agricultural	NA
	CR-46R	Calaveras River at east side of the bridge for El Dorado St.	Commercial	NA
	DC-65RUS	Duck Creek at Stagecoach Road	Industrial	NA
	DC-65R	Duck Creek at Odell Ave. over-crossing	Industrial	NA
	SC-1R	Smith Canal at east side of the bridge for Pershing Avenue	Mixed use	NA

Notes: "NA" – information not available

The comprehensive set of constituents for which samples are analyzed is listed in **Appendix H-1**. It should be noted that during wet weather, all urban discharge samples are collected as flow-weighted composites with the exception of a few parameters (volatile and semi-volatile organic compounds, oil and grease, and indicator bacteria), which are collected as grab samples. During dry weather, all urban discharge samples are collected as grab samples, and all receiving water samples (dry and wet) are collected as grab samples. A summary of the types of samples taken at each site is provided in **Appendix H-2**. The timing of monitoring events is based on forecasted precipitation amounts and number of days of antecedent dry weather. The first wet weather event of each Permit year targets the first qualifying storm event.

Incoming storm events are tracked and assessed against storm selection criteria<sup>2</sup> and the forecasted reliability that the storm will occur. Wet weather monitoring is particularly challenging in the SUA, as

<sup>2</sup> A qualifying storm event occurs when there is sufficient rainfall within a 24-hour period to monitor at least one drainage basin and one corresponding receiving water station. Storms with a predicted rainfall of at least 0.25 inches at a seventy percent probability of rainfall 72 hours prior to the event are targeted.

rainfall forecasts are often unreliable due to the convective nature of incoming storms. In addition, because storms normally intersect the SUA traveling from the west to the east, it is not unusual for northern part of the SUA to receive significant rainfall, while southern part of the SUA remains dry, or vice versa. With this in mind, wet weather events are timed to capture urban runoff impacts with the highest possible representation of the targeted storm event (i.e., high percent capture) using flow-based composite samplers at urban discharge stations. Data regarding total storm event rainfall, total runoff volume, percent storm event capture, duration of storm events, antecedent dry weather conditions, total runoff volume, and receiving water discharge conditions are recorded and reported with each Annual Report.

## **Water Column Toxicity Monitoring**

The water column toxicity monitoring component of the 2007-2012 Monitoring Program allows for assessment of toxicity in local receiving waters and, if toxicity is found, provides further steps for determination of the cause of toxicity. Toxicity samples are collected from baseline urban discharge and receiving water stations during two wet events and two dry events annually. These samples may be taken at the same time as baseline monitoring grab samples. Because the pesticide study also requires dormant spray period monitoring and pesticides are known to be toxic, sampling events may also be coordinated with pesticide sampling when possible.

Water column toxicity is conducted in accordance with USEPA methods. A minimum grab sample volume of five gallons is collected at each site for the following freshwater species tests:

- 1) Survival test with water fleas (the crustacean *Ceriodaphnia dubia*)
- 2) Survival test with larval fathead minnows (*Pimephales promelas*)

Efforts are taken to ensure that holding time does not exceed 36 hours.

Using these two species, a phased approach is used to quantify chronic toxicity:

- 1) If toxicity is determined to be statically significant and greater than or equal to a 50% increase in *Pimpehales promelas* or *Ceriodaphnia dubia* mortality or reduction in *Ceriodaphnia dubia* reproduction compared to the laboratory control is observed, then a Phase 1 Toxicity Identification Evaluation (TIE)<sup>3</sup> will be conducted as described below and in Footnote 3:
  - i) Chelex for divalent metals
  - ii) C18 or C8 SPE column for non-polar organics (including pesticides)
  - iii) Centrifugation for particulates and associated toxins
  - iv) Piperonyl Butoxide (PBO) for metabolically-activated pesticides and some other organics
- 2) If 100% mortality is detected in a receiving water sample within 24 hours of test initiation, a dilution series testing is conducted (0.5x steps ranging from the undiluted sample to 6.25% of the sample) to determine the magnitude of toxicity.
- 3) If a toxicant is identified through the TIE process, a Toxicity Reduction Evaluation (TRE) is performed to identify the sources of the toxicity and discuss appropriate BMPs to eliminate the causes of toxicity.

If toxicity is greater than or equal to a 50% increase in *Pimpehales promelas* or *Ceriodaphnia dubia* mortality or reduction in *Ceriodaphnia dubia* reproduction and is statistically different to the laboratory control results, a TRE Corrective Action Plan will be included in the Annual Report to detail the source of pollutants and corrective actions. The SWMP will also be updated to reflect any changes to reduce the pollutants causing toxicity or increase pollutant monitoring.

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<sup>3</sup> Although the cause of toxicity in any given ambient water sample can often not be determined without a TIE, the classes of contaminants likely to be the cause of toxicity in ambient waters are often very different than that of effluents. For example, it is not uncommon for effluents to be toxic due to polymers, pH-labile toxicants (e.g., detergents, ammonia), and treatment system by-products (e.g., bisulfite). Classes of contaminants usually of the greatest concern in ambient waters are organics (e.g., pesticides) and metals. Therefore, it is not uncommon to implement a “targeted” TIE approach for ambient water monitoring programs (e.g., CVRWQCB Irrigated Lands Regulatory Program). For ambient waters, the Phase I TIE should be targeted to include methods that assist in the identification of organics and metals. Should the “targeted” Phase I TIE not resolve the cause of the toxicity, then a full Phase I TIE should be implemented.

## Dry Weather Field Screening

The primary purpose of the dry weather monitoring program is to identify dry weather flows and potential illicit discharges and illegal connections (see SWMP Section 2). The City monitors 20% of the outfalls each year (approximately 25 per year) so that all outfalls are screened over the course of the permit term. Field screening occurs during dry weather periods throughout each permit year (July 1 – June 30) and each event is preceded by non-rainfall period of at least two weeks. Grab samples are taken at sites with sufficient flow and analyzed in the field for temperature, pH, phenols, chlorine, total copper, electrical conductivity (EC), methyl blue activated substances (MBAS, which are detergents/surfactants), and turbidity. A list of outfalls planned to be screened during the 2007-2012 permit term is given in **Appendix H-4**. The list will be confirmed in the field and updated as necessary.

The SWMP identifies action levels that initiate a field procedure to identify potential illicit discharges and illegal connections and further investigation by source tracking. If any of the action levels identified shown in **Table 8-5** are exceeded during dry weather monitoring events, source tracking upstream of the exceedance location is conducted in order to isolate the illicit discharge to a specific segment of the drainage system, if possible.

**Table 8-5. Dry Weather Field Screening Action Levels**

Constituent	Units	Action Levels
Phenols	mg/L	>0.017
Total copper	mg/L	>2
Electrical Conductivity	umhos/cm	>700
Methyl Blue Activated Substances (MBAS)	mg/L	>0.275
Turbidity	NTU	>55

Notes:

mg/L = milligrams per liter

umhos/cm = micromhos per centimeter =  $\mu\text{S}/\text{cm}$  = micro Siemens per centimeter

NTU = Nephelometric turbidity units

Dry weather field screening is ongoing throughout the dry season and is not coordinated with other baseline monitoring. However, the monitoring activities of baseline monitoring overlap as shown in **Table 8-6**.

**Table 8-6. Baseline Monitoring and Reporting Program (MRP) Implementation Schedule**

Program Components	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	Parks and Recreation	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
Water Quality Monitoring Program – Baseline Monitoring																												
Baseline Reporting																												
Annual Report	C					X				X				X				X				S		P				
Annual Work Plan	C				X				X				X				X				X	S		P				
Baseline Monitoring																												
Baseline Urban Discharge Sites																												
Water quality parameters	C	2	F	1		2	F	1		2	F	1		2	F	1		2	F	1		P						
Baseline Receiving Water Sites																												
Water quality parameters	C	2	F	1		2	F	1		2	F	1		2	F	1		2	F	1		P						
Water column toxicity	E	2	F	1		2	F	1		2	F	1		2	F	1		2	F	1		P						
20% of Outfalls <sup>4</sup>																												
Dry weather field screening	C				2				2				2				2					P						

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

4. Pending budget approval, monitoring scheduled for 2009-2010 may be initiated in fiscal year 2010-2011.

X = Performance standard will be completed during this quarter. F = First flush event. 1 = One sampling event will be completed during this quarter. 2 = Two sampling events will be completed during this quarter.

MUD = Municipal Utilities Department.

## **SUPPLEMENTAL WATER QUALITY MONITORING PROGRAMS**

### **Bioassessment Study**

The primary objective of the bioassessment monitoring program during the 2002-2007 permit term was to characterize biological and physical conditions in the receiving waters and to collect data to contribute to the Surface Water Ambient Monitoring Program (SWAMP). The SWAMP is a statewide effort to develop standardized measures and criteria for monitoring and assessing the physical and biological integrity of the state's waters, with the goal of developing an Index to Biological Integrity (IBI) for each geographic region of California. Bioassessment monitoring consisted of quantitative biodiversity measurements of benthic macroinvertebrates and qualitative evaluation of habitat quality to allow for the calculation of an IBI for a waterway.

In general, the ultimate goals of bioassessment are to assess the biological integrity of receiving waters, detect biological responses to pollution, and identify probable causes of impairment not detected by chemical and physical water quality analysis. Along with the 2007/2008 Annual Report, the City and County have submitted a report on the bioassessment monitoring conducted in 2004 and 2005 (Analysis of Bioassessment Efforts Conducted from 2003 to 2007 under Monitoring and Reporting Program Order No. R5-2002-0181, 2008). The report analyzed the 2004 and 2005 results and identified sites on Duck Creek, Mosher Slough, and the Calaveras River as potentially impaired. Two years of data, however, were insufficient to draw strong conclusions. The data provides a baseline for the area and a Sampling and Analysis Plan to be developed by 2009/10 for further bioassessment monitoring. Additional monitoring may be conducted during 2010-2012



## Detention Basin Monitoring

Detention basin monitoring is designed to evaluate the effectiveness of detention basins in removing various constituents including POCs. Monitoring will occur during 2008/09 and 2010/11 (see **Table 8-9**), and includes influent, effluent, sediment chemistry, and sediment toxicity sampling. **Figure 8-1** shows the location of La Morada Basin to be sampled. It should be noted that the basin has been called Basin 2 or the San Joaquin Area Flood Control Agency (SJAFCA) Basin in the past. La Morada Basin drains about 760 acres and represents primarily residential discharge. During each of the two years of monitoring, sampling influent and effluent sampling will occur during two storms of sufficient runoff and sediment sampling will be performed during the following dry season. The first wet weather sample will target a post first flush event. Wet weather stormwater samples are analyzed for:

- Bacteria
- Field measurements (EC, dissolved oxygen, pH, and temperature)
- Mercury (Total and Methyl)
- Organophosphate pesticides (Chlorpyrifos and Diazinon)
- Pyrethroids
- Total Dissolved Solids
- Total Suspended Solids
- Turbidity

Dry weather sediment chemistry samples are analyzed for organophosphate pesticides, pyrethroids, and total mercury. As much as possible sediment toxicity testing will be conducted in coordination with other detention basin sampling. Toxicity samples will target a post first flush event and take place during one dry weather event in both the second and forth year of the Permit for a total of two wet weather events and two dry weather events. Samples taken to conduct sediment toxicity analysis will be tested for total organic carbon and grain size. If toxicity is detected and sediment toxicity samples have been taken during the same period as sediment chemistry samples, chlorpyrifos and pyrethroid analysis conducted as part of sediment chemistry sampling will simply be reviewed. If sediment chemistry and toxicity samples have not been taken within sufficient proximity, the toxicity test will be followed with analysis for chlorpyrifos and pyrethroids as shown in **Appendix H-4** (Sediment Toxicity Monitoring Constituents). Until the nature of and cause of toxicity is defined, toxicity testing and sediment chemistry testing for chlorpyrifos and pyrethroids will continue. Overall, detention basin monitoring will be conducted in compliance with the Detention Basin Monitoring Work Plan (**Appendix H-5**).

## **Best Management Practice (BMP) Effectiveness Studies**

The BMP Effectiveness Study will continue to evaluate the Legion Park BMP as well as a new study of a LID BMP. The Legion Park BMP is a Media Filter Stormwater Treatment System (MFST) which is intended to reduce pollutants entering the adjacent Yosemite Lake. Based on the Smith Canal Work Plan and an agreement with the Friends of Smith Canal, the City constructed the MFST System and began operation in December 2005. The filter is connected to the 2800 gpm low-flow pump, which is the main pump during dry weather and during the early portion of storm events. Flow-weighted composite samples of the Legion Park filter influent and effluent are monitored for pathogens, nutrients, heavy metals and pesticides. The study is discussed in depth in the Legion Park BMP Revised Study Plan (**Appendix H-6**).

The LID BMP is defined fully in the Best Management Practices Effectiveness Study Plan (**Appendix H-7**). Finding 57 of the Permit describes LID as any stormwater management strategy that maintains or restores natural hydrologic function. The BMP selected for monitoring is Morelli Park Swale A. Swale A is one of three grassy swales designed for pollutant removal at the Morelli Park Boat Launching Facility, which is a recent downtown Stockton redevelopment effort. In 2008/09, a sampling and analysis plan for Swale A will be developed and the swale will be monitored within 2009/10 to 2011/12. Influent and effluent will be monitored each year for a total of ten storm events during the Permit term. In addition, the ability of Swale A to reduce runoff volume will be monitored as this has an impact on the overall pollutant load. Constituents to be monitored include pathogens, nutrients, heavy metals, and pesticides to correspond with the constituents monitored at Legion Park.

## Sediment Toxicity

The purpose of the Sediment Toxicity Work Plan is to characterize sediment quality in areas subject to urban discharge and pending these results, to identify BMPs for controllable sources of sediment toxicity. Five SUA waterways listed as impaired due to pesticides as described in **Table 8-7**.

**Table 8-7. Pesticide Impaired Waterways within the SUA**

Impaired Waterbody	Impaired Reach	Estimated Size Affected	Potential Toxicity Source
Calaveras River	Lower	5.8 Miles	Pesticides
Delta Waterways	Stockton Deep Water Ship Channel (DWSC)	1,603 Acres	Pesticides Dioxin/Furans PCBs Unknown Toxicity
Five-Mile Slough	Alexandria Place to Fourteen-Mile Slough	1.6 Miles	Pesticides
Mosher Slough	Downstream of Interstate 5	1.3 Miles	Pesticides
Smith Canal	Entirety	2.3 Miles	Pesticides

The Permit instructs the Permittees to select sediment toxicity sampling sites based on the following criteria: (1) sediment depositional areas downstream and within close proximity of representative stormwater outfalls; (2) assessment of land uses including residential, suburban residential, commercial, industrial, and mixed; and 3) age of residential and suburban neighborhood drainage areas including less than 10 years old, 10 to 25 years old, and older than 25 years old. To select sampling sites that consider these diverse criteria and also focus on the impaired waterways in **Table 8-7**, the eight sites listed in **Table 8-8** will be sampled.

**Table 8-8. SUA Sediment Toxicity Monitoring Locations**

Waterbody	Monitoring Location*	Receiving Water Site ID	Land Use	Approximate Development Age
Mosher Slough	Mariner's Bridge	MS-14R	Residential/Commercial	10 – 25 years
Mosher Slough	La Morada Basin	MS-5R	Residential	< 10 years
NA	La Morada Detention Basin <sup>4</sup>	NA	Residential	< 10 years
Five-Mile Slough	Swenson Park Golf Course	5M-27R	Residential/Recreational	≥ 25 years
Calaveras River	Brookside Road	CR-39R	Residential/Recreational	< 10 years
Calaveras River	West Lane Bridge	CR-46R	Mixed Use	<u>&lt; 5 to ≥ 25</u> years
Smith Canal	Yosemite Lake	SC-5R	Residential/Commercial	≥ 25 years
Mormon Slough	Commerce Street	MR-2R	Mixed Use	≥ 25 years
Duck Creek / Walker Slough	Manthey Road Bridge	WK-64R	Mixed Use	≥ 25 years

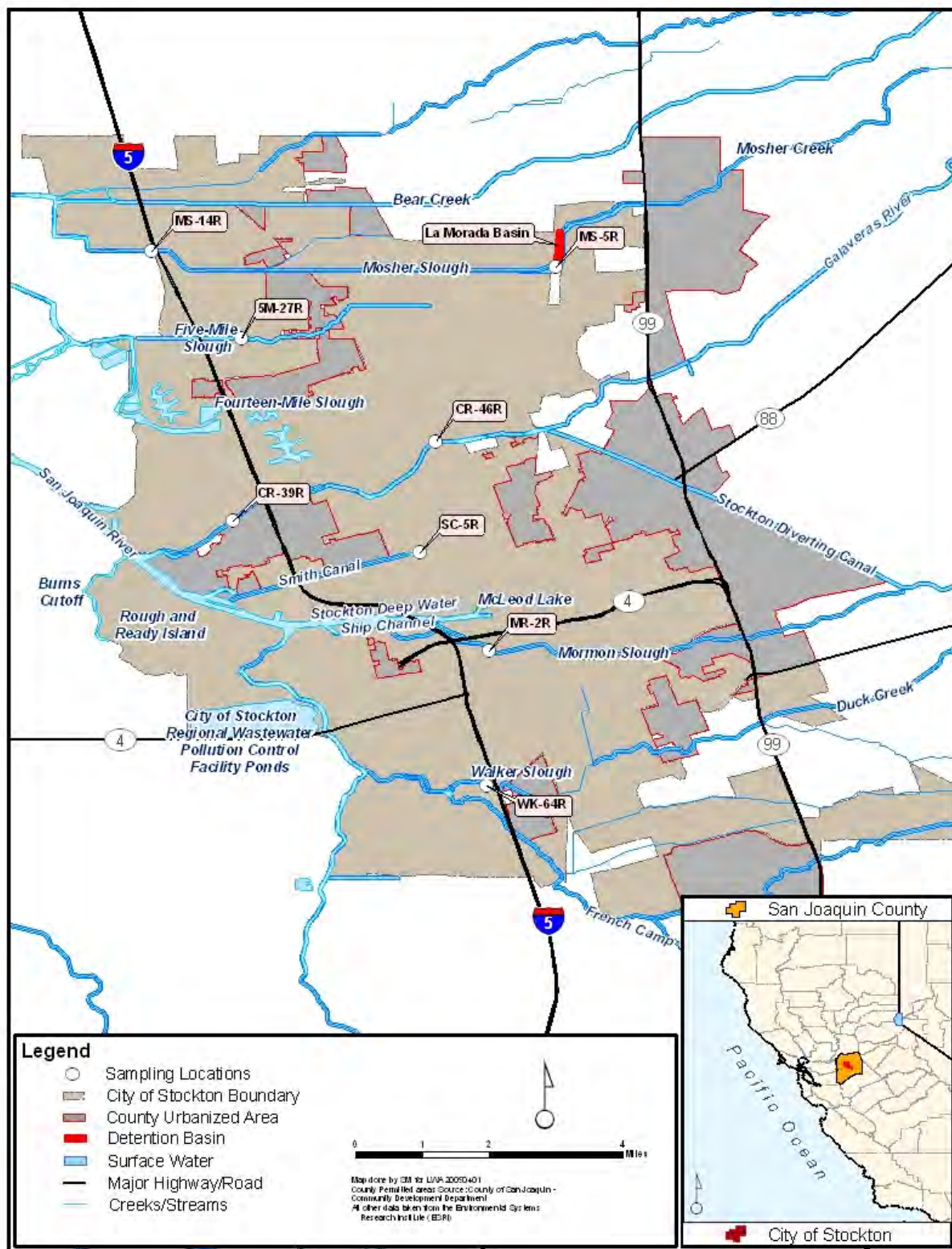
\*Nearest cross street or urban feature

NA = Not Applicable

Mixed Use = Residential/Commercial/Industrial Uses

Sites are shown in **Figure 8-2**. Monitoring at each site will target one post first flush and sample one dry weather event. A staggered sampling schedule will be implemented so that all eight sites are sampled twice during one fiscal year between 2008/09 and 2011/12. An amphipod (*Hyalella azteca*) 10-day survival and growth test as well as an analysis of sediment organic carbon and grain size will be conducted on each sample. If at any site toxicity is determined to be statistically significant and greater than or equal to 50% increase in *Hyalella azteca* mortality is observed, follow-up testing including targeted sediment TIE and analyses for chlorpyrifos and pyrethroids as listed in **Appendix H-4** will be conducted at the site until the cause of the toxicity is determined. More details are included in the Sediment Toxicity Work Plan attached in **Appendix H-8**.

<sup>4</sup> Detention basin sediment toxicity monitoring will be addressed in the Detention Basin Monitoring Work Plan, updated April 2009.



**Figure 8-2. Sediment Toxicity Monitoring Locations in Stockton Urbanized Area**

The Supplemental Water Quality Monitoring activities overlap as shown in **Table 8-9**.

**Table 8-9. Supplemental Monitoring and Reporting Program (MRP) Implementation Schedule**

Program Components	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	Parks and Recreation	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
Water Quality Monitoring Program – Supplemental Monitoring <sup>4</sup>																												
Supplemental Monitoring Development and Implementation																												
BMP Effectiveness Study	N																					P						
Bioassessment Sampling and Analysis Plan	N																					P						
Supplemental Monitoring																												
Baseline Receiving Water Sites																												
Sediment toxicity	N						F		1		F		1		F		1		F		1	P						
La Morada Basin																												
Influent / Effluent	E							2							2							P						
Sediment chemistry	E					1								1								P						
Sediment toxicity	N					1		1						1		1						P						

**Notes:**

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

4. Pending budget approval, monitoring scheduled for 2009-2010 may be initiated in fiscal year 2010-2011.

X = Performance standard will be completed during this quarter.

F = Post first flush event.

1 = One sampling event will be completed during this quarter.

2 = Two sampling events will be completed during this quarter.

■ = Plan component will be completed during the specified timeframe.

MUD = Municipal Utilities Department.

## **REPORTING**

A summary of the monitoring performed prior to June 30 of each year will be reported in the Annual Report due September 1st of each Permit year. The report will contain a summary of completed field activities and the appropriate analytical and sampling data. The report will include the results of a complete data evaluation based on the collected quality control (QC) samples and the laboratory quality assurance (QA) program. Data will be qualified according to the EPA standard procedures. The reported data will be compared to the applicable water quality standards in the Water Quality Control Plan for the California RWQCB, Central Valley Region (Basin Plan), the California Toxics Rule (CTR), and California Title 22.



## Section 9

# Water Quality Based Program

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### OVERVIEW

The purpose of the Water Quality Based Program is to address specific pollutants that have been identified as impacting or potentially impacting local receiving water quality in the SUA. Special studies addressing these pollutants are designed to characterize their fate and transport and to assist with source identification and identification of control measures. Over the course of the Permit term (2007-2012), the following pollutant plans will be implemented:

- Pesticide Plan (continued from the 2002-2007 permit)
- Pathogen Plan (continued from the 2002-2007 permit)
- Mercury Plan and Methylmercury Monitoring Plan
- Low Dissolved Oxygen Plan (continued from the 2002-2007 permit)

An overview of the pollutant plans is provided in the following sections and in **Table 9-1**. The plans are included in **Appendices I-1** through **I-5**.

**Table 9-1. Water Quality Based Program–Pollutant Specific Plans**

<b>Pollutant Specific Plan</b>	<b>Highlights</b>
<b>Pesticide Plan</b>	<ul style="list-style-type: none"><li>• Provide public education/outreach to promote safe pesticide handling and uses of safer pesticide alternatives</li><li>• Promote integrated pest management (IPM) in municipal and public pest management practices</li><li>• Monitor waterbodies to determine extent of pesticide contamination and to determine plan effectiveness</li><li>• Conduct a survey of pesticide use and disposal, track outreach activities and track municipal IPM activities to determine plan effectiveness</li></ul>
<b>Pathogen Plan</b>	<ul style="list-style-type: none"><li>• Identify host (human, livestock, dog) sources of fecal bacterial contamination</li><li>• Implement three-phased approach to mitigate high indicator bacteria levels in six SUA waterbodies</li><li>• Implement targeted BMPs to mitigate pathogen contamination</li><li>• Monitor waterbodies to determine levels of fecal indicator bacteria and effectiveness of plan</li></ul>
<b>Mercury Plan and Methylmercury Monitoring Plan</b>	<ul style="list-style-type: none"><li>• Promote proper handling and disposal of mercury-containing products through public education/outreach</li><li>• Assess mercury use in municipal operations</li><li>• Support BMPs to minimize erosion, and transport of sediment-associated mercury</li><li>• Monitor total mercury and methylmercury in waterbodies to determine the contribution to Delta mercury levels by the Permittees</li></ul>
<b>Low Dissolved Oxygen Plan</b>	<ul style="list-style-type: none"><li>• Identify areas and activities that contribute to low DO in receiving waters</li><li>• Identify and implement BMPs to mitigate low DO</li><li>• Monitor waterbodies to determine extent of DO impairment</li></ul>

## **PESTICIDE PLAN**

### **Description**

During previous years, the Program identified organophosphate pesticides (OP; i.e., diazinon and chlorpyrifos) as problematic pollutants that impaired local waterbodies. In order to address the OP pesticide impairment of urban streams, and as specified in Provision D.18.a.v. of the 2002-2007 permit, the Permittees developed a Pesticide Plan that addressed the use of diazinon and chlorpyrifos by the Permittees and others. The Pesticide Plan results from 2002-2007 are summarized in the updated Pesticide Plan (**Appendix I-1**). Results suggest that diazinon and chlorpyrifos are no longer stormwater POCs in the SUA. Additionally, pyrethroids were not detected in any samples.

As diazinon and chlorpyrifos are phased out, the most important component of the Pesticide Plan will likely be the promotion of IPM, which is applicable to all types of pesticides. The goal of IPM is to control pests using safer, more effective, longer-lasting methods.

The overall goal of the Pesticide Plan is to protect water quality by implementing IPM and associated BMPs to minimize or eliminate pesticides in stormwater runoff. The Pesticide Plan addresses this goal both through water quality monitoring and the promotion of IPM to the public and within municipal operations. As outlined in the Pesticide Plan, the Permittees will continue public outreach and promotion of IPM that was implemented during the 2004-2007 pesticide program and will extend their monitoring efforts to ensure that OP pesticides are no longer POCs. The Pesticide Plan includes the following components:

- Public education and outreach;
- IPM and municipal operations; and
- Water quality monitoring

### **Implementation Activities**

#### ***Public Education and Outreach***

The Permittees will continue to provide targeted information to the public about safe pesticide use and disposal, as well as less toxic pest control alternatives. Education and outreach programs that have been conducted thus far as components of the Pesticide Plan will continue to be implemented. Key outreach forums/mechanisms include:

- The “Our Water Our World” (OWOW) outreach (including outreach to pesticide retail outlets);
- Annual public outreach messages, including brochures, public service announcements, and newspaper articles;
- City-sponsored workshops to promote IPM; and
- Conducting surveys (every two years) of local or regional sales and use of residential and commercial pest control products.

#### ***Municipal Operations***

The Permittees will continue to implement pesticide and fertilizer application protocol at park sites, landscaped medians, and golf courses. Public Works—Parks Division (City) and Facilities Management—Parks and Recreation Division (County) will continue to conduct an internal inventory tracking pesticide use. In addition, the Permittees will continue coordination with the Household

Hazardous Waste program to promote proper disposal of pesticides. The IPM program focuses on alternative pest control strategies as urban use of diazinon and chlorpyrifos decreases.

Specific components of the IPM program include the following:

- Develop and implement IPM protocols, including proper handling, application, and disposal of pesticides;
- Train municipal staff and pest control operators;
- Develop landscape alternative standards; and
- Develop contract language for outside landscape contractors to use IPM.

### ***Water Quality Monitoring***

Monitoring will continue annually for diazinon, chlorpyrifos, and pyrethroids in the Calaveras River, Mosher Slough, Five-Mile Slough, and Smith Canal. The objectives will be to determine the Permittees' contribution of pesticides discharged to the above waterbodies, to determine the effectiveness of the phase-out of urban diazinon and chlorpyrifos uses, and assess whether water quality objectives are met. Monitoring will include the following efforts:

- Monitor annually until it is demonstrated that water quality objectives are met
- Sample two wet events coinciding with dormant and post-dormant spray seasons and one dry weather event
- Analyze all water samples for diazinon and chlorpyrifos,
- Analyze urban runoff/discharge for pyrethroids

### **Assessment Data and Information**

The assessment data and information identifies those items that should be tracked and reported as a part of the Annual Report and used within the program effectiveness assessments. The data and information to be collected may include, but will not be limited to, the following:

- Annual use of pesticides by active ingredient and total area for application (see MO4)
- Areas and types of IPM measures that are being implemented (see MO4)
- Number of retail stores participating in OWOW or similar programs
- Distribution of outreach messages, including numbers of brochures, television commercials, and newspaper articles, with an estimation of the number of people who were reached (see PO3)
- Number of public workshops and number of attendees, with comments collected from attendees
- Number of pest control operators and municipal employees who participated in training workshops (see MO8)

## Pesticide Plan Implementation Schedule

Pesticide Plan Component	Type of Component <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	Parks and Recreation	City Attorney
Pesticide monitoring	C																					P						
Public Education and Outreach																												
OWOW Program outreach	N																					P						
Annual public outreach messages	E					X				X				X				X				P					P	
Pest control workshops	N																					P						
Conduct survey of pesticides available for the public	N									X								X				P						
Municipal Operations																												
Review pesticide application protocols	C						X															P					S	
Implement IPM protocols	C																									P	S	
Train municipal employees	E							X				X				X				X		P				S	S	
Review and implement landscaping standards	C																					S				P	S	
Enforce IPM standards for contracted landscapers	C																					S				P	S	

### Notes:

1. C = Continue; E = Enhance; N = New
  3. P = Primary Responsibility; S = Secondary Responsibility
- MUD = Municipal Utilities Department

2. Q1 = Jan-March (wet events); Q2 = April-June (wet events); Q3 = July-Sep (dry events); Q4 = Oct-Dec (wet events)
- X = Plan component will be implemented during this quarter.
- = Plan component will be completed on an ongoing basis or during the specified timeframe.

## PATHOGEN PLAN

### Description

The focus of the Pathogen Plan is the San Joaquin River tributaries within the SUA that are classified as impaired due to the presence of fecal indicator bacteria. The Permittees developed a Pathogen Plan in accordance with Provision D.18.b of the 2002-2007.

The overall goals of the Pathogen Plan are to identify, monitor and mitigate the controllable sources of bacteria. The Pathogen Plan was designed to accomplish these goals and satisfy permit requirements through the following components:

- Characterization Monitoring (using traditional indicator bacteria) to determine the magnitude of bacterial contamination at various points in each waterbody
- Source Identification (ID) Studies to identify the host (human, cow/horse, or dog) that contributed to fecal contamination
- BMP Development and Implementation to identify effective BMPs to reduce fecal contamination
- Effectiveness Monitoring and Plan Assessment to determine whether BMPs have effected fecal contamination

An additional goal of the Pathogen Plan is to address the Pathogen TMDL<sup>1</sup> in a timely manner. The Pathogen Plan will be conducted over three phases until 2018 (**Appendix I-2**). The Pathogen Plan addresses six waterbodies, and is implemented in a three phase approach that focuses on two waterbodies for each phase (**Table 9-3**). Phase I, focusing on Smith Canal and Mormon Slough, began during the previous permit. Under the current permit, Phase I will be completed and Phase II (Mosher Slough and Five-Mile Slough) and Phase III (Walker Slough and lower Calaveras River) will begin. The total time frame for each phase will be periodically reviewed, and may be reduced based on experience and knowledge gained from the previous phase. The schedule will be reconsidered upon completion of Phase I, during the Permit renewal in 2012.

**Table 9-3. Pathogen Plan Implementation Phases.**

Monitoring Phase	Waterbody	Start Date	End Date
Phase I	Smith Canal Mormon Slough	July 1, 2004	June 30, 2012
Phase II	Mosher Slough Five-Mile Slough	July 1, 2007	June 30, 2015
Phase III	Lower Calaveras River Walker Slough	July 1, 2010	June 30, 2018

<sup>1</sup> CVRWQCB. 2008. Total Maximum Daily Load Report for Pathogens In: Five-Mile Slough, Lower Calaveras River, Mormon Slough, Smith Canal and Walker Slough. Final Staff Report. March 2008.

## **Implementation Activities**

### ***Characterization Monitoring***

The goal of the characterization monitoring is to determine long-term trends in bacteria loading and identify bacteria “hot spots” that contribute to beneficial use impairments. Monitoring of traditional indicator bacteria (total coliform, fecal coliform, and *E. coli*) is conducted at strategic locations along impaired waterbodies, both at stormwater discharge sites and in receiving waterbodies.

- The Phase II sites (Mosher Slough and Five-Mile Slough) and Phase III sites (Lower Calaveras River and Walker Slough) will undergo characterization monitoring.

### ***Source Identification Studies***

Source ID studies are conducted using Microbial Source Tracking (MST). Analytical methods are used to evaluate the organisms (e.g., human or non-human) from which the indicator bacteria likely originated. The MST method is based on species-specific DNA sequences in *Bacteroidales-Prevotella* (*Bacteroidales*), which are anaerobic bacteria that are highly abundant in the intestines of warm-blooded animals. At this time, methods have been developed to quantify bacteria from the following hosts: general warm-blooded animal inputs (called “universal”); humans; cow and horses; and dogs. In addition, samples are analyzed for concentrations of human-specific viruses known as entero- and adenovirus.

- Source ID will be conducted for Phase II sites (Mosher Slough and Five-Mile Slough) and Phase III sites (Lower Calaveras River and Walker Slough).
- Characterization monitoring for fecal indicator bacteria only will be conducted during Source ID monitoring events (at locations selected for source identification).

### ***BMP Development and Implementation***

The ultimate goal of the Pathogen Plan is to protect beneficial uses through focused BMP implementation. Once a site or activity that contributes to high bacteria concentrations from a specific source has been determined, BMPs can be better identified, selected, and implemented.

- Targeted BMPs for Phase I sites (Smith Canal and Mormon Slough) will be applied based on Source ID results.
- Targeted BMPs for Phase II sites (Mosher Slough and Five-Mile Slough) will be determined and implemented.

A list of current and proposed BMPs, along with schedules for their implementation, is presented in the Pathogen Plan (Appendix I-2).

### ***Effectiveness Monitoring***

After BMPs are implemented and monitored for a sufficient amount of time, the success of implemented bacteria control programs will be assessed. Such monitoring will also include receiving water monitoring to determine if recreational use WQOs are attained.

- Effectiveness monitoring will be conducted for Phase I sites (Smith Canal and Mormon Slough) to determine BMP effectiveness.

## Pathogen Plan Implementation Schedule


Pathogen Plan Component	Type of Component <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	Parks and Recreation	City Attorney	
Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2										
Phase I																													
BMP Implementation	E																						P				S	S	
Effectiveness Monitoring	N																						P						
Phase II																													
Characterization Monitoring	N																						P						
Source ID Monitoring	N																						P						
BMP Implementation	N																						P				S	S	
Effectiveness Monitoring	N																						P						
Phase III																													
Characterization Monitoring	N																						P						
Source ID Monitoring	N																						P						

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March (wet events); Q2 = April-June (wet events); Q3 = July-Sep (dry events); Q4 = Oct-Dec (wet events)

3. P = Primary Responsibility; S = Secondary Responsibility

X = Plan component will be implemented during this quarter.  = Plan component will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department



## **MERCURY PLAN**

### **Description**

The Sacramento-San Joaquin Delta Estuary (the Delta) is on the Clean Water Act Section 303(d) List of Impaired Water Bodies because of elevated levels of methylmercury in fish. To address mercury impairment in the Delta, the Permittees will develop and implement a mercury pollution prevention program.

The Permittees' mercury pollution prevention strategy is described in the Mercury Plan (**Appendix I-3**). The focus of the Mercury Plan is to reduce mercury in urban runoff to the maximum extent possible. The Mercury Plan identifies possible sources of mercury to urban runoff, and describes public outreach and education strategies to mitigate the controllable sources of mercury pollution. It addresses the following goals:

- Public outreach to promote proper use and disposal of products containing mercury, including coordination with household hazardous waste facilities and commercial and industrial outreach
- Assessment and reduction of municipal use of mercury-containing products
- Support of sediment and erosion control efforts
- Characterization of total mercury and methylmercury in Stockton waterbodies and stormwater discharges

### **Mercury Plan Components**

#### ***Public Outreach***

The goal of public outreach is to promote public awareness about mercury pollution prevention, as well as inform the public of the health risk of mercury contamination in fish and Department of Health Services (DHS) fish consumption advisories. Activities include:

- Public outreach programs, including classroom and community presentations and Earth Day Festival participation (see PO3 and PO4)
- Webpage providing mercury-specific information (City and County) (see PO3)
- Coordination with the household hazardous waste collection programs to inform the public about proper disposal of mercury-containing products (see PO1)

#### ***Commercial and Industrial Outreach***

The Permittees provide pollution prevention information for businesses, with a focus on minimizing pollutants in stormwater runoff. Fact sheets detailing BMPs specific to auto shops, dry cleaners, equipment rental shops, and restaurants are distributed and are available online.

- Information specific to each business, listing products that contain mercury, along with proper handling and disposal procedures, will be added to business-specific fact sheets (see PO5)
- City and County inspections of commercial and industrial operations will include a discussion regarding mercury-containing products, along with proper handling and disposal procedures (see IC2)

### ***Municipal Operations***

The Permittees are required to identify the extent of their use of mercury containing products. This will be accomplished through a mercury use survey, administered to municipal departments. The Permittees will do the following:

- Develop and administer a survey to identify the types of mercury-containing products used by municipal departments, and will report the results
- Identify products with a potential to enter stormwater runoff and determine possible alternative products, or proper disposal procedures
- Develop guidelines for a mercury policy to require elimination of mercury from municipal operations when possible, and to ensure the proper management of mercury-containing products

### ***Erosion Prevention BMPs***

Sediment-associated elemental mercury from historic mining activity is a prevalent mercury source within the Central Valley. Erosion control BMPs will be implemented to avoid increased erosion and transport of mercury-contaminated soil into receiving waters via runoff.

### ***Mercury Characterization Monitoring***

The Permit requires monitoring to characterize the concentrations and loads of methylmercury entering the Delta from SUA runoff. Characterization studies will focus on total and methylmercury concentrations in receiving waters and discharges (including detention basins). The objective of the Mercury Plan (**Appendix I-3**) and the Mercury Monitoring Plan (**Appendix I-4**) at this stage is to conduct baseline monitoring to determine the methylmercury and total mercury concentrations and loads discharged to the Delta by the SUA.

The specific monitoring activities are outlined below:

- A combination of discharge outfalls, major upstream tributaries of the SUA and/or downstream locations will be monitored for total mercury, methylmercury, and suspended sediment
- Three storm events and two dry weather events will be monitored each year for three years, including a range of storm intensities
- The instantaneous discharges will be estimated at the sampled locations during the time of sampling, and used to estimate the annual discharge volumes from the Stockton area within each watershed

## Mercury Plan Implementation Schedule

Mercury Plan Component	Type of Component <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	Parks and Recreation	City Attorney
Monitor methylmercury and total mercury	N																					P						
Public Outreach																												
Modify City's website to include information re: mercury	N																					P						
Coordinate with HHW Program to publicize mercury-containing product information and disposal	E																					P				S		
Commercial and Industrial Outreach																												
Distribute fact sheet for businesses	N																					P						
Business inspections	E																					P						
Track commercial and industrial business' participation in UWR and CESQG programs	N												X								X	P						

### Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March (wet events); Q2 = April-June (wet events); Q3 = July-Sep (dry events); Q4 = Oct-Dec (wet events)

3. P = Primary Responsibility; S = Secondary Responsibility

X = Plan component will be implemented during this quarter.  = Plan component will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

## Mercury Plan Implementation Schedule (cont.)

Mercury Plan Component	Type of Component <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	Parks and Recreation	City Attorney
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2							
Municipal Operations																												
Develop survey to identify use of mercury-containing products	N								X													P				S		
Administer survey	N																	X				P				S		
Develop recommendations for City Departments/Divisions	N										X											P				S		
Implement recommendations	N																					P	S			S		
Track mercury-containing products disposed through the HHW and e-waste collection events	C									X				X				X				P						
Estimate increases in mercury loads in runoff from construction and projected future development	N																		X			P						
Develop annual urban runoff mercury load calculations	N									X				X					X			P						
Collaboration with Delta MS4s and tracking regional mercury programs	N									X				X				X				P						
Coordinate with Regional Water Board staff to assess air pollution sources to mercury in stormwater	N													X					X			P						
Erosion/Sediment Control																												
Implement Sediment/Erosion Control BMPs	C																					P				P		

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March (wet events); Q2 = April-June (wet events); Q3 = July-Sep (dry events); Q4 = Oct-Dec (wet events)

3. P = Primary Responsibility; S = Secondary Responsibility

X = Plan component will be implemented during this quarter.  = Plan component will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

## LOW DISSOLVED OXYGEN PLAN

### Description

The Low Dissolved Oxygen Plan will address dissolved oxygen (DO) impairment of the following water bodies:

- Smith Canal
- Mosher Slough
- Five-Mile Slough
- Lower Calaveras River
- Mosher Slough
- Stockton DWSC near McLeod Lake (Stockton Channel)
- Mormon Slough

A previous report accepted by the Regional Water Board found that urban runoff did not appear to be the cause of low DO in Smith Canal. Instead, the report asserted that impairment was caused by sediment oxygen demand which resulted from sediments being disturbed and resuspended during storm events. The Regional Water Board responded to the report by requiring additional monitoring. Specifically, the Permittees are directed to identify areas and activities which contribute to low DO in all listed receiving waters. Possible causes of low DO include unsewered areas within the SUA, natural vegetation, animal and bird waste, discharges of food wastes, and direct discharges from the sanitary sewer due to overflows and blockages.

### Plan Implementation

Smith Canal will be monitored for one additional year and the Calaveras River, each of the sloughs, and the Stockton Channel near McLeod Lake will be monitored for two years. With the exception of Smith Canal and Mormon Slough, each waterbody will be sampled at two urban discharge sites and two receiving water sites. The first urban discharge site was chosen to discharge from a large catchment area located as close to the eastern SUA boundary as possible. The second urban discharge site was chosen to discharge from a large catchment area located as close as possible to the waterbody's confluence with the DWSC. In general, receiving water sites near the SUA boundary will represent upstream urban water quality and water quality leaving the SUA. Receiving water sites, however, are limited to locations that consistently have sufficient water column depth to support *in-situ* water quality monitoring.

During the sampling terms for each waterbody, two storm events per year and one grab sample per month will be analyzed for the following:

- |                             |                            |
|-----------------------------|----------------------------|
| • Biochemical Oxygen Demand | • Total Ammonia-Nitrogen   |
| • Chemical Oxygen Demand    | • Nitrate and Nitrite as N |
| • DO                        | • Ortho Phosphate          |
| • Total Suspended Solids    | • Total Phosphorus         |

Field analysis will be performed to measure EC, salinity, turbidity, and total dissolved solids. Based on data collected, a final report will be submitted to the Regional Water Board by December 1, 2012. The report will identify areas and activities that contribute to low DO, will recommend BMPs to address these issues and areas, and will include a schedule for the implementation of the BMPs.

The complete Low Dissolved Oxygen Monitoring and Assessment Work Plan (Low DO Plan) is attached as **Appendix I-5**.


### **Deep Water Ship Channel Bubbler System BMP Effectiveness Assessment**

In conjunction with sampling for the Low DO Plan, the effectiveness of a BMP that has been identified as increasing DO in the DWSC will also be assessed. Interspersed along the reach of the Stockton Channel from McLeod Lake to the I-5 overpass are eight laterals which extend from the south shore of the Stockton Channel roughly 75% across the Stockton Channel along its bottom. The laterals are pipes with 1/16" diameter holes in them every three feet that diffuse air into the water column. The system was originally designed by HDR Engineering (HDR) to address blue-green algae problems in the waterway. At the time of the project, DO was considered adequate, but significant temperature stratification was a concern. After investigating chemical, biological, and physical solutions to this problem, HDR selected this "bubbler" system to increase circulation. The bubbler system is operated continuously from April to October and intermittently for maintenance-only purposes from November to March. Current DO monitoring in the Stockton Channel has shown that DO increases when the bubbler system is turned on.

Stockton Channel monitoring, as outlined in the Low DO Plan Implementation section, will be used to assess the effectiveness of the bubbler system in minimizing low DO events. In addition to this monitoring, water column profiling of temperature may also be conducted to assess the bubbler system's effect on previously observed temperature stratification. More information is included in **Appendix I-5**.

## Low Dissolved Oxygen Plan Implementation Schedule

Low Dissolved Oxygen Plan Component	Type of Component <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>							
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	Parks and Recreation	City Attorney	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
Dissolved Oxygen Monitoring <sup>4</sup>																													
Smith Canal	E																						P						
Mosher Slough	N																												
Lower Calaveras River	N																						P						
Stockton DWSC near McLeod Lake (Stockton Channel)	N																						P						
Five-Mile Slough and Mormon Slough	N																						P						

- Notes:
1. C = Continue; E = Enhance; N = New
  2. Q1 = Jan-March (wet events); Q2 = April-June (wet events); Q3 = July-Sep (dry events); Q4 = Oct-Dec (wet events)
  3. P = Primary Responsibility; S = Secondary Responsibility
  4. Pending budget approval, monitoring scheduled for 2009-2010 may be initiated in fiscal year 2010-2011.
- X = Plan component will be implemented during this quarter.  
 = Plan component will be completed on an ongoing basis or during the specified timeframe.  
MUD = Municipal Utilities Department

## Section 10

# Program Implementation, Assessment, and Reporting

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### OVERVIEW

The City is actively and adaptively managing the SWMP through the implementation, assessment, and reporting of the Program Elements and the related Control Measures and Performance Standards. Each of these aspects is summarized below.

### PROGRAM IMPLEMENTATION

The SWMP has been structured to identify the specific activities that must be implemented as well as the responsible party for implementing the activities. This has been accomplished through the establishment of Control Measures and Performance Standards. However, some Control Measures and Performance Standards require a series of tasks to be undertaken in order to complete them. Therefore, progressive implementation of the Performance Standards throughout the Permit term will be necessary in order to completely implement the Program Elements.

Successful implementation of the SWMP also requires an extensive training effort by the City to ensure that its employees understand the Stormwater Program and conduct their activities in a manner to minimize pollutants from stormwater discharges. The City's proposed training effort is described within each of the SWMP Program Elements.

### Performance Standards

Each Program Element described in the SWMP has a list of associated Control Measures that address activities required by the Permit. The City will follow these Control Measures and implement the associated Performance Standards (i.e., the specific efforts outlined to complete the Control Measures). The Performance Standards will be assessed annually to determine whether they are effective or should be modified.

### Assessment Tasks

Assessment tasks have also been identified for each Control Measure. The assessment tasks identify the data that need to be collected in order to document the City's activities and to aid in assessing the effectiveness of the Control Measures. These data will be compiled and reviewed each year to assess trends, improvements, and data gaps.

### Annual Work Plan

An Annual Work Plan will be submitted to the Regional Board by **April 1** of each year. The Annual Work Plan will summarize the proposed activities that the City will undertake during the next fiscal year (July 1 – June 30). While the Annual Work Plan will generally follow the Control Measures and Performance Standards outlined within the SWMP, it may also include additional activities that the City has identified as being necessary during the previous reporting period.



## EFFECTIVENESS ASSESSMENT

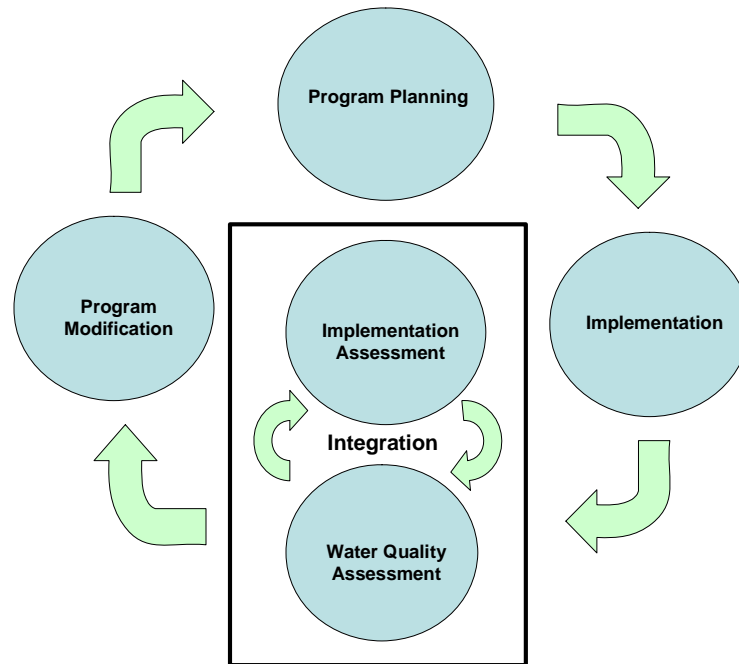
Paramount to the success of the stormwater program is the need for the City to evaluate the effectiveness of its program by compiling and reviewing program data. As a part of this process, the City is currently assessing effectiveness as a part of the annual reporting process (see each of the Program Elements) and has identified an effectiveness assessment strategy as a part of the SWMP. However, the strategy will continue to build upon the results of the annual reports and initial program effectiveness assessments and address the stormwater program in terms of achieving both programmatic goals (i.e., raising awareness, changing behavior) and environmental goals (i.e., reducing pollutant discharges, improving environmental conditions). Different tools will be used to assess these different types of goals or outcomes. In refining the long-term strategy, the City will consider efforts by CASQA to identify methods for assessing the effectiveness of a stormwater program.<sup>1</sup> The City will incorporate these guidelines as applicable in the effectiveness assessment strategy.

Generally, program evaluations will be conducted by comparing how well the City implemented Program Elements, the completion of which are likely to lead to stormwater quality improvement. If correlations can be established between the program (e.g., conducting a survey, assessing BMP implementation) and water quality, it may allow predictions of water quality resulting from implementation of certain types of programs. Over time, correlating water quality improvement to programmatic results may help to identify the most expedient and cost-effective approaches to planning and assessing the program. As a part of the program effectiveness assessment, the City will track the long-term progress of achieving improvements in receiving water quality.

By utilizing the iterative process and conducting effectiveness assessments, the City can use the information gained to adapt its programs and ensure that the resources expended are providing commensurate benefit and are protective of water quality. The iterative process is illustrated in **Figure 10-1**; the points at which effectiveness assessments (implementation and water quality) are conducted are also identified. The results of these assessments and proposed modifications to the SWMP will be provided to the Regional Water Board on an annual basis as a part of the reporting process.

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<sup>1</sup> California Stormwater Quality Association (CASQA), Municipal Stormwater Program Effectiveness Assessment Guidance, March 2007.



**Figure 10-1. Iterative Process and Effectiveness Assessments Outcome Levels**

Based on the program evaluation and experience in the implementation of the various Control Measures, the SWMP may need to be modified, revised, or amended periodically in order to respond to changing conditions or to incorporate more effective approaches. In addition, the City may also need to revise the SWMP in order to comply with regional/watershed-specific requirements or waste load allocations developed and approved pursuant to the TMDL process. Proposed revisions will be provided to the Regional Water Board as a part of the Annual Report submittal.

## REPORTING

The City of Stockton and County of San Joaquin will coordinate their efforts in developing standardized formats for all reports that are required pursuant to the stormwater Permit. This will include annual reports, fiscal analysis reports, and program effectiveness reports. Pursuant to the federal regulations, all work plans and reports will be signed and certified.

### Annual Report

An annual report will be submitted in both electronic and hard copy to the Regional Water Board by **September 1** of every year. The purpose of the Annual Report is to document the status of the SWMP implementation, present results from activities implemented, provide a compilation of deliverables and milestones reached during the previous fiscal year (July 1 – June 30), and report on the overall status and effectiveness of the SWMP. Updates, improvements, or revisions to the SWMP may also be proposed in the Annual Report.

The Annual Report will include:

- An Executive Summary discussing the effectiveness of the SWMP in reducing stormwater pollution to the MEP;
- Summary of activities conducted by the City (including an up-to-date organizational chart) and a comparison of program implementation results to SWMP performance standards;
- Status of compliance with permit requirements including implementation dates for all time-specific deadlines. If the permit deadlines were not met, the City shall identify the reasons why the requirement was not met and how it will be met in the future, including projected implementation dates;
- Identification of BMPs and discussion of their effectiveness;
- Summary of monitoring data, including the identification of water quality improvements or degradation, and recommendations for improvements to the SWMP based on the monitoring results;
- Assessment of stormwater program with regard to applicable water quality standards, including the identification of water quality improvements or degradation;
- If the water quality data indicate that the discharges are causing or contributing to exceedances of applicable water quality standards, the report shall include a discussion of how the Permittees plan to comply;
- A summary of any Reports of Water Quality Exceedances (RWQEs) that have been completed throughout the year and a status update for those in progress;
- A summary of each water-quality based plan (Pathogen Plan, Pesticide Plan, etc.) that includes the data collected in the assessment, all supporting documentation for the evaluation of the data (graphs, charts, etc.), and documentation of the QA/QC procedures.
- Estimate of annual pollutant loads for each sampling station;
- Maps, photographs, and description of monitoring station locations;
- Effectiveness assessment for each program element. The assessment will build upon each consecutive year, identify any necessary modifications, and identify the primary questions that are being answered;
- Recommendations to improve the monitoring program, BMPs, Performance Standards, and the SWMP; and
- Operating data from all City or County pump stations as an appendix in electronic format only to assist in calculating flow volumes as needed.

## **Report of Waste Discharge**

The municipal stormwater Permit expires on December 6, 2012. As a result, the City and County are required to submit a Report of Waste Discharge (ROWD) to the Board 180 days prior to its expiration (June 6, 2012). The ROWD serves as the application for the re-issuance of the Permit.

## Implementation Schedule

Control Measure and Performance Standards	Type of Standard <sup>1</sup>	Implementation Schedule <sup>2</sup>																				Responsibility <sup>3</sup>						
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012				MUD – Stormwater Management	MUD – Engineering	MUD – Environmental Control	Community Development	Public Works	PW - Parks Division	City Attorney
Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2									
Program Implementation																												
Submittal of work plan (by April 1 each year)	C				X				X				X				X				X	P						
Evaluation/Assessment																												
Conduct effectiveness assessments	E					X				X				X				X				P						
Reporting																												
Review/revise standardized annual reporting format	C			X	X	X				X				X				X				P	S		S	S	S	
Submittal of annual report (by Sep 1 each year)	C					X				X				X				X				P	S		S	S	S	
Submittal of ROWD	C																			X	P							

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter. ☐ = Performance standard will be completed on an ongoing basis or during the specified timeframe.

MUD = Municipal Utilities Department

Resolution No. **08-0377**

## STOCKTON CITY COUNCIL

### RESOLUTION AUTHORIZING THE CITY MANAGER TO EXECUTE A MEMORANDUM OF UNDERSTANDING BETWEEN CITY OF STOCKTON AND SAN JOAQUIN COUNTY PERTAINING TO STORMWATER PERMIT OBLIGATIONS

The City of Stockton and the County of San Joaquin entered into an agreement to jointly administer the National Pollutant Discharge Elimination System Permit issued by the California Regional Water Quality Control Board, Central Valley Region on December 6, 2007; and

The City and County have established Stormwater Management Programs to reduce pollutants entering waters of the State; and

The Memorandum of Understanding states that the parties will share program administration and costs required to comply with the National Pollutant Discharge Elimination System Stormwater Permit, where practical; now, therefore,

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF STOCKTON, AS  
FOLLOWS:

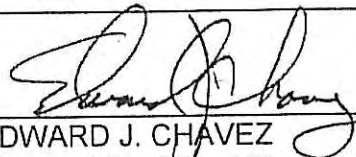
1. This action does not constitute a "project" under the California Environmental Quality Act, and is otherwise categorically exempt under the State of California Environmental Quality Act Guidelines, Article 19, Section 15301, Class 1.

2. The Memorandum of Understanding between the City of Stockton and the County of San Joaquin as Co-Permittees in National Pollutant Discharge Elimination System Permit is approved.

3. The City Manager is directed to execute a Memorandum of Understanding, in substantially the form as presented in Exhibit "A" attached hereto and incorporated herein by this reference.

4. The City Manager is authorized and directed to take whatever actions are appropriate to carry out the purpose and intent of this Resolution.

PASSED, APPROVED, AND ADOPTED SEP 16 2008

  
EDWARD J. CHAVEZ  
Mayor of the City of Stockton

ATTEST:

  
KATHERINE GONG-MEISSNER  
City Clerk of the City of Stockton



City Atty:  
Review  
Date September 10, 2008

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# Before the Board of Supervisors

County of San Joaquin, State of California

B-08- 1016

MOTION: **Mow/Gutierrez/5**

**BOARD ORDER APPROVING A MEMORANDUM OF UNDERSTANDING**  
**BETWEEN THE CITY OF STOCKTON AND SAN JOAQUIN COUNTY**  
**AS NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM CO-PERMITTEES**

THIS BOARD OF SUPERVISORS HEREBY approves the Memorandum of Understanding between the City of Stockton and San Joaquin County as National Pollutant Discharge Elimination System Co-Permittees; and

FURTHER, authorizes and directs the Chairman of the Board of Supervisors to sign the Memorandum of Understanding.

I HEREBY CERTIFY that the above order was passed and adopted on 9/16/08,  
by the following vote of the Board of Supervisors, to wit:

AYES: **Ruhstaller, Ornellas, Gutierrez, Mow, Vogel**

NOES: **None**

ABSENT: **None**

ABSTAIN: **None**

LOIS M. SAHYOUN  
Clerk of the Board of Supervisors  
County of San Joaquin  
State of California

**Lois Sahyoun**





**MEMORANDUM OF UNDERSTANDING  
BETWEEN  
THE CITY OF STOCKTON AND THE COUNTY OF SAN JOAQUIN  
AS Co-PERMITTEES**

**in  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT**

This Memorandum of Understanding (MOU) is made and entered into this 16<sup>th</sup> day of Sept 2008, 2008, by and between the COUNTY of San Joaquin, a political subdivision of the State of California, (COUNTY) and the CITY of Stockton, a municipal corporation, (CITY).

WHEREAS, this National Pollutant Discharge Elimination System (NPDES) MOU is entered into by the CITY and COUNTY, collectively the hereinafter referred to as Permittees, to collaborate and to promote consistency in the administration and management of the National Pollutant Discharge Elimination System Permit (Permit) and Program;

WHEREAS, this MOU defines the coordination and collaboration of resources for regional monitoring, public outreach/education, and planning and coordination of other activities the Permittees are required to implement for the Permit and Program;

WHEREAS, Congress in 1987 amended Section 402 of the Federal Clean Water Act requiring the United States Environmental Protection Agency to establish permit regulations for storm water discharges;

WHEREAS the United States Environmental Protection Agency regulations designated the CITY as a municipality that was required to obtain a National Pollutant Discharge Elimination System Permit for discharge of storm water into the waters of the United States;

WHEREAS, the United States Environmental Protection has delegated to the State of California the authority to issue NPDES Permits and the State of California has given Regional Water Quality Control Boards the responsibility to issue NPDES Permits;

WHEREAS, the Central Valley Regional Water Quality Control Board granted the Permittees their first NPDES Permit (Order No. 95-035 CA0082597) in February 1995 to jointly manage the Stockton area urbanized. In October 2002 Permittees were granted a second Permit (Order No. R5-220-0181-CAS083470) through December 5, 2007. On December 6, 2007, Permittees were granted their current and third and current Permit (R5-2007-0173-CAS083470);

WHEREAS the Permittees have jurisdiction over and maintenance responsibilities for storm drains in the Stockton Urbanized Area and thereby have joint responsibilities and benefits under the Permit and are required to enter into this MOU as a condition of obtaining and continuing its Permit;

WHEREAS, this MOU supersedes the MOU between the CITY AND THE COUNTY dated January 10, 1995 and the Cost Sharing Agreement dated August 19, 1997; and

**NOW, THEREFORE,** the CITY and COUNTY agree as follows:

I. Filing Status

The Permittees will file the applications for future stormwater permits as co-Permittees. The CITY and COUNTY will each be a co-permittee. Each of the Permittees shall be entitled to review each other's applications and addendums to the applications at least thirty (30) days before the submission to the Regional Water Board and cooperatively expedite the finalization of the applications.

II. Term of MOU

This MOU shall commence upon signature acceptance and shall be effective through the termination date of the Permit (Order No. R5-2007-0173/NPDES No. CSA083470) unless extended by formal action of the CITY and COUNTY. Any change or amendments to this MOU are subject to Clause X. Amendment. Any termination to this MOU is subject Clause IX. Termination.

III. Delegation of Responsibilities:

*Shared Responsibilities*

- A. CITY shall perform for the Permittees water quality monitoring required within the monitoring and reporting program and water quality based programs for Permit compliance including monitoring except the dry weather field screening. Any consultants, contractors, and/or laboratories retained to conduct the monitoring and reporting shall be contracted by the CITY, subject to review and written authorization by the COUNTY Public Works Department of the budget and the scope of work in advance of entering in the contract/agreement. A copy of the executed contract/agreement will be provided to the COUNTY for information. The monitoring and reporting program and water based program documentation will be submitted to the COUNTY for its records.
- B. CITY shall manage for the Permittees the data and information collected as a part of the water quality monitoring program and shall analyze the data for submittals required or requested by the Regional Water Board. Any consultants or contractors retained for data analysis or management services will be contract by the CITY, subject to review and written authorization by the COUNTY Public Works Department of the budget and the scope of work in advance of entering into the contract/agreement. A copy of the executed contract or agreement will be submitted to the COUNTY for its records/
- C. Permittees shall work cooperatively to negotiate, develop, implement and update uniform criteria/guidance documents for the NPDES Program.
- D. Permittees shall jointly cooperate to enforce storm water regulation compliance for areas where there is jurisdictional overlap or coexistence.



- E. Permittees shall cooperatively and continuously evaluate the business practices, resources and efficiencies of joint responsibilities of the NPDES Program

*Individual Responsibilities:*

*Each Permittee:*

- F. is solely responsible for compliance with the Permit within its respective jurisdictions.
- G. is a legal entity and has the authority to develop, administer, implement, and enforce the NPDES program or the related within its own jurisdictions.
- H. Is solely responsible for the records management required by the Permit or agencies records management requirements whichever is greater, except as noted in Clause III. B., above.
- I. Shall prepare its respective annual work plans and operating budgets for each fiscal year (July 1 – June 30) for its individual responsibilities. A copy of the work plan and budget shall be exchanged between Permittees, upon request, for information purposes only.
- J. Shall prepare and submit annual reports and any other information necessary for the individual implementation of the NPDES program to the Regional Water Board.
- K. Shall perform the dry weather field screening for permit compliance within its respective jurisdictions and report the results and any follow up actions to the Regional Water Board as a part of the annual reports.
- L. Shall manage its data and information required by the individual responsibilities of the Permit.
- M. Shall maintain storm water infrastructure maps for its respective jurisdictions.
- N. Shall implement the Illicit Discharge, Detection, and Elimination Program within its respective jurisdictions and develop, implement and enforce local codes and ordinances.
- O. Shall implement a facility inspection Program within its respective jurisdictions for the storm waster infrastructure in accordance with the Permit and SWMP.
- P. Shall cooperate in sharing information to effectuate best business practices. The Permittees shall continually evaluate the business practices and needs of the parties to maintain business efficiency.

- Q. Shall prepare a Report of Waste Discharge as required in the Permit for its respective jurisdiction and individual responsibilities. A copy of the Report of Waste Discharge shall be provided to each Permittee as requested.

#### IV. Cost Sharing

Permittees shall discuss, negotiate and prepare an annual shared cost budget and scope of work at the beginning of each fiscal year (July 1-June 30). The shared costs shall include, but are not limited to, consultants, contractors, laboratory services, equipment, supplies, advertisements, events and printing. The Permittees' program administrative costs are not shared costs, unless otherwise determined by mutual written agreement after budget adoption by the Permittees and amended to the annual budget.

The following cost share percentage contribution algorithm shall be in effect from execution of this MOU through June 30, 2009 or extended by mutual written agreement. The cost share percentage contribution shall be applied to any and all shared costs within the annual shared budget or amended to the budget by mutual written agreement. The County shall calculate the cost share percentage contribution using the following algorithm:

$$\frac{[(\text{Permittee Phase I Area by Acreage})/(\text{Total Phase I Area by Acreage}) + (\text{Permittee Phase I Population}/\text{Total Phase I Population})]/2 \times 100.}$$

"Phase I Area by acreage" shall be based upon County generated GIS data and "Permittee Phase I Population in Phase I" jurisdiction shall be based upon current US Census data. The City shall review the percent contribution and concur in its application for invoicing.

Beginning July 1, 2009, unless extended by mutual written agreement as reference above, the cost share percentage contribution algorithm shall be based on mutually agreeable storm drain flow data as determined by land use for the year prior or other algorithm or other mutually agreed to algorithm by Permittees.

#### V. Invoicing

CITY shall invoice the COUNTY quarterly based upon the costs generated from Clause IV. Cost Sharing.

#### VI. Other Collaborative Arrangements for Compliance

Nothing in this MOU shall prevent the CITY and/or COUNTY from entering into agreements/MOUs with each other or with other parties to obtain to provide services related to implementation of the Permit or MOU obligations. Such service agreements do not relieve the CITY and/or COUNTY from their obligations under the Permit or this MOU. Obligations under this MOU will supersede any conflicting obligations of separate agreements.

VII. Indemnification

The Permittees shall indemnify, defend and hold harmless each other, its elected officials, officers and employees in connection with any claims, imposition of penalties or any enforcement or other actions, including, but not limited to those brought by federal, state or local agencies having regulatory jurisdiction over the subject matter of this MOU. Where any legal action is deemed necessary to enforce any provision of this MOU, the prevailing Permittee shall be entitled to receive from the other Permittee enumeration.

VIII. Precedence of State or Federal Guidelines or Laws

The terms of all applicable federal and state guidelines, as presently written or as changed during the life of this MOU are hereby incorporated by reference and made part of this MOU and take precedence over any inconsistent terms of this MOU. Inconsistencies between the terms of the Permit and final State or Federal regulations are not applicable unless mandated by court order.

IX. Termination

This MOU may be terminated by mutual written consent of both Permittees with 90 days advance notice. No term or provision hereof shall be deemed waived and no breach excused unless such waiver or consent shall be in writing and agreed to by both Permittees.

X. Amendments to the MOU

No Permittee can alter, revise or amend the MOU without mutual written consent by both parties. Amendments to the MOU shall be prepared and become an attachment to the MOU.

XI. Novation

This MOU shall replace the *Memorandum of Understanding for Filing as Co-Permittees for a National Pollutant Discharge Elimination System Permit* dated January 10, 1995 and the *Cost Sharing Agreement between the CITY of Stockton and the COUNTY of San Joaquin for the Joint CITY-COUNTY National Pollutant Discharge Elimination System Permit Program* dated August 19, 1997.

IN WITNESS THEREOF, this Memorandum of Understanding is executed based upon the date of the last signature applied hereto.

**CITY OF STOCKTON**

*APPROVED AS TO FORM:*

  
\_\_\_\_\_  
CITY ATTORNEY

Date: 10-3-08

**CITY OF STOCKTON**

  
\_\_\_\_\_  
By CITY MANAGER (CITY)

Date: 10/14/08

**CITY OF STOCKTON**

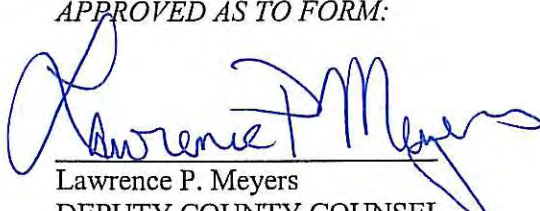
ATTEST:

  
\_\_\_\_\_  
CITY CLERK


Date: 10/15/08

**SAN JOAQUIN COUNTY**

*APPROVED AS TO FORM:*

  
\_\_\_\_\_  
Lawrence P. Meyers  
DEPUTY COUNTY COUNSEL

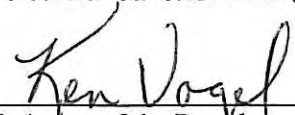
*RECOMMENDED FOR APPROVAL*

  
\_\_\_\_\_  
for By PUBLIC WORKS DIRECTOR  
Thomas R. Flinn

Date: SEP 16 2008



**COUNTY OF SAN JOAQUIN**

  
\_\_\_\_\_  
Chairman of the Board  
Of Supervisors of San Joaquin COUNTY



**CITY OF STOCKTON**  
**OFFICE OF THE CITY ATTORNEY**  
CITY HALL  
426 North El Dorado Street  
Stockton, CA 95202-1997  
Telephone (209) 937-8333  
Facsimile (209) 937-8898

June 6, 2008

Pamela Creedon, Executive Officer  
California Regional Water Quality Control Board  
Central Valley Region  
11020 Sun Center Drive #200  
Rancho Cordova, CA 95670-6114

**Subject: Legal Authority to Implement and Enforce the Requirements of 40 CFR  
122.26(d)(2)(i)(A-F) and RWQCB Order R5-2002-0181**

The City of Stockton submits this statement in its capacity as a Permittee under RWQCB Order R5-2007-0173 ("Order") in accordance with Section D. 8 of that Order.

**1. Legal Authority Statement**

The undersigned City Attorney for the City of Stockton does hereby state that the City has or will timely obtain adequate legal authority to comply with the legal requirements imposed upon the City under RWQCB Order No. R5-2007-0173, consistent with the requirements set forth in the regulations to the Clean Water Act, 40 CFR [Code of Federal Regulations] 122.26(d)(2)(i)(A-F), and to the extent permitted by State and Federal law and subject to the limitations on municipal action under the California and United States Constitutions.

**2. Status of Implementation**

The City has not yet implemented some of the requirements imposed by the Order that have future effective dates and/or that are incremental to the requirements imposed by the previous Order. However, the City has or will have adequate legal authority, as envisioned by the Clean Water Act and applicable regulations, to implement such requirements by the mandated dates, and to enforce such additional requirements after they have been implemented, all to the extent permitted by California and Federal Law and subject to the limitations on municipal action under the constitutions of California and the United States.

**3. Ordinances**

Below you will also find a description of the various City Ordinances related to urban runoff. This list also identifies the City Department responsible for enforcement.

Stockton Municipal Code, Chapter 7, Part VIII Stormwater Management and Discharge Control, Sections 7-800 through 7-860.2 (the "City Water Quality Ordinance"). This ordinance is the City's primary vehicle for protecting and enhancing the quality of receiving waters pursuant to the Clean Water Act. This ordinance is enforced by the Municipal Utilities Division.

Stockton Municipal Code, Chapter 13, Part V Grading and Erosion Control, Sections 13-500 through 13-513. This ordinance addresses requirements applicable to construction activity, with the goal being to reduce or eliminate the disposition of sediments from construction sites into storm run-off with the goal being the protection and enhancement of the quality of receiving waters in accord with the Clean Water Act. This ordinance is enforced by the Municipal Utilities Division.

Stockton Municipal Code, Chapter 16, Article 3, Division 16-335 Water Waste Prohibited, Sections 16-335.050 through 16-335.070. This ordinance requires that development provide and maintain landscaping so as to prevent excessive run-off of irrigation water. This ordinance is enforced by the Community Development and Municipal Utilities Departments.

#### Enforceability

The City has the authority under the Constitution and statutes of the State of California to enact and enforce these ordinances, and because these ordinances were duly enacted they are fully enforceable in accordance with their respective terms. These ordinances contain specific enforcement provisions and/or are enforceable under the generally applicable enforcement provisions of the Stockton Municipal Code. Violation of the Stockton Municipal Code is generally a misdemeanor (Stockton Municipal Code section 1-010A), however, abatement orders (Stockton Municipal Code sections 7-859, et seq.) and administrative penalties (Stockton Municipal Code section 1-040, et seq. and 7-846.1, et seq.) may also be used where appropriate.

#### Implementation and Challenge

Some of these ordinances are implemented through permit programs and some are implemented as regulatory programs. Under each ordinance, one or more City departments or department Directors are authorized and directed in each ordinance to take the actions contemplated by the ordinance, e.g., to consider evidence and make findings, to issue or deny permits, to impose conditions on projects, to inspect, to take enforcement action, etc.

The City Water Quality Ordinance is the principal City ordinance addressing urban runoff. This ordinance is regulatory, and applies to all development projects and to all new and existing facilities in the City's jurisdiction, whether or not a City permit or approval is required. The Water Quality Ordinance contains discharge prohibitions and BMP requirements. This ordinance also authorizes the City to require the submission of stormwater pollution prevention plans.

Other City ordinances require compliance with the Water Quality Ordinance as a condition for issuance of a City permit. For example, the Public Works and Planning Department require proof of compliance with the Water Quality Ordinance before discretionary approvals are given or recommended. These departments may also impose specific conditions of approval consistent with the Water Quality Ordinance.

All City environmental ordinances are also implemented in part through the application of the CEQA process to proposed projects.

Although proposed City ordinances are not subject to appeals, they are subject to a public notice and comment process prior to enactment. Enacted City ordinances can be challenged by the timely filing of writs of mandate in Superior Court. The referendum and initiative process can also be used to challenge enacted ordinances. The imposition of abatement orders, administrative penalties and fines under these ordinances (where applicable) can be appealed within the City organization and, once all administrative remedies have been exhausted, to the courts. Trial court decisions to impose civil penalties or to grant injunctive or other relief can also be appealed.

#### 5. Administrative and Legal Procedures

In addition to the above authority, the City has in place the following legal and administrative procedures to assist in enforcing the various urban runoff related Ordinances:

##### Administrative Remedies

- Notice of Non-Compliance/Notice of Violation
- Administrative Compliance Orders
- Cease and Desist Orders
- Stop work orders (for work requiring a City permit)
- Administrative penalties
- Permit revocation or withdrawal

##### Nuisance Remedies

- Public nuisance under State law
- City Nuisance abatement procedures

##### Criminal Remedies

- Citations / prosecution (misdemeanor or infraction explicitly authorized for grading violations and stormwater violations)
- Restitution

##### Equitable Remedies

- Injunctive relief under State law
- Declaratory relief under State law

##### Other Civil Remedies

- Federal law claims, e.g. CWA and RCRA Citizen Suits

Please contact Assistant City Attorney John Luebberke should you have any questions or need any additional information.



RICHARD E. NOSKY, JR.  
CITY ATTORNEY





# SANITARY SEWER OVERFLOW EMERGENCY RESPONSE PLAN

March 10, 2009  
(revised)



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## 1. OBJECTIVE

The City of Stockton's Sanitary Sewer Overflow Emergency Response Plan (SSOERP) is designed to ensure that every report of a sanitary sewer overflow (SSO) is dispatched to the appropriate response personnel so that the effects of the overflow can be minimized with respect to its adverse impacts on public health, the environment, and property. The source of the SSO shall be stopped and the spill contained as soon as possible. Notification and reporting to governmental agencies, affected residents and property owners shall be done in an appropriate time frame. All state and local regulations shall be observed and implemented in response and remediation procedures.

## 2. DEFINITIONS

**Category 1 SSO** – All discharges of sewage resulting from a failure in the sanitary sewer system that:

- Equal or exceed 1000 gallons; or
- Result in a discharge to a drainage channel and/or surface water; or
- Discharge to a storm drain pipe that was not fully captured and returned to the sanitary sewer system.

**Category 2 SSO** – All other discharges of sewage resulting from a failure in the sanitary sewer system.

**Online SSO Reporting System** – Online spill reporting system that is hosted, controlled, and maintained by the State Water Resources Control Board. The web address for this site is <http://ciwqs.waterboards.ca.gov>. This online database is maintained on a secure site and is controlled by unique usernames and passwords.

**Order** – State Water Resources Control Board Order No. 2006-0003-DWQ, Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.

**Private Lateral Sewage Discharges** – Sewage discharges that are caused by blockages or other problems within a privately owned lateral.

**Receiving Water** – Surface waters receiving discharge from stormwater conveyance systems.

**Sanitary Sewer Overflow (SSO)** – Any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs include:

- Overflows or releases of untreated or partially treated wastewater that reach waters of the United States;
- Overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and
- Wastewater backups into buildings and on private property that are caused by blockages or flow conditions within the publicly owned portion of a sanitary sewer system.

**Sanitary Sewer System** – Any system of pipes, pump stations, sewer lines, or other conveyances, upstream of a wastewater treatment plant headworks used to collect and convey wastewater to the publicly owned treatment facility. Temporary storage and conveyance facilities (such as vaults, temporary piping, construction trenches, wet wells, impoundments, tanks, etc.) are considered to be part of the sanitary sewer system, and discharges into these temporary storage facilities are not considered to be SSOs.

**Surface Waters** – Waters of the United States as defined in 40 CFR 122.2 such as navigable waters, rivers, streams (including ephemeral streams), lakes, natural ponds, lagoons, estuaries, man-made canals, ditches, wet meadows, wetlands, marshes, sloughs and water courses.

### 3. IMPLEMENTATION

The City shall take all feasible steps to eliminate SSOs. In the event that an SSO does occur, the City shall take all feasible steps to contain and mitigate the impacts of an SSO.

The City supervisor or highest level staff person on-site is responsible for using sound judgment in efforts to stop and contain the SSO as soon as possible, initiate proper notifications in accordance with an approved communication plan, and implement safe and effective measures to remediate the spill.

All SSOs shall be reported in accordance with State Water Resources Control Board Order No. 2006-0003-DWQ, Monitoring and Reporting Program, Statewide General Waste Discharge Requirements for Sanitary Sewer Systems; and State Water Resources Control Board Order No. WQ 2008-0002-EXEC, Amended Monitoring and Reporting Requirements for Statewide General Waste Discharge Requirements for Sanitary Sewer Systems; and amendments thereto.

The City shall ensure that up-to-date copies of the Sanitary Sewer Overflow Emergency Response Plan are readily available to sewer system operation and maintenance personnel at all times.

The Sanitary Sewer Overflow Emergency Response Plan shall include an SSO Field Procedures Manual (Attachment 5) with detailed field guidance procedures for handling all aspects of sanitary sewer overflow incidents.

The City shall ensure that SSO response personnel are properly trained in the use of the Sanitary Sewer Overflow Emergency Response Plan.

#### **4. REPORTING PROCEDURES**

##### **Category 1 SSOs**

All SSOs that meet the criteria for Category 1 SSOs shall be reported as specified in Section 6 – “NOTIFICATION REQUIREMENTS” as soon as:

- the City has knowledge of the discharge;
- reporting is possible; and
- reporting can be provided without substantially impeding cleanup or other emergency measures.

The City shall report the SSO to the Regional Water Quality Control Board and appropriate governmental agencies, including the California Emergency Management Agency (CalEMA) in accordance with California Water Code Section 13271, and San Joaquin County Environmental Health Department in accordance with California Health and Safety Code Section 5410 et seq.

The information reported shall include:

- Name and phone number of the person reporting the SSO;
- Responsible sanitary sewer system agency;
- Date and time of the SSO;
- Estimated volume of SSO;
- Location of the discharge;
- Name of the affected receiving water; and
- Whether the SSO is on-going at the time of the report.

A Sanitary Sewer Overflow Notification Log (Attachment 1) shall be completed for all Category 1 SSOs.

In addition, Category 1 SSOs shall be reported using the Online SSO Reporting System as soon as possible but no later than three (3) business days after the City is made aware of the SSO. Minimum information that shall be contained in the 3-day report shall include all information identified in the State Water Resources Control Board Order No. 2006-0003-DWQ, Monitoring and Reporting

Program, Statewide General Waste Discharge Requirements for Sanitary Sewer Systems; and amendments thereto. A final certified report shall be completed through the Online SSO Reporting System within fifteen (15) calendar days of the conclusion of SSO response and remediation. Additional information may be added to the certified report, in the form of an attachment, at any time.

In the event that the SSO Online Reporting System is not available, the City shall fax all required information to the appropriate Regional Water Quality Control Board office in accordance with the time schedules identified above. In such event, the City shall also enter all required information into the Online SSO Database as soon as practical.

### **Category 1 SSOs Discharged to a Drainage Channel or Surface Water**

For any SSO that results in a discharge to a drainage channel or a surface water, the City shall, as soon as possible, but not later than two (2) hours after becoming aware of the discharge, notify the Regional Water Quality Control Board, California Emergency Management Agency, and San Joaquin County Environmental Health Department.

As soon as possible, but no later than twenty-four (24) hours after becoming aware of the discharge to a drainage channel or a surface water, the City shall submit to the Regional Water Quality Control Board a certification that the California Emergency Management Agency, and San Joaquin County Environmental Health Department have been notified of the discharge (Attachment 4).

These requirements are specified in State Water Resources Control Board Order No. WQ 2008-0002-EXEC, Amended Monitoring and Reporting Requirements for Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.

### **Category 2 SSOs**

All SSOs that meet the criteria for Category 2 SSOs shall be reported using the Online SSO Reporting System within thirty (30) days after the end of the calendar month in which the SSO occurs.

### **Private Lateral Sewage Discharges**

All sewage discharges that meet the criteria for Private Lateral Sewage Discharges may be reported using the Online SSO Reporting System based

upon the City's discretion. If a Private Lateral Sewage Discharge is recorded in the Online SSO Database, the City shall identify the sewage discharge as occurring and caused by a private lateral, and a responsible party (other than the City) should be identified, if known.

### **Required Information**

At a minimum, the following mandatory information shall be included in the Online SSO Report prior to finalizing and certifying the report for each category of SSO:

#### **Category 2 SSOs:**

- Location of SSO by entering GPS coordinates;
- Applicable Regional Water Board, i.e. identify the region in which the SSO occurred;
- County where SSO occurred;
- Whether or not the SSO entered a drainage channel and/or surface water;
- Whether or not the SSO was discharged to a storm drain pipe that was not fully captured and returned to the sanitary sewer system;
- Estimated SSO volume in gallons;
- SSO source (manhole, cleanout, etc.);
- SSO cause (mainline blockage, roots, etc.);
- Time of SSO notification or discovery;
- Estimated operator arrival time;
- SSO destination;
- Estimated SSO end time; and
- SSO Certification. Upon SSO Certification, the SSO Database will issue a Final SSO Certification Number.

#### **Private Lateral Sewage Discharges (optional):**

- All information listed above (if applicable and known), as well as;
- Identification of sewage discharge as a private lateral sewage discharge; and
- Responsible party contact information (if known).

#### **Category 1 SSOs:**

- All information listed for Category 2 SSOs, as well as;
- Estimated SSO volume that reached surface water, drainage channel, or not recovered from a storm drain;

- Estimated SSO amount recovered;
- Response and corrective action taken;
- If samples were taken, identify which regulatory agencies received sample results (if applicable). If no samples were taken, NA shall be selected;
- Parameters that samples were analyzed for (if applicable);
- Identification of whether or not health warnings were posted;
- Beaches impacted (if applicable). If no beach was impacted, NA shall be selected;
- Whether or not there is an ongoing investigation;
- Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the overflow;
- CalEMA control number (if applicable);
- Date and time CalEMA was called (if applicable);
- Identification of whether or not County Health Officers were called; and
- Date and time County Health Officer was called (if applicable).

If there are no SSOs during the calendar month, the City shall provide, within thirty (30) days after the end of each calendar month, a statement through the Online SSO Reporting System certifying that there were no SSOs for the designated month.

### **SSOs Discharged to Private Lakes and Waterways**

In the event of an SSO potentially discharged to a private lake or waterway, the City shall notify the management company responsible for each effected lake or waterway. The management company will then determine appropriate response measures for each lake or waterway and will have the responsibility for performing such actions. Response measures may include isolating water supply pumps, posting warning signs around lakes/waterways, residential notifications, lake/waterway sampling, etc.

## **5. REPORT CERTIFICATION**

All final reports shall be certified by an authorized person as required by State Water Resources Control Board Order No. 2006-0003-DWQ, Statewide General Waste Discharge Requirements for Sanitary Sewer Systems; and amendments thereto.

## 6. NOTIFICATION REQUIREMENTS

### Category 1 Sanitary Sewer Overflow Notifications

Organization / Agency	Contact / Telephone
City of Stockton, Municipal Utilities Dept.: Technical Services Supervisor	Richard Stiffler (209) 993-3274 (cell) (209) 937-8740 (office) (209) 477-7399 (home)
City of Stockton, Municipal Utilities Dept.: Regulatory Compliance Officer, <b>OR</b>  Assistant Director, <b>OR</b>  Director	Laura Lazzelle (209) 937-8852 (office) (209) 423-6244 (cell) (209) 952-4439 (home) Jeff Willett (209) 8734 (office) (209) 858-8824 (cell) (925) 778-4180 (home) Mark Madison (209) 937-8700 (office) (209) 993-1325 (cell) (209) 334-2117 (home)
City of Stockton, City Manager's Office: Public Information Officer	Connie Cochran (209) 937-8827 (office) (209) 629-1251 (cell) Fax: (209) 937-7149
City of Stockton, City Manager's Office: Deputy City Manager	Laurie Montes (209) 937-8843 (office) (209) 612-6143 (cell) Fax: (209) 937-7149
California Emergency Management Agency	(800) 852-7550
Regional Water Quality Control Board	(916) 464-4825 Ann Hopkinson
San Joaquin County Environmental Health	(209) 468-3420
CA Department of Fish and Game (1)	(916) 324-6256 Fax (M-F 8-4) (916) 358-0330 Fax (after hours)
Alameda County Water District (1)	(510) 656-3426 Fax (M-F 8-4) (510) 657-5944 Fax (after hours)
Alameda Co. Flood Control Dist., Zone 7 (1)	(925) 447-1188 Fax
Contra Costa Water District (1)	(925) 689-5936 Fax
Santa Clara Valley Water District (1)	(408) 395-5550 Fax
San Joaquin Co. Flood Ch. Maint. Div.(1)	(209) 468-8464 Fax
Reclamation District 1614 (2)	(209) 462-8061 / (209) 992-2827 Max Gallegos (209) 469-3133 Message
Regional Water Quality Control Board 2 Hour Notification Certification (1)	(916) 464-4681 Fax
State Water Resources Control Board Online SSO Reporting System	<a href="http://ciwqs.waterboards.ca.gov">http://ciwqs.waterboards.ca.gov</a>

(1) for discharges of any amount to surface waters.

(2) for discharges of any amount to Reclamation District 1614 collection system.

### Category 2 Sanitary Sewer Overflow Notifications

All SSOs that meet the criteria for Category 2 SSOs shall be reported using the Online SSO Reporting System within thirty (30) days after the end of the calendar month in which the SSO occurs.



## **7. RESPONSE PROCEDURES**

When a report of a possible SSO is received, it triggers an immediate response to identify and correct the problem. This section describes the general procedures employed by the City to stop, contain, and clean up the impact of an overflow. City personnel shall perform the following SSO response procedures, as applicable. These procedures are summarized in Figure 1, Sanitary Sewer Overflow Response Flowchart. The Category 1 SSO Response Procedures Checklist (Attachment 2) is completed for all Category 1 SSOs.

The following procedures are included as a general overview. Please refer to the SSO Field Procedures Manual (Attachment 5) for detailed procedures.

### **Investigation and Assessment**

Following notification of a possible sanitary sewer overflow, a crew is dispatched to conduct an investigation. The initial response team is responsible for assessing the cause of the problem and determining the level of effort needed to correct the problem. If the overflow is confirmed, the supervisor or highest level staff person on-site shall record the relevant spill information on a sewer overflow incident report form.

### **Notify Response Personnel**

Response personnel are dispatched to the site as appropriate based on the following criteria.

- Source of the SSO
- Volume of the SSO
- Severity of the SSO

The supervisor or highest level staff person on-site shall immediately notify appropriate SSO response personnel. SSO response personnel are City staff trained to respond to SSO situations. Personnel involved in clean-up activities shall be trained and properly equipped with appropriate personal protective equipment (PPE). Appropriate PPE shall be determined by the site supervisor based on the hazard, weather conditions and clean-up procedures.

### **Stop and Contain Overflow**

The supervisor or highest level staff person on-site shall be responsible for determining the most effective method(s) to:

- Control or limit the SSO volume discharged;
- Terminate the SSO as rapidly as possible; and
- Contain the spill as rapidly as possible.

### **Traffic and Crowd Control**

The supervisor or highest level staff person on-site shall be responsible for determining the most effective method(s) to:

- Safely control traffic flow around the spill area; and
- Provide crowd control measures to ensure public safety at all times.

The following City Departments may be contacted to assist with traffic and crowd control measures:

- Stockton Police Department (209) 937-7911
- Stockton Public Works Department (209) 937-8341

SSO response personnel shall be adequately trained in traffic control procedures and public safety requirements.

### **Clean-up and Remediation**

The supervisor or highest level staff person on-site is responsible for determining the most effective clean-up method and remediation procedures and shall determine when adequate remediation procedures have been completed.

For SSOs contained downstream in the stormwater collection system due to hydraulic surcharging of the system (typically from gravity discharges), the City will remediate the SSO by removing from the system at the point of containment a minimum of one hydro-vactor load of wastewater (approximately 2,000-2,500 gallons) or three times the volume of the SSO, whichever is greater.

For SSOs either fully or partially contained at a stormwater pump station wet well, the City will remediate the SSO by flushing and pumping the contaminated water from the stormwater system to the sanitary sewer system. Remediation will begin no later than the next regular business day, with the following conditions:

- If precipitation is forecast, remediation will begin immediately.
- City personnel will check and record the stormwater pump station wet well elevation every six hours and remediation will begin immediately if necessary to prevent excessively high wet well levels.
- Stormwater pump stations with higher rates of inflow will require immediate remediation.

### **Receiving Water Inspection and Monitoring**

If the overflow is discharged to a receiving water body, the impact of the spill on water quality is assessed by visual inspection for abnormal conditions such as effects on aquatic life, abnormal color, odors, etc.

A Receiving Water Inspection/Sampling Log (Attachment 3) is used to record the findings of the inspection.

The impact on water quality is also evaluated by collecting samples at the discharge location as well as at sites upstream and downstream of the spill, if possible. Samples will be analyzed for E. coli using methods prescribed in 40 CFR Part 136.

If storm or other conditions present an unsafe sampling environment, sampling may be omitted. In this case, the impact of the spill on receiving water shall be based on visual observations only.

Follow up samples are collected as soon as possible, typically 3-10 days after the overflow event, to determine whether the receiving water body at the discharge location remains contaminated with sewage. The decision for when to sample is site specific and is dependent on such items as tidal action and receiving water flow.

If water quality samples are required as a result of any SSO, records of monitoring information shall include:

- The date, location, and time of sampling or measurements;

- The individual(s) who performed the sampling or measurements;
- The date(s) analyses were performed;
- The individual(s) who performed the analyses;
- The analytical technique or method used; and
- The results of such analyses.

Photographs may be used to document the extent of the spill, including the discharge location, and any adverse effects to receiving water or surrounding areas.

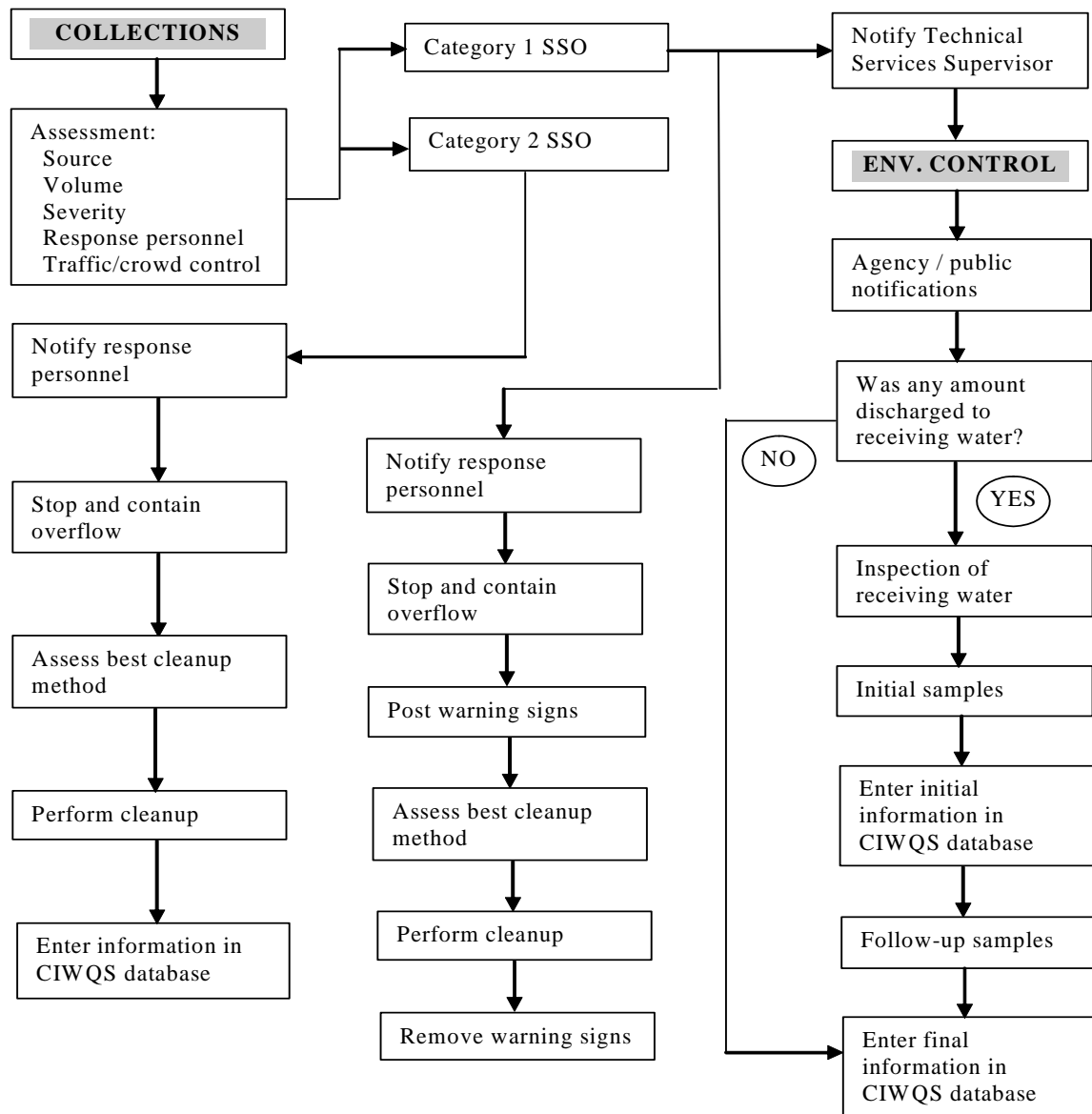
For discharges that enter a receiving water body, public health warning signs shall be posted to protect the public from exposure to water contaminated with sewage:

- Signs will be posted in the affected area at appropriate intervals on both sides of the banks, if possible, of the receiving water body.
- Due to the occurrence of posted signs periodically being vandalized, stolen, wind-blown, etc., City staff will maintain a log and map of sign placement and removal. The signs will be checked on a regular basis by City staff and replaced or repositioned as necessary to make certain they are visible to the public throughout the entire spill event.
- Signs will remain posted until the San Joaquin County Public Health Department or the Regional Water Quality Control Board authorizes their removal, or until receiving water sample results indicate E. coli levels are less than or equal to 235 mpn per 100 ml.

For SSOs greater than 1,000 gallons in volume and which enter a receiving water body, public health warning notifications shall be distributed door-to-door in known areas where residents utilize receiving water for landscape irrigation purposes. Notification distribution procedures will follow Department guidelines.

FIGURE 1

**SANITARY SEWER OVERFLOW RESPONSE FLOWCHART**



## **8. PREVENTION AND TRAINING**

### **SSO Preventive Measures**

Investigation and Corrective Actions - Following containment and cleanup of an overflow, the causes of the discharge are evaluated to determine improvements to prevent future problems. Lines are cleaned and TV cameras are used to inspect the pipe. Necessary repairs are completed and maintenance schedules are adjusted as appropriate.

Maintenance Programs – Programs include regular cleaning of sewer lines, connections and pumps, and foaming to remove tree roots.

Enforcement Program - City code requires installation of grease interceptors at businesses and establishments where any grease or objectionable materials may be discharged into a public or private sewage main or disposal system. Enforcement orders are issued to businesses that do not adequately maintain and/or clean the interceptors.

### **SSO Response Personnel Training**

All SSO response personnel shall receive annual training to ensure awareness with the procedures contained in the SSOERP. Periodic refresher sessions will be conducted whenever the SSOERP is updated or as necessary.

## **9. RECORD KEEPING**

Individual SSO records shall be maintained by the City for a minimum of five years from the date of the SSO. This period may be extended when requested by a Regional Water Board Executive Officer.

All monitoring instruments and devices that are used by the City to fulfill the prescribed monitoring and reporting program shall be properly maintained and calibrated as necessary to ensure their continued accuracy.

The City shall retain records of all SSOs, such as, but not limited to and when applicable:

- Record of Certified SSO reports, as submitted to the Online SSO database;
- All original recordings for continuous monitoring instrumentation related to SSOs;

- All service call records and complaint logs related to SSOs received by the City;
- Steps that have been and will be taken to prevent SSOs from recurring and schedules of implementation;
- Work orders, work completed, and any other maintenance records which are associated with responses and investigations of system problems related to SSOs;
- Documentation of performance and implementation measures related to SSOs; and
- Personnel training records. These records shall be maintained by the Municipal Utilities Department Occupational Health & Safety Compliance Specialist.

Attachment 1  
**Category 1 Sanitary Sewer Overflow Notification Log**

**SSO Date:** \_\_\_\_\_

**SSO Location:** \_\_\_\_\_

Date	Time	Contact	Organization / Agency	Contact / Telephone
			City of Stockton, Municipal Utilities Dept.: Technical Services Supervisor	Richard Stiffler (209) 993-3274 (cell) (209) 937-8740 (ofc) (209) 477-7399 (hm)
			City of Stockton, Municipal Utilities Dept.: Regulatory Compliance Officer, <b>OR</b> Assistant Director, <b>OR</b>  Director	Laura Lazzelle (209) 937-8852 (office) (209) 423-6244 (cell) (209) 952-4439(hm) Jeff Willett (209) 8734 (office) (209) 858-8824 (cell) (925) 778-4180(hm) Mark Madison (209) 937-8700 (office) (209) 993-1325 (cell) (209) 334-2117(hm)
			City of Stockton, City Manager's Office: Public Information Officer	Connie Cochran (209) 937-8827 (office) (209) 629-1251 (cell) Fax: (209) 937-7149
			City of Stockton, City Manager's Office: Deputy City Manager	Laurie Montes (209) 937-8843 (office) (209) 612-6143 (cell) Fax: (209) 937-7149
			California Emergency Management Agency (CalEMA)	(800) 852-7550 Report #
			Regional Water Quality Control Board	(916) 464-4825 Ann Hopkinson
			San Joaquin Co. Environmental Health	(209) 468-3420
		Fax	CA Department of Fish and Game (1)	(916) 324-6256 Fax (M-F 8-4) (916) 358-0330 Fax (after hours)
		Fax	Alameda County Water District (1)	(510) 656-3426 Fax (M-F 8-4) (510) 657-5944 Fax (after hours)
		Fax	Alameda County Flood Control District, Zone 7 (1)	(925) 447-1188 Fax
		Fax	Contra Costa Water District (1)	(925) 689-5936 Fax
		Fax	Santa Clara Valley Water District (1)	(408) 395-5550 Fax
		Fax	San Joaquin Co. Flood Ch. Mnt. Div.(1)	(209) 468-8464 Fax
			Reclamation District 1614 (2)	(209) 462-8061 / (209) 992-2827 Cell (209) 469-3133 Msg. Max Gallegos
		Fax	Regional Water Quality Control Board 2 Hour Notification Certification (1)	(916) 464-4681 Fax
		Online	State Water Resources Control Board Online SSO Reporting System	<a href="http://ciwqs.waterboards.ca.gov">http://ciwqs.waterboards.ca.gov</a>

(1) for discharges of any amount to surface waters.

(2) for discharges of any amount to Reclamation District 1614 collection system.



Attachment 2

**Category 1 Sanitary Sewer Overflow Response Procedures Checklist**

**SSO Date:** \_\_\_\_\_

**SSO Location:** \_\_\_\_\_

<b>Date</b>	<b>Performed by*</b>	<b>Response Procedure</b>	<b>Comments</b>
		Investigation and Assessment	
		Notify Response Personnel	
		Stop and Contain Overflow	
		Assess Best Cleanup Method	
		Begin Remediation	
		Inspect Receiving Water	
		Collect Samples	
		Post Warning Signs	
		Photographs	
		Agency / Public Notifications	
		CIWQS Data Entry – Draft	
		Complete Remediation	
		Collect Follow-up Samples	
		Remove Warning Signs	
		CIWQS Data Entry - Final	

\* EC: Environmental Control; C: Collections; M: Maintenance

### Attachment 3

<b>Receiving Water Inspection / Sampling Log</b>					
Date _____	Time _____	Inspector _____			
Spill Date _____					
Spill Location _____					
Receiving Water Location _____					
Sewage Color	None <input type="checkbox"/>	Light <input type="checkbox"/>	Moderate <input type="checkbox"/>	Heavy <input type="checkbox"/>	
Sewage Foam	None <input type="checkbox"/>	Light <input type="checkbox"/>	Moderate <input type="checkbox"/>	Heavy <input type="checkbox"/>	
Sewage Solids	None <input type="checkbox"/>	Light <input type="checkbox"/>	Moderate <input type="checkbox"/>	Heavy <input type="checkbox"/>	
Sewage Odor	None <input type="checkbox"/>	Mild <input type="checkbox"/>	Moderate <input type="checkbox"/>	Severe <input type="checkbox"/>	
Aquatic Life	No adverse impact observed <input type="checkbox"/>				
	Impacted <input type="checkbox"/>	Describe _____			
Photographs	None <input type="checkbox"/>	Upstream <input type="checkbox"/>	Discharge <input type="checkbox"/>	Downstream <input type="checkbox"/>	
Warning Signs	None <input type="checkbox"/>	Upstream <input type="checkbox"/>	Discharge <input type="checkbox"/>	Downstream <input type="checkbox"/>	
Samples	None <input type="checkbox"/>				
	Upstream <input type="checkbox"/>	Locations _____			
		Site and flow conditions _____			
		_____			
	Discharge <input type="checkbox"/>	Locations _____			
		Site and flow conditions _____			
		_____			
	Downstream <input type="checkbox"/>	Locations _____			
		Site and flow conditions _____			
		_____			

## Attachment 4

# CITY OF STOCKTON

## SANITARY SEWER OVERFLOW (SSO) DISCHARGE REPORT

Notification to (via fax):	Regional Water Quality Control Board.....(916) 464-4681 San Joaquin County Environmental Health.....(209) 468-3433 CA Department of Fish & Game (M-F 8-4).....(916) 324-6256 (after hours).....(916) 358-0330 Alameda County Water District (M-F 8-4).....(510) 656-3426 (after hours).....(510) 657-5944 Alameda County Flood Control District, Zone 7.....(925) 447-1188 Contra Costa Water District.....(925) 689-5936 Santa Clara Valley Water District.....(408) 395-5550 San Joaquin Co. Flood Channel Maint. Division.....(209) 468-8464	
Reported by:	Richard Stiffler, Technical Services Supervisor 2500 Navy Dr., Stockton, CA 95206 Office:     (209) 937-8740 Cell:       (209) 993-3274	
CalEMA Report Control Number:		
Date / Time City Notified of SSO:	Date:	Time:
Date / Time City Aware of SSO Discharged to Receiving Water:	Date:	Time:
Location of SSO:		
Estimated Duration of SSO:	_____ Days      _____ Hours      _____ Minutes	
Estimated Total Volume of SSO:	_____ Gallons	
Estimated Volume of SSO Discharged to Receiving Water:	_____ Gallons	
Status of SSO:	_____ On-going      _____ Overflow Stopped	
Discharge Location (Receiving Water):		

Attachment 5

**SANITARY SEWER OVERFLOW FIELD PROCEDURES MANUAL**

# **PROCEDURES MANUAL**

**ARTICLE:        G**

**SECTION:        24**

**SUBJECT:        HAZARDOUS MATERIALS INCIDENTS**

## **PURPOSE**

The purpose is to provide uniform and consistent response guidelines to minimize the risk to life, the environment, and property in the event of an incident involving hazardous materials.

## **POLICY**

It is the policy and mission statement of the Stockton Fire Department (SFD) to mitigate all reported hazardous materials emergencies within our jurisdiction.

## **GENERAL INFORMATION**

### **HAZARDOUS MATERIALS RESPONSE LEVELS- DEFINED**

#### **Level I**

Spills, leaks, ruptures, and/or fires involving hazardous materials which can be contained, extinguished, and/or abated utilizing equipment, supplies, and resources immediately available to the first responding company; no evacuation of civilians or notifications to other agencies are required. The first company can handle the incident.

#### **Level II**

Hazardous materials incidents that need to be identified, tested, sampled, contained, extinguished, and/or abated using the resources of the SFD Hazardous Materials Response Team (HMRT); any hazardous materials incident requiring the evacuation of civilians; any hazardous materials incident involving a navigable waterway or storm drain, sewer drain, creek, slough, canal, etc.; Motor vehicle fluid spills equal to or greater than 40 gallons. Notifications will have to be made by the HMRT for Level II, or greater, incidents.

### Level III

Hazardous materials incidents that need to be contained and/or abated by resources in addition to those available from the SFD HMRT; Fires involving hazardous materials that are allowed to burn due to ineffectiveness or actual danger of extinguishing agents, or the unavailability of water; threat of large container failure; explosion, detonation, BLEVE, or container failure has occurred; incidents requiring the evacuation of civilians extending across jurisdictional boundaries; serious civilian injuries or death as a result of the hazardous materials incident; the incident has become one of multi-agency involvement; incidents requiring the assistance of the San Joaquin County Joint Hazardous Materials Response Team, also known as "Joint Team".

### Level IV

When resource needs exceed the ability to handle the incident and State or Federal resources are needed.

## **PROCEDURE**

The following Standard Operating Guidelines for Hazardous Materials Incidents will be followed while mitigating such incidents; they are in accordance with the City of Stockton Hazardous Materials Emergency Response Plan.

### **1. PRE-PLANNING**

Company officers should be familiar with the hazardous nature of materials routinely stored or transported within their respective districts. Informal plans and procedures for dealing with known hazards should be researched and reviewed periodically.

### **2. DISPATCH**

Upon notification of an incident involving hazardous materials, ECD shall make the appropriate dispatch in accordance with SFD Policies and Procedures Article A, Section 5.

### **3. COMMUNICATIONS**

Level I responses will remain on the Stockton Fire Department Dispatch (Channel 1), unless directed by ECD a Chief Officer or incident commander (IC). A tactical channel may be requested by the first in responding officer, while en route, or upon arrival. Level II, or greater, responses may be assigned a tactical channel by ECD, upon dispatch.

#### **4. FIRST ARRIVING UNIT**

The first in unit must avoid committing itself to a dangerous situation. When approaching, slow down or stop to assess any visible activity taking place. Evaluate effects of wind, topography, and location of the situation. Approach the incident from an upwind direction. Apparatus must be kept out of the danger area. Route any other responding companies away from any hazards. Always remember- SIN (Safety, Isolate, Notify)!

For Level II, or greater, responses, the first in officer on scene shall assume the role of Incident Commander (IC) and establish the Command Post in the most strategically desirable and safe location (upwind/uphill/upstream); the Battalion Chief shall assume the position of IC upon arrival. The primary goal of the IC is to establish an Incident Action Plan (IAP) based on life safety, incident stabilization, and environment/property conservation.

The IC should consider establishing a staging area for other emergency response (ERG) units. Staged companies must be in a safe location, taking into account wind, spill flow, explosion potential, and similar factors in any situation. THE DOT GUIDEBOOK OR ANY OTHER MATERIAL SUCH AS MATERIALS SAFETY DATA SHEETS OR SHIPPING PAPERS SHOULD BE USED TO ESTABLISH A SAFE DISTANCE FOR STAGING.

#### **5. SIZE-UP**

The first officer on scene must make a careful size-up before making a commitment. It may be necessary to take immediate action to make a rescue or evacuate an area. This should be attempted only after a risk/benefit analysis is completed. Personnel must take advantage of available personal protective equipment in these situations. ALL PERSONNEL MUST WEAR FULL PROTECTIVE CLOTHING, INCLUDING SCBA, FOR ALL HAZARDOUS MATERIALS INCIDENTS.

The objective of the size-up is to identify the nature and severity of the immediate problem and to gather sufficient information to formulate an effective action plan. Hazardous materials incidents require a cautious and deliberate size-up.

Avoid premature commitment of companies and personnel to potentially hazardous locations. Proceed with caution in evaluating risks before formulating a plan, and keep uncommitted companies at a safe distance.

IN MANY CASES, EVALUATION BY THE SFD HAZARDOUS MATERIALS RESPONSE TEAM IS THE SAFEST APPROACH.

## **6. IDENTIFICATION**

The first in officer on scene will safely attempt to identify the type of material, quantity of material, possibility of contamination, and the immediate exposure problem. Never ignore your sense of smell; if you smell a distinct odor, especially while driving to the scene, back out until you reach a safe location!

The objective is to identify the type of material involved in a situation, and the hazards presented, before formulating an action 704 placard. Use whatever labels, placards, shipping papers, MSDS, NFPA DIAMOND, etc. to identify the material and hazard class. Refer to pre-fire plans (if available), and ask personnel at the scene for additional information (plant management, responsible party, truck drivers, etc.).

Refer to your DOT ERG for proper classification and establish a "Hot Zone" based on the recommended initial isolation distances. Hazard tape shall be used to cordon off the area. Identify the "Hot Zone" based on potential danger, taking into account materials involved, time of day, wind and weather conditions, location of the incident, and degree of risk to unprotected personnel. Do not allow unnecessary personnel to approach the scene. Always approach the incident in pairs, and have personnel in reserve as a rescue team. Take immediate action to evacuate and/or rescue persons in critical danger, if possible, providing for safety of rescuers FIRST.

## **7. INCIDENT ACTION PLAN (IAP)**

Based on the initial size-up and any information available, the IC will formulate an action plan to deal with the situation.

THE ACTION PLAN MUST PROVIDE FOR:

1. Safety of civilians and fire personnel
2. Evacuation of endangered area, if necessary
3. Control of situation
4. Stabilization of hazardous materials
5. Decontamination, if applicable
6. Disposal or removal of hazardous material
7. Notifications to required agencies (contact the SFD HMRT for phone numbers or for assistance with notifications)

Most hazardous materials are intended to be maintained in a safe condition for handling and use, through confinement in a container or protective system. The emergency is usually related to the material escaping from the protective container or system and creating a hazard on the exterior.



The action plan must identify the method of hazard control and the resources necessary to accomplish this goal. It may be necessary to select one method over another, due to the unavailability of a particular resource or to adopt a "holding action" to wait for needed equipment or supplies.

The method of hazard control may include controlling the flow or release, getting the hazardous material back into a safe container, neutralizing it, allowing it to dissipate safely, and/or coordinating proper disposal.

Avoid committing personnel and equipment prematurely or "experimenting" with techniques and tactics. Personnel should be prepared to take appropriate action for preventing the spread of hazardous materials to other areas (i.e. sewers, streams, etc.). The SFD HMRT shall be requested if any hazardous material enters a water-way or storm drain and for assistance with determining the appropriate course of action for any hazardous materials incident.

## **8. EVACUATION AND SHELTER IN PLACE**

Use references that are available (for example, DOT ERG). Determine the extent of the hazard and take the necessary steps to protect life. The appropriate amount of resources should be requested to assist with evacuation. The area to be evacuated depends on the nature and amount of the material and type of risk it presents to unprotected people (toxic, explosive, etc.).

In some cases, it is necessary to completely evacuate a radius around a site for a certain distance (i.e., potential explosion). In other cases, it may be advisable to evacuate a path downwind where toxic or flammable vapors may be carried (and control ignition sources in case of flammable vapors).

Note: When toxic or irritant vapors are being carried downwind, it may be most effective to, (shelter in place), keep everyone indoors with windows and doors closed to prevent contact with the material instead of evacuating the area. In these cases, companies may be assigned to patrol the area, assisting citizens with shutting down ventilation systems and/or evacuating persons with susceptibility to respiratory problems.

Do not shelter-in-place anyone who is in a flammable atmosphere.

## **9. HAZARDOUS MATERIALS GROUP**

For Level II, or greater, responses, the SFD HMRT and the appropriate amount of additional qualified personnel will be assigned the duties of the Hazardous Materials Group. An Assistant Safety Officer- Hazardous Materials will be assigned in accordance with CCR Title 8, Section 5192 (q)(3)(G). The

responsibility of appropriate containment or confinement shall be of the Hazardous Materials Group Supervisor. The Group Supervisor shall oversee the leaders for entry, decontamination, site access control, technical reference, and safe refuge. The Group Supervisor shall ensure that the Hot, Warm, and Cold control zones are in place and that the appropriate agency notifications have been made. Note: Refer to the Field Operation Guide ICS 420-1, Chapter 13, for specific Hazardous Materials Group responsibilities.

#### **10. USE OF NON-FIRE DEPARTMENT PERSONNEL**

In some cases, it may be advantageous to use non-Fire Department personnel to evaluate hazards and perform certain functions within their area of expertise. In accordance with CCR Title 8, when "Skilled Support Personnel" are outfitted with breathing apparatus, chemical suits, etc., they must be made aware of the functions, limitations, and safety precautions necessary in their use; they must also be briefed about the chemical hazards involved, and what duties are to be performed. Fire Department personnel must closely monitor and/or accompany Skilled Support Personnel for safety.

#### **11. DISPOSAL**

Local and Federal regulations require the lawful disposal of hazardous materials by the responsible person(s); environmental safety must be given high priority. UNDER NO CIRCUMSTANCES SHOULD DEPARTMENT PERSONNEL WASH MATERIAL INTO SEWERS, DITCHES, ETC. Hazardous materials should not be left out if there is a possibility of rain or if they pose a significant potential for public exposure. Cover or contain the material to prevent possible entry into a waterway. The Officer in charge of the scene will ensure that proper notifications are made and for the appropriate disposal of hazardous materials; this includes motor vehicle fluid spills of less than 40 gallons.

Hazardous materials on private property will be the responsibility of the property owner; the private property owner should be advised that the SJ County Environmental Health Department will be contacting them regarding the disposal. If there is no responsible party and the hazardous material is on City or County property, ECD shall notify the City Corporation Yard or County Public Works of the type and amount of hazardous material to be collected; after-hour response of the Corporation Yard or County Public Works shall be approved by a Battalion Chief. Disposal of hazardous materials on the freeway will be under the direction of the California Highway Patrol. All hazardous materials shall be properly identified and labeled prior to disposal.

## **12. INCIDENTS ON STATE/COUNTY ROADS OR CITY STREETS**

If the hazardous materials incident is on a State/County road or City Street, the law enforcement agency with traffic enforcement responsibility will respond to the scene; they will be directed to the Command Post (if applicable). The need for a Unified Command may be required to effectively mitigate the Hazardous Materials incident. The HMRT shall be requested for all Level II incidents and motor vehicle fluid spills that are 40 gallons or more.

### **Motor Vehicle Fluid Spills (less than 40 gallons)**

#### **1. On-Roadway Spills**

If the motor vehicle fluids are contained to the roadway and there is minimal risk of exposure to the public, absorbent material will be spread over fuels, lubricants, and coolants; it shall be properly disposed of by the responsible person(s) or tow truck driver. If it is not removed from the scene, the HMRT shall be notified immediately.

#### **2. Off-Roadway Spills**

If the motor vehicle fluids have spilled off the pavement and are in the soil, the IC shall notify the HMRT via cell phone or radio. The HMRT will notify SJ County Environmental Health.

#### **3. Waterway Spills**

If the motor vehicle fluids have entered a waterway (storm drains, etc.), or have the potential to enter a waterway, the IC shall request the HMRT to respond. The HMRT will notify SJ County Environmental Health.

#### **4. Health Threat Spills**

If the motor vehicle fluids, or fluids mixed with absorbent, pose a significant potential for public exposure, the IC shall notify the HMRT immediately. The HMRT will notify SJ County Environmental Health. A significant potential for public exposure includes spills in close proximity to residences, schools or playgrounds, etc.

#### **5. Other Materials**

For motor vehicle accidents involving hazardous materials, other than motor vehicle fluids, the IC shall notify the HMRT immediately. The HMRT will notify SJ County Environmental Health. Clean-up operations will be coordinated by the

responsible authority (i.e., Stockton Police, Sheriff, CHP) after consultation with SJ County OES, SJ County Environmental Health, and/or other State agencies.

**RONALD L. HITTLE**  
**FIRE CHIEF**

RLH/stm

Revised 2/7/08

**DIVISION OF TRAINING**

DATE: 4-24-03

Director [Signature]

Depty. Director \_\_\_\_\_

Depty. Director \_\_\_\_\_

Staff [Signature] [Signature]

**PROCEDURES MANUAL**

**ARTICLE: G**

**SECTION: 33**

**SUBJECT: HAZARDOUS MATERIALS RESPONSE---STANDARD  
OPERATING PROCEDURES**

**POLICY**

*It is the policy of the Stockton Fire Department to mitigate all reported hazardous material emergencies within our jurisdiction.*

**PURPOSE**

*To provide uniform and consistent response guidelines for hazardous material emergencies.*

**PROCEDURE**

*The attached Standard Operating Procedures for Haz-Mat incidents will be followed while in mitigation of such incidents.*

[Signature]

**W. GARY GILLIS  
FIRE CHIEF**

WGG/CM:dac

Attachment  
3/24/03

STOCKTON  
FIRE DEPARTMENT

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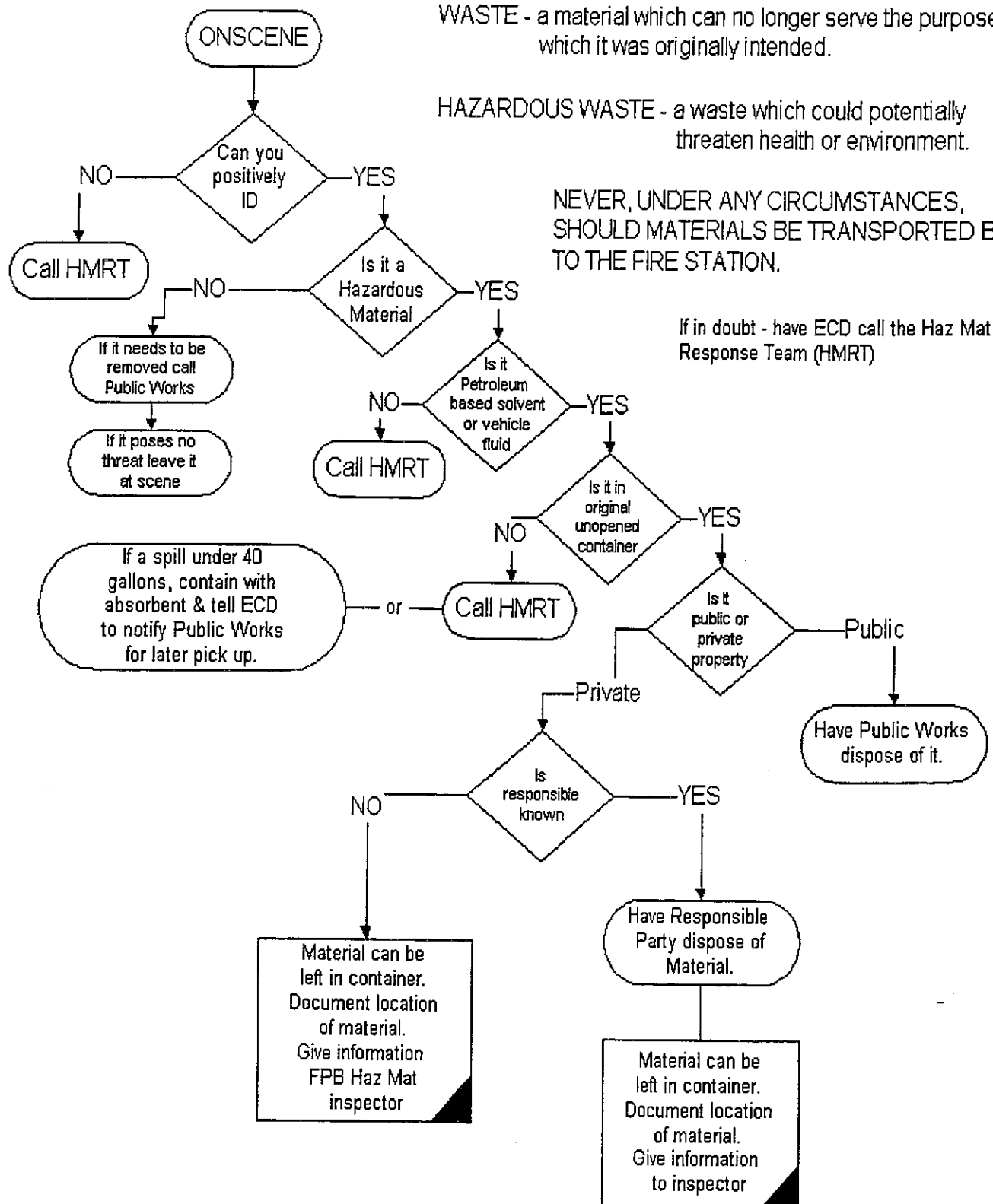
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STANDARD OPERATING  
PROCEDURES  
for  
HAZARDOUS MATERIALS  
INCIDENTS

Division of Training

## OFFICER DISCRETION

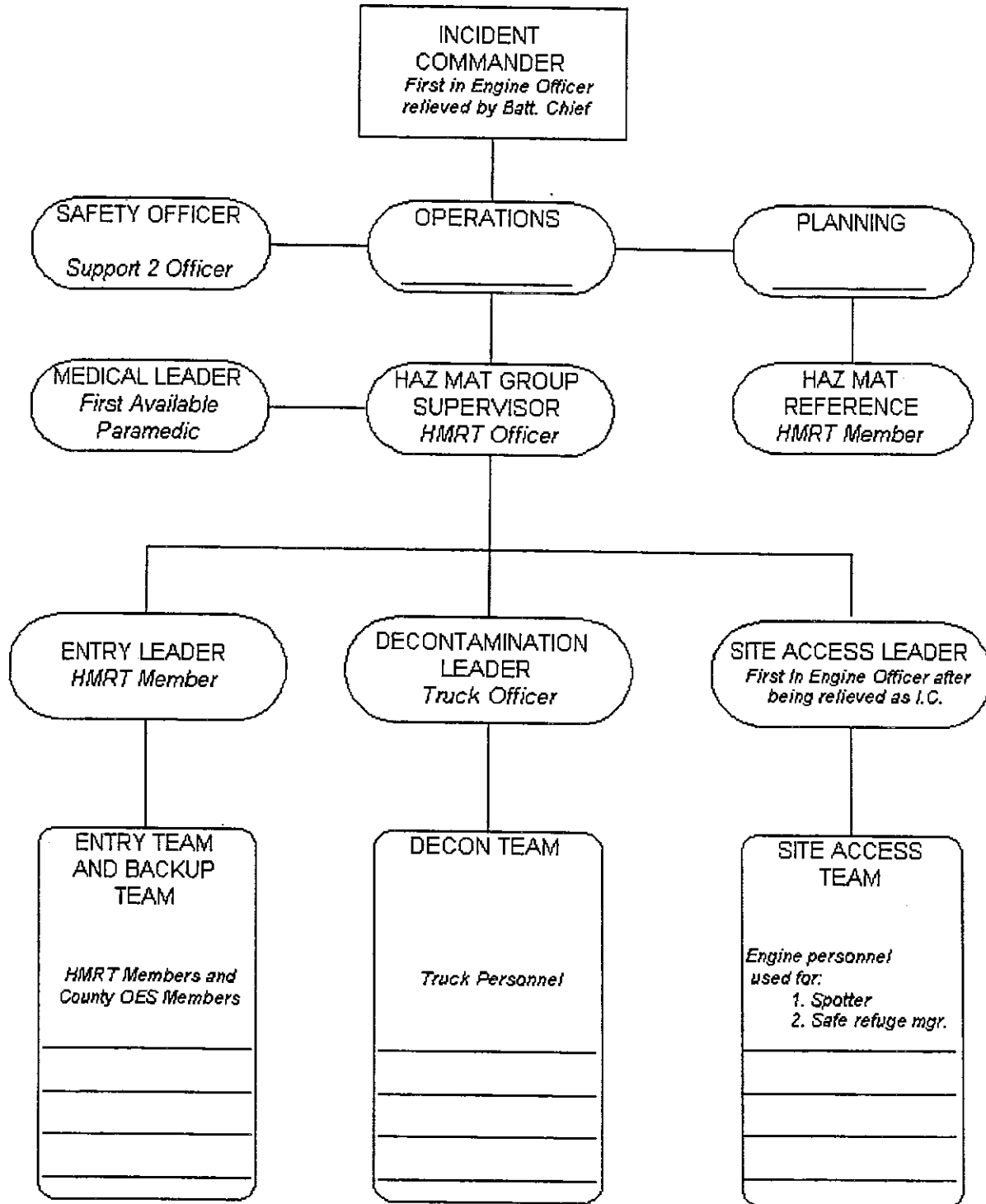
These and future Standard Operating Procedures (SOP's) are designed to assist SFD personnel to perform emergency hazardous materials operations. They are not designed to tie our hands on each specific incident. The Company Officers, acting or permanent, always have the latitude to make necessary adjustments to SOP's appropriate to the conditions that are present. It is understood that the fire or emergency ground is dynamic, rapidly changing, and rarely the same as the previous incident. However, it also must be understood that if major deviations in procedures occur, the Company Officer must be prepared to explain his/her actions including the conditions, which necessitated the change.





# STOCKTON FIRE DEPARTMENT

## HAZARDOUS MATERIALS GROUP STRUCTURE



## **SUBJECT: BIOLOGICAL WASTE**

**Definition:** An agent or condition that constitutes a hazard to humans or the environment.

1. Blood, body fluids (blood, saliva, sputum, gastric secretions, urine, feces, semen or other drainage) or tissues.

## **OBJECTIVE:**

To establish guidelines for situations involving biological waste.

## **PROCEDURE:**

The following guidelines shall be observed when encountering biological waste during the listed conditions:

### **LEAK – NO FIRE**

1. Identify product
2. Isolate area as per DOT Guidebook recommendations, or a minimum of 500'
3. Do not attempt entry or rescue into material until positively identified as being a non-absorption hazard
4. Full protective clothing with SCBA and latex gloves are required
5. Needles or other paraphernalia are to be disposed of in accordance with SFD procedures.

### **LEAK – WITH FIRE**

1. Identify product
2. Isolate area as per DOT Guidebook recommendations, or a minimum of 500'
3. Do not attempt extinguishment of, or entry into, material until positively identified.
4. Full protective clothing and SCBA are required.

**SUBJECT: DISPOSAL OF BIOLOGICAL LIQUID WASTE**

**OBJECTIVE:**

To establish guidelines for the disposal of biological liquid wastes

**PROCEDURE:**

The following guidelines shall be observed when encountering biological fluids.

1. Full protective clothing and latex gloves shall be worn.
2. If the pH, of the waste, is between 5 & 10, the liquid waste can be collected and placed into the sanitary sewer system. (Not the **storm** drain system.)
3. Notify Municipal Utilities of the location of the drain the material was placed into.
4. Notify Municipal Utilities **before** disposing of 10 gallons or more into the sewer system.

**SUBJECT: COMPRESSED GASES (Poisonous)**

Examples: Hydrogen Cyanide, Methyl Bromide

**OBJECTIVE:**

To establish guidelines for situations involving poisonous compressed gas products during the listed conditions.

**PROCEDURE:**

The following guidelines shall be observed when encountering compressed gas products during the listed conditions:

**LEAK – NO FIRE**

1. Identify product
  - A. Name
  - B. Amount
  - C. Location
  - D. Source of Leak
2. Identify vapor travel (direction and velocity)
  - A. Secure ignition sources if material is flammable.
  - B. Evacuate as per DOT Guidebook for that product
3. Entry may be attempted in special protective clothing only.

**LEAK WITH FIRE**

1. Identify product
2. Isolate as per DOT Guidebook for that product.
3. Attempt to cool cylinder if:
  - A. Flame impingement is above liquid level, and
  - B. Adequate water is available for unstuffed firestreams, and
  - C. Signs of imminent BLEVE are absent.
4. Do not extinguish fire if leak cannot be secured.
5. Consider smoke direction for possible evacuation.

**SUBJECT:** COMPRESSED GASES (Non-Poisonous)

**OBJECTIVE:**

To establish guidelines for situations involving compressed gas products used for fuel.

**PROCEDURE:**

The following guidelines shall be observed when encountering compressed gas products during the listed conditions:

**LEAK – NO FIRE**

1. Identify product
  - A. Name
  - B. Amount
  - C. Location
  - D. Source of Leak
2. Identify vapor travel (direction and velocity)
  - A. Secure ignition sources if material is flammable/oxidizer.
  - B. Evacuate as per DOT Guidebook for that product
3. If not an absorption hazard, entry may be attempted for rescue or leak termination.
  - Wear full protective clothing with SCBA

**LEAK WITH FIRE**

1. Identify product
2. Isolate as per DOT Guidebook for that product.
3. Attempt to cool cylinder if:
  - A. Flame impingement is above liquid level, and
  - B. Adequate water is available for unstaffed firestreams, and
  - C. Signs of imminent BLEVE are absent.
4. Do not extinguish fire if leak cannot be secured.
5. Protect exposures.
6. Wear full protective clothing with SCBA

**SUBJECT: CORROSIVES**

**OBJECTIVE:**

To establish guidelines for situations involving corrosives.

**PROCEDURE:**

The following guidelines shall be observed when encountering corrosive materials during the listed conditions:

**LEAK – NO FIRE**

1. Identify product, if readily available
2. Isolate area as per DOT Guidebook recommendations, or a minimum of 250'
3. Do not attempt entry or rescue into material until positively identified as being a non-absorption hazard.
4. Full protective clothing and SCBA are required.
5. Contain material, if applicable and prevent runoff.

**LEAK WITH FIRE**

1. Identify product, if readily available
2. Isolate as per DOT Guidebook recommendations, or a minimum of 350'
3. Do not attempt extinguishment of material until positively identified.
4. Full protective clothing and SCBA are required.
5. Contain material, if applicable and prevent runoff.
  - Dam or dike

**SUBJECT: CRYOGENIC LIQUIDS****OBJECTIVE:**

To establish guidelines for situations involving cryogenic liquid products.

**PROCEDURE:**

The following guidelines shall be observed when encountering cryogenic liquid products during the listed conditions:

**LEAK – NO FIRE**

1. Identify material.
2. Isolate per DOT Guidebook
3. Control all ignition sources
4. Do not contact liquid/vapor or surfaces contacted by liquid/vapor. Some materials (e.g. Liquid Oxygen (LOX) are shock sensitive when in contact with hydrocarbons such as asphalt or Nomex.)
5. Prevent spill from entering sewer/drain system
6. Wear full protective clothing with SCBA.

**LEAK WITH FIRE**

1. Isolate as per DOT Guidebook
2. Protect exposures/tank unless insulation is torn from cylinder and water would contact inner tank
3. Prevent runoff from entering sewer/storm drain
  - Dam or dike
4. Do not contact liquid/vapor or surfaces contacted by liquid/vapor. Some materials (e.g. Liquid Oxygen (LOX) are shock sensitive when in contact with hydrocarbons such as asphalt or Nomex.)
5. Wear full protective clothing with SCBA.

**SUBJECT: ETIOLOGICAL HAZARDS**

Definition: A living organism that may cause human disease.

**OBJECTIVE:**

To establish guidelines for situations involving infectious etiological hazardous materials.

**PROCEDURE:**

The following guidelines shall be observed when encountering infectious etiological hazardous materials during the listed conditions:

**LEAK – NO FIRE**

1. Identify product, if readily available.
2. Isolate area as per DOT Guidebook recommendations, or a minimum of 500'.
3. Do not attempt entry or rescue into material until positively identified as being a non-absorption hazard.
4. Full protective clothing with SCBA is required.
5. Contain material. Small spills can be controlled by covering with a towel saturated with chlorine bleach.

**LEAK WITH FIRE**

1. Identify product, if readily available.
2. Isolate area as per DOT Guidebook recommendations, or a minimum of 500'.
3. Do not attempt extinguishment of, or entry into, material until positively identified.
4. Full protective clothing and SCBA are required.
5. Contain material.



**SUBJECT: EXPLOSIVES****OBJECTIVE:**

To establish guidelines for situations involving explosive products.

**PROCEDURE:**

The following guidelines shall be observed when encountering explosive products during the conditions listed:

**NO FIRE**

1. Control ignition sources.
2. Prevent product contamination.
3. Prevent additional product movement. Protect from shock.
4. Establish a 500' isolation area.
5. Contact Police Department.

**FIRE NOT INVOLVING PRODUCT**

1. Protect exposed cargo.
2. Extinguish fire if water supply is adequate.
3. Stabilize cargo from movement.
4. Fire streams can shock product. Direct streams with caution. Contain water runoff.
5. Consider large-scale evacuation should fire extend. Contact Police Department

**FIRE INVOLVED WITHIN PRODUCT/CARGO AREA, OR IMMINENT INVOLVEMENT WITHOUT ADEQUATE WATER SUPPLY**

1. Immediately evacuate personnel.
2. Evacuate 2500' in all directions.
3. Let product burn.

**BOMB THREAT**

1. Contact Police Department Watch Commander
  - A. Assist in evacuation and search, if requested.
  - B. Assist in coordination of resources
2. Do not leave the scene until released by the Police Department

In addition, the following guidelines shall be observed in every explosive product incident:

1. No radio transmissions or cellular phone use within 300 yards (900') of product.
2. Request Bomb Squad response.
3. Do not handle product.

**SUBJECT: FLAMMABLE/COMBUSTIBLE LIQUIDS**

**OBJECTIVE:**

To establish guidelines for situations involving flammable/combustible liquids.

**PROCEDURE:**

The following guidelines shall be observed when encountering flammable/combustible liquids during the listed conditions.

**LEAK – NO FIRE**

1. Identify product, if readily available.
2. Control all ignition sources.
3. Isolate per the DOT Response Guidebook.
4. Prevent spill from entering storm/sewer drains.
  - Dam or dike
5. Control fuel flow if possible.
6. Suppress vapor production with foam if necessary.
  - A. Compatibility with liquid. (Hydrocarbons vs. Polar Solvents)
  - B. Amount needed to cover surface.
6. Wear full protective clothing with SCBA

**LEAK WITH FIRE**

1. Identify product, if readily available.
2. Isolate per the DOT Response Guidebook.
3. Full protective clothing with SCBA will be worn.
4. Protect exposures.
5. Apply foam as needed
  - A. Compatibility with liquid. (Hydrocarbons vs. Polar Solvents) Do not apply until total needed amount is on scene.
6. Control fuel flow if possible.

7. Prevent runoff from entering storm/sewer drains.
  - Dam or dike

In addition, the following guidelines shall be observed for all incidents involving flammable/combustible liquids.

1. Washing of flammable or combustible liquids into sewer or storm drains is prohibited without approval from the Municipal Utilities District.

**SUBJECT: FLAMMABLE SOLIDS**

Examples: White or Red Phosphorus, Sulfur, Paraffin Wax

**OBJECTIVE:**

To establish guidelines for situations involving flammable solids.

**PROCEDURE:**

The following guidelines shall be observed when encountering flammable solid materials during the listed conditions:

**LEAK – NO FIRE**

1. Identify product, if readily available.
2. Isolate per DOT Guidebook recommendations, or a minimum of 500'.
3. Eliminate ignition sources and protect from contamination from other products.
4. Prevent material from being scattered.

**LEAK WITH FIRE**

1. Identify product, if readily available.
2. Isolate per DOT Guidebook recommendations, or a minimum of 500'.
3. Attempt extinguishment per DOT Guidebook recommendations.
  - Do not attempt to extinguish without positive identification of material burning.
4. Large quantities of water may be needed. Contain runoff.
5. Consider letting product burn. Be aware that smoke may be very toxic. Consider smoke direction.

**SUBJECT: MISCELLANEOUS HAZARDS**

**OBJECTIVE:**

To establish guidelines for situations involving other hazardous materials not covered under previous subjects in this section of the Manual.

**PROCEDURE:**

The following guidelines shall be observed when encountering other miscellaneous hazardous materials during the listed conditions:

**LEAK – NO FIRE**

1. Identify product, if readily available.
2. Isolate per DOT Guidebook recommendations.
3. Contain material and prevent runoff.

**LEAK WITH FIRE**

1. Identify product, if readily available.
2. Isolate per DOT Guidebook recommendations.
3. Do not attempt to extinguish without positive identification of material burning.
4. Full protective clothing and SCBA are required.
5. Contain material, if applicable and prevent runoff

**SUBJECT: OXIDIZERS**

**OBJECTIVE:**

To establish guidelines for situations involving oxidizing materials.

**PROCEDURE:**

The following guidelines shall be observed when encountering oxidizing materials during the listed conditions:

**LEAK – NO FIRE**

1. Identify product, if readily available. Those product names that end with 'ite' or 'ate' are potentially very dangerous.
2. Isolate per DOT Guidebook recommendations, or a minimum of 500'.
3. Eliminate ignition sources.
4. Full protective clothing with SCBA is required.

**LEAK WITH FIRE**

1. Identify product, if readily available.
2. Isolate per DOT Guidebook recommendations, or a minimum of 500'.
3. Attempt extinguishment of small fires per DOT Guidebook recommendations only after positive identification.
  - Use unstaffed fire streams as much as possible, if applicable.
  - Large amounts of water will be needed
4. Keep in mind that little can be done to extinguish or control large amounts of burning oxidizers.
5. Contain runoff.

**SUBJECT: POISONS**

**OBJECTIVE:**

To establish guidelines for situations involving poisons.

**PROCEDURE:**

The following guidelines shall be observed when encountering poison materials during the listed conditions:

**LEAK – NO FIRE**

1. Identify product, if readily available.
2. Isolate area per DOT Guidebook recommendations, or a minimum of 500'
3. Do not attempt entry or rescue into material until all Personal Protective Equipment (PPE) concerns have been addressed.
4. Full protective clothing and SCBA are required.
5. Contain material, if applicable and prevent runoff.

**LEAK WITH FIRE**

1. Identify product, if readily available.
2. Isolate area as per DOT Guidebook recommendations, or a minimum of 500'
3. Do not attempt to extinguish, or enter into material until positively identified.
  - Use as little water as possible, if applicable.
4. Full protective clothing and SCBA are required.
5. Consider smoke direction and possible evacuation.
6. Contain material, if applicable and prevent runoff.



**SUBJECT: RADIOACTIVE MATERIAL**

**OBJECTIVE:**

To establish guidelines for situations involving radioactive materials.

**PROCEDURE:**

The following guidelines shall be observed when encountering radioactive materials during the listed conditions:

**LEAK – NO FIRE**

1. Identify product, if readily available
2. Isolate area as per DOT Guidebook recommendations, or a minimum of 500'
3. Use full protective clothing with SCBA and personal dosimeters are to be worn.
4. Use radiological equipment to determine exposure.
  - A. Limit exposure to one milliroentgen/hour.
  - B. Expand isolation area if monitoring indicates a larger zone is needed.
5. Always decontaminate personnel when alpha and beta sources are involved.

**LEAK WITH FIRE**

1. Identify material, if readily available.
2. Isolate per DOT Guidebook recommendations.
3. Use full protective clothing with SCBA and personal dosimeters should be worn.
4. Extinguish fire only if no risk to personnel. It is best to let nuclear or waste fuels burn.
5. Contain runoff
6. Decontaminate all exposed personnel.

In incidents involving nuclear fuels, waste fuels, or weapons on fire isolate an area of 3000' around site. Do not enter – the risk is too great.

## **SUBJECT: SMALL SPILLS OF PETROLEUM PRODUCTS**

Examples: 40 gallons or less of motor oil, solvents, or gasoline.

### **OBJECTIVE:**

To establish guidelines for situations involving small spills of motor oils or solvents.

### **PROCEDURE:**

The following guidelines shall be observed when encountering small spills of petroleum products during the conditions listed:

#### **HAS NOT ENTERED STORM OR SANITARY SEWER SYSTEM**

1. If product is still leaking plug or patch the container.
2. Keep product from sewer openings by diking with available material.
  - A. Contain remaining product by diking around entire spill
  - B. Absorb product with diking material and sweep into gutter for later disposal.
  - C. Notify ECD to contact Public Works to pick up absorbent at a later time.

#### **PRODUCT HAS ENTERED STORM OR SANITARY SEWER SYSTEM**

1. Notify ECD to contact Hazmat Response Team (HMRT)
  - A. Include the following information:
    - 1) Location of spill.
    - 2) Approximate quantity of spill and amount of product that has entered the drain.
    - 3) Any apparent threat to life, environment, or property.
2. Minimize environmental damage and reduce clean up costs.
  - A. Dike around spill or form a berm around sewer drains.
  - B. Plug or patch source of leak with available materials.
  - C. Absorb product and sweep material into a pile for later disposal.

#### **DISPOSAL – LOW ALARM WASTE**

Hazardous wastes fall into this category if they have the following characteristics:

- a. Materials of petroleum base (oil that tests <1000 ppm or less with the Chlor-D-Tect Kit) or solvents, or
- b. Latex Paints, or

- c. Small quantities of household materials, or
- d. Materials which demonstrate a pH of less than 12.5 or greater than 2,  
or
- e. Materials which are not considered reactive.

**Preparation for Transport:**

Members of the Hazardous Materials Response Team shall properly separate, overpack, and label materials for transportation. The Hazardous Materials Team Captain shall request a vehicle from City Public Works. Hazmat team members shall be responsible for the loading and securing of the containers.

**Storage of Containers:**

Overpacked materials will be transported to the Municipal Service Center for storage in the hazardous waste bins. Final disposal shall be arranged by Public Works.

**DISPOSAL – HIGH ALARM WASTE**

If the materials are unknown or do not meet the criteria for "Low Alarm Waste", then they will be classified as "High Alarm Waste". This material will be removed by a licensed contractor for storage and final disposal.

**STOCKTON FIRE DEPARTMENT  
INCIDENT COMMAND SYSTEM  
FIELD WORKBOOK**

**HAZ MAT GROUP  
SUPERVISOR**

**JUNE 1993**

## **HAZ MAT GROUP SUPERVISOR**

The Haz Mat Group Supervisor is responsible for the implementation of the Incident Action Plan dealing with Haz Mat Group Operations. The Haz Mat Group Supervisor assigns resources within the Haz Mat Group, reports on the progress of operations and status of resources within the group, and directs overall operations of the Haz Mat Group.

### **A. NOTIFICATION OF INCIDENT**

1. Notify appropriate agencies and team members.
2. Ensures necessary team equipment and supplies.
3. Develop and maintain radio contact with the IC or ECD.

### **B. ON SCENE ASSESSMENT**

1. Ensure that all necessary agencies are notified.
2. Obtain briefing from the IC.
3. Ensure safe entrance and egress from exclusion zone in case of emergency.
4. Ensure control zones and access points are established.
5. Recommends mitigation options to the IC.
6. Establishes Haz Mat Team operations area with IC assistance.
7. Establish and maintain communications with team leaders.

### **C. PRE – ENTRY RESPONSIBILITIES**

1. Function as supervisor only, whenever possible.
2. Ensure the completion of the Haz Mat Hazard Assessment Worksheet and Site Safety Plan
3. Conduct tailgate safety meeting prior to entry.
4. Select proper protective equipment with team member input.
5. Determine time of entry and duration of entry and notify Decon Leader.
6. Ensure integrity of supplies and equipment used.
7. Ensure Decon is established prior to entry.
8. OK entry after checking with all team members.

### **D. ENTRY RESPONSIBILITIES**

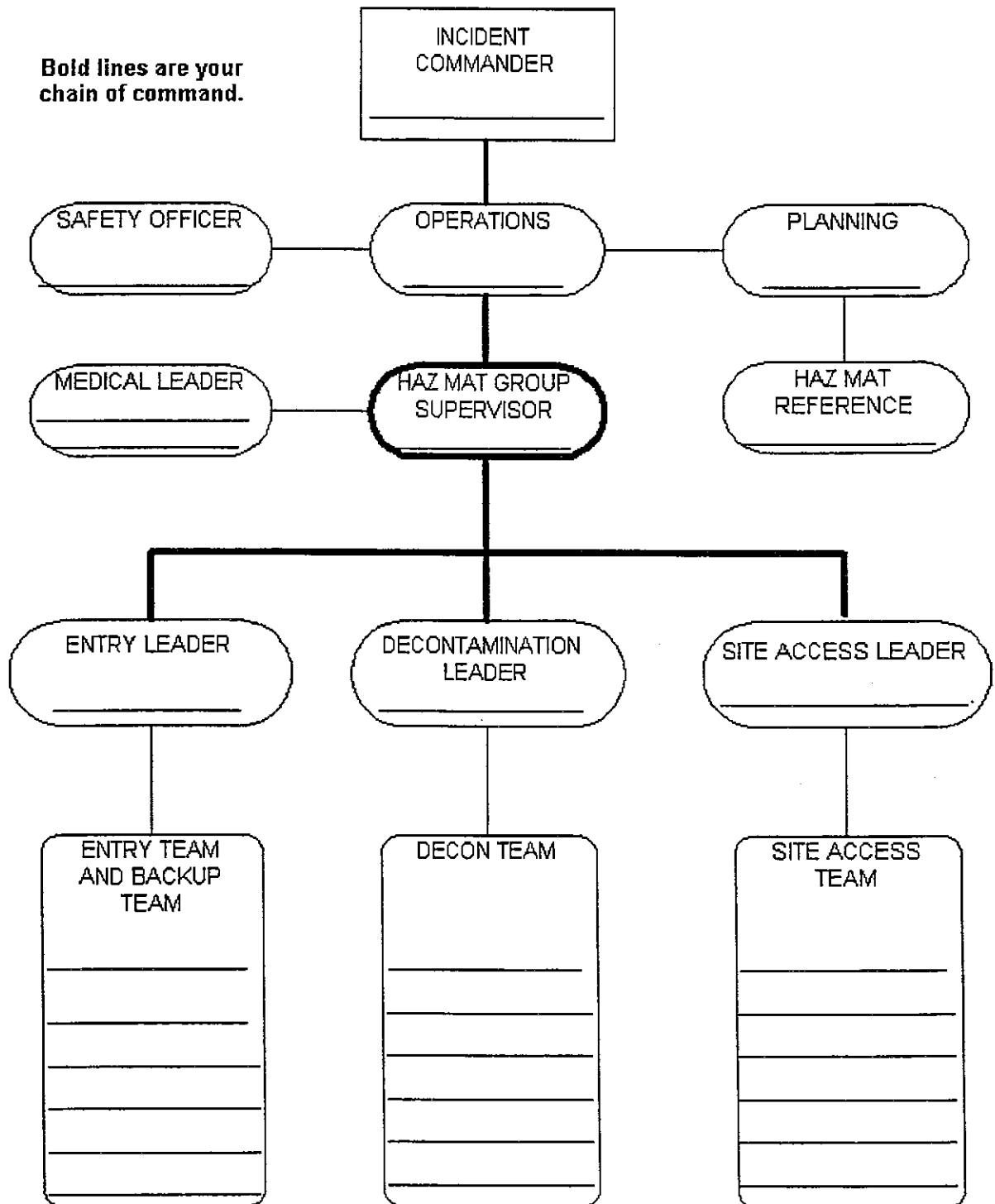
1. Notify IC and Team Leaders upon entry.
2. Maintain contact with Team Leaders and IC.
3. Maintain contact with Safety Officer to ensure that all safety measures are being followed.

### **E. POST OPERATION RESPONSIBILITIES**

1. Recommend clean-up and disposal suggestions to IC
2. Coordinate other agencies in investigation and clean-up with IC
3. Ensure the integrity off all samples taken.
4. Verify appropriate notifications are made.
5. Conduct on site debriefing and evaluation of incident.

# STOCKTON FIRE DEPARTMENT

## HAZARDOUS MATERIAL GROUP STRUCTURE



JOINT HAZ-MAT TEAM

HAZARDOUS MATERIAL SITE SAFETY PLAN

INCIDENT NUMBER: \_\_\_\_\_ DATE OF INCIDENT: \_\_\_\_\_

A. SITE DESCRIPTION: \_\_\_\_\_

1. LOCATION:

AREA AFFECTED: ☐ INDUST. ☐ COMMERCIAL ☐ RESIDENTIAL  
☐ OPEN ☐ OTHER (SEE ABOVE)

AREA THREATENED: ☐ INDUST. ☐ COMMERCIAL ☐ RESIDENTIAL  
☐ OPEN ☐ OTHER (SEE ABOVE)

2. TOPOGRAPHY:

WATERWAYS: \_\_\_\_\_ TRANSPORTATION ROUTES: \_\_\_\_\_

☐ SITE MAP ATTACHED. JHT #4

3. WEATHER: TEMPERATURE: \_\_\_\_\_ WIND SPEED: \_\_\_\_\_ DIR: \_\_\_\_\_  
HUMIDITY: \_\_\_\_\_

B. 1. PRELIMINARY INCIDENT EVALUATION

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. TASKS TO BE ACCOMPLISHED:

ACTION:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

☐ HEALTH & SAFETY HAZARD ASSESSMENT WORKSHEET: FORM JHT #3

C. 1. HAZARD EVALUATION:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



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D. PROTECTIVE CLOTHING: (PPE)

LEVEL OF PPE

TASK CHOSEN FOR

REFERENCE

☐A ☐B ☐C

☐A ☐B ☐C

☐A ☐B ☐C

☐A ☐B ☐C

☐A ☐B ☐C

MISC. INFO ON SELECTION OF PPE

NOTE: IF ANY REPIRATORY PROTECTION OTHER THAN SCBA IS  
WORN A 5-MINUTE ESCAPE SCBA MUST BE CARRIED  
(1910.120)

E. ON SITE WORK PLANS AND OBJECTIVES:

TEAM NAMES

TASKS TO BE PERFORMED/TIME ALLOWED

TEAM 1

PPE ☐

ENTRY ☐

BACKUP ☐

TEAM 2

PPE ☐

ENTRY ☐

BACKUP ☐

TEAM 3

PPE ☐

ENTRY ☐

BACKUP ☐

TEAM 4

PPE ☐

ENTRY ☐

BACKUP ☐

DECON \_\_\_\_\_

PPE ☐ \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

F. SAFETY AND HEALTH:

PARAMEDICS ☐ YES ☐ NO: NAME(S) \_\_\_\_\_

AMBULANCE ☐ YES ☐ NO: NAME(S) \_\_\_\_\_

WAS PRE – ENTRY SAFETY MEETING HELD? ☐ YES ☐ NO

SAFETY OFFICER \_\_\_\_\_ (Print)

\_\_\_\_\_ (Sign)

TO BE FILED AT COMPANY TEN

JHT #2

JOINT HAZ-MAT TEAM  
HEALTH AND SAFETY HAZARD ASSESSMENT WORKSHEET

(to be used with JHT #2 site safety plan)  
(complete one for each chemical)

INCIDENT NUMBER \_\_\_\_\_ DATE \_\_\_\_\_  
PAGE# \_\_\_\_\_ OF \_\_\_\_\_

CHEMICAL NAME \_\_\_\_\_

TRADE NAME \_\_\_\_\_

PHYSICAL STATE: ☐ GAS ☐ LIQUID ☐ SOLID ☐ POWDER  
☐ OTHER \_\_\_\_\_

DESCRIPTION CONTAINER/MATERIAL \_\_\_\_\_

QUANTITY \_\_\_\_\_ MARKINGS \_\_\_\_\_

PHYSICAL PROPERTIES: SPECIFIC GRAVITY \_\_\_\_\_ BOILING PT \_\_\_\_\_

WATER SOLUBLE \_\_\_\_\_ REACTIVE \_\_\_\_\_ VAPOR DENSITY \_\_\_\_\_

OTHER \_\_\_\_\_

HEALTH HAZARD: ☐ YES ☐ NO ☐ SUSPECTED ☐ UNKNOWN

TYPE: ☐ INHALATION ☐ INGESTION ☐ ABSORPTION

☐ ACUTE ☐ CHRONIC ☐ ENVIRONMENTAL

☐ OTHER \_\_\_\_\_

DESCRIPTION: \_\_\_\_\_

FIRE: ☐ YES ☐ NO ☐ SUSPECTED ☐ UNKNOWN

FLASH Pt \_\_\_\_\_ IGN PT \_\_\_\_\_ FLAMM LIMITS \_\_\_\_\_

DESCRIPTION: \_\_\_\_\_

CORROSIVE HAZARD: ☐ YES ☐ NO ☐ SUSPECTED ☐ UNKNOWN

DESCRIPTION: \_\_\_\_\_

REACTIVITY HAZARD: ☐ YES ☐ NO ☐ SUSPECTED ☐ UNKNOWN

DESCRIPTION: \_\_\_\_\_

ETIOLOGICAL HAZARD: ☐ YES ☐ NO ☐ SUSPECTED ☐ UNKNOWN

DESCRIPTION: \_\_\_\_\_

TESTING EQUIPMENT USED AND RESULTS \_\_\_\_\_

% OF OXYGEN IN AIR AS TESTED \_\_\_\_\_

ATTACH A SEPARATE HAZ-CAT FORM FOR EACH CHEMICAL TO THIS FORM.

TESTING PERFORMED BY: \_\_\_\_\_

RESEARCH PERFORMED BY: \_\_\_\_\_

PER CFR 1910.120 THIS INFORMATION MUST BE REVIEWED BY ENTRY  
TEAM MEMBERS PRIOR TO MAKING ENTRY.

ATTACH TO JHT #2

JHT #3



**STOCKTON FIRE DEPARTMENT  
INCIDENT COMMAND SYSTEM  
FIELD WORKBOOK**

**ENTRY LEADER**

**JUNE 1993**

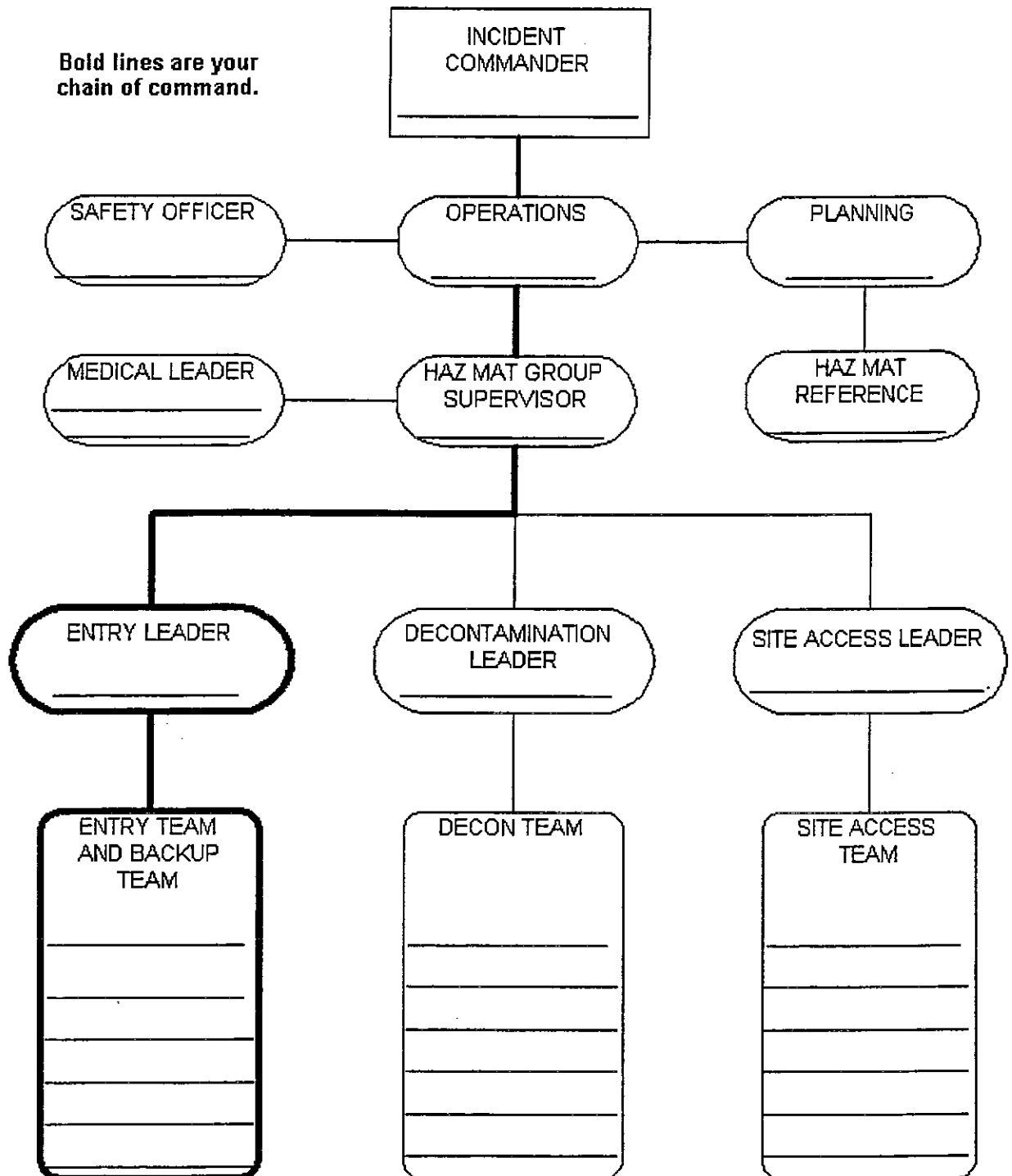
## **ENTRY LEADER**

Entry Leader – Reports to the Hazardous Materials Group Supervisor. The Entry Leader is responsible for the overall entry operations of assigned personnel within the Exclusion Zone.

- A. Obtain briefing from the Haz Mat Group Supervisor.
  - a. Participate in the site safety plan meeting.
- B. Supervise entry operations into the exclusion zone.
  - a. Get instructions on monitoring equipment, tools, and sampling containers from the Haz Mat Supervisor.
- C. Recommend actions to mitigate the situation within the exclusion zone.
  - a. Get instructions on what protective clothing to wear from the Technical Reference Group and Haz Mat Supervisor.
- D. Carry out actions, as directed by the Hazardous Materials Group Supervisor, to mitigate the hazardous materials release or threatened release.
  - a. Have a plan and warning signals in case things go wrong.
- E. Maintain communications and coordinate operations with the Decontamination Leader.
- F. Maintain communications and coordinate operations with the Site Access Control Leader.
- G. Maintain control of movement of people and equipment within the exclusion zone, including contaminated victims.
- H. Direct rescue operations, as needed, in the exclusion zone.
- I. Record progress of Entry Team and any unusual circumstances in Event Log.

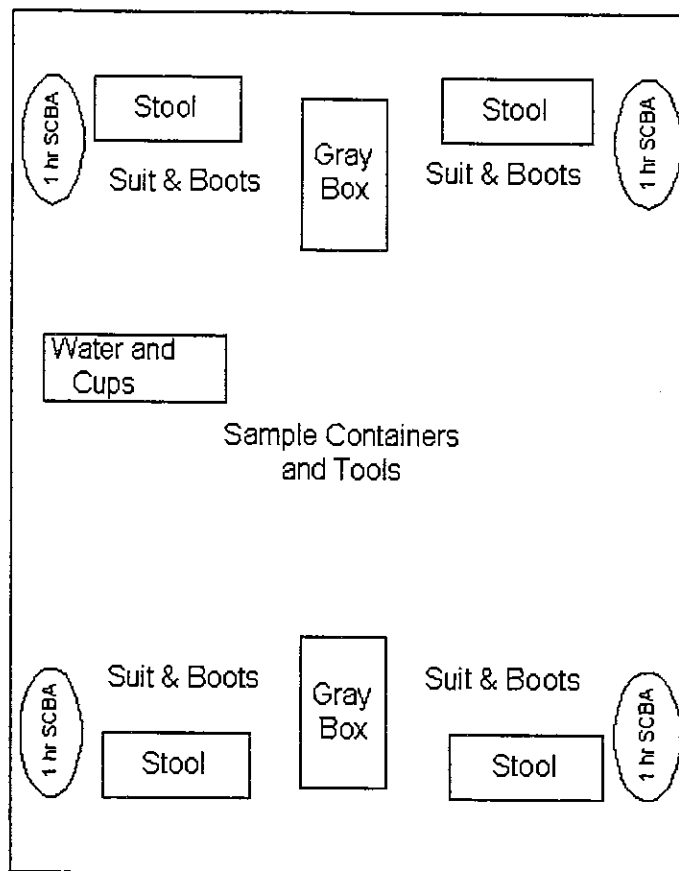
# STOCKTON FIRE DEPARTMENT

## HAZARDOUS MATERIALS GROUP STRUCTIURE





## SFD STANDARD ENTRY TEAM DRESSING AREA



### EQUIPMENT NEEDED

- 1 - 12' X 18' TARP
- 4 - Traffic cones (at least) to secure tarp
- 4 - Stools
- 2 - Gray Boxes
- 4 - 1 hr. SCBA
- 1 - Entry Suit, 1 - pair rubber boots for each ENTRY member
- 1 - Tote box w/needed tools & sample containers
- 1 - Water jug w/proper liquid & cups

### NOTES

- 1. Set up area near Haz Mat Van
- 2. Have 1 helper for every 2 ENTRY TEAM members
- 3. Record names of ENTRY TEAM and BACK UP TEAM in EVENT LOG
- 4. Record events & unusual circumstances in EVENT LOG.
- 5. Notify DECON LEADER when entry is to be made and record time.
- 6. Give liquids to ENTRY TEAM
- 7. Medical check for all ENTRY members before entry and record



**STOCKTON FIRE DEPARTMENT  
INCIDENT COMMAND SYSTEM  
FIELD WORKBOOK**

**DECONTAMINATION  
LEADER**

**JUNE 1993**

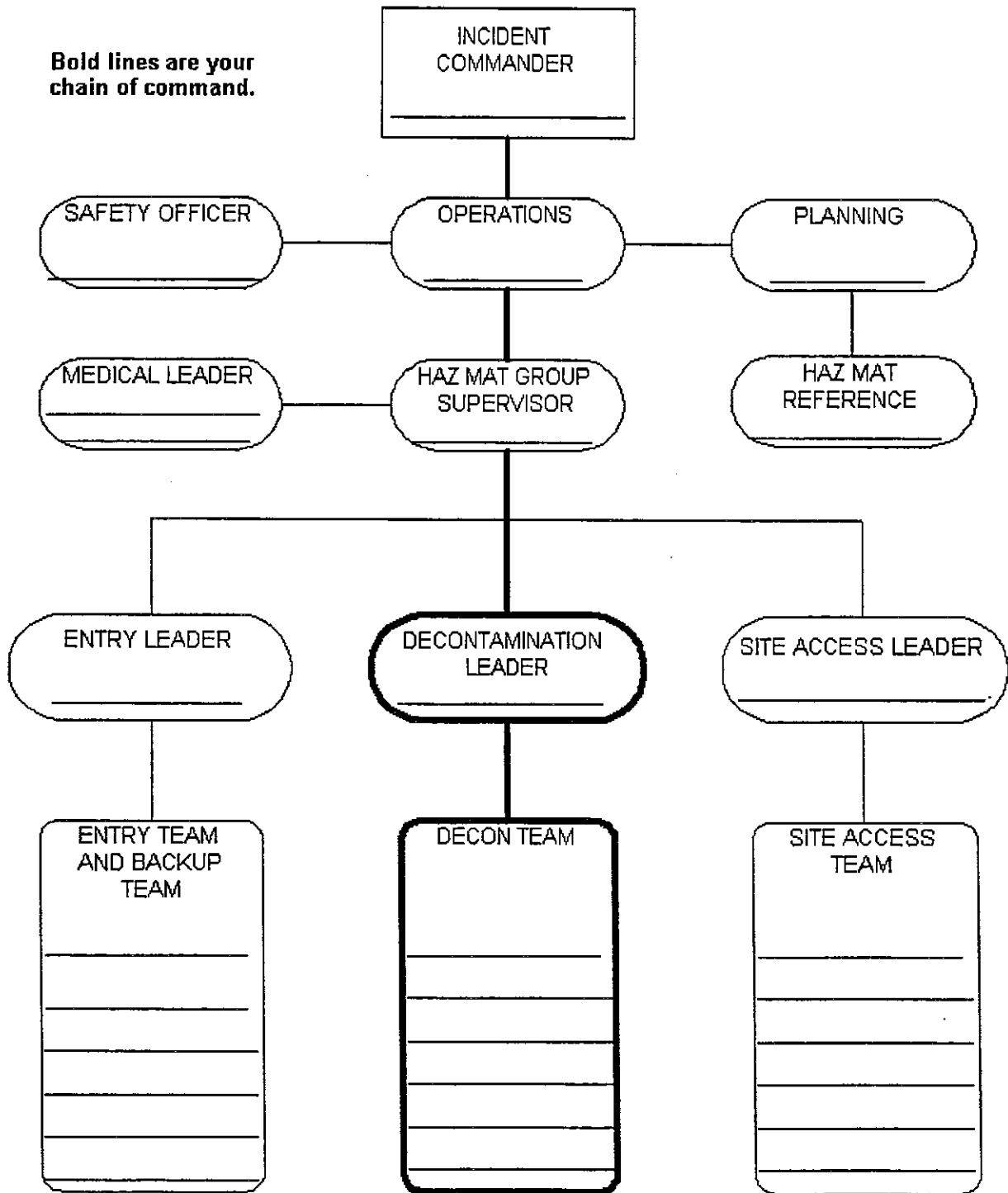
## **DECONTAMINATION LEADER CHECKLIST**

The Decontamination Leader supervises the operations of the decon element, maintains control of movement of people and equipment within the Contamination Reduction Zone including contaminated patients, maintains communications and coordinates operations with the Haz Mat Group Supervisor.

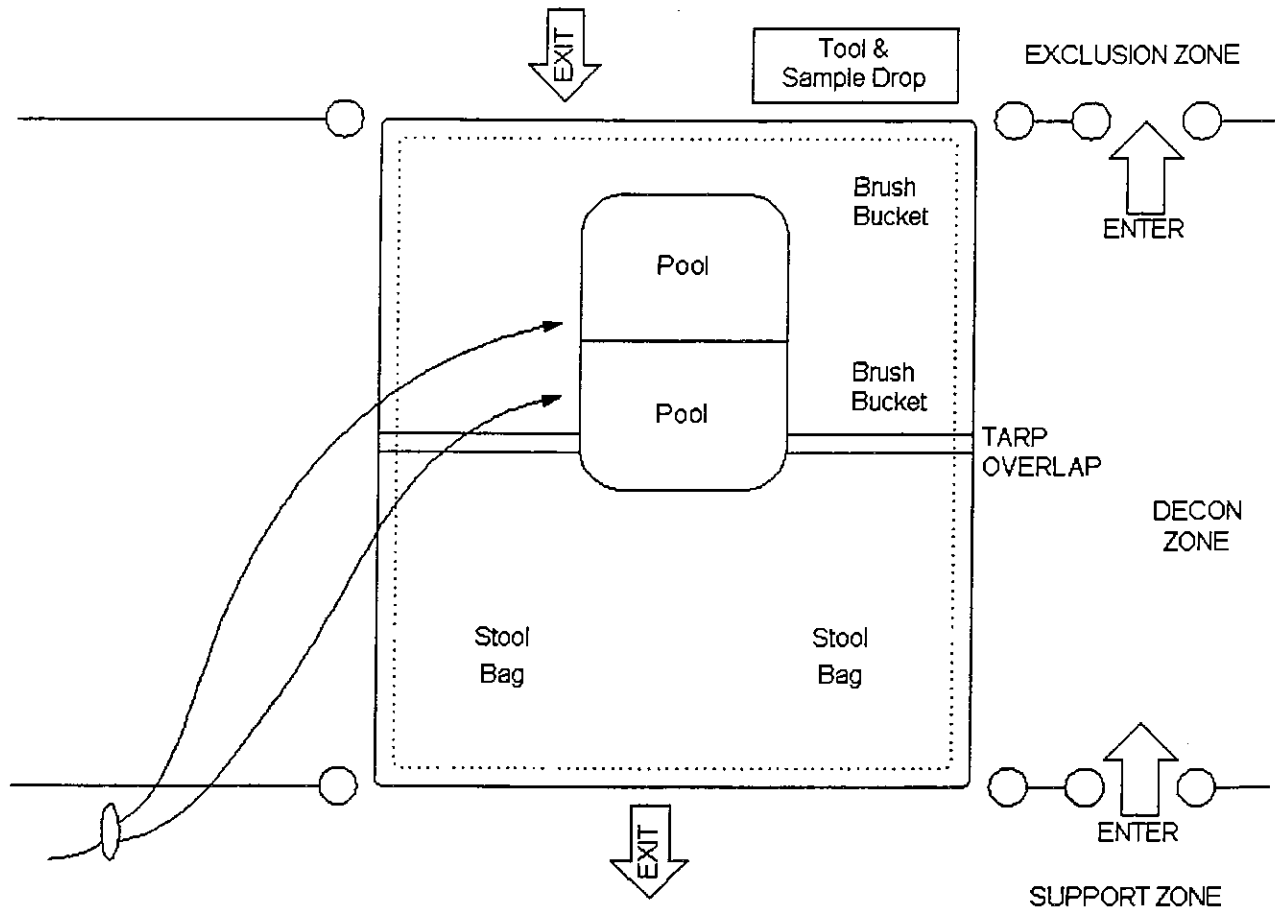
- A. Obtain briefing from the Hazardous Materials Group Supervisor.
  - 1. Complete your Hazardous Materials Group structure Sheet
  - 2. Identify material and people contaminated.
  - 3. Request any additional personnel needed to complete your tasks.
    - a) A 3 station corridor requires a minimum of 6 personnel plus the leader.
- B. Establish the decon Corridor according to the briefing.
  - 1. Up grade and up wind from the contaminated area.
- C. Supervise the operations of the decon element.
- D. Maintain control of movement of people and equipment within the Decon Corridor.
- E. Maintains communications and coordinates operations with the Site Access Control Leader or Haz Mat Group Supervisor.
- F. Coordinate the transfer of contaminated patients requiring medical attention (after decontamination) to the Medical Group.
- G. Coordinate the handling, storage, and transfer of contaminants within the Decon Corridor.
- H. Coordinate the handling and packaging of any samples taken.
- I. Record progress of decontamination and unusual events in the Event Log.
- J. Assure that all Entry Team Members are given a medical evaluation before leaving the Decon Area. Have medics record same.

# STOCKTON FIR DEPARTMENT

## HAZARDOUS MATERIALS GROUP STRUCTURE



## SFD STANDARD DECONTAMINATION CORRIDOR



### EQUIPMENT NEEDED

ENOUGH TARPS TO COVER A 12X18 FOOT AREA

6 - TRAFFIC CONES, TO HOLD DOWN TARPS

DECON POOLS

2 - BRUSHES

2 - BUCKETS W/LIQUID SOAP (1 CUP SOAP TO 1 BUCKET WATER)

1 - WATER MANIFOLD W/GARDEN HOSE

2 - WATER WANDS

2 - STOOLS

2 - BAGS FOR EACH ENTRY TEAM MEMBER

### NOTES

1. ALL DECON PERSONNEL IN LEVEL B SUITS AND SCBA

2. FIREFIGHTERS AT EACH STATION

3. DECON PERSONNEL DO NOT MOVE FROM STATION TO STATION

4. SCRUBBER WILL CONTROL TRAFFIC THROUGH DECON

5. ROLL EDGES OF TARPS IN APPROX. 12"



**STOCKTON FIRE DEPARTMENT**  
**INCIDENT COMMAND SYSTEM**  
**FIELD WORKBOOK**

**SITE ACCESS**  
**CONTROL LEADER**

**JUNE 1993**

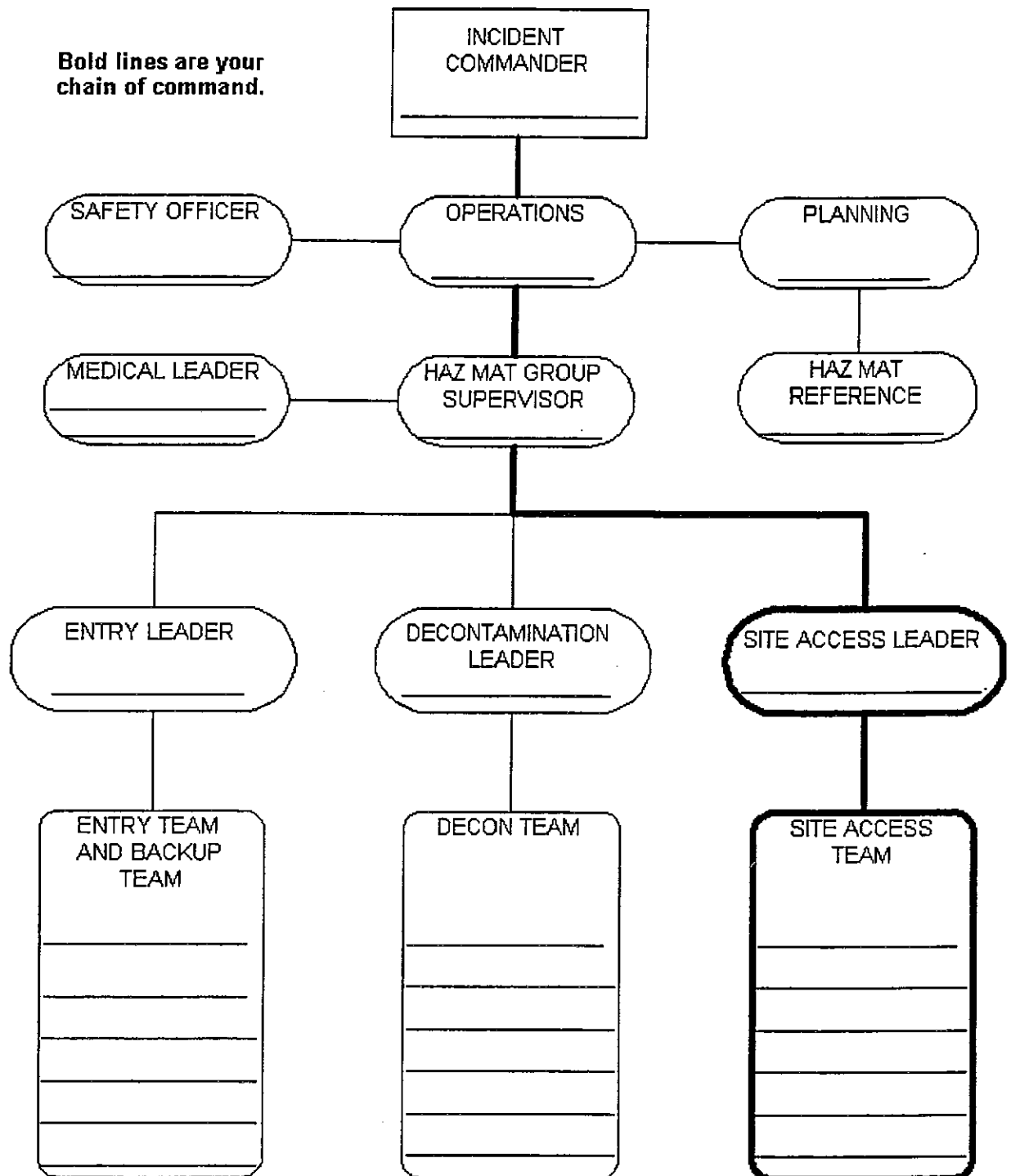


## **SITE ACCESS CONTROL LEADER**

The Site Access Control Leader reports to the Hazardous Materials Group Supervisor. The Site Access Control Leader is responsible for the movement of all people and equipment through appropriate access routes at the hazard site. Only one Site Access Control Leader should be established per Haz Mat site regardless of the size of the operation.

- A. Receive briefing from the Hazardous Materials group supervisor (HMGS).
- B. Verify that control zones are correct and report to HMGS.
- C. Prevent unauthorized personnel from entering restricted zones.
- D. Establish and maintain communication with other group leaders.
- E. Notify all group leaders of time for situation briefing.
- F. Ensure appropriate action is taken to prevent spread of contamination.
- G. Monitor material release and environmental conditions.
- H. Report any control problems with zones and recommend zone adjustments or termination of operations if necessary.
- I. Report readiness of Haz Mat groups to HMGS prior to entry.
- J. Monitor radio communications between team members.
- K. Maintain event log with times and events as they happen.
- L. Verify that everything leaving the area is decontaminated and track persons passing through the Decon Zone to ensure that long-term observations are provided.
- M. Participate in operations debriefing and turn in reports as necessary.

**STOCKTON FIRE DEPARTMENT**  
**HAZARDOUS MATERIALS GROUP STRUCTURE**



[illegible]

**STOCKTON FIRE DEPARTMENT**  
**INCIDENT COMMAND SYSTEM**  
**FIELD WORKBOOK**

**MEDICAL LEADER**

**JUNE 1993**

# Stormwater Program Illicit Discharge Complaint Form

Received By: \_\_\_\_\_ Call, message, email, Ask Stockton? \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received: \_\_\_\_\_

Name of Complainant: \_\_\_\_\_

Complainant Address: \_\_\_\_\_

Complainant Phone #: \_\_\_\_\_

Location of Incident: \_\_\_\_\_

Details of Incident: \_\_\_\_\_

Actions Taken: \_\_\_\_\_

Amount of pollutant removed or remediated: \_\_\_\_\_

Date of Response: \_\_\_\_\_ Time of Response: \_\_\_\_\_ Responding Officer(s): \_\_\_\_\_

**CITY OF STOCKTON, CALIFORNIA  
MUNICIPAL UTILITIES DEPARTMENT DIRECTIVE**

Subject:  <b>PROHIBITING NON-STORMWATER DISCHARGES TO THE STORM DRAINAGE SYSTEM</b>	Directive No.  <b>SW-02</b>	Page No.  <b>1 of 4</b>
	Effective Date:  <b>3/13//09</b>	Revised from:  <b>N/A</b>

**I. PURPOSE**

To establish uniform and consistent policies and procedures in the administration of the City's Stormwater Management and Discharge Control Program (Chapter 7, Part VIII Stockton Municipal Code) and to establish the responsibilities of those City Departments and individuals designated to implement to Stormwater Program. It is recognized that several activities throughout the City have the potential to impact stormwater including, but not limited to, construction, commercial, business and residential activities, and special events.

**II. POLICY**

- A. It is the policy of the City of Stockton to prohibit the discharge of any pollutant, wastewater, or any substance or material which will interfere with the operation or performance of the City's storm drainage system or violate the City's NPDES permit.
- B. The Municipal Utilities Department is charged with the responsibility of implementing the City's Stormwater Program and shall take whatever action is necessary as permitted by law to regulate activities that have the potential to impact storm water including, but not limited to, construction, commercial, business and residential activities, and special events.

**III. PROCEDURE**

- A. Enforcement Procedures – Construction , Commercial / Industrial Businesses, Residential Activities, and Special Events
  - 1. Complaint Received or Violation Witnessed. An enforcement officer responds to a complaint or witnesses an activity which may result in an increase in pollutants entering the City storm drainage system or a non-stormwater discharge to the City storm drainage system.
    - a. Verbal Warning issued for conditions that result in violations of the Stormwater Program due to poor housekeeping or management

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practices. Verbal warning is accompanied by a compliance schedule set forth by the enforcement officer to correct the violation.

- b. Notice of Violation issued for conditions that result in violation of the Stormwater Program due to first-time or isolated incidents, or minor infractions with minimal impact on the storm drainage system and the environment. Notice of violation includes a compliance schedule set forth by the enforcement officer to correct the violation.
  - c. Cease and Desist Order issued for major violations of the Stormwater Program (e.g. large spills, gross negligence), or for violations that have a potential for a significant impact to the environment. The cease and desist order includes a compliance schedule set forth by the enforcement officer to correct the violation.
  - d. Stop Work Order issued for major violations of the Stormwater Program (e.g. large spills, gross negligence in housekeeping or management practices), or for violations that have a potential for a significant impact to the environment. The stop work order includes a compliance schedule set forth by the enforcement officer to correct the violation.
2. Re-inspection. An enforcement officer will return to the site for re-inspection within 30 days for construction, commercial/industrial business or residential activity violations. An enforcement officer will return to the site for re-inspection within 4 hours for special event violations.
- a. Violation Abated Case finalized and closed.
  - b. Violation Continues
    - i. Issue Notice of Violation for failure to implement appropriate BMPs.
    - ii. Issue Cease and Desist Order for failure to terminate illicit connection or otherwise fail to respond appropriately to a verbal warning or an notice of violation.
    - iii. Issue Stop Work Order for failure to respond appropriately to a verbal warning or a notice of violation, third violation in a twelve (12) month period, ongoing discharges of pollutants to the

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storm drain system or to the environment, significant impact to the environment caused by the violation, or facility is not cooperative.

- c. Violation Continues Unabated. Refer violation case to other enforcement authorities for the failure to respond appropriately to previous warnings or orders or if evidence indicates that the violator acted willfully with intent to cause, allow to continue, or conceal discharge in violation of the Stormwater Program (San Joaquin Department of Environmental Resources, Central Valley Regional Water Quality Control Board, County Agricultural Commissioners Office, California Department of Fish and Game, County District Attorney and/or City Attorney for action, as appropriate).
3. Issue Fines. Fines are imposed per violation in the amount of two hundred dollars (\$200.00) for the first Notice of Violation and five hundred dollars (\$500.00) for each subsequent reinspection during which it is noted that the violation has not been corrected.
  - a. In determining the type of action to take, the enforcement officer shall consider factors including but not limited to the seriousness of the violation, the responsible party's efforts to correct the violation, the injury/damage, if any, suffered by any member of the public, any instances in which the responsible party has been in violation of the same or similar code provisions in the previous three years, the amount of city staff time which was expended investigating or addressing the violation, and the amount of fines which have been imposed in similar situations.
  - b. If the responsible party fails to correct the violations, subsequent citations may be issued for the same violations. The amount of the fine shall increase at the following rate:
    - i. First administrative citation two hundred dollars (\$200.00).
    - ii. Second and subsequent administrative citation five hundred dollars (\$500.00).
  - c. Payment of the fine shall not excuse the failure to correct the



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violations nor shall it bar further enforcement action by the City.

d. All fines assessed shall be payable to the City of Stockton.

4. Appeals. An appeal from the issuance of an administrative citation shall follow the procedures set forth in Division 7 of Part VII of Chapter 1 and in Section 7-847 of Chapter 7.

- a. Responsible party must pay all outstanding fees before being able to appeal a fine.
- b. When hearing clerk receives the request for an appeals hearing, he/she will schedule hearing in open appointment of monthly hearing calendar and set date/time of hearing. Hearing clerk will prepare evidence packet with information from Enforcement Officer's case file and send out hearing confirmation letter with evidence packet. Packet to include copies of citations, photos taken by officer and all of the materials that will be presented at the hearing.

APPROVED:

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MARK J. MADISON  
DIRECTOR OF MUNICIPAL UTILITIES

## 1.0 Introduction

In December 2007, the City of Stockton (City) received its third term municipal stormwater permit, Order No. R5-2007-0173. Among other things, the permit required the City to provide regular internal and external training on the applicable components of the Stormwater Management Plan (SWMP) including construction, industrial/commercial, planning and land development, illicit discharge detection and elimination, and municipal related activities. In June 2008, the City submitted a revised SWMP to the Central Valley Regional Water Quality Control Board (Regional Water Board). The SWMP identified that a formal training strategy would be developed during fiscal year 2008-2009.

Developing a formal training strategy and program for internal and external training assists in raising awareness and prompting behavioral changes that are fundamentally necessary for the effective implementation of the SWMP and in protecting water quality. The purpose of this document is to provide a comprehensive, goal-oriented training strategy to complement the Stockton SWMP and aid in its successful implementation during the third term permit period (2007-2012)<sup>1</sup>. The overarching goals of the training program are to:

- Assist in maintaining compliance with the municipal stormwater permit and City SWMP;
- Increase the general awareness and understanding of the SWMP;
- Increase the awareness and understanding of the various SWMP programs, control measures, and performance standards;
- Allow the attendees to remain current on applicable stormwater regulations and policies as well as the technical aspects of their duties;
- Develop the skills and expertise of the attendees so that they can be proficient in implementing the stormwater program as a part of their daily activities;
- Ensure that the SWMP is being implemented in a consistent and cost effective manner; and
- Increase the awareness and prompt the behavior changes that are necessary to protect water quality.

This document highlights the training performance standards for each of the SWMP program elements and identifies an internal, module-based training program and schedule that will be implemented during the permit term. This strategy focuses on those trainings that will be conducted for municipal staff, contractors and external audiences as it may apply. It does not provide the strategy for external outreach to the private sector.

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<sup>1</sup> This document has been based, in part, on the principles and guidelines from the Orange County Stormwater Program Training Program Framework, July 2008.

## 2.0 Program Approach

The training program will be developed and implemented as a series of modules for five of the SWMP program elements including:

1. Illicit Discharges Detection and Elimination;
2. Municipal Operations;
3. Industrial and Commercial;
4. Construction; and
5. Planning and Land Development.

For each of these program elements, this document identifies the modules that will be developed and provided and the schedule. The general principles used in developing the strategy are outlined below.

Instructional Setting - Various instructional settings are used for the training program including classroom settings, field demonstrations, and tailgate sessions. The setting selected is based on what is likely to be most successful for the subject matter and target audience. Regardless of the instructional setting, all training is based on adult-learning principles, goal oriented and interactive.

Frequency of Training - The frequency for the training program considers the number of attendees necessary to warrant holding the session, staff turnover, and the pace necessary to reflect new regulatory and/or technical developments. A summary table with all of the training modules and when they would be provided over the course of the permit term is included in **Attachment A**.

Effectiveness Assessments - For each training module the following assessment data and information will be obtained. This data and information will be reported within each annual report and used within the program effectiveness assessments.

- Number and types of training sessions held;
- Number of attendees at each session and their affiliation; and
- Results of the pre and post training surveys.

Certificate of Completion - Completion of the identified training modules will provide the participants with the core knowledge required for each program element. This core knowledge base is a critical component for success of the SWMP. Training participants will be provided with a Certificate of Completion for fulfillment of each module of the training program.

Modification of Training Modules - The training modules will be modified during the permit term based on the effectiveness assessments, in response to respond to regulatory changes, and/or to generally maintain interest.

Schedule - It is anticipated that the training modules will be developed beginning in 2008-2009. See **Attachment A** for training module schedule.

### 3.0 Illicit Discharge Detection and Elimination Program

Since illicit discharges and illegal connections (IDIC) can be a significant source of pollutants to the storm drain system and receiving waters, training will be conducted for staff who are responsible for the identification, investigation, cleanup, reporting, and enforcement of illicit discharges and illegal connections.

The target audiences for the illicit discharges training program include:

Internal Target Audiences	
Hotline staff	Police Dept.
Public Works maintenance crews	Fire Dept.
Industrial/Commercial inspectors	Environmental Control Officers
Building and construction inspectors	

The general program responsibilities include:

- a) Responding to water pollution complaints and incidents
  - o Receive and log initial incident reports and prioritize incidents and response times
  - o Route complaints to appropriate department and initiate documentation
- b) Representing their agency and conveying factual information
  - o Convey information about the stormwater regulatory program and permits
- c) Coordinating with other agencies or departments as needed in order to collect information, obtain compliance and/or refer other identified problems
  - o Coordinate with Fire, Police, Health, District Attorney, Regional Water Board
- d) Conducting legally defensible investigations during which information of verifiable quality is gathered and organized
  - o Identify illicit discharges during normal maintenance activities
  - o Identify illegal connections
  - o Identify if the discharge is an exempted discharge
  - o Investigate the complaint using legally defensible methods
  - o Assess the impact on the environment and determine the source of the pollution/problem
  - o Identify operational activities at various sites and their associated environmental risks
  - o Assess other records for compliance history (incident reports, Stormwater Pollution Prevention Plans (SWPPPs), monitoring data, etc.)
- e) Conducting/overseeing source identification studies or other special studies as needed
- f) Investigating compliance with the local codes and ordinances including the Stormwater Management and Discharge Control Ordinance
  - o Assess the incident for compliance with the Stormwater Management and Discharge Control Ordinance

- g) Overseeing the cleanup of incidents that have impacted the public right of way
  - o Understand the impacts, manage the level of response necessary, and deploy basic spill response equipment
  - o Coordinate the cleanup internally or with spill response clean up companies
- h) Assisting with the necessary programmatic record keeping and data analysis
- i) Organizing observations and supporting documentation into an investigation form and/or a narrative report and reporting findings objectively, methodically, and without personal bias
  - o Complete incident reports and/or other narrative reports
- j) Eliminating illegal discharges or illicit connections in a timely and efficient manner
  - o Identify appropriate follow up actions and coordinate with internal departments
- k) Enforcing the ordinance(s) through various mechanisms including administrative and criminal remedies
  - o Identify enforcement actions/procedures
  - o Identify if administrative or criminal enforcement actions are necessary
  - o Provide enforcement and corresponding follow up actions
  - o Ensure that a progressive enforcement approach is utilized

Existing modules will be enhanced to cover the general program responsibilities. The new/enhanced modules will include adult learning principles and incorporate the knowledge and experience of the experienced responders/personnel. They will also include discussions of lessons learned, current issues, and day-to-day activities. The modules that will be provided for the illicit discharges detection and elimination program element include the following:

IDIC Training Modules
<b>Responders Introduction</b> – Presents overview of IDIC program and identifies the responsibilities including reporting, spill response, inspection, cleanup and enforcement procedures
<b>Responders Field Implementation</b> - Includes hands on scenarios that may be encountered while in the field conducting inspections or responding to water pollution complaints
<b>Investigative Techniques</b> – Identifies the fundamental techniques necessary for conducting legally defensible investigations and used “hands on” exercises to introduce key concepts related to record keeping, hazard identification, environmental sampling, photography, and enforcement
<b>Fire Department Activities</b> - Identifies the emergency and non-emergency activities that fire department personnel may be involved. Provides examples of how those activities may be conducted without having an adverse impact on water quality

The modules, target audiences, and general program responsibilities that would be addressed within each module are presented in **Table 3-1**.

**Table 3-1. Illicit Discharge Detection and Elimination Training Modules, Internal Target Audiences, and Program Responsibilities**

Training Module	Internal Target Audience(s)	Program Responsibilities										
		Respond	Represent Agency	Coordinate	Investigate	Studies	Code Compliance	Cleanup	Records	Reports	Eliminate	Enforce
Illicit Discharges Detection and Elimination Program Introduction	Hotline Staff, Public Works Maintenance Crews, Industrial/Commercial inspectors, Police Department, Building and Construction Inspectors, Environmental Control Officers	x	x	x	x			x	x		x	x
Responders Field Implementation	Environmental Control Officers	x	x	x	x	x	x	x	x		x	x
Investigative Techniques	Environmental Control Officers	x	x	x	x		x		x	x	x	x
Fire Department Activities	Fire Department	x	x	x			x		x		x	

The instructional setting and frequency of training for the illicit discharge detection and elimination program is summarized in **Tables 3-2** and **3-3**. The instructional setting includes classroom and the potential for a field-based training module.

**Table 3-2. Illicit Discharge Detection and Elimination Training Modules**

Training Module	Classroom/ Hands On	Field
Illicit Discharges Detection and Elimination Program Introduction	<b>x</b>	
Responders Field Implementation	<b>x</b>	<b>p</b>
Investigative Techniques	<b>x</b>	
Fire Department Activities	<b>x</b>	

**p** – The module could be developed as a field based training

**Table 3-3. Recommended Training Frequency for Illicit Discharge Detection and Elimination Modules**

Training Module	Frequency	Hours
Illicit Discharges Detection and Elimination Program Introduction	Every 2 Years	1 ½ - 2
Responders Field Implementation	Every 2 Years	2 - 3
Investigative Techniques	Every 2 Years	2 - 3
Fire Department Activities	Every 2 Years	1 ½ - 2

## 4.0 Municipal Operations Program Element Training Strategy

The City, as part of its normal operations, conducts a number of activities (e.g., catch basin cleaning, street repairs, street sweeping via a contract) that may generate or mobilize pollutants. Training will be conducted for municipal staff and contract or lease staff involved in municipal operations and maintenance activities, whose day to day activities have a significant role in managing the infrastructure and protecting water quality.

The target audiences for the municipal operations training program include:

Internal Target Audiences	
Public Works maintenance crews	Waste pickup
Road crews	Parks and recreation crews
Street sweepers	Pesticide/fertilizer applicators
Parking facilities crews	Contract/lease staff
Facility operators	

The general program responsibilities include:

- a) Scheduling inspections of municipal facilities/activities as needed
  - o Create a schedule based on inventory and inspection frequency requirements.
- b) Performing inspections to assess compliance with local codes, ordinances, and permit. Verifying facility information to update the inventory and assist with prioritizations
  - o Complete inspections by required deadlines
  - o Assess the facility for compliance
  - o Identify other regulatory programs that may be applicable such as hazardous materials, waste, construction general permit and/or industrial general permit. Understand other programs to the extent that the recommendations made during the inspections are consistent with the other program requirements.
- c) Reviewing BMP implementation at the site during inspections
  - o Identify implementation of BMPs outlined in the SWMP, Fact Sheets and/or other handbooks/guidance materials utilized by the City
- d) Assessing appropriateness/effectiveness of BMPs implemented at the sites
  - o Identify and understand operational activities at various sites and understand the potential pollutant sources and appropriate BMPs for those activities
  - o Assess other records to establish BMP effectiveness (monitoring data, previous audits, etc.)



- Addressing proper BMPs for the field and fixed facilities based on activities conducted
- e) Performing follow up inspections related to non-compliance
- f) Completing inspection forms to document facility information, inspection findings, areas of non-compliance and associated corrective actions, and/or facility follow-up activities
  - Document inspection findings using appropriate forms
  - Take photographs to document site conditions at time of inspection
  - Develop tracking system

Existing modules will be enhanced to cover the general program responsibilities. The new/enhanced modules will include adult learning principles and incorporate the knowledge and experience of the experienced responders/personnel. They will also include discussions of lessons learned, current issues, and day-to-day activities. The modules that will be provided for the municipal operations program element include the following:

Municipal Operations Training Modules
<b>Fixed Facility Operations</b> – Provides an introduction to the municipal operations program and the BMPs that should be utilized at fixed facilities to protect water quality
<b>Field Programs Operations</b> - Provides an introduction to the municipal operations program and the BMPs that should be utilized while conducting field activities to protect water quality

The modules, target audiences, and general program responsibilities that would be addressed within each module are presented in **Table 4-1**.

**Table 4-1. Municipal Operations Training Modules, Target Audiences, and Program Responsibilities**

Training Module	Internal Target Audience(s)	Program Responsibilities					
		Schedule Inspections	Perform Inspections	BMP Implementation	Effectiveness	Follow Up Inspections	Record Keeping
Fixed Facility Operations	Facility operators, Parking facilities crews, Parks and recreation crews, Contract and lease staff	x	x	x	x	x	x
Field Programs Operations	Maintenance crews, Road crews, Street sweepers, Waste pickup, Pesticide and fertilizer applicators, Contract and lease staff	x	x	x	x	x	x

The instructional setting and frequency of training for municipal operations program is summarized in **Tables 4-2** and **4-3**. The instructional setting includes classroom and the potential for a field-based training module.

**Table 4-2. Municipal Operations Training Modules**

Training Module	Classroom/ Hands On	Field
Fixed Facility Operations	x	<i>p</i>
Field Programs Operations	x	<i>p</i>

*p* – The module could be developed as a field based training

**Table 4-3. Recommended Training Frequency for Municipal Operations Modules**

Training Module	Frequency	Hours
Fixed Facility Operations	Every 2 Years	2 - 3
Field Programs Operations	Every 2 Years	2 - 3

## 5.0 Industrial and Commercial Program Element Training Strategy

The Industrial and Commercial Program Element effectively prohibits unauthorized non-stormwater discharges and reduce pollutants in stormwater runoff from industrial and commercial facilities to the Maximum Extent Practicable (MEP). This is accomplished by tracking, inspecting, providing outreach, and ensuring compliance at industrial and commercial facilities identified as potentially significant sources of pollutants in stormwater.

Training is important for the implementation of the Industrial and Commercial Program Element to ensure that inspectors have and implement a consistent understanding of the stormwater program during inspections and when providing information to the City businesses. External training (e.g. businesses) is achieved through the public and business outreach elements of the SWMP.

The target audiences for the industrial and commercial training program include:

Internal Target Audiences	
Industrial inspectors	Commercial inspectors

The general program responsibilities include:

- a) Scheduling inspections of industrial and commercial facilities to meet prescribed frequencies established in the stormwater permit and/or SWMP
  - o Create a schedule based on inventory and inspection frequency requirements.
  - o Identify pre-inspection procedures to prepare for on-site activities
- b) Performing inspections to assess compliance with local codes, ordinances, and permit. Verifying facility information to update the inventory and assist with prioritizations
  - o Understand pre-inspection preparation procedures, site entry requirements, on-site inspection procedures, and record keeping requirements related to the inspection program
  - o Complete inspections by required deadlines
  - o Assess the facility for compliance with the Stormwater Management and Discharge Control Ordinance
  - o Identify other regulatory programs that may be applicable such as hazardous materials, waste, construction general permit and/or industrial general permit. Understand other programs to the extent that the recommendations made during the inspections are consistent with the other program requirements.
  - o Understand fundamental requirements of the State's General Industrial Permit
- c) Reviewing BMP implementation at the site during inspections

- Identify implementation of BMPs outlined in the SWMP, Fact Sheets and/or other handbooks/guidance materials utilized by the City
- d) Assessing appropriateness/effectiveness of BMPs implemented at the sites
  - Identify and understand operational activities at various sites and understand the potential pollutant sources and appropriate BMPs for those activities
  - Assess other records to establish BMP effectiveness (monitoring data, previous audits, etc.)
- e) Identifying and working with the facility owner/operator to eliminate illegal discharges and illicit connections in a timely and efficient manner
  - Identify follow up actions and coordinate with appropriate internal/external departments
- f) Enforcing the water quality ordinance through various mechanisms including administrative and criminal remedies. Performing follow up inspections related to non-compliance
  - Identify appropriate enforcement actions/procedures
  - Identify if administrative or criminal enforcement actions are necessary
  - Provide enforcement and corresponding follow up actions
- g) Completing inspection forms to document facility information, inspection findings, areas of non-compliance and associated corrective actions, and/or facility follow-up activities
  - Document inspection findings using appropriate forms
  - Take photographs to document site conditions at time of inspection
  - Develop tracking system
- h) Verify facility information to update inventory and assist with prioritization and annual reporting

Existing modules will be enhanced to cover the general program responsibilities. The new/enhanced modules will include adult learning principles and incorporate the knowledge and experience of the experienced responders/personnel. They will also include discussions of lessons learned, current issues, and day-to-day activities. The modules that will be provided for the industrial and commercial program element include the following:

Industrial and Commercial Training Modules
<b>Industrial and Commercial Inspectors Field Implementation</b> – Provides overview of the program element and SWMP commitments as well as detailed information for inspections, use of forms, record keeping requirements, enforcement options and simulated exercises.

The modules, target audiences, and general program responsibilities that would be addressed within each module are presented in **Table 5-1**.

**Table 5-1. Industrial and Commercial Training Modules, Target Audiences, and Program Responsibilities**

Training Module	Target Audience(s)	Program Responsibilities								
		Schedule Inspections	Perform Inspections	BMP Implementation	Effectiveness	Eliminate ID and IC	Enforcement	Follow Up Inspections	Record Keeping	Update Inventory
Industrial and Commercial Inspectors Field Implementation	Industrial and commercial inspectors	x	x	x	x	x	x	x	x	x

The instructional setting and frequency of training for the industrial/commercial program is summarized in **Tables 5-2** and **5-3**. The instructional setting includes classroom and the potential for a field-based training module.

**Table 5-2. Industrial and Commercial Training Modules**

Training Module	Classroom/ Hands On	Field
Industrial and Commercial Inspectors Field Implementation	<b>x</b>	<b>p</b>

**p** – The module could be developed as a field based training

**Table 5-3. Recommended Training Frequency for Industrial and Commercial Module**

Training Module	Frequency	Hours
Industrial and Commercial Inspectors Field Implementation	Every 2 Years	2 - 3

## 6.0 Construction Program Element Training Strategy

During construction projects, a number of activities may generate or mobilize pollutants. The purpose of the Construction Program Element is to coordinate City programs and resources to effectively reduce pollutants in runoff from construction sites during all construction phases. This training program is primarily focused upon construction site inspectors and plan reviewers. Training is important to ensure that inspectors have and implement a consistent understanding of the stormwater program during inspections and that the plan reviewers understand the program requirements. External training (e.g. contractors and developers) is achieved through the public and business outreach elements of the SWMP.

The target audiences for the construction training program include:

Internal Target Audiences	
Construction inspectors	Grading permit inspectors
Building inspectors	Grading plan reviewers

External Target Audiences	
Developers	Builders
Contractors	

The general program responsibilities include:

- a) Understand and be able to describe the Construction General Permit, municipal stormwater permit and SWMP requirements to field personnel
  - Understand when permits are required
- b) Apply knowledge of the municipal permit requirements to assess field situations/review plans
  - Understand the requirements of the SWMP for construction sites
  - Determine compliance and use checklist
- c) Understand common construction site pollutants and potential impacts to receiving waters
  - Understand when construction materials can become pollutants
  - Understand receiving water impacts and 303(d) listed waterbodies
  - Understand the sources of various pollutants on construction sites
- d) Understand how to install, operate, and maintain erosion control BMPs
  - Have a working knowledge of basic erosion control BMPs, their installation, operation, and maintenance



- Understand erosion concepts and how to control erosion for various soil types
- e) Understand how to install, operate, and maintain sediment control BMPs
- Understand how sediment control differs from erosion control
  - Have a working knowledge of basic sediment control BMPs, their installation, operation, and maintenance
- f) Be able to apply good housekeeping principles in the field
- Understand cover and contain strategies
  - Have a working knowledge of good housekeeping BMPs for identified construction site pollutants
- g) Inspect sites for non-stormwater discharges and proper BMPs
- Understand basic types of non-stormwater present on a construction site
  - Understand appropriate BMPs for various types of non-stormwater
  - Understand the regulatory requirements for dewatering of both groundwater and stormwater
- h) Inspect/review for installation of post-construction BMPs
- i) Inspect site for final site stabilization
- Understand final site stabilization requirements
  - Be able to assess a site to determine if it meets stabilization requirements
- j) For public projects – apply knowledge of the Construction General Permit requirements to assess field situations/review plans
- Understand the requirements of the Construction General Permit for construction sites
  - Determine compliance and use the checklist
- k) Existing modules will be enhanced to cover the general program responsibilities. The new/enhanced modules will include adult learning principles and incorporate the knowledge and experience of the experienced responders/personnel. They will also include discussions of lessons learned, current issues, and day-to-day activities. The modules that will be provided for the construction program element include the following:

Construction Training Modules
<b>Inspecting Construction Site BMPs</b> – Provides information on inspection frequency, minimum inspection requirements, enforcement, reporting, dry season requirements, specific BMP installation information and maintenance of BMPs.
<b>Grading Plan Review</b> – Provides an overview of the construction program (both municipal and state), the BMPs required and what should be considered during the plan review process.

The modules, target audiences, and general program responsibilities that would be addressed within each module are presented in **Table 6-1**.

**Table 6-1. Construction Training Modules, Target Audiences, and Program Responsibilities**

Training Module	Target Audience(s)	Program Responsibilities										
		Understand Permits	Assess Site	Pollutants and Impacts	Sources	Erosion BMPs	Sediment BMPs	Housekeeping	Non-stormwater	Post Construction	Site Stabilization	Construction General Permit
Inspecting Construction Site BMPs	Construction inspectors, building inspectors, grading inspectors	x	x	x	x	x	x	x	x	x	x	x
Grading Plan Review	Plan reviewers	x	x	x	x					x		x

The instructional setting and frequency of training for the construction program is summarized in **Tables 6-2** and **6-3**. The instructional setting includes classroom and the potential for a field-based training module.

**Table 6-2. Construction Training Modules**

Training Module	Classroom/ Hands On	Field
Inspecting Construction Site BMPs	<b>x</b>	<b>p</b>
Grading Plan Review	<b>x</b>	

**p** – The module could be developed as a field based training

**Table 6-3. Recommended Training Frequency for Construction Module**

Training Module	Frequency	Hours
Inspecting Construction Site BMPs	Every Year	2 - 3
Grading Plan Review	Every 2 Years	2 - 3

## 7.0 Planning and Land Development Program Element Training Strategy

The addition of impervious areas for homes, industrial and commercial businesses, parking lots, and streets and roads increases the amount of stormwater runoff, as well as the potential for pollution. The Planning and Land Development Program Element ensures that the impacts on stormwater quality from new development and redevelopment are limited through implementation of general site design measures, site-specific source control measures, and treatment control measures. This training program is primarily focused on City staff that review development plans. External training (e.g. contractors and developers) is achieved through the public and business outreach elements of the SWMP.

The target audiences for the construction training program include:

Target Audiences	
Planners	Building Inspectors
Plan Checkers	Construction Inspectors

The general Planner program responsibilities include:

- a) Understanding the stormwater program and City SWMP
- b) Understanding the Stormwater Quality Control Criteria Plan (SWQCCP)
  - What qualifies as a priority project
  - What qualifies as a site design, source control and treatment control BMP
- c) Understanding the application of General or Special notes for Plan sheets and knowing any special conditions associated with specific development sites
- d) Ensuring that project proponents have identified appropriate pollutants of concern based on the project applicant information. Assess plans for selection of appropriate control of pollutants of concern
- e) Coordinating with project proponents and ensuring that the site design, source control, and treatment control BMPs are incorporated within the project plan

The general Plan Checker program responsibilities include:

- a) Understanding the stormwater program and City SWMP
- b) Understanding the Stormwater Quality Control Criteria Plan (SWQCCP)
  - Having a design level understanding
  - Understanding what qualifies as a priority project

- Understanding what qualifies as a site design, source control and treatment control BMP
- c) Understanding and appropriate application of General or Special notes for Plan sheets as identified within the SWMP and knowing any special conditions associated with specific development sites
- d) Ensuring that project proponents have identified appropriate pollutants of concern based on the project applicant information
- e) Having knowledge of the hydrology of the area based on the project applicant's information; ensuring that the project proponents has identified the hydrologic conditions of concern
- f) Having the most current knowledge of project site level BMPs, ensuring that development projects include site design and source control BMPs before treatment is considered, and ensuring that treatment control BMPs for projects effectively address the pollutants of concern and are sized and designed correctly
- g) Reviewing and coordinating with project proponents on planning level and final plans and any associated grading and/or building plans, ensuring that project proponents have the appropriate permits, and ensuring that the projects comply with local water quality ordinances
- h) Ensuring that the plans are properly recorded to enable enforcement against subsequent property owners

The general Inspector program responsibilities include:

- a) Understanding the stormwater program and City SWMP
- b) Understanding the Stormwater Quality Control Criteria Plan (SWQCCP)
  - Having a design level understanding
  - Understanding what qualifies as a priority project
  - Understanding what qualifies as a site design, source control and treatment control BMP
- c) Understanding of final plans, ensuring that the property owners is operating and maintaining the treatment control BMPs incorporated onsite
  - Having a working knowledge of treatment control BMPs, their installation, operation, and maintenance
  - Completing the checklist
- d) Providing for enforcement if treatment control BMPs are not operating or maintained

Existing modules will be enhanced to cover the general program responsibilities. The new/enhanced modules will include adult learning principles and incorporate the knowledge and experience of the experienced responders/personnel. They will also include discussions of lessons learned, current issues, and day-to-day activities. The modules that will be provided for the construction program element include the following:

Planning and Land Development Training Modules <sup>2</sup>
<b>Project Planning &amp; Design</b> – Provides overview of the laws and regulations applicable to new development and significant redevelopment, the connection between the program and water quality, how to develop and review a plan for a high priority project, how to design and incorporate site design, source control, and treatment control BMPs into a project.
<b>Project Inspection</b> – Provides an overview of the SWQCCP process and the inspections that must occur for high priority projects. Identifies the types of site design, source control and treatment control BMPs that may be incorporated into a project and what to inspect for.

The modules, target audiences, and general program responsibilities that would be addressed within each module are presented in **Tables 7-1** and **7-2**.

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<sup>2</sup> These modules may be modified based on the approved SWQCCP in 2009

**Table 7-1. Planning and Land Development Training Module, Target Audiences, and Program Responsibilities for Planners and Plan Checkers**

Training Module	Target Audience(s)	Program Responsibilities										
		Stormwater Program	SWQCCP	Notes/Plan Sheets	Pollutants of Concern	BMPs Incorporated	Treatment BMP Sizing	Hydrology	Permits	Recordation		
Project Planning and Design	Planners	x	x	x	x	x						
	Plan Checkers	x	x	x	x	x	x	x	x	x		



**Table 7-2. Planning and Land Development Training Module, Target Audiences, and Program Responsibilities for Inspectors**

Training Module	Target Audience(s)	Program Responsibilities					
		Stormwater Program	SWQCCP	Final Plans	Inspection of Site	Enforcement	
Project Inspections	Inspectors	x	x	x	x	x	

The instructional setting and frequency of training for the planning and land development program is summarized in **Tables 7-3** and **7-4**. The instructional setting includes classroom and the potential for a field-based training module.

**Table 7-3. Planning and Land Development Training Modules**

Training Module	Classroom/ Hands On	Field
Project Planning and Design	x	
Project Inspections	x	<i>p</i>

*p* – The module could be developed as a field based training

**Table 7-4. Recommended Training Frequency for Planning and Land Development Modules**

Training Module	Frequency	Hours
Project Planning and Design	Every Year	2 - 3
Project Inspections	Every Year	2 - 3

## ATTACHMENT A

Training Module	2008-2009												2009-2010											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Illicit Discharge Detection and Elimination																								
Responders Introduction													X											
Responders Field Implementation													X											
Investigative Techniques																							X	
Fire Department Activities																								X
Municipal Operations																								
Fixed Facility Operations										X														
Field Programs Operations										X														
Industrial and Commercial																								
Inspectors Field Implementation																					X			
Construction																								
Inspecting Construction Site BMPs															X									
Grading Plan Review																						X		
*Tailgate meeting / Rainy Season Letters			X							X					X							X		
Planning and Land Development																								
Project Planning and Design													X											
Project Inspection																								X

\* Tailgate meetings are conducted year-round as needed

Training Module	2010-2011												2011-2012											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
<b>Illicit Discharge Detection and Elimination</b>																								
Responders Introduction													X											
Responders Field Implementation													X											
Investigative Techniques																							X	
Fire Department Activities																								X
<b>Municipal Operations</b>																								
Fixed Facility Operations										X														
Field Programs Operations										X														
<b>Industrial and Commercial</b>																								
Inspectors Field Implementation																				X				
<b>Construction</b>																								
Inspecting Construction Site BMPs			X												X									
Grading Plan Review																						X		
*Tailgate meeting / Rainy Season Letters			X							X				X								X		
<b>Planning and Land Development</b>																								
Project Planning and Design	X												X											
Project Inspection												X												X

\* Tailgate meetings are conducted year-round as needed

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## SECTION ONE – BACKGROUND

### INTRODUCTION

The City of Stockton and County of San Joaquin's County Service Area 54 (Co-Permittees) submitted a Report of Waste Discharge Report and a Proposed Stormwater Management Plan on April 1, 2007 for the Stockton Urbanized Area. The Report of Waste Discharge (ROWD) was integrated within the proposed Stormwater Management Plan (SWMP) so that the submittal was streamlined and the information obtained from program assessments formed the basis of proposed program modifications. The ROWD portion of the submitted document provided an assessment of the Stormwater Program activities conducted during the last permit period (2002-2007). It is anticipated that a third Phase I NPDES permit will be issued for the area-wide Municipal Separate Storm Sewer System (MS4) to discharge stormwater runoff from storm drains within their jurisdictions and to implement a Storm Water Management Program (SWMP) for the five year period (2007-2012).

The overall goals of the five year strategy are to a) reduce the degradation of waters of the State and water of the United States by urban runoff and protect their beneficial uses and b) develop and implement an effective SWMP that is well-understood and broadly supported by regional stakeholders. Natural resources to protect include the San Joaquin River, Mokelumne River, and Calaveras River and tributary streams. The following four sub-basins flow into the City of Stockton:

- Middle San Joaquin-Lower Merced-Lower Stanislaus (South/South-East)
- San Joaquin Delta (West)
- Lower Calaveras-Mormon Slough (East)
- Lower Consumnes-Lower Mokelumne (North)

The core objectives of the updated SWMP are the following:

- Identify and control those pollutants in urban runoff that pose significant threats to the waters of the State and waters of the U.S. and their beneficial uses;

- Comply with the federal regulations to eliminate or control, to the maximum extent practicable (MEP), the discharge of pollutants from urban runoff associated with the stormwater drainage system;
- Develop a cost-effective program which focuses on pollution prevention of urban stormwater;
- Seek cost-effective alternative solutions where prevention is not a practical solution for a significant problem; and
- Coordinate implementation of control measures with other agencies.

The SWMP proposes a wide range of continuing, enhanced and new Best Management Practices (BMPs) and control measures that will be implemented during the third term Permit period. It is the intent of this SWMP to meet all Permit requirements through an iterative process. Each year, the City will review its work to date and, if appropriate, modify and/or enhance the control measure to make progress towards permit compliance.

While public education and outreach is a key element in achieving SWMP objectives, it is only one of the program elements that make a successful SWMP for meeting the NPDES Permit requirements. The pollution control efforts to be developed and implemented by the co-permittees will continue to focus on keeping pollutants out of the storm drain system. This approach has been widely accepted as the most cost-effective means to meet the goals of reducing pollution in storm water to the MEP.

Pollutants that may be contained in storm water include, but are not limited to, certain heavy metals including mercury; sediments; petroleum hydrocarbons from sources such as used motor oil; pathogens; pesticides and pyrethroids; sources of acute and chronic aquatic toxicity; and nutrients that cause or contribute to the depletion of dissolved oxygen and/or toxic conditions in receiving waters.

Water quality assessments will continue to be conducted by the Permittees, Delta Keeper, and the Regional Board. These assessments have identified impairment, or threatened impairment, of beneficial uses of water bodies in the Stockton Urbanized Area. The causes of impairments include oxygen demanding substances, pesticides, and pathogens. Pollutants in storm water can have damaging effects on both human health and aquatic ecosystems. Listed below are several water bodies, which are water

quality impaired by the pollutants shown. These impairments are based on identified exceedances in the past of water quality standards:

- Five-Mile Slough – dissolved oxygen (DO) and pathogens in addition to chlorpyrifos and diazinon;
- Mosher Slough – DO and pathogens in addition to chlorpyrifos and diazinon;
- Stockton Deep Water Channel – dioxin, furans, PCBs and pathogens;
- San Joaquin River – boron, chlorpyrifos, DDT, diazinon, electrical conductivity, Group A pesticides, selenium and unknown toxicity;
- Calaveras River – DO and pathogens;
- Mormon Slough – DO and pathogens;
- Smith Canal – DO, organophosphate pesticides and pathogens; and
- Walker Slough – pathogens.

It is anticipated that the Phase I SWMP, in its effort to reduce pollutants entering the MS4, will continue to require that the following target communities be addressed over the next five year period:

- Municipal Departments and Personnel
- Construction Sites Owners and Developers
- Industrial/Commercial Owners and Operators
- General Public and School Children
- Quasi-Governmental Agencies and Districts, e.g., educational institutions, water districts, sanitation districts, etc.
- Residents who engage in the following practices
  - Automobile repair and maintenance
  - Automobile washing/fund raising car wash events
  - Automobile parking
  - Home and garden care activities and product use (pesticides, herbicides, and fertilizers)
  - Disposal of pet waste
  - Disposal of green waste

The high priority pollutants, their sources and the target communities described above provide a basis for the prioritization of public involvement and education activities.

In summary, this Plan provides a framework for public education and outreach activities over the next five years. Once the third Phase I NPDES Permit is completed, this Plan will be reviewed and updated, if necessary, to assure it meets the final requirements of the Permit. And each year thereafter, County and City staff will review this Plan and develop an annual work plan to carry out individual tasks. Tasks will be coordinated with other agencies to ensure regional consistency and applicability. Coordination of activities will be an essential ingredient to the success of the Public Education Strategic Implementation Plan (Plan).

## **SWMP PUBLIC OUTREACH PROGRAM GOALS**

The purpose of the Public Outreach Program Element is to inform the public (increase knowledge) regarding the impacts of urban stormwater runoff and introduce the steps the public can take to reduce pollutants from everyday activities. The SWMP objectives address key components of the Public Outreach Program and identify that, in order to be effective, the program must:

- Encourage the public to actively participate in the implementation of the stormwater program as well as various outreach events;
- Promote the use of the 24-hour public reporting hotline
- Implement a public education strategy for the overall program that includes the following efforts:
  - Develop and distribute materials (BMP fact sheets, brochures, etc.)
  - Conduct mixed media campaigns (radio, print ads, signage, etc.)
  - Participate in community outreach events and collection programs
  - Conduct public opinion surveys to gauge the level of awareness and behavior change within a community and/or target audience
- Reevaluate exiting public school education program;



- Implement a business outreach program
- Conduct an annual effectiveness assessment for the Annual Progress Report to determine the effectiveness of the Public Outreach Program Element and identify any necessary modifications.

## **STRATEGIC IMPLEMENTATION PLAN**

The City of Stockton and the County of San Joaquin retained ASTONE, formerly known as Panagraph, Inc., to assist in the updating of the Strategic Implementation Plan (Plan) for accomplishing the above objectives over the five year Permit period. The updating of the Plan is one of the performance standards required for meeting SWMP Control Measure PO3 – Public Outreach Implementation. The Plan is conceptual and includes:

- Development Tasks – to refine the overall concepts, themes and strategic messaging for the Public Outreach Program and to coordinate with existing public information efforts;
- Implementation Tasks – to develop communication materials and to convey the messages to target audiences within the community; and
- Assessment Tasks – to document activities and evaluate their effectiveness.

These tasks will provide a strategic approach to meeting the performance standards and level of effort required for SWMP Control Measure PO3. These performance standards include the following:

- Update Strategic implementation Plan and modify based on 2003 and 2005 survey results
- Update survey and conduct survey twice during the permit term (2009 and 2011)
- Identify and/or create, revise and distribute educational materials as needed
- Ensure that educational materials (e.g. fact sheets) address proper disposal of pet waste (WQBP)
- Investigate possibility of purchasing and distributing pet waste bags for pet owners
- Update audiovisual tools and website as needed
- Conduct mixed media campaigns
- Participate in community wide events
- Explore opportunities to participate in local pet events

- Provide community relations
- Implement pesticide outreach effort for city staff, residents retail stores and pest control operators
- Investigate the feasibility of conducting periodic survey in conjunction with other regional programs regarding local or regional sales and use of residential and commercial pest control products

The Plan is the product of a series of workshops with City and County stormwater staff. The purpose of the Plan is to provide a strategic foundation and direction for specific tasks to be conducted over the term of the third NPDES Phase I Permit. It also provides a structure for documenting lessons learned during program implementation and provides guidelines for the development of program branding, mixed media, communication tools and activities that target specific communities and high priority pollutants.

ASTONE recommends reviewing this plan formally and in detail once the Phase I NPDES Permit is finalized, then again at the beginning of Year 3 and at the end of Year 4 to assure all requirements are being met and to also incorporate community and pollutant specific information gathered during program implementation. This process recognizes that educating the greater metropolitan community of Stockton is a continually evolving process of refining the messages to be communicated, evaluating the audiences to be reached and identifying the most effective and cost efficient methods to communicate.

The Stockton Urbanized Area is a diverse community and the Public Outreach Program must be able to communicate with these different groups. This Plan recognizes that this communication task requires a comprehensive, yet specialized understanding of the community's social, ethnic and cultural composition, language needs, existing level of awareness of MS4s, storm water pollution and pollution prevention practices.

Section II of the Plan presents a conceptual message strategy that is based on a detailed public assessment process summarized in the 2007 Public Opinion Survey Report. This Report compared public opinion survey findings from a Baseline Public Opinion Survey Report (June, 2003), with changes in responses in two Follow-Up Public Opinion Survey Reports (Spring 2005 and February 2007). The Plan responds to the measurable changes in public awareness levels and perceptions during this period. It identifies message concepts, audience priorities, communication tools, and media opportunities within the

Stockton Area. Several assessment tools are described that can assist staff in evaluating the program's effectiveness.

Section III of the Plan describes the development, implementation and assessment tasks for the City of Stockton and County of San Joaquin SWMP. The tasks presented are tailored to target specific audiences, coordinate with existing information and education programs and satisfy Phase I Permit requirements.

## **SECTION TWO – STRATEGY**

### **INTRODUCTION**

This section of the Plan outlines the strategy to be utilized in implementing the Public Outreach Program. The strategy incorporates key storm water and urban runoff technical issues and the findings of the three public opinion surveys implemented during the 2002-2007 Phase I Permit period. This section presents:

- Significant findings of the public opinion surveys
- Message concepts to be communicated
- Audiences to be reached
- Tools and media to be used
- Assessment strategies

The public opinion surveys were implemented in 2003, 2005 and 2007 to measure changes overtime in public attitudes and perceptions about storm water pollution prevention. Each survey included 400 telephone interviews with a representative sample of the general public within the Stockton Area. The surveys provided information about the following issues:

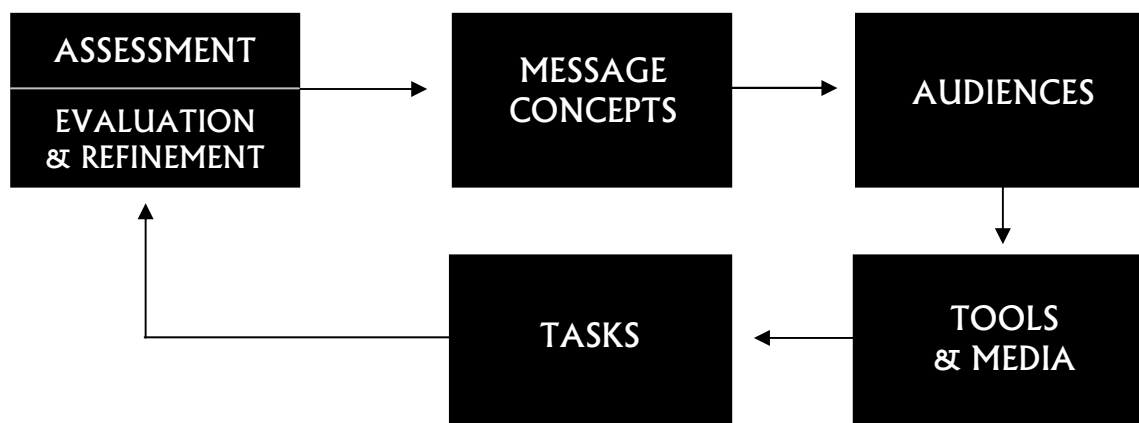
- Perceptions of the seriousness and impacts of pollution
- Understanding of the major contributors to water pollution
- Use patterns and disposal practices of pollution related products
- Awareness of storm drains and the storm drain system
- Willingness to participate in pollution prevention practices
- Awareness of City and County storm water programs
- Exposure to storm water information

The significant findings of the surveys were presented in workshops held with County and City staff during the second Phase I Permit period. At these workshops, changes in public attitudes and

perceptions were evaluated and the impacts that these findings might have on the Public Outreach and Education Program identified.

The findings of the most recent survey (2007) and the correlating message concepts are two of the key factors in this strategic planning process. The other key factors are the audiences to whom the messages will be communicated, the media that will carry the messages and the evaluation component that will assess the effectiveness of the strategy. The interrelationship of these segments is graphically illustrated in Figure 1.

**Figure 1. Strategic Planning Process**



### **SIGNIFICANT FINDINGS OF THE 2007 FOLLOW-UP PUBLIC OPINION SURVEY**

The 2007 Follow-Up Public Opinion Survey included a random digit dial telephone polling of a representative sample of the general public in the Stockton Urbanized Area. It generated a substantial amount of information, and the Executive Summary has been included in Appendix A. A complete copy of the Public Opinion Survey Follow-Up Report (February 2007) is available from City and/or County staff. The results of the survey were distilled into the following five significant findings:

1. *While residents currently view air pollution as the most serious environmental issue, they continue to recognize that the Stockton waterways are at risk (2007: 47%, 2005: 45%, 2003: 48%). Concerns about pollution's impact on the natural environment and human health continue to "drive" the intensity of their viewpoints.*
2. *While respondents demonstrate awareness that they contribute to pollution, many residents continue to blame others, specifically industry, for the majority of the pollution that occurs.*
3. *While Stockton Area residents demonstrate awareness of and participate in pollution prevention practices, local variations continue to exist that need to be addressed.*
  - Reported pesticide use is currently at 40% (2003: 39%) with 12% (2003: 21%) reporting putting leftovers in the trash.
  - 78% of respondents reported putting yard waste in their green waste bin. In 2003, respondents taking care of their own yards reported disposing of yard waste by placing it on the street near the curb.
  - Of the 37% (2003: 36%) of residents that have pets they take on walks, 78% report that they bag pet waste and put it in the trash (2003: 70%).
  - Fewer respondents report changing their own motor oil (2007: 21%, 2003: 26%). The vast majority report taking the used oil to a household hazardous waste center (2007: 82%, 2003: 70%) with another 10% mentioning they recycled their used motor oil through curbside collection for the first time. These measurable results are a significant milestone for the Program's efforts.
4. *While the vast majority of Stockton Area residents are aware of the presence of storm drains and waterways (2007: 84%, 2003: 83%), confusion continues to exist in understanding how the storm drain system differs from the sewer/wastewater treatment system.*

5. *The vast majority of Stockton Area residents continue to be very willing to take responsibility in addressing stormwater pollution and the City of Stockton continues to enjoy a high level of awareness about its responsibility in the operation and management of the storm drain system. A growing number of residents were able to recognize the County of San Joaquin's participation.*

These five significant findings bring to light a great deal about the public's attitudes and awareness level of urban runoff, stormwater, pollution prevention and their relationship to the environment. These five statements form the foundation of the Public Outreach Program strategy by identifying the messages that must be conveyed on a broad and repetitive basis.

## **MESSAGE CONCEPTS**

To conduct an effective communication effort that not only informs the general public and other target communities about storm water pollution prevention, but also motivates them to change, it is necessary to directly link the significant findings of the survey with conceptual messages that can be effectively conveyed through the best media.

These conceptual messages provide a framework for the tasks and activities that are recommended in this Plan. The specific copy with the appropriate level of detail for each target audience will be developed from the concepts as each component of the public outreach effort is produced.

The specific audiences targeted to receive the messages are reviewed and identified on pages 16 – 27 and in Figure 7, found on page 38. The communication tools and media opportunities are reviewed on pages 27 - 35. Some messages are more pertinent for one audience than another and some are better conveyed in one medium than another. Figure 8, (p. 39), illustrates the media most appropriate for reaching specific audiences, and Figure 9, (p. 40), presents the tools and media most appropriate in the distribution of the messages.

1. *While residents currently view air pollution as the most serious environmental issue, they continue to realize that the Stockton waterways are at risk (2007: 47%, 2005: 45%, 2003: 48%). Concerns about*

*pollution's impact on the natural environment and human health continue to "drive" the intensity of their viewpoints.*

Public concerns over the seriousness of air pollution have grown over time as the need to meet air quality standards and improve environmental health have become public garnering major news coverage and public discussion. The general public of Stockton continues to be conscious of water pollution and realize their waterways are at risk. And, they continue to be concerned about pollution's impact on the environment and human health. These concerns provide a foundation for educating the general public. Because of the overall perspective of these concerns, the messages presented below should be communicated to all of Stockton's target communities.

**The message concepts to be conveyed:**

- a. Storm water and urban runoff pick up pollutants from our neighborhoods that pollute our creeks, rivers, sloughs, canals and the Delta.
- b. Storm water pollution endangers human health, the health of our Stockton environment, our wildlife and our children.
- c. Keeping storm water and urban runoff clean helps to maintain our quality of life.

*2. While respondents demonstrate awareness that they contribute to pollution, many residents continue to blame others, specifically industry and business, for the majority of the pollution that occurs.*

Stockton Area residents continue to blame industrial point sources for water pollution. In a similar and recent survey implemented for the Contra Costa Clean Water Program, respondents also blame industrial point sources including oil refineries, manufacturing facilities and commercial businesses. In the Stockton area, the tendency to blame others continues to be is tempered with awareness that everyone pollutes. Through the process of achieving an effective branding for the Stockton Area SWMP, that is, through achieving an effective and integrated "look and feel" for program, the residents and businesses will better understand the impact of their own practices and the public outreach effort will be empowered to



transform perceptions of “they pollute or everyone pollutes” to an understanding of “I pollute or we pollute.” It will be important for all communication tools to both utilize this new brand position and clearly demonstrate how individuals contribute to pollution, if perceptual and behavioral changes are to occur.

**The message concepts to be conveyed:**

- a. All of us are responsible for keeping our neighborhoods, creeks, rivers, sloughs, canals and the Delta clean and healthy.
  - b. Many people think that industry is to blame for water pollution. However, it’s regular people like you and I who do most of the polluting, according to EPA estimates.
3. *While Stockton Area residents continue to demonstrate awareness of and participate in pollution prevention practices, local variations continue to exist that need to be addressed.*

While most of the public outreach effort should be linked to a comprehensive, overarching view of storm water pollution prevention messaging and focus on the impacts of storm water pollution on the health of the Stockton Area environment and human health, various target communities engage in specific polluting behaviors and need information and education on pollution prevention practices.

**The message concepts to be conveyed:**

- a. Residents can pollute urban runoff and storm water. Here’s what to do to prevent pollution:
  - Use pesticides sparingly and always follow directions on the label.
  - Use your green waste container to dispose of your yard waste or follow the city/county guidelines for proper disposal.
  - Animal waste from dogs, cats and other household animals must be disposed of properly by sealing the waste in a bag and throwing it in a trash bin.
  - Keep vehicles tuned and leak free.

- Fluorescent bulbs, batteries, thermometers and other items contain mercury and must be disposed of properly at a household hazardous waste center/event.
  - Household hazardous waste disposal is easy and convenient.
  - Use less toxic alternatives to harsh cleaners and pesticides.
  - Litter and cigarette butts end up in our waterways.
  - Never dump waste in storm drains or directly into our waterways.
  - Never pour oil or auto fluids in a storm drain.
- b. Businesses, organizations and industries can pollute urban runoff and storm water. Here's what to do to prevent pollution:
- Know the City/County ordinance and the consequences of noncompliance.
  - Research and implement Best Management Practices (BMPs) that work for your business, industry, or organization.
  - Do your part to reduce pollution because it enhances the economic well-being and health of our community.

There are target communities in the Stockton Area that will be identified by the NPDES Phase II Permit, which the public outreach effort must address. These will require the development of specific outreach materials for the following groups: municipal department and personnel, construction site owners and operators, business and community groups, educational institutions, non profit organizations, water districts and other organizational entities.

*4. While the vast majority of Stockton Area residents are aware of the presence of storm drains and waterways (2007: 84%, 2003: 83%), confusion continues to exist in understanding how the storm drain system differs from the sewer/wastewater treatment system.*

Even though many residents understand that stormwater and runoff goes to a storm drain and ends up in a Stockton Area waterway, they do not understand how the storm drain system works. They continue to be confused about how the system differs from the sanitary sewer system and think the water may be treated before it is returned to the environment. Raising awareness of the fact that stormwater is

*untreated* is a critical element to educating residents about the impact of polluting behaviors on local waterways and motivating them to change.

**The message concepts to be conveyed:**

- a. Wastewater and stormwater are managed by separate systems.
- b. In the Stockton area, stormwater and urban runoff flow untreated through storm drains, underground pipelines and culverts to local creeks rivers, sloughs, canals, and the Delta.
- c. Since stormwater is untreated and reaches waterways that people and wildlife depend on, it's important to keep storm water and runoff clean.

Since these messages are a critical part of understanding the relationship of specific behaviors and their impact on the Stockton environment, these message concepts will be directed to all audiences. Due to the complexity of these messages, not all can be easily conveyed through the media. Communication tools and methods will be tailored for community presentations, school programs, displays and printed materials. Water supply, wastewater management, and storm drain systems are effectively communicated through displays, posters and digital media presentations. These tools are particularly effective for presentations and education sessions with community groups, service clubs, business organizations, employee organizations, labor unions and other interested parties.

*5. The vast majority of Stockton Area residents continue to be very willing to take responsibility in addressing stormwater pollution and the City of Stockton continues to enjoy a high level of awareness about its responsibility in the operation and management of the storm drain system. A growing number of residents were able to recognize the County of San Joaquin's participation.*

**The message concepts to be conveyed:**

In the 2007 Follow-Up Public Opinion Survey, Stockton Area residents continued to demonstrate in an overwhelming manner their willingness to participate in improving the quality of life of their community.

In addition, the City of Stockton continues to enjoy recognition for responsibility and the County saw public perceptions of its responsibility grow.

These findings present a key opportunity for the SWMP Public Outreach Program to educate the public about what must be done to prevent pollution. Since residents are already aware of the problem and are willing to be part of the solution, the public outreach materials can take on a easy to understand, relational and friendly tone rather than the more shocking, “in your face” approach required to reach less responsive communities.

- a. The City of Stockton and San Joaquin County operate the storm drain system for the benefit of its residents to protect the community’s quality of life and the health of our environment.

The challenge to the Public Outreach Program will be to effectively “brand” the program, its values and practices so that residents not only are willing to change, but will take that next critical step to practicing the correct behaviors. Branding this program and its key message concepts to as wide a Stockton Area constituency as possible so the values are “ringing” in the minds of residents is key to taking the program to the next level.

## **AUDIENCES**

Specific audiences must be reached in a targeted manner if the Public Outreach Program’s communication effort is to be successful. This section describes these specific audiences. To produce a measurable change in public knowledge and action concerning storm water quality issues, the Public Outreach Program must prioritize communication with broad audiences on a repeated basis with simple, clear messages. The audiences to be reached include:

- Municipal departments and personnel
- Construction site owners and developers
- Industrial/Commercial owners and operators
- General public
  - English speaking members of the general public

- Non-English speaking members of the general public
  - School children
  - Media
  - Community groups
- Quasi-governmental agencies/districts
- Residential community
  - Automobile repair and maintenance, washing and parking
    - Latino males, 18-34, English and Spanish speaking
  - Home and garden care activities and product use
    - Adults 55+, homeowners, earning >\$50,000, Caucasians
  - Disposal of household hazardous waste
    - Adults 25+, homeowners
  - Disposal of pet waste
    - Adults 25+, homeowners, earning >\$75,000
  - Disposal of green waste
    - Adults 25+, homeowners, earning >\$75,000

As previously mentioned, Figure 7, (p. 38), presents a summary of the message concepts and the audiences to whom the messages will be targeted. The chart depicts which message concepts are to be communicated to each group. Figure 8, (p. 39), indicates the tools and media most appropriate for reaching the specific audiences. Below is a description of each of the audiences to be reached.

### **Municipal Departments and Personnel**

The municipal departments of the City of Stockton and the County of San Joaquin, including utilities, police and fire services, information systems, city/county management and other entities within local government, house about 10,000 employees. These internal audiences can be reached through employee associations, city/county based newsletters, e-newsletters, information access through the City's and County's websites, and presentations in which they are able to interact with a presenter, ask questions and form conclusions. In the general field of marketing products and ideas, internal audiences are often

forgotten. These internal audiences can become the Public Outreach Program's most committed and ardent supporters through the design and implementation of effective and repetitive communication efforts.

Each permittee is required to implement a Municipal Program to effectively prohibit non-storm water discharges and prevent or reduce pollutants in runoff from all municipal land use areas, facilities, and activities. Training for employees whose interactions, jobs, and activities affect storm water quality should be prioritized:

- Sewage System Maintenance, Overflow, and Spill Prevention
- Public Construction Activities Management
- Vehicle Maintenance/Material Storage Facilities/Corporation Yards Management
- Landscape and Recreational Facilities Management
- Storm Drain Operation and Management
- Detention Basin Maintenance
- Streets and Roads Maintenance
- Parking Facilities Management
- Emergency Procedures

The Public Outreach Program will support the Municipal Program by developing communication tools that promote a clear understanding of the potential for maintenance activities to pollute storm water and identify appropriate BMPs.

### **Construction Site Owners and Developers**

Construction sites, commercial building projects and residential development can produce specific watershed pollution, water quality and urban runoff problems and can generate construction waste that must be disposed of properly. The approach for audiences that are regulated is to target them as a subgroup of the general public, providing opportunity to reiterate the overall branding themes of the campaign. Specialized printed pieces were already developed during the first permit period for specific industry topics.

## Industrial/Commercial Owners and Operators

Industrial and commercial facilities or businesses identified as top priority due to significant sources of unauthorized non-storm water discharges and/or storm water pollution will be subject to inspections twice during the permit period. The Permittees must maintain a database of these facilities, conduct inspections and provide education for the sites to implement pollutant reduction and control measures.

- Auto body shops
- Auto dealers
- Auto repair shops
- Dry cleaners
- Equipment rentals
- Nurseries
- Kennels
- Restaurants
- Retail gasoline outlets (RGOs)
- Any facility under the general industrial permit

Other businesses tend to create temporary or intermittent sources of unauthorized non-storm water discharges and/or storm water pollution but still need to be tracked on a database and educated.

- Automotive washing and detailing
- Carpet cleaning
- Commercial pesticide application
- Concrete pouring contractors
- Concrete cutting
- General building contractors
- Landscape installation and/or maintenance
- Paint contractors
- Portable toilet rental and maintenance
- Pressure washing
- Street sweepers
- Swimming pool contractors
- Swimming pool maintenance providers

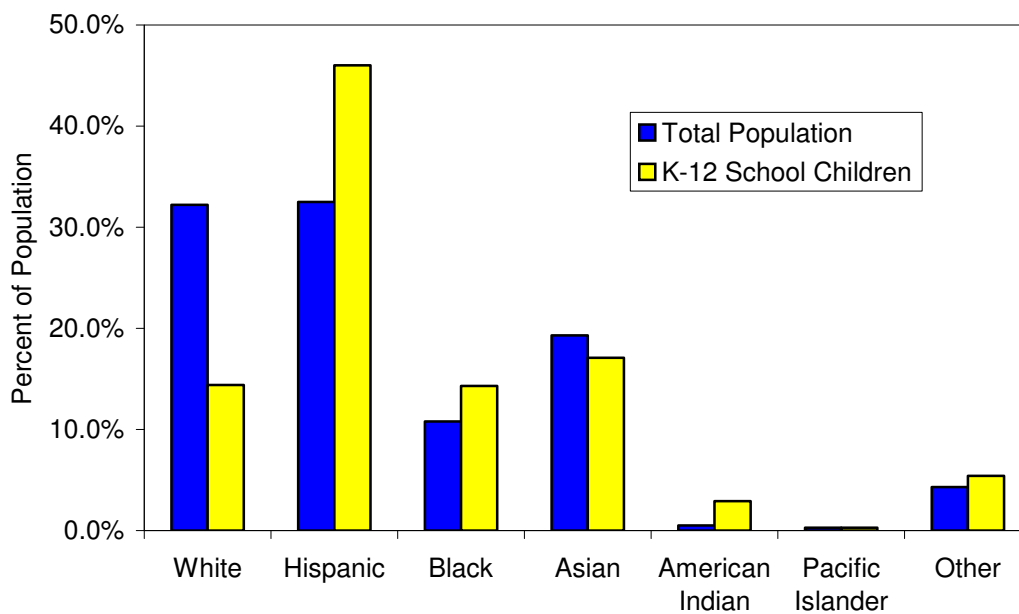
The approach for these industrial/commercial audiences is to target them as a sub-group of the general public, providing the opportunity for general message communication, but incorporating several specialized printed pieces that communicate relevant BMPs. The SWMP effort should include outreach activities, as needed such as targeted mailings, workshops and facility visits to convey messages and

facilitate specific pollution prevention practices. Many outreach materials were produced in the first permit period and are listed in Appendix B.

## General Public

The Stockton Area is a community that is diverse in its ethnicities. It is important to review the general demographics of the community before identifying a primary target for the educational efforts of the Public Outreach Program. In the 2003 Strategic Plan the following chart, based on data from the 2000 Census was provided to illustrate the ethnic makeup of the City of Stockton.

**Figure 2. Ethnic Composition of Stockton vs. Stockton Unified School District**



More recent demographic information is available on the City of Stockton's website and is taken from the U.S. Census Bureau's 2005 American Community Survey. It reports a total population of 279,513 within the City limits and another 138,401 residents living in the unincorporated areas. The website's 2010 projected population figures include 322,462 for the City of Stockton and 149,833 for unincorporated areas. Another source, the California Department of Finance, estimates the 2007 population of Stockton as 289,789.



In the 2005 American Community Survey, residents reported their ethnicity in the following manner: 148,535 (53.3%) “White alone”, 102,441 (36.7%) “Hispanic or Latino”, 63,633 (22.8%) “Asian alone”, 31,744 (11.4%) “Black or African American alone”, 11,522 (4.1%) “Two or more races”, 20,763 (7.4%) “Some other alone”, 1,471 (.5%) “Native or American Indian alone”, and 817 (.002%) “Pacific Islander alone”. Percentages do not add up reliable in the 2005 American Community Survey, but responses are “indicative” of perceived ethnicity on the part of respondents.

A review of the Stockton Area population by ZIP code and income levels provides some insights where the more stressed, underserved populations are located. Currently data that is available is compared with the data that was utilized in the 2003 Strategic Plan. These populations include both English speaking and non-English speaking residents. These regional demographics by ZIP code are also useful for targeting mailings to specific target audiences that are more likely to exhibit a specific behavior, e.g., affluent groups that are more likely to use pesticides.

**Figure 3. 2003 Demographics by ZIP Code**

<b>ZIP Codes</b>	<b>Percentage of Homes</b>	<b>Percentage of Apartments</b>	<b>Percentage of Businesses</b>	<b>Median Income</b>	<b>Median Age</b>	<b>% of Homes with Children</b>
95202	17.9	61.9	20.5	\$18,750	50	16.7
95203	69.3	22.8	7.9	\$37,403	49	30.8
95204	79.0	14.1	6.9	\$46,354	53	24.0
95205	76.0	12.1	11.9	\$28,261	51	44.0
95206	90.8	3.9	5.3	\$29,206	45	43.9
95207	56.2	35.9	7.9	\$49,118	55	26.0
95209	90.8	5.7	3.4	\$62,344	51	33.8
95210	75.0	21.2	3.8	\$39,506	48	35.3
95212	78.3	18.3	3.4	\$62,727	58	22.9
95215	83.0	10.9	6.2	\$39,630	53	29.6
95219	65.1	31.7	3.2	\$72,924	51	29.2

**Figure 4. 2007 Demographics by ZIP Code**

<b>ZIP Codes</b>	<b>Percentage of Homes</b>	<b>Percentage of Apartments</b>	<b>Percentage of Businesses</b>	<b>Median Income</b>	<b>Median Age</b>	<b>% of Homes with Children</b>
95202	16.2	65.6	18.2	\$14,666	50	21.0
95203	69.7	21.6	8.7	\$27,835	53	28.0
95204	79.5	14.0	6.5	\$44,690	56	20.0
95205	77.5	11.8	10.6	\$20,279	52	32.0
95206	92.3	3.3	4.5	\$33,494	47	42.0
95207	56.4	35.6	8.1	\$42,174	55	25.0
95209	92.2	5.9	1.9	\$74,712	53	29.0
95210	73.5	22.2	4.3	\$44,112	52	34.0
95212	88.1	9.7	2.2	\$66,907	52	32.0
95215	82.1	11.7	6.2	\$42,457	56	29.0
95219	68.1	28.1	3.8	\$112,358	52	24.0

*English speaking members of the general public*

To plan and implement an effective mixed media campaign it is important to identify target audiences by age, gender and place. For radio, demographics are used to select the programming and stations that deliver the broadest audiences for the resources the Permittees have to allocate to the effort.

One of the largest audiences to be reached in the Public Outreach Program's effort is the English speaking general public, 18 years of age and older, who reside in the Stockton Area. This group is the primary target audience because of its size and the level of its contribution to storm water pollution.

Studies on pollution prevention attitudinal change indicate that women, in general, feel more intensely about issues surrounding the environment and the health of the family. While this trend may be under dynamic change with more men choosing to share homemaking responsibilities, women continue to be influencers within their home and work settings. For this reason, branding, image selection and messaging should be framed to gain the attention of this segment of the population.

Each year a combination of media should be selected to achieve maximum exposure for the dollars allocated. Market trends within the radio industry include fragmentation, station format changes and lack of audience loyalty. A yearly review of each medium's strength to deliver the messages to all or segments of the general public should be done. The Permit requires a minimum of 800,000 impressions per year about storm water and urban runoff pollution prevention via print, local television access, local radio or other appropriate media.

*Non-English speaking members of the general public*

Within the Stockton Area, there are residents who do not speak English as a primary language. In-language communication tools and messaging will need to be developed and disseminated to these non-English speaking residents.

Because of the size and continuing growth of the Latino population within the Stockton Area, resources will be allocated over the next several years to communicate effectively with this audience. The messages will be patterned after the general strategy discussed in the Plan. Media trends and data continue to demonstrate that Latinos prefer getting information about environmental and health-oriented services and issues primarily via Spanish television and radio. Signage and one-on-one communication also work. In general, the Latino community is made up of three generations, each having a different degree of assimilation into American culture. In the Stockton Area as elsewhere, the Latino population is young and growing rapidly.

The Stockton Area continues to have a sizable Asian community. For purposes of this Plan, Census 2000 data will continue to be utilized. This data provides population numbers for the four largest Southeast Asian communities in the Stockton-Lodi area: Cambodian (9,313 or 3.8%), Vietnamese (6,032 or 2.5%), Hmong (5,653 or 2.3%) and Lao (3,054 or 1.3%). Trust continues to be a major issue within the various Southeast Asian groups, and the elders of these communities continue to guide many of the decisions of their residents, so it will be important to gain their trust. In-language communication tools and media as well as identifying opportunities for one-on-one communication will be key elements of reaching these target communities.

### *School Children*

Historically, full-time staff members from the County and City oversaw exceptional public education and participation projects involving students and educators within the Stockton Area. One approach of public outreach was to target elementary school age children with in-class presentations utilizing video and distribution of “Only Rain Down the Drain” activity booklets and stickers to fourth, fifth and sixth graders. These efforts were done in response to the Phase I Permit which required an annual average of 25 percent of all school children in the fifth grade be educated on storm water pollution prevention.

While schools have provided a venue for educational outreach to communicate about and interact with the issues related to storm water quality and pollution prevention in the past, it has become more difficult, overtime, to gain entrance into classrooms. Teachers have many curriculum requirements and classroom demands to meet. These demands are making it more and more difficult to gain the access needed to accomplish educational outreach through the schools.

### *Media*

Media representatives are considered an audience because of the important role they play in communicating and disseminating the Public Outreach Program’s key messages, particularly in news coverage of events and related stories. An ongoing task of the Public Outreach Program will be to respond to changes in media staffing and programming strengths as well as identify the most effective media opportunities for the SWMP. Through these efforts, media representatives will be able to present storm water quality and pollution prevention messages more accurately. A comprehensive listing and discussion of the strengths of the various newspapers and television and radio stations can be found on pages 27 – 31.

### *Community Groups*

Community groups include, but are not limited to, service organizations, neighborhood associations, youth organizations, and historical, cultural, church and environmental groups. Empowering community-based organizations with communication tools that can be distributed to their constituency is effective for increasing awareness.

The use of community presentations to reach these groups is another effective way to provide public education concerning storm water quality and pollution prevention issues. Most groups that regularly schedule meetings are interested in filling their calendars with well-prepared programs that provide essential information on quality of life in the community. Presentations allow for communicating the more complex messages concerning the SWMP. Presentations should be kept simple and straightforward with an opportunity provided for asking questions and making comments. Many members of these audiences, having heard the SWMP presentations, will disseminate the messages to others through word-of-mouth communication.

### **Quasi-Governmental Agencies/Districts**

State and local agencies, commissions, educational institutions, water and sanitation districts located within the Stockton Area make up this audience. Due to the regional nature of storm water management and the importance all quasi-governmental agencies and districts working collaboratively for solutions to pollution prevention, informational materials will be provided upon request and when appropriate to enhance the involvement of the specific agency or district. The level of knowledge within these quasi-government groups about storm water quality will vary greatly, which necessitates the tailoring of the message content to specific audiences within this target community.

### **Residential Community**

Within the general public of the Stockton Area, there are pollutant-specific groups and practices that require targeted distribution of information. The following demographics are recommended to assist in the task of developing audience-specific communication tools and in planning and purchasing cost-efficient

and effectively targeted mixed media campaigns. These demographic specifications are recommended based on the historic information gathered about the program, the results of the public opinion surveys and knowledge related to other storm water quality management programs.

- Automobile repair and maintenance, washing and parking

The number of individuals changing their used motor oil themselves remained relatively constant over the last Permit period. The primary audiences involved in these activities continue to be males, aged 18-34, who speak English and/or Spanish. Important networks for reaching this group are auto parts and supply stores, curb side collection programs, automobile dealers, car wash facilities, repair and maintenance shops and service stations.

- Home and garden care activities and product use

Adults over the age of 55, homeowners, Caucasians, those living in zip codes 95209, 95210 and 95212, and those earning incomes of \$35 – 50K or over \$75K tend to be the residents involved in home and garden care activities. These residents require education related to less-toxic home and garden care, whether it is for personal practice or for directing the activities of individuals they may hire to maintain their yard. Community events, collaborative retail outlets, utility bill inserts, radio spots, direct mailings and zip code placed signage are all communication vehicles to consider in reaching these residents.

- Disposal of household hazardous waste

Homeowners over the age of 25 tend to accumulate household hazardous waste (HHW) as they are often engaged in home improvement projects. Collaboration with other agencies to achieve higher levels of HHW collection and recycling should be a key element of the Public Outreach Program.

- Disposal of pet waste

Homeowners between the ages of 35 – 54 years old, college educated, with annual incomes of \$35 – 50K and over \$75K make up this target audience. Although many don't want to admit it, water

quality data continues to point to the fact that many Stockton Area residents may not dispose of their pet waste properly. Messages about proper disposal practices along with the more global messages about the impacts of storm water pollution on the environment and human health will be important to communicate through appropriate media and communication tools.

- Disposal of green waste

Homeowners, Asians, residents of zip codes 95202, 95206, 95209, 95210, 95212 and 95215 with annual incomes of less than \$25K, \$35 – 50K and more than \$75K make up the audience that disposed of green waste because they take care of their own yard. A significant contribution to stormwater pollution prevention was the successful introduction of the green waste bin program within the City of Stockton. A vast majority of Stockton residents are participating in this program. On-going education and messaging about the importance of maintaining these proper disposal practices will help the program maintain its momentum.

Many residents may not understand how green waste pollutes waterways since it is “natural” and “biodegradable.” It will be important to provide more than BMPs – residents will need to understand that the degradation process uses up dissolved oxygen that aquatic life depends on.

## **MEDIA AND TOOLS TO BE USED**

Overall, the Public Outreach Program will use a combined media approach to reach the target audiences. Figure 7, found at the end of this section, illustrates which media will be used for communicating the specific message concepts. Figure 8 summarizes which media will be used to reach specific audiences.

### **General Media Planning**

The SWMP media recommendation will include at least one general public campaign each year. The campaign will focus on effective branding of the Program and its “overarching,” motivational theme and key messaging. This must be done on a repetitive basis during the permit period in order to be effective in

establishing a brand position, reaching public education goals and achieving message retention on the part of targeted audiences. It is anticipated that the third Phase I Permit will require a documentation of mixed media campaign impressions each year. While some of these impressions can be gained through participation in events, community relations and outreach to targeted groups, the general public in Stockton, as in other urban markets, prefers to get information from watching television and listening to radio. The following components could be scheduled into a coordinated communications strategy depending on budget allocations made available to the program:

- Newspaper advertisements
- Television and radio public service announcements
- Signage
- Nontraditional media – bus signs and movie theater slides

### **Mass Media**

The Stockton area is served by a number of television and radio stations, one general market newspaper, a weekly Spanish language newspaper, and a number of smaller newspapers. Since the area falls within Sacramento's television media market, there are certain communications challenges that face the Public Outreach Program, specifically fragmentation and cost.

Media strengths change over time. Both the television and radio markets are fragmented with lack of audience loyalty. This trend continues with frequent format changes especially in the radio market. Media analysis will be completed each time a new purchase is made to assure the SWMP effort is as cost-effective as possible.

- **Television:** While Stockton is served by television stations mostly based out of Sacramento, it is important for the public outreach effort to consider the use of this media tool because of its proven impact with "mass market" viewers and its visual strength in generating memorable messaging, viewer recognition of the SWMP Program's brand position and viewer responsiveness to the Program's specific calls to action.



The following list is a snap shot of television stations that consider utilizing during a yearly media campaign effort.

**Figure 5. Television Stations**

Television Station	Nielsen Rating*	Average Share*	Audience
KCRA Channel 3 (NBC)	2.2	13.5	General Market 18+
KCSO-LP Channel 33 (Telemundo)	0.1	0.6	General Market 18+
KMAX Channel 31 (CW)	1.1	6.9	General Market 18+
KOVR Channel 13 (CBS)	1.5	9.1	General Market 18+
KQCA Channel 58 (My Network)	0.4	2.2	General Market 18+
KTFK-TV Channel 64 (TeleFutura)	0.1	0.5	General Market 18+
KTXL Channel 40 (FOX)	0.6	3.4	General Market 18+
KUVS Channel 19 (Univision)	1.1	6.7	General Market 18+
KVIE Channel 6 (PBS)	0.2	1.1	General Market 18+
KXTV Channel 10 (ABC)	1.5	9.1	General Market 18+

- Newspapers:** There are a number of newspapers in the Stockton Area that reach a variety of audiences. *The Record* is the dominant newspaper of the region. *La Voz* is a weekly Spanish language newspaper targeting Latino readership within the Stockton Area. *Connections* continue to be a newspaper read by a cross-section of the Stockton Area population who are interested in alternative views. The *CARAVAN* is a community newspaper that primarily serves single-family residences in the high-income areas near the Miracle Mile, Brookside, and Country Club, parts of Lincoln Village West and other nearby neighborhoods. The *Western Ranch Advertiser* is another community newspaper that serves the new Western Ranch development. *The Business Journal* communicates with the business community in Stockton and throughout the Central Valley. The *Downtowner* is a small newspaper read by the downtown business community.
- Blogs and online publications:** Blogs and online publications are becoming more and more popular for specific target audiences to access, gather information on specific issues, from and share views with others who have also accessed the online blogs. "Eyes of Argus.net" (<http://www.eyesofargus.net/>) is a blog that covers leadership issues and personalities in the

Sacramento, Elk Grove, Stockton, Lodi and surrounding counties. It has been in operation since 2005 and its Editor is Elk Grove political activist, Jason Daniel.

- **Radio:** Radio will also be used to reach most of the target audiences within the general public. A current list of the most popular radio stations should be prepared for every campaign, analyzing the audience by demographic and time-of-day factors. The following chart provides a snapshot of several radio stations to utilize in a mixed media campaign.

**Figure 6. Radio Stations**

<b>Radio Station</b>	<b>Average AQH Rating*</b>	<b>Average AQH Share*</b>	<b>Audience</b>
KATM-FM (KAT Country 103.3)	1.7	9.0	General market 18+
KMIX-FM (Spanish Regional 100.9)	1.5	7.9	General market 18+
KWIN-FM (Urban Contemporary 97.7)	1.2	6.6	General market 18+
KHKK-FM (The Hawk Classic Rock 104.1)	1.2	6.4	General market 18+
KJOY-FM (Star 99.3)	1.2	6.4	General market 18+
KQOD-FM (MEGA 100.1)	0.9	4.7	General market 18+
KSTN-FM (La Ponderosa 107.3)	0.7	3.7	General market 18+
KNBR-AM (Sports Talk 680)	0.5	2.8	General market 18+
KHOP-FM (Adult Contemporary 95.1)	0.5	2.5	General market 18+
KOSO-FM (B93 93.1)	0.5	2.4	General market 18+
KLMG-FM (Regional Mexican 94.3)	0.4	2.0	General market 18+
KHTK-AM (Sports Talk)	0.4	2.0	General market 18+
KSTE-AM (Talk Radio 650)	0.3	1.8	General market 18+
KFBK-AM (News Talk 1530)	0.3	1.8	General market 18+
KWOD-FM (Quad 106.5)	0.3	1.8	General market 18+

\* *Rating* reflects the percentage of total radio audience reached by the station in an average one-quarter hour period from Monday to Friday, 6 a.m. to 7 p.m. based on a four-book Arbitron average. *Share* represents the percentage of the radio audience listening to a particular radio station in the Stockton Area.

- **Signage:** Outdoor advertising, such as billboards, is utilized to reinforce the newspaper and broadcast media in reaching the general public audience. Signage also serves to establish and reinforce the program brand positioning look and feel, logo and theme.
- **Nontraditional Media:** Movie theatre advertising is a media venue that effectively reaches movie patrons in the Stockton Area. Many theaters now have the capability of playing public service announcements and television spots as a part of their venue. Before every movie either a fully produced public service announcement or attention-grabbing slides can be presented while the audience waits for the movie to start. Messages can be communicated in a clutter-free environment with no competition for the viewer's attention.

Bus signage, posted on the exterior and interior of Stockton Transit District buses, can be used effectively to deliver simple pollution prevention messages to Stockton Area residents. The signage on the side of the bus is called a “king” while the signage on the back of the bus is known as a “tail.” These forms are widely visible to both commuters and bus riders. The interior bus signage is especially effective in reaching the bus rider. Interior signage is posted on the inside of the bus for three months at a time and can often be placed at no charge. Both of these opportunities are cost-effective and provide visibility to all ethnic demographics and audiences. Another option, the “bus wrap,” is larger than the kings and tails because the graphic covers the entire bus. The advantages of the bus wrap are that it can be seen from all angles and is more attention grabbing.

Mall graphics are large poster-size signage displayed in kiosks at the local malls. This is an opportunity for the messages to be communicated to many ethnic demographics and audiences. This non-traditional marketing approach is extremely cost-effective because the display receives frequent exposure to the targeted audience.

Forms of target marketing, such as direct mail, door hangers and point-of-purchase flyers, can be used to convey messages to Stockton Area residents targeted by ZIP code and/or community group or neighborhood. This provides an excellent opportunity to communicate with pollutant specific or ethnic audiences that live in particular neighborhoods. Point-of-purchase materials are effective in reaching pollutant-specific audiences when they are buying products such as motor oil or pesticides.

It is anticipated that the Permit will require specific outcomes for the public education effort for engaging and changing behaviors of Stockton Area households. The tactics and tools utilized will be key elements in the effectiveness of the education of Stockton Area residents. They will include the overall branding messages of the campaign in addition to pollutant-specific “how-to” instructional messages on relevant pollution prevention practices.

### **Existing Networks**

Specific audiences, such as agencies, businesses, industry and community groups, can be reached with in-depth, targeted materials disseminated through existing association and agency newsletters, publications and event-oriented printed materials. Many of these activities have been at the center of the Permittees’ SWMP activities during the first permit period. It is recommended that these activities continue through the new permit period.

### **Community Relations**

An important part of the public outreach strategy is to meet in person with key community leaders to communicate the basic message concepts. Leaders that cannot be reached through workshops and existing networks will be reached through personal presentations.

### **Events**

There are a number of special events that occur in the Stockton Area than can be used to reach various target audiences within the general public in addition to business, industry and community groups. Some of the major community events include:

- Brubeck Festival (April)
- Stockton Asparagus Festival (April)
- Black Family Day
- Cambodian New Year (April)
- Cinco de Mayo
- Earth Day Festival (April)
- Filipino Barrio Fiesta (August)
- The Record’s Family Day at the Park
- Greek Festival (September)
- Jewish Food Fair (June)

- Stockton Obon Bazaar (July)
- Keep America Beautiful Month
- State of the City (City of Stockton)
- Make a Difference Day
- National Pollution Prevention Week
- California Coastal Cleanup

Neighborhood events are utilized to convey messages to communities that tend to lack trust in government agencies. These events are particularly effective with the Latino, Southeast Asian and African American communities because they build relationships and give a face to the City and County programs.

### **Editorial and Media Relations**

The media, especially reporters assigned to water and/or environmental issues, will be contacted routinely to ensure that the public outreach events, workshops and speaking engagements receive as much publicity as possible. Press releases will be developed to help promote events as well as provide coverage on topics related to regional storm water quality. Interviews on television and radio public affairs shows will be solicited when appropriate.

This is an extremely valuable tool for building widespread awareness of the SWMP and the efforts to improve the quality of the environment and to protect storm water from pollution. With this tool, the Public Outreach Program is able to garner critical third-party endorsements that directly reach a target audience. These endorsements come from well-respected journalists and other community opinion leaders, so the general public perceives the message as genuine. In addition, published reports and articles secured through these activities are able to include a detailed explanation of the desired message, which translates into highly effective communication to the target audience.

### **Resources for Schools**

Resources and printed materials will be provided to teachers in Stockton area schools for use in their classrooms. A list of the resources delivered to various schools in Stockton will be developed and maintained to facilitate evaluation, support and enhance learning opportunities about storm water pollution prevention. Relevant materials may be developed as needed to support providing resources about storm water.

## **Printed Materials**

Printed materials, such as brochures, flyers, posters and signs, will be used to reach all of the target audiences identified earlier in this section. Existing documents and brochures from the first permit period can be utilized to meet the needs of specific audiences. A consistent look and theme should be developed and incorporated into all new materials so that they clearly support and build upon one another.

Point-of-sale and event displays can be created to communicate directly and clearly to the general public, businesses, industries, community groups and pollutant-specific audiences. The displays can be placed in regional shopping centers, schools and select businesses. Event displays and exhibits can be designed to communicate the basic storm water messages and information about pollutant prevention practices.

## **Digital Media, Audiovisuals and Websites**

Digital media including traditional formats such as videotape presentations and PowerPoint presentations are effective in communicating concise messages in group settings. The presentations can be designed and produced to communicate messages that require more time and detail than can be realized in a television or radio spot. Once the brand position of the Program has been created, a videotape presentation for use in community settings, festivals, meetings, workshops and classrooms should be produced to provide the more detailed messaging needed to garner pollution prevention activities on the part of the general public.

Electronic media, such as CD-ROM, website and e-mail, are other powerful communication tools that effectively reach a variety of audiences. CD-ROM and DVD technology allows for more sophisticated presentations to groups but can also be given to individuals for self-guided virtual tours. Another use for CD-ROMs is distribution of school program curricula where teachers can easily access and print materials as needed.

A “audience friendly, brand positioning” website offers the general public, target audiences, community groups and other interested groups, such as the media, businesses and the general public,

access to consumer based information about the SWMP and also provides the opportunity to download posted files. These campaign consumer related sites can be easily linked with the government agencies which make up the co-permittees of the SWMP, providing a seamless, trustable approach to distributed audience friendly messaging about storm water pollution prevention. In addition, more and more young people are using websites as their primary form of information gathering and communication. E-mail is now a popular form of communication that facilitates inquiries from and responses to the general public. Another use for e-mail would be to send e-blast newsletters to businesses, industrial entities and other groups needing to understand best management practices related to storm water pollution prevention.

## **ASSESSMENT OF THE PUBLIC OUTREACH PROGRAM**

Each major product developed and activity implemented will be measured in light of a specified, results driven objective. The City of Stockton and County of San Joaquin are required to evaluate the effectiveness of the SWMP and its Public Outreach Program and report the pertinent results in an Annual Report format. Possible assessment tools are described below.

### **Documentation of Activities**

Permittees will continuously document:

- Presentations, workshops and participation levels;
- Quantities of materials produced and distributed;
- Mixed media campaign impressions, reach and frequencies
- Tours and events conducted;
- Number of school presentations and distribution of outreach materials to students;
- Storm water quality public inquiries and contacts; and
- Number of website hits.

### **Follow-up Public Opinion Surveys**

Follow-up surveys will be conducted by telephone during 2009-2010 and near the end of the permit period in 2011-2012 to determine the effectiveness of the outreach program. The results will be compared to the findings of the 2007 Baseline Public Opinion Survey, conducted in Year 1, to measure changes in public awareness and behavior as it relates to storm water pollution prevention. Other event-specific surveys may be conducted to measure effectiveness of the particular event.

### **School Outreach Documentation**

Continue relationships established with elementary schools and continue to support school programs by providing educational materials. Distributed materials will be reported in Annual Report.

### **Media Placement Assessment**

Prior to the placement of media advertising, a media plan will be developed. As part of the media plan, an evaluation process will be developed and will include:

- Proof of publication or commercial airing;
- Cost analysis; and
- Analysis of audience reached.

### **Audience Response Mechanisms**

Audience response mechanisms will be used periodically with specific target audiences to assess whether a specific message meets its objective. The results will be used to further refine the message and/or change the manner in which it is disseminated.



## **Behavioral Measurements**

The goal of the public outreach effort is to motivate and reinforce appropriate pollution prevention behavior. The Public Outreach Program will evaluate behavioral responses to the public outreach activities by measuring:

- Participation levels in promoted activities such as used motor oil recycling;
- Participation levels in household hazardous waste (HHW) collection events and visits to the new permanent site;
- Self-reported behaviors through surveys;
- Incidence of illegal dumping reports; and
- Other activities that denote general behavioral changes relative to storm water pollution.

**Figure 7. Audiences Targeted to Receive Specific Message Concepts**

MESSAGE CONCEPTS	AUDIENCES					
	Municipal departments and personnel	Construction site owners and developers	Industrial/Commercial owners and operators	General public	Quasi-governmental agencies/districts	Residential community
1a. Storm water and urban runoff pick up pollutants from our neighborhoods that pollute our creeks, rivers, sloughs, canals and the Delta.	•	•	•	•		•
1b. Storm water pollution endangers human health, the health of our Stockton environment, our wildlife and our children.	•	•	•	•	•	•
1c. Keeping storm water and urban runoff clean helps to maintain our quality of life.	•	•	•	•	•	•
2a. All of us are responsible for keeping our neighborhoods, creeks, rivers, sloughs, canals and the Delta clean and healthy.	•	•	•	•	•	•
2b. Many people think that industry is to blame for water pollution. However, it's regular people like you and I who do most of the polluting, according to EPA estimates.				•		•
3a. Residents can pollute urban runoff and storm water. Here's what to do to prevent pollution...				•		•
3b. Businesses, organizations and industries can pollute urban runoff and storm water. Here is what to do to prevent pollution...	•	•	•		•	
4a. Wastewater and storm water are managed by separate systems.	•	•	•	•	•	•
4b. In the Stockton area, storm water and urban runoff flow untreated through storm drains, underground pipelines and culverts to local creeks, rivers, sloughs, canals, and the Delta.	•	•	•	•	•	•
4c. Since storm water is untreated and reaches our waterways that people and wildlife depend on, it's important to keep storm water and runoff clean.	•	•	•	•	•	•
5a. The City of Stockton and San Joaquin County operate the storm drain system for the benefit of its residents to protect the community's quality of life.	•	•	•	•	•	•

Figure 8. Tools and Media Most Appropriate to Reach Specific Audiences	MEDIA				TOOLS					
	Newspapers	Radio	Signage	Nontraditional	Existing Networks	Community Relations	Events	Editorial/Media Relations	Printed Materials	Digital Media
AUDIENCES										
Municipal departments and personnel					•				•	•
Construction site owners and developers					•	•	•	•	•	•
Industrial/Commercial owners and operators					•	•	•	•	•	•
General public	•	•	•	•	•	•	•	•	•	•
Quasi-governmental agencies/districts					•	•	•	•	•	•
Residential community	•	•	•	•	•	•	•	•	•	•

**Figure 9. Tools and Media Most Appropriate in the Distribution of Specific Message Concepts**

MESSAGE CONCEPTS	MEDIA						TOOLS			
	Newspapers	Radio	Signage	Nontraditional	Existing Networks	Community Relations	Events	Editorial/Media Relations	Printed Materials	Digital Media/Websites
1a. Storm water and urban runoff pick up pollutants from our neighborhoods that pollute our creeks, rivers, sloughs, canals and the Delta	•	•		•	•	•	•	•	•	•
1b. Storm water pollution endangers human health, the health of our Stockton environment, our wildlife and our children.	•	•	•	•	•	•	•	•	•	•
1c. Keeping storm water and urban runoff clean helps to maintain our quality of life.	•	•			•	•	•	•	•	•
2a. All of us are responsible for keeping our neighborhoods, creeks, rivers, sloughs, canals and the Delta clean and healthy.	•	•			•	•	•	•	•	•
2b. Many people think that industry is to blame for water pollution. However, it's regular people like you and I who do most of the polluting, according to EPA estimates.	•				•	•	•	•	•	•
3a. Residents can pollute urban runoff and storm water. Here's what to do to prevent pollution...	•			•	•	•	•		•	•
3b. Businesses, organizations and industries can pollute urban runoff and storm water. Here is what to do to prevent pollution...					•	•	•		•	•
4a. Wastewater and storm water are managed by separate systems.	•				•	•	•	•	•	•
4b. In the Stockton area, storm water and urban runoff flow untreated through storm drains, underground pipelines and culverts to local creeks, rivers, sloughs, canals, and the Delta.	•	•	•	•	•	•	•	•	•	•
4c. Since storm water is untreated and reaches our waterways that people and wildlife depend on, it's important to keep storm water and runoff clean.			•	•	•	•	•	•	•	•
5a. The City of Stockton and San Joaquin County operate the storm drain system for the benefit of its residents to protect the community's quality of life.	•				•	•	•	•	•	•

## SECTION THREE – IMPLEMENTATION

### INTRODUCTION

This section of the Plan describes the yearly tasks and activities needed to implement an effective Public Outreach Program for City of Stockton and County of San Joaquin's Stockton Municipal Stormwater Program. The Plan seeks to target specific audiences, coordinate with existing information and educational programs, and identify public awareness activities to meet the current goals and objectives as described in Sections 1 and 2 of this document.

Tasks related to Years 1, 2 and 3 (fiscal years 2007-08, 2008-09 and 2009-10) are described in detail while the tasks for Years 4 and 5 (2010-2011 and 2011-2012) are described more generally.

### YEAR 1 TASKS (2007-08)

The following program development, implementation and assessment tasks will be pursued during the 2007-08 fiscal year.

#### Development Tasks

1. Manage the Public Outreach Program. Manage, guide and coordinate all tasks for the most effective public education and outreach effort. Manage the process to assure input from key staff, Advisory Committee members and interested parties. Assure compliance and assessment activities are completed.
2. Coordinate with other programs. Participate in statewide coordination efforts to develop consistent messages about stormwater pollution prevention. Review national, state and regional SWMP activities and materials to assess their applicability to the Public Outreach Program. Provide for regular meetings and input from the SWMP Advisory Committee and coordinate messages as appropriate with related pollution prevention and environmental education programs.

3. Conduct 2007 Baseline Public Opinion Survey. Assess public attitudes and perceptions through quantitative research utilizing a public opinion telephone survey of a representative sample of Stockton Urbanized Area residents.
4. Develop a Public Outreach Strategic Implementation Plan. Using the results of the public opinion survey, prepare a strategic implementation plan that outlines message concepts, target audiences, media and tools to be used and assessment tools to measure the effectiveness of the Public Outreach Program Element of the SWMP. Identify specific activities to be conducted and products to be developed over the third term of the permit, 2007 through 2012. Produce a plan that will be sufficiently flexible to allow for revisions as necessary over the permit period. Annually, activities and tasks will be further refined as a part of the budgeting process and subsequent contractual scopes of work.
5. Create a brand position and an “overarching campaign approach” for the Program to heighten the impact of its Public Outreach Program efforts and increase community wide understanding of the importance protecting the health of the Delta and the watershed of the Stockton Urbanized Area. As a part of this task, develop a logo, tagline, and a campaign “look and feel” for the Program that resonates with target audiences and motivates them to understand, trust and take the actions needed to prevent stormwater pollution and achieve SWMP goals and objectives. Conduct focus groups to assess the effectiveness of various creative approaches and gain insight into effective outreach methods. Following the focus group process, finalize the brand position and campaign approach for final approval from Program staff.
6. Develop brand positioning communication tools to provide for consistency in messaging and brand applications. As a part of this effort, develop a Program General Awareness Packet for use with community stakeholders, decision makers, business owners, influencers and the media. The packet will include a folder, a 4 – 8 page brochure, and four “waterfall” fact sheets focusing on key elements of the Program. By developing this general awareness packet, a comprehensive, concise presentation of Program goals, objectives and elements will be presented in a manner that assure consistency in messaging and brand application. In addition, smaller general awareness brochures should be developed to carry the “brand position” forward for residents of the community at large in a cost effective format for printing and distributing larger quantities when needed.

## Implementation Tasks

7. Support other SWMP core programs. Update existing and/or develop new materials to communicate Best Management Practices (BMPs) associated with the Construction, Planning and Development, Industrial and Commercial, Municipal Operations and Illicit/Illegal Discharge programs. Update and/or initiate municipal employee training in targeted positions (whose interactions, jobs, and activities affect storm water quality) regarding the requirements of the SWMP.
8. Participate in community events. Prepare a calendar of community and neighborhood-based events for building awareness of the SWMP. Participate in community-wide events that provide outreach to the general public and co-sponsor neighborhood events that provide public outreach to specific pocket communities within the Stockton Area, e.g., underserved and/or Environmental Justice (EJ) census tracts, and cultural groups including but not limited to African Americans, Asians, Latinos and seniors. Disseminate culturally appropriate outreach materials at events. Partner with grass roots organizations staging events, e.g., health programs and organizations, cultural groups, environmental groups and others as appropriate.
9. Support coastal and stream cleanup events and other community improvement programs. Expand upon existing relationships and form new partnerships as needed with regional and community groups to support and increase public participation in coastal and stream clean up events and community improvement programs. Provide assistance as needed and maintain the Community Grant Program.
10. Support storm drain stenciling program. Publicize the storm drain stenciling program and recruit volunteers.
11. Conduct mixed media campaign. If implemented in spring of 2008, utilize radio PSA and movie theatre slides produced during the second permit period. Place in targeted media outlets.
12. Conduct editorial and media relations. Create a database of media sources for use in educating the community about storm water pollution prevention. Invite broadcast and print media coverage of events. Pitch feature stories. Secure interview opportunities on public affairs shows.

13. Maintain the 24-hour hotline. Update and maintain the hotline established during the prior permit period that serves as the general public contact point for reporting clogged catch basin inlets and illicit discharges/dumping, faded or lack of catch basin stencils, and general storm water management information.

### **Assessment Tasks**

16. Assess and evaluate the past School Education Program and make recommendations on the future approaches that should be taken to communicate with elementary school children and secondary level students about stormwater pollution prevention and the health and quality of Stockton Area waterways and the Delta.
14. Document implementation of the Public Outreach Program. Qualitatively and quantitatively document and evaluate the level of effort expended in implementation of the Public Outreach Program and the level of success in increasing awareness and changing behaviors. During development of each task, event or project, identify performance standards for subsequent evaluation. Quantitative documentation will include tracking the number of brochures or other materials distributed, the number of community presentations, the attendance at all events, the quantity of telephone calls, etc. Qualitative documentation will be solicited through community response forms and evaluation forms given out at community presentations, neighborhood events and other activities.

### **YEAR 2 TASKS (2008-09)**

#### **Development Tasks**

1. Manage the Public Outreach Program. Manage, guide and coordinate all tasks for the most effective public education and outreach effort. Manage the process to assure input from key staff, Advisory Committee members and interested parties. Assure compliance and assessment activities are completed.



2. Coordinate with other programs. Participate in statewide coordination efforts to develop consistent messages about storm water pollution prevention. Review national, state and regional SWMP activities and materials to assess their applicability to the Public Outreach Program. Provide for regular meetings and input from the SWMP Advisory Committee and coordinate messages as appropriate with related pollution prevention and environmental education programs.
3. Develop mixed media campaign tools. Utilizing the brand position and “look and feel” of the overarching campaign approach finalized during the prior year, develop the following tools:
  - a. ***Produce public service announcements.*** Refine, reinforce and repeat message strategies through the development of television and radio PSAs, as resources are available.
  - b. ***Produce print ads and signage.*** Supplement PSAs with print ads and signage to reinforce SWMP messages, as resources are available.
  - c. ***Produce alternative communication media.*** After review of opportunities for utilizing nontraditional media such as bus signage, movie theater slides, mall posters and direct mail, produce final artwork as needed for mixed media campaign.
  - d. ***Incorporate promotion of the storm water hotline*** into public service announcements and appropriate outreach tools. Consider development of signage as a means to enhance awareness of the phone number and the reasons to use it.

## Implementation Tasks

4. Support other SWMP core programs. Update existing and/or develop materials to communicate Best Management Practices (BMPs) associated with the Construction, Planning and Development, Industrial and Commercial, Municipal Operations and Illicit/Illegal Discharge programs. Update and/or complete municipal employee training in targeted positions (whose interactions, jobs, and activities affect storm water quality) regarding the requirements of the SWMP. Promote a clear understanding of the potential for maintenance activities to pollute storm water. Identify and select appropriate BMPs.
5. Develop printed materials on storm water pollution prevention. Produce informational materials as necessary to conduct effective public outreach. Review and update current materials as needed for effective public outreach.

6. Update traditional and nontraditional audiovisuals and media. Determine which audiovisual tools need to be refreshed, updated and which new tools would be beneficial, such as PowerPoint presentations, CD-ROMs, and/or a website designed specifically for effective public outreach.
7. Maintain the 24-hour hotline. Update and maintain the hotline established during the prior permit period that serves as the general public contact point for reporting clogged catch basin inlets and illicit discharges/dumping, faded or lack of catch basin stencils, and general storm water management information.
8. Conduct mixed media campaign. Prepare a mixed media campaign plan to maximize reach and frequency for both English speaking and non-English speaking audiences. Investigate both traditional and non-traditional audio-visual and electronic media opportunities as a part of this process. Organize contracts, place media and provide a post-campaign analysis and evaluation. Launch the campaign once the mixed media plan is approved.
9. Conduct editorial and media relations. Update the database of media sources for use in educating the community about storm water pollution prevention. Invite broadcast and print media coverage of events. Pitch feature stories. Secure interview opportunities on public affairs shows.
10. Provide community relations. Hold briefing sessions for community leaders, educators and public servants to build awareness of storm water quality management issues.
11. Participate in community events. Update the calendar of community and neighborhood-based events for building awareness of the SWMP. Participate in community-wide events that provide outreach to the general public and co-sponsor neighborhood events that provide public outreach to specific pocket communities within the Stockton Area. Disseminate culturally appropriate outreach material at events. Partner with grass roots organizations staging events, e.g., health programs and organizations, cultural groups, environmental groups and others as appropriate.

12. Support coastal and stream cleanup events and other community improvement programs. Partner with groups involved in community improvement programs. Provide assistance as needed and maintain the Community Grant Program.
13. Support storm drain stenciling program. Publicize the storm drain stenciling program and recruit volunteers.
14. Promote available resources for school programs. Establish and/or maintain relationships with both targeted students and educators. Maintain partnership with the City of Stockton Parks and Recreation Department to include storm water presentations in the after school program.
15. Update and expand the business outreach program. Educate targeted business owners and operators about storm water regulations. Provide business presentations and facilitate discussion about business specific storm water quality issues and concerns. Distribute and discuss educational material regarding storm water pollution and specific BMPs. Provide suggestions to facilitate compliance with storm water regulations and explain penalties for noncompliance.

### **Assessment Tasks**

16. Document implementation of the Public Outreach Program. Qualitatively and quantitatively document and evaluate the level of effort expended in implementation of the Public Outreach Program and the level of success in increasing awareness and changing behaviors. During development of each task, event or project, identify performance standards for subsequent evaluation. Quantitative documentation will include tracking the number of brochures or other materials distributed, the number of community presentations, the attendance at all events, the quantity of telephone calls, etc. Qualitative documentation will be solicited through community response forms and evaluation forms given out at community presentations and other events.

## YEAR 3 TASKS (2009-10)

### Development Tasks

1. Manage the Public Outreach Program. Manage, guide and coordinate all tasks for the most effective public education and outreach effort. Manage the process to assure input from key staff, Advisory Committee members and interested parties. Assure compliance and assessment activities are completed.
2. Coordinate with other programs. Participate in statewide coordination efforts to develop consistent messages about storm water pollution prevention. Review national, state and regional SWMP activities and materials to assess their applicability to the Public Outreach Program. Provide for regular meetings and input from the Advisory Committee and coordinate messages as appropriate with related pollution prevention and environmental education programs.
3. Update the Strategic Implementation Plan. Review available resources, progress and effectiveness of public outreach activities and amend the plan as necessary.

### Implementation Tasks

4. Support other SWMP core programs. Update and/or develop new materials to communicate Best Management Practices (BMPs) associated with the Construction, Planning and Development, Industrial and Commercial, Municipal Operations and Illicit/Illegal Discharge programs. Update and/or maintain municipal employee training in targeted positions (whose interactions, jobs, and activities affect storm water quality) regarding the requirements of the SWMP. Promote a clear understanding of the potential for maintenance activities to pollute storm water. Identify and select appropriate BMPs.
5. Develop printed materials as needed on storm water pollution prevention. Produce informational materials as necessary to conduct effective public outreach. Review and update current materials as needed for effective public outreach.

6. Update audiovisuals and electronic media. Update audiovisual tools as needed. Add new pages to the public outreach website as new BMPs and pollutants of concern are identified.
7. Update and maintain the 24 hour hotline. Refresh the hotline messaging and voice over if needed to keep the hotline up to date and functioning effectively. Assure the phone number continues to be listed in the government pages of the telephone book.
8. Conduct mixed media campaign.
  - a. ***Launch mixed media campaign.*** Prepare a mixed media campaign plan to maximize reach and frequency for both English speaking and non-English speaking audiences. Organize contracts, place media and provide a post-campaign analysis and evaluation.
9. Conduct editorial and media relations. Update the database of media sources for use in educating the community about storm water pollution prevention. Invite broadcast and print media coverage of events. Pitch feature stories. Secure interview opportunities on public affairs shows.
10. Participate in community events. Update the calendar of community and neighborhood-based events for building awareness of the SWMP. Participate in community-wide events that provide outreach to the general public and co-sponsor neighborhood events that provide public outreach to specific pocket communities within the Stockton Urbanized Area. Disseminate culturally appropriate outreach material at events. Partner with grass roots organizations staging events, e.g., health programs and organizations, cultural groups, environmental groups and others as appropriate.
11. Support coastal and stream cleanup events and other community improvement programs. Partner with groups involved in community improvement programs. Provide assistance as needed and maintain the Community Grant Program.
12. Support storm drain stenciling program. Publicize the storm drain stenciling program and recruit volunteers.
13. Maintain and promote school programs. Provide resources and materials to students and educators

regarding pollution prevention and stormwater management. Maintain the partnership with the City of Stockton Parks and Recreation Department to include storm water presentations in the after school program.

14. Continue to implement business outreach program. Provide presentations to business groups, facilitate discussion of stormwater related issues and concerns. Distribute brand positioning collateral developed early on in the permit period.

### **Assessment Tasks**

15. Conduct public opinion survey. Conduct a follow-up public opinion survey. This quantitative study will measure changes in the level of public awareness related to storm water pollution issues and pollution prevention behaviors.
16. Document implementation of the Public Outreach Program. Qualitatively and quantitatively document and evaluate the level of effort expended in implementation of the Public Outreach Program and the level of success in increasing awareness and changing behaviors. During development of each task, event or project, identify performance standards for subsequent evaluation. Quantitative documentation will include tracking the number of brochures or other materials distributed, the number of community presentations, the attendance at all events, the quantity of telephone calls, etc. Qualitative documentation will be solicited through community response forms and evaluation forms given out at community presentations and other events.

### **YEAR 4 TASKS (2010-11)**

#### **Development Tasks**

1. Manage the Public Outreach Program. Manage, guide and coordinate all tasks for the most effective public education and outreach effort. Manage the process to assure input from key staff, Advisory Committee members and interested parties. Assure compliance and assessment activities are completed.

2. Coordinate with other programs. Participate in statewide coordination efforts to develop consistent messages about storm water pollution prevention. Review national, state and regional SWMP activities and materials to assess their applicability to the Public Outreach Program. Provide for regular meetings and input from the Advisory Committee and coordinate messages as appropriate with related pollution prevention and environmental education programs.
3. Update the Strategic Implementation Plan. Review available resources, progress and effectiveness of public outreach activities and amend the plan as necessary.
4. Update communication tools to refresh the approach, positioning look and feel, and messaging needed to assure the Public Outreach Program Element is motivated target audiences to take pollution prevention actions to enhance the quality of the Stockton environment. As a part of this task, update the following mixed media tools as needed or indicated as needed by 2009 Public Opinion Survey results:
  - a. **Public service announcements:** Refine, reinforce and repeat message strategies through the development of television and radio PSAs, as resources are available.
  - b. **Print ads and signage:** Supplement PSAs with print ads and signage to reinforce SWMP messages, as resources are available.
  - c. **Investigate alternative communication media.** Review opportunities for utilizing nontraditional media such as bus signage, movie theater slides, mall posters and direct mail.
  - d. **Incorporate promotion of the storm water hotline** into public service announcements and appropriate outreach material.

## Implementation Tasks

5. Support other SWMP core programs. Develop materials to communicate best management practices associated with the Construction, Planning and Development, Industrial and Commercial, Municipal Operations and Illicit/Illegal Discharge programs. Specifically educate residential and commercial builders on statutes and regulations prohibiting discharge of sediment and other pollutants from their sites and into MS4s; guidance documents available for selecting and installing BMPs; and penalties for noncompliance.

6. Develop printed materials on storm water pollution prevention. Produce informational materials as necessary to conduct effective public outreach. Review and update current materials as needed for effective public outreach.
7. Update audiovisuals and electronic media. Update audiovisual tools as needed. Add new pages to the public outreach website as new BMPs and pollutants of concern are identified.
8. Maintain the 24 hour hotline. Maintain the hotline and arrange for the phone number to be listed in the government pages of the telephone book.
9. Conduct mixed media campaign.
  - a. **Launch mixed media campaign.** Prepare a mixed media campaign plan to maximize reach and frequency for both English speaking and non-English speaking audiences. Organize contracts, place media and provide a post-campaign analysis and evaluation.
10. Conduct editorial and media relations. Update the database of media sources for use in educating the community about storm water pollution prevention. Invite broadcast and print media coverage of events. Pitch feature stories. Secure interview opportunities on public affairs shows.
11. Provide community relations. Hold briefing sessions for community leaders, educators and public servants to build awareness of storm water quality management issues.
12. Participate in community events. Update the calendar of community and neighborhood-based events for building awareness of the SWMP. Participate in community-wide events that provide outreach to the general public and co-sponsor neighborhood events that provide public outreach to specific pocket communities within the Stockton Area. Disseminate culturally appropriate outreach material at events. Partner with grass roots organizations staging events, e.g., health programs and organizations, cultural groups, environmental groups and others as appropriate.



13. Support coastal and stream cleanup events and other community improvement programs. Partner with groups involved in community improvement programs. Provide assistance as needed and maintain the Community Grant Program.
14. Support storm drain stenciling program. Publicize the storm drain stenciling program and recruit volunteers.
15. Maintain and promote school programs. Make presentations in elementary or secondary level classrooms and provide pollution prevention and stormwater management materials to students and educators. Maintain the partnership with the City of Stockton Parks and Recreation Department to include storm water presentations in the after school program if appropriate.
16. Maintain business outreach program. Educate targeted business owners and operators about storm water regulations. Distribute and discuss educational material regarding storm water pollution and specific BMPs. Provide suggestions to facilitate compliance with storm water regulations and explain penalties for noncompliance.

### **Assessment Tasks**

17. Document implementation of the Public Outreach Program. Qualitatively and quantitatively document and evaluate the level of effort expended in implementation of the Public Outreach Program and the level of success in increasing awareness and changing behaviors. During development of each task, event or project, identify performance standards for subsequent evaluation. Quantitative documentation will include tracking the number of brochures or other materials distributed, the number of community presentations, the attendance at all events, the quantity of telephone calls, etc. Qualitative documentation will be solicited through community response forms and evaluation forms given out at community presentations and other events.

## YEAR 5 TASKS (2011-12)

### Development Tasks

1. Manage the Public Outreach Program. Manage, guide and coordinate all tasks for the most effective public education and outreach effort. Manage the process to assure input from key staff, Advisory Committee members and interested parties. Assure compliance and assessment activities are completed.
2. Coordinate with other programs. Participate in statewide coordination efforts to develop consistent messages about storm water pollution prevention. Review national, state and regional SWMP activities and materials to assess their applicability to the Public Outreach Program. Provide for regular meetings and input from the Advisory Committee and coordinate messages as appropriate with related pollution prevention and environmental education programs.

### Implementation Tasks

3. Support other SWMP core programs. Update and/or develop new materials to communicate best management practices associated with the Construction, Planning and Development, Industrial and Commercial, Municipal Operations and Illicit/Illegal Discharge programs.
4. Develop printed materials on storm water pollution prevention. Produce informational materials as necessary to conduct effective public outreach. Review and update current materials as needed for effective public outreach.
5. Update audiovisuals and electronic media. Update audiovisual tools as needed. Add new pages to the public outreach website as new BMPs and pollutants of concern are identified.
6. Maintain the 24 hour hotline. Maintain the hotline and arrange for the phone number to be listed in the government pages of the telephone book.
7. Conduct mixed media campaign.

- a. ***Launch mixed media campaign.*** Prepare a mixed media campaign plan to maximize reach and frequency for both English speaking and non-English speaking audiences. Organize contracts, place media and provide a post-campaign analysis and evaluation.
8. Conduct editorial and media relations. Update the database of media sources for use in educating the community about storm water pollution prevention. Invite broadcast and print media coverage of events. Pitch feature stories. Secure interview opportunities on public affairs shows.
9. Participate in community events. Update the calendar of community and neighborhood-based events for building awareness of the SWMP. Participate in community-wide events that provide outreach to the general public and co-sponsor neighborhood events that provide public outreach to specific pocket communities within the Stockton Area. Disseminate culturally appropriate outreach material at events. Partner with grass roots organizations staging events, e.g., health programs and organizations, cultural groups, environmental groups and others as appropriate.
10. Support coastal and stream cleanup events and other community improvement programs. Partner with groups involved in community improvement programs. Provide assistance as needed and maintain the Community Grant Program.
11. Support storm drain stenciling program. Publicize the storm drain stenciling program and recruit volunteers.
12. Maintain and promote school programs. Make presentations in elementary or secondary level classrooms and provide pollution prevention and stormwater management materials to students and educators. Maintain the partnership with the City of Stockton Parks and Recreation Department to include storm water presentations in the after school program if appropriate.
13. Maintain business outreach program. Educate targeted business owners and operators about storm water regulations. Distribute and discuss educational material regarding storm water pollution and specific BMPs. Provide suggestions to facilitate compliance with storm water regulations and explain penalties for noncompliance.

## **Assessment Tasks**

14. Conduct public opinion survey. Conduct a follow-up public opinion survey. This quantitative study will measure changes in the level of public awareness related to storm water pollution issues and pollution prevention behaviors.
  
15. Document implementation of the Public Outreach Program. Qualitatively and quantitatively document and evaluate the level of effort expended in implementation of the Public Outreach Program and the level of success in increasing awareness and changing behaviors. During development of each task, event or project, identify performance standards for subsequent evaluation. Quantitative documentation will include tracking the number of brochures or other materials distributed, the number of community presentations, the attendance at all events, the quantity of telephone calls, etc. Qualitative documentation will be solicited through community response forms and evaluation forms given out at community presentations and other events.

**Figure 10. Tasks and Timeline**

YEAR 1 TASKS	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Budget
<b>STAFF</b>													
Manage the Public Outreach Program													
Coordinate with Other Programs													
Support SWMP Core Programs													
Participate in Community Events													
Support Coastal/Stream Clean up Events													
Support Storm Drain Stenciling													
Mixed Media Campaign								Media Campaign					\$ -
Editorial and Media Relations													
Maintain 24-hour Hotline													
Editorial and Media Relations													
Performance & Effectiveness Evaluation													
Document Public Outreach Program													
<b>CONSULTANT</b>													
Conduct a Baseline Public Opinion Survey													\$ 26,000
Develop a Strategic Plan													\$ 19,000
Create a Brand Position													\$ 12,000
Focus Groups													\$ 18,000
Develop Brand Position Communication Tools													\$ 32,500

**Budget Estimate****\$ 107,500**

Permit Year: 2008 -  
2009

YEAR 2 TASKS	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Budget
<b>STAFF</b>													
Manage the Public Outreach Program													
Coordinate with Other Programs													
Support SWMP Core Programs													
Maintain 24 hour hotline													
Mixed Media Campaign										Media Campaign			\$ 60,000
Conduct editorial and media relations													
Conduct Community Relations													
Participate in Community Events													
Support Coastal/Stream Clean up Events													
Support Storm Drain Stenciling													
Provide School Resources													
Expand Business Outreach													
Collateral Duplication													\$ 30,000
Performance & Effectiveness Evaluation													
Document Public Outreach Program													
<b>CONSULTANT</b>													
Develop mixed media tools: TV & radio													\$ 32,000
Develop printed materials													\$ 15,000
Update trad & nontrad tools													\$ 10,000
Print Ads and Signage Development													\$ 15,000
Website Development/Updating													\$ 12,000
Performance & Effectiveness Evaluation													\$ 2,500

**Budget Estimate**

\$ 176,500

Permit Year: 2009 - 2010

YEAR 3 TASKS	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Budget
<b>STAFF</b>													
Coordinate with Other Programs													
Support other SWMP core programs													
Update/Maintain 24 hour hotline													
Mixed Media Campaign										Media Campaign			\$ 80,000
Participate in Community Events													
Support Coastal/Stream Cleanup Events													
Support Storm Drain Stenciling													
Promote School Resources													
Implement Business Outreach													
Collateral Duplication													\$ 25,000
Meet with Advisory Committee													
Performance & Effectiveness Evaluation													
<b>CONSULTANT</b>													
Update strategic plan													\$ 7,500
Develop printed materials as needed													\$ 8,000
Update trad/nontrad tools													\$ 15,000
Website Updates													\$ 10,000
Campaign Plan & Reconciliation													\$ 10,000
Editorial and Media Relations													\$ 15,000
Public Opinion Survey											Interviews		\$ 28,500
Performance & Effectiveness Evaluation													\$ 2,500
<b>Budget Estimate</b>													<b>\$ 121,500</b>

STOCKTON AREA STORM WATER PUBLIC OUTREACH PROGRAM STRATEGIC IMPLEMENTATION PLAN

**Permit Year: 2010 - 2011**

YEAR 4 TASKS	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Budget
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<b>STAFF</b>													
Manage the Public Outreach Program													
Coordinate with Other Programs													
Support other SWMP core programs													
Maintain 24-hour hotline													
Mixed Media Campaign										Media Campaign			\$ 85,000
Provide community relations													
Participate in Community Events													
Support Coastal/Stream Cleanup Events													
Support Storm Drain Stenciling													
Promote School Resources													
Implement Business Outreach													
Collateral Duplication													\$ 25,000
Meet with Advisory Committee													
Performance & Effectiveness Evaluation													
<b>CONSULTANT</b>													
Collateral Development													\$ 13,000
Update TV and Radio Spots													\$ 14,000
Update Print Ads and Signage													\$ 8,000
Website Updates													\$ 10,000
Campaign Plan & Reconciliation													\$ 10,000
Editorial and Media Relations													\$ 10,000
Strategic Plan Update & Evaluation													\$ 3,000

**Budget Estimate** \$ 178,000



Permit Year: 2011 -  
2012

YEAR 5 TASKS	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Budget
<b>STAFF</b>													
Manage the Public Outreach Program													
Coordination with Other Programs													
Support other SWMP core programs													
Maintain 24 hour hotline													
Mixed Media Campaign										Media Campaign			\$ 85,000
Participate in Community Events													
Support Coastal/Stream Cleanup Events													
Support Storm Drain Stenciling													
Promote School Resources													
Maintain Business Outreach													
Collateral Duplication													\$ 10,000
Meet with Advisory Committee													
Performance & Effectiveness Evaluation													
<b>CONSULTANT</b>													
Collateral Development													\$ 10,000
Website Updates													\$ 10,000
Campaign Plan & Reconciliation													\$ 8,000
Editorial and Media Relations													\$ 15,000
Public Opinion Survey											Interviews		\$ 32,000
Performance & Effectiveness Evaluation													\$ 2,500
<b>Budget Estimate</b>													\$ 172,000

**APPENDIX A****2007 STOCKTON PUBLIC OPINION SURVEY REPORT****A. EXECUTIVE SUMMARY**

A follow-up public opinion survey was conducted in February 2007 for the City of Stockton, Municipal Utilities Department, Storm Water Management Program (City) and the County of San Joaquin, Department of Public Works (County) to assess changes in public perceptions and behaviors related to storm water quality management as compared to the survey data from the spring of 2005 and baseline survey data established in the spring of 2003. The study was designed and implemented as a part of the public education and outreach program mandated by the National Pollutant Discharge Elimination System (NPDES) Permit issued by the California Regional Water Quality Control Board, Central Valley Region.

This study was implemented through a telephone survey of 400 heads of household in the Stockton Urbanized Area (Stockton Area) to quantitatively evaluate how residents perceive and relate to environmental issues associated with storm water. Comparative data about public attitudes, perceptions and behaviors that will be helpful in the strategic development and implementation of the City's and County's public awareness campaign is identified. The survey provided information about the following issues:

- Perceptions of the seriousness and impacts of pollution
- Understanding of major contributors to water pollution
- Use patterns and disposal practices of pollution related products
- Awareness of storm drains and the storm drain system
- Willingness to participate in pollution prevention practices
- Awareness of city and county storm water programs
- Exposure to storm water information

The principal findings of the survey are listed on the following five pages.

## **Perceptions of the Seriousness and Impacts of Pollution**

*Air pollution continued its upward climb ranking highest (2007: 40%, 2005: 35%, 2003: 29%) among a list of six environmental issues. The seriousness of water pollution remained constant as compared with 2005 (2007: 26%, 2005: 26%, 2003: 39%). Perceptions of the seriousness of the impacts of urban growth decreased 8%, returning to its 2003 level (2007: 14%, 2005: 22%, 2003: 14%).*

*Almost three quarters (2007: 73%, 2005: 71%) of the respondents continued to affirm the existence of a nearby body of water, a 7 percent increase since 2003 (66%). Those aware of a water body tended to be those who were 35 – 49 years with some college background residing in ZIP codes 95202, 95203, 95204, 95207, and 95219.*

*Stockton Area residents continue to realize that the waterways are at risk. In the three studies, a relatively consistent number of respondents, who had identified a body of water, perceived it as “very dirty” (2007: 47%, 2005: 45%, 2003: 48%), while other respondents continued to perceive it to be “somewhat dirty” (2007: 29%, 2005: 31%; 2003: 30%). The number of respondents who answered “don’t know” to this question remained constant at 7%.*

*The top two impacts of water pollution identified by respondents were harming the natural environment (2007: 30%, 2005: 33%, 2003: 32%) and causing human health problems (2007: 27%, 2005: 23%, 2003: 27%).*

## **Understanding of Major Contributors to Water Pollution**

*When asked an open-ended question about the causes of water pollution, fewer respondents (2007: 34%, 2005: 41%, 2003: 30%) first mentioned “people, everyone or residents in general” in 2007 as compared to 2005. The number of respondents pointing the blame at industrial plants was relatively consistent between the last two studies (2007: 9%, 2005: 10%, 2003: 19%).*

*Using a four-point scale, respondents were asked to rate how much they believed industry, business, residents, agriculture, and transportation contribute to water pollution. Average ratings were calculated and industry continued to be seen as the main contributor (2007: 3.36, 2005: 3.37, 2003: 3.47) while residents (2007: 3.05, 2005: 2.95, 2003: 3.03) were seen as the second highest contributor, replacing businesses (2007: 2.85, 2005: 2.82, 2003: 3.07).*

*Respondents who identified “everyone” as having responsibility for solving water pollution problems remained relatively constant (2007: 34%, 2005: 36%, 2003: 32%). Interestingly, respondents who singled out residents increased between the last two studies (2007: 17%, 2005: 8%). The number of respondents mentioning industry as responsible for solving water pollution problems was similar between the last two studies (2007: 2%, 2005: 1%, 2003: 7%).*

## **Use Patterns and Disposal Practices of Pollution Related Products**

### **Pesticides**

*About the same number of respondents (2007: 40%, 2005: 40%, 2003: 39%) reported using pesticides or weed killers within the last year. These respondents tended to be homeowners, those who are 55+, Caucasian, reside in ZIP codes 95209, 95210, and 95212, and earn annual incomes of \$35k-\$50k or over \$75k.*

*Of those respondents who reported using pesticides, slightly fewer (2007: 48%, 2005: 51%, 2003: 38%) reported using it all up. A similar level of respondents (2007: 29%, 2005: 29%, 2003: 23%) knew to take the leftovers to a household hazardous waste collection event. Respondents who reported that they threw leftovers in the trash were relatively consistent (2007: 12%, 2005: 10%, 2003: 21%). More respondents reported storing leftovers for future use (2007: 10%, 2005: 4%).*

### **Yard Waste**

*Two thirds (2007: 66%, 2005: 66%, 2003: 62%) of the respondents continued to report taking care of their own yard. These respondents tended to be homeowners, Asian, residents of ZIP codes 95202/15, 95206 and 95209/10/12 with annual incomes less than 25K, 35 – 50K and more than 75K.*

*More residents reported putting yard waste in their green waste bin (2007: 78%, 2005: 70%). In the 2003 study about half of the respondents reported placing the waste on the street. A significant finding of this study is the continuing and growing number of respondents who are successfully participating in the green waste bin program.*

**Pet Waste**

*About the same number of respondents (2007: 37%, 2005: 34%, 2003: 36%) continue to report regularly taking a pet on walks. These respondents tend to be homeowners, Caucasian, 35-54 years old, college educated and have annual incomes of \$35k – 50K and over \$75K.*

*These respondents were asked to identify their method of pet waste disposal. Consistent numbers of respondents (2007: 78%, 2005: 80%, 2003: 70%) reported bagging it and putting it in the trash in the last two studies.*

**Used Motor Oil**

*Respondents who reported changing their motor oil at home within the last year remained relatively consistent between studies (2007: 21%, 2005: 18%, 2003: 26%).*

*Of those who change their motor oil at home, 10% mentioned for the first time in 2007 that they recycled their oil through curbside collection. In addition, the vast majority of respondents (2007: 82%, 2005: 93%, 2003: 75%) report taking the used oil to a household hazardous waste center. This progress in proper disposal practices related to motor oil continues to be a significant milestone for the Program.*

**Awareness of the Storm Drain System**

*The number of respondents reporting the existence of storm drains in their neighborhoods remained significantly high and constant between studies (2007: 84%, 2005: 84%, 2003: 83%). Respondents living in ZIP codes 95205/15 tended to say that they did not exist.*

*Similar numbers of respondents (2007: 24%, 2005: 25%, 2003: 25%) reported they were “very familiar” with the storm drain system. These respondents tended to be aged 35+, college educated and living in ZIP codes 95207/19. Renters tended to report more often that they were “not at all familiar” with the system.*

*Significantly more respondents (2007: 47%, 2005: 40%, 2003: 34%) reported “very well,” when asked a question about how well the storm drain system works during the rainy season. These respondents*

*tended to be 35 years or older, earning annual incomes over 35K, and living in ZIP codes 95207/19 and 95209/10/12.*

*When asked to identify where storm water goes after it flows into the storm drain, a similar number of respondents mentioned the Delta (2007: 34%, 2005: 34%, 2003: 29%) while more mentioned a river (2007: 30%, 2005: 22%, 2003: 28%). Fewer respondents (2007: 9%, 2005: 13%, 2003: 8%) believed the water went to a treatment plant.*

*When respondents were asked to agree or disagree with the statement about the storm drain system and the sewer system sharing the same underground pipes, slight more respondents (2007: 33%, 2005: 31%, 2003: 40%) incorrectly agreed and more respondents (2007: 33%, 2005: 28%, 2003: 21%) were unable to decide. Confusion continues to exist over the differences between the storm drain system and the sewer system.*

*When respondents were asked to agree or disagree with the statement about storm water being routed to a treatment plant, fewer incorrectly agreed (2007: 43%, 2005: 51%, 2003: 49%) and more (2007: 27%, 2005: 21%, 2003: 13%) were unable to decide. Confusion continues to exist among many residents who think that storm water is being treated before it goes to the local waterways.*

*When asked an open ended question about how the water that flows into storm drains can get polluted, "illegal dumping by individuals" continued to earn the top mention (2007: 40%, 2005: 42%, 2003: 43%). Leaking vehicles (2007: 10%, 2005: 14%, 2003: 8%) and garden care products (2007: 7%, 2005: 12%, 2003: 6%) mentions fluctuated depending on the study. A significant new response to this open ended question in the 2007 study was "litter and trash in the streets" (16%).*

### **Willingness to Participate in Pollution Prevention Practices**

*The vast majority of the respondents continue to indicate they are "very willing" to engage in eight pollution prevention practices: disposing of litter (2007: 98%, 2005: 95%, 2003: 95%), avoiding dumping in storm drains (2007: 95%, 2005: 94%, 2003: 94%), recycling glass, etc. (2007: 95%, 2005: 92%, 2003: 88%), keeping the vehicle tuned and leak free (2007: 95%, 2005: 91%, 2003: 95%), taking HHW to a disposal center (2007: 93%, 2005: 90%, 2003: 88%), disposing of pet waste properly (2007:*

93%, 2005: 87%, 2003: 87%), using less toxic products (2007: 88%, 2005: 82%, 2003: 83%) and reporting illegal dumping (2007: 84%, 2005: 81%, 2003: 79%).

Respondents showed a higher level of willingness to obtain information about water pollution from either a toll-free number (2007: 79%, 2005: 74%, 2003: 67%) or website (2007: 66%, 2005: 65%, 2003: 59%). Brochures continued to be mentioned at high levels (2007: 83%, 2005: 87%, 2003: 86%) and information booths were also mentioned frequently (2007: 69%, 2005: 66%, 2003: 76%)

When asked to select a preferred information source from the four listed, “website” continued to be most popular (2007: 39%, 2005: 38%, 2003: 33%) followed by “brochure” (2007: 33%, 2005: 35%, 2003: 32%).

### **Awareness of the City and County Storm Water Programs**

When asked to identify the agency responsible for operating and managing the storm drain system, more respondents identified the City of Stockton (2007: 58%, 2005: 56%, 2003: 61%) and significantly more identified San Joaquin County (2007: 23%, 2005: 10%, 2003: 16%). Fewer respondents answered “don’t know” between 2007 and 2005 (2007: 18%, 2005: 25%, 2003: 17%).

The number of respondents reporting that they would be willing to support an annual tax increase of \$5 to aid the operation of the storm drain system in preventing storm water pollution increased over the last two years (2007: 58%, 2005: 53%, 2003: 59%).

### **Exposure to Storm Water Information**

Fewer respondents (2007: 27%, 2005: 30%, 2003: 37%) reported seeing or hearing television or radio spots, advertisements, or other forms of information about storm water pollution in the past year.

Of those respondents who reported some form of exposure to storm water pollution prevention information, significantly more (2007: 69%, 2005: 56%, 2003: 67%) reported seeing something on television. In addition, more respondents reported seeing something in the newspaper (2007: 21%, 2005: 16%).

## APPENDIX B

### INVENTORY OF EXISTING MATERIALS

2007-2008

#### BEST MANAGEMENT PRACTICE BROCHURE SERIES

**Brochure: “Stormwater Pollution Prevention for Construction Sites”**

This brochure gives guidelines for projects that need a Storm Water Pollution Prevention Plan (SWPPP). It supplies background information on storm water pollution and storm water controls as well as provides guidelines for material storage and delivery, paving and concrete waste management, solid waste management, non-storm water discharge, spill prevention and control, sanitary/septic waste management, earthmoving/grading operations.

**Brochure: “Roadwork and Paving”**

This brochure provides information on general storm water pollution, educates road workers on how they can specifically work to help prevent on site storm water pollution, and provides suggestions for general business practices for the company.

**Brochure: “Retail Gasoline Outlets”**

This brochure provides Best Management Practices recommended for facilities that provide vehicle fueling services.

**Brochure: “Auto Body Shops”**

This brochure provides Best Management Practices recommended for facilities that conduct auto body repair, painting, detailing and washing services.

**Brochure: “Auto Dealers”**

This brochure provides Best Management Practices recommended for facilities that buy, trade, and/or sell automobiles.



**Brochure: “Equipment Rentals”**

This brochure provides Best Management Practices recommended for facilities that clean, store and rent equipment.

**Brochure: “Nurseries”**

This brochure provides Best Management Practices recommended for facilities that sell plants conduct other landscaping activities.

**Brochure: “Kennels”**

This brochure provides Best Management Practices recommended for facilities that conduct kennel and other types of domestic animal housing and maintenance practices.

**Brochure: “Restaurants”**

This brochure provides Best Management Practices that are recommended for facilities that prepare and serve food.

**Brochure: “Special Events”**

This brochure provides Best Management Practices recommended for vendors that prepare and serve food at community events.

**Brochure: “Pollution Prevention on Your Boat”**

This brochure educates recreational boat owners, live-aboards, Jet Ski and wave runner owners, water recreation enthusiasts, and marina owners and operators on how their actions directly contribute to water pollution. It further asks its audience to take responsibility for their actions and provides a number of practices they can engage in to help prevent water pollution.

**Brochure: “Pollution Prevention in Your Garage”**

This brochure targets homeowners, renters, apartment owners, condominium owners, recreational vehicle park residents, and commercial business merchants. It educates the reader on different ways that storm water is polluted, outlines specific storm water polluting behaviors in the garage, and provides alternative methods of car maintenance that help prevent storm water pollution.

**Brochure: “Pollution Prevention Outside Your Home”**

This brochure is directed towards homeowners, renters, and apartment and condominium owners. It provides information on storm water pollution in the area, gives information on pollution causing practices outside the home, and provides instructions for pollution prevention behaviors.

**Brochure: “Pollution Prevention Inside Your Home”**

This brochure is targeted to homeowner, renters, apartment and condominium owners, recreational vehicle park residents, and commercial business merchants. It gives information on storm water pollution in the area, both specific and general. It also provides suggestions for ways people can modify their behavior in the home to prevent water pollution.

**ADDITIONAL INDUSTRIAL/COMMERCIAL OUTREACH TOOLS****Brochure: “Did You Know... Your Facility May Need a Storm Water Permit.”**

This brochure is targeted to industrial facilities and manufacturing operations in order to create awareness about obtaining coverage under the Industrial Activities Storm Water General Permit. It provides a description of industries that are regulated, outlines the requirements of a permit, gives information on obtaining coverage, defines non-storm water discharge and storm water pollution, provides a brief description of Best Management Practices for industries, and identifies the National Pollutant Discharge Elimination System.

**TOPPS Brochure: “Restaurants”**

*English and Spanish*

This brochure, targeted to restaurants, provides a guideline for pollution prevention while cleaning equipment, handling and disposing grease, and cleaning dumpsters and parking lots. It also provides general information about storm water pollution.

**TOPPS Poster: “Good Cleaning Practices – Food & Restaurant Industry”**

*Bilingual English/Spanish*

This poster provides visual illustrations indicating pollution prevention practices in the food and restaurant industry.

**Poster: “Good Cleaning Practices – Auto Repair Industry”**

*Bilingual English/Spanish*

This poster provides visual illustrations of people participating in pollution prevention behaviors in the auto repair industry.

**Flyer: “Vendor Instructions for Special Events”**

*Bilingual English/Spanish*

This poster provides visual illustrations of proper disposal methods at events which include FOGs, greywater, food scraps and recycling.

**BMP Postcard: “Are you ready for an inspection?”**

This postcard provides commercial developers, contractors and sub-contractors with tips on avoiding stormwater pollution during the rainy season.

**American Water Works Association Brochure: “Landscaping to Save Water”**

*English and Spanish*

This brochure provides information on water conservation landscaping and design, including tips on proper irrigation practices and soil and plant selection.

**Integrated Waste Management Board: “Grass Recycling”**

*English and Spanish*

This brochure provides information on recycling grass.

**C.U.R.E.S. Brochure: “Parks and Recreation Turf Management Tips & Techniques”**

This brochure provides lawn care professionals with information regarding the importance of water conservation and contamination.

**City of Stockton Municipal Utilities: “Stormwater System—Illegal Dumping”**

This provides information on illegal dumping, what it is and what someone should do if they see it in progress.

## **GENERAL PUBLIC COLLATERAL**

### **Brochure: “Water is Vital to Life”**

*Bilingual English/Spanish*

This full-color, two sided brochure focuses on water conservation and ways to reduce stormwater pollution.

### **Poster: “Earth Day Festival”**

This colorful poster advertises food, music, and education at the Earth Day Festival on April 19th, at Weber Point in Stockton.

### **Brochure: “Keep our creeks, rivers and Delta clean for our children”**

*English, Spanish, Cambodian, Vietnamese and Hmong*

This brochure was produced to educate the general public on ways they can help prevent pollution in their housecleaning, lawn and garden care, car washing and repair, and painting and home maintenance. It also provides general information on how the water gets polluted, and supplies phone numbers for further information.

### **Brochure: “Storm Drain Stenciling Program”**

This brochure advertises storm drain stenciling as a community service project. It informs people of the importance of storm drain stenciling and provides instructions from start to finish on the process.

### **Door Hanger: “Storm Drain Stenciling”**

This yellow door hanger created by the City of Stockton, serves as a notification to residents that their neighborhood storm drains are currently being painted. The door hanger also informs residents about the direct connection between the storm drains and the Delta.

### **Stickers: “Only Rain Down the Drain”**

These 2.5” x 3.375” stickers sport the Storm Water Pollution Prevention Program logo.

### **Stickers: “Water Conservation”**

Stickers that highlight various water conservation messages.

**Magnet: “Only Rain Down the Drain”**

Shaped like a fish, this magnet has the Storm Water Pollution Prevention Program logo and contact information.

**Patch: “Storm Water Pollution Prevention”**

This 2” x 3” patch exhibits the Storm Water Pollution Prevention Program logo.

**EDUCATIONAL AIDS**

**Activity Booklet: “Only Rain Down the Drain”**

An activity and coloring book aimed at teaching children about storm water pollution as well as to educating them on ways to prevent storm water pollution.

**Activity Booklet: “Discover Storm Water”**

An activity and coloring book aimed at teaching children about storm water pollution as well as to educating them on ways to prevent storm water pollution.

**Poster: “Protect Your Health if You Eat DELTA FISH”**

*English/Spanish*

A full-color poster that educates the public on the type of fish found in the Delta and the health hazards of eating fish with high levels of Mercury.

**City of Stockton Municipal Utilities: “50 Simple Ways to Save Water”**

Tips on water conservation in the bathroom, in the kitchen, in the laundry room and outdoors are described in this public information piece.

**PEST CONTROL/PESTICIDES**

**C.U.R.E.S. Brochure: “Keeping Pest Control Products Out of Creeks”**

This brochure provides the public with safe alternative pest control solutions and tips for reducing stormwater pollution.

**C.U.R.E.S. Brochure: “Residential Pest Control Landscape Management Tips & Techniques”**

This brochure provides residents with information regarding the importance of water conservation and contamination.

**University of California Cooperative Extension: Slim Jims**

Each card provides a background on pests informing the public of indications of having a pest, how to identify the pest and how to get rid of the pest. Each of the following are covered:

- Rats
- Lawn Insects
- Aphids
- Earwigs
- Snails & Slugs
- Ants
- Cockroaches
- Termites
- Tree Borers
- Gardening with Good Bugs
- Safe Use & Disposal of Pesticides

**Our Water Our World Brochure: “Use and Disposal of Pesticides”**

*English and Spanish*

This brochure explains the warning and hazards of pesticides, tips on what to look for when buying them and proper disposal of them.

**Our Water Our World Brochure: “Keeping Mosquitoes Away From Your Yard”**

*English and Spanish*

This brochure provides a background on the development of mosquitoes, prevention tips and alternative pesticide solutions.

**Our Water Our World Brochure: “Controlling Yellowjackets Around Your Home”**

*English and Spanish*

This brochure provides background information, identification and detection of yellowjackets including prevention tips and safe disposal tips.

**Our Water Our World Brochure: “Living with Spiders the Helpful Hunters”**

*English and Spanish*

This describes the benefits to having spiders and provides tips on removing them from your home and what to do if you have black widows or brown recluse spiders.

**Our Water Our World Brochure: “Keeping Fleas Off of Your Pets and Out of Your Yard”**

*English and Spanish*

This brochure informs the public on how to detect fleas and provides solutions for less toxic controls to use inside and outside of your home.

**Our Water Our World Brochure: “Controlling Ants in Your House”**

*English and Spanish*

This brochure informs the public on how to detect ants and provides solutions for less toxic controls to use inside and outside of your home.

**Our Water Our World Brochure: “Controlling Aphids in Your Garden”**

*English and Spanish*

This brochure provides a background on aphids including what plants can and cannot tolerate them, as well as safe alternatives for removal.

**Our Water Our World Brochure: “Growing a Healthy Garden to Manage Pests Naturally”**

*English and Spanish*

This brochure provides gardening tips on attracting the right types of pests.

**Our Water Our World Brochure: “Tips for a Healthy Beautiful Lawn”**

*English and Spanish*

This brochure gives recommendations on proper irrigation and lawn care that result in a beautiful lawn.

**Our Water Our World Brochure: “Pesticides and Water Pollution”**

*English and Spanish*

This brochure informs the public on the dangers of pesticides entering our waterways and damaging our environment.

**APPENDIX C****EXISTING PROGRAMS--2007****STORMWATER PROGRAM**

The City of Stockton Stormwater Management Division and the County of San Joaquin each work to organize outreach and education programs in and around the Stockton area. Each year the City of Stockton and the County of San Joaquin organize a county-wide Coastal Clean Up. The 2007 Coastal Clean up attracted 800 volunteers and removed 72 tons of trash from San Joaquin *Waterways* (*per Stockton Record*). Throughout the year, the City of Stockton is host to several community Stream Cleanups in conjunction with neighborhood schools and community organizations.

With over 20,000 storm drains in the Stockton, the Volunteer Stenciling Program has become a popular community service project for youth organizations, civic clubs, and groups of friends. When storm drains are clearly marked with a stencil that says "No Dumping - Flows to Delta," people may give more thought about what goes down those drains. The Stormwater Management Program will provide paints, stencils, and a map of where Stockton storm drains are located for stenciling.

**WATER QUALITY AND CONSERVATION EDUCATION**

The City of Stockton Water Division's website provides information on conserving water in the home, appropriate water use and air conditioning behavior during rolling blackouts, and guidelines for watering the lawn. The Water Division also produces an Annual Drinking Water Quality Report that educates residents about critical water issues and reports monitoring information as required by the Regional Water Quality Control Board and The California Department of Health Services.

The Stormwater Prevention Pollution in the Classroom Program takes 5<sup>th</sup> graders through a 35-minute interactive presentation where students will understand the importance of stormwater pollution prevention. There's no charge for the program which includes a brief video presentation and each student will receive a stormwater activity booklet and sticker.



## **SOLID WASTE AND RECYCLING EDUCATION**

The City of Stockton Solid Waste and Recycling Division offers a wide range of programs on waste reduction, home composting, and recycled product purchasing. Further, recycling is promoted through the Waste Reduction and Recycling Guide, which provides a directory of recyclable materials and recycling sites. This guide also defines household hazardous waste (HHW) and supplies information on handling these pollutants, as well as encourages recycling oil.

## **RIVERS OF WORDS**

River of Words is a California-based 501(c) (3) non-profit organization that has been conducting training workshops for teachers, park naturalists, grassroots groups, state resource agencies, librarians and others since 1995, helping them to incorporate observation-based nature exploration and the arts into their work with young people.

The City of Stockton and the San Joaquin Watershed Education Partnership are local project affiliates with the River of Words International, sponsoring the San Joaquin Co. “River of Words” Environmental Poetry and Art Contest.

The local contest invites all San Joaquin County schools students ages 5-19 (and not yet in college) to submit their work to both the local and international River of Words Environmental Poetry and Art Contest.

The City of Stockton and the San Joaquin Watershed Education Partnership sponsors the local River of Words Environmental Poetry and Art contest in conjunction with the annual Earth Day Festival held every April. The local contest is judged by professional poets and artists. Awards will be given for First Place and Honorable Mention for the following grade categories: K-4; 5-8; and 9-12. Certificates of Recognition will be presented to all participants. An exhibition of students’ entries will be featured at the annual Earth Day Festival.

## **SAN JOAQUIN AREA FLOOD CONTROL AGENCY (SJAFCA)**

The San Joaquin Area Flood Control Agency (SJAFCA) is a Joint Powers Authority between the City of Stockton, San Joaquin County, and the San Joaquin County Flood Control and Water Conservation

District. It was formed in an attempt to issue new Flood Insurance Rate Maps (FIRMs) placing all of metropolitan Stockton and the surrounding Country areas in a floodplain. SJAFCAs provides information on its website about the steps it has taken in its Flood Protection Restoration Project to help prevent the Stockton area from flood destruction.

## **ANNUAL EARTH DAY FESTIVAL**

The City of Stockton hosts an Earth Day Festival at Weber Point Events Center, where residents receive the opportunity to learn about environmental issues such as stormwater pollution prevention, correct composting procedures, and the benefits of recycling, as well as view works of environmental art and poetry by local students. Each year in April, the City of Stockton partners with the Peace and Justice Network to sponsor the annual Earth Day Festival. The day is filled with activities to promote environmental awareness. The Festival has found a home at beautiful Victory Park, behind the Haggin Museum. More than 70 vendors are on hand with educational material, interactive displays, music, crafts and general information to promote stewardship of the environment.

The day is filled with a variety of wonderful entertainment as well. Some past performers have include Mariachi Juvenile, the always well-received Delta Sunset Belly Dance Troupe, Ripon High School Steel Drum Band, Lao Khmu Youth Dancers, Hamilton Middle School Jazz Band, to name but a few. The day's events come to a traditional close with the "rockin' sounds" of environmental activist band, Clan Dyken. And there's plenty of good food to savor while enjoying the music and displays.

## **OTHER OUTREACH AND EDUCATION**

The City of Stockton provides many tips for environmental and pollution preventing practices that residents can use around the home and in the garden. Guidelines for these practices, which include landscaping, heating and cooling homes, lighting, garden care and more, can be accessed through the City Government website. Some of these tips have been featured on Stockton's Channel 97 (I didn't find anything in the archives on Stormwater at Channel 97) or in local publications such as, Connections, Lincoln Center Chronicles, the Caravan and the Latino Times.

The San Joaquin County also provides educational programs through out the year through its Oak Grove Regional Park Nature Center.

## **POTENTIAL PARTERS/SPONSORS**

The City of Stockton has a very active community dedicated to the improvement of environment in and around Stockton. Astone has identified several groups and organizations where the City of Stockton Stormwater Management Program could form partnerships and or sponsorships that support the mission of educating the public on the importance of keeping our waterways clean.

### **Greater Stockton Chamber of Commerce:**

- The **Green Team San Joaquin** is a Public / Private Partnership designed to enhance the delivery of Chamber services and to address economical and environmental development issues within San Joaquin County.

The purpose of Green Team San Joaquin is to streamline recycling and economic efforts, enhance communication between the public and private sectors as it pertains to business attraction and retention in San Joaquin County, as well as to promote programs that demonstrate environmentally sound technologies to the general public to reduce, reuse and recycle for the betterment of our environment and economic efficiencies of the public and private sector.

The goal of Green Team San Joaquin is to incorporate Chamber, County and Municipal programs and to proactively advocate for mutually beneficial resolve in the creation of private enterprise, diversion from local landfills and to create the foundation for private businesses, regulatory and public agencies to work together for the common good. The goals of Green Team San Joaquin will be based on the Ten Year Plan outlined by San Joaquin County's Solid Waste Department.

San Joaquin County includes the cities of Lodi, Stockton, Lathrop, Manteca, Tracy, Ripon, Escalon and the unincorporated areas.

- Founded in 1981, **Leadership Stockton** is California's oldest adult community leadership program.

Leadership Stockton is a program designed to inspire a new generation of men and women ready to assume leadership roles in our community. It challenges and prepares individuals from diverse backgrounds to become influential in our region's future.

**Delta Keepers:**

Delta Keepers is a part of Bay Keepers and the Water Keeper Alliance. Bay Keepers mission is to protect and preserve the San Francisco Bay and Delta waterways and ultimately restoring the quality of our water.

**Sierra Club:**

The Sierra Club's mission is to enjoy and protect the wild places of the earth by practicing and promoting responsible use of the earth's ecosystem, to educate and enlist humanity to protect and restore the quality of the natural and human environment.

**Clean Water Action:**

Clean Water Action is a national organization of diverse people and groups working together for clean water, protection health, creating jobs, and making democracy work. By organizing grass roots groups and coalitions to create campaigns focuses on solving environmental and community problems.

**Sister Cities International:**

Modesto Sister Cities International (MSCI) is a non-profit, community based, volunteer organization promoting international understanding, friendship, and peace between nations. The U.S. Sister City program originated in 1956 when President Eisenhower proposed a people-to-people citizen diplomacy initiative; MSCI continues to promote international understanding through programs originated at the community level. Modesto has 5 sister cities and MSCI has developed a variety of programs with those cities including medical relief, business and governmental exchanges, and cultural and student exchanges.

**San Joaquin Historical Museum Mickey Grove Park & Zoo:**

This popular landmark is a staple for San Joaquin's outdoor enthusiasts. Tracing the history of San Joaquin County through many exhibits and interactive displays; it is the largest museum complex in the county.

The Delta Building contains exhibits on the Holt side-hill harvester, dredge buckets used to build channels and levees, the new Foundries of San Joaquin County exhibit and the Floyd J. Locher Tool Collection. This collection has over 3,750 different hand-and-foot powered tools representing 19 trades that have been practiced in San Joaquin County and California. The tools date from late 16th century through mid-20th century. The collection is the most complete west of the Mississippi River and is of national significance.

**Port of Stockton:**

The Port seeks to assure environmental compliance and consistency with Federal, State, and local environmental laws and regulations in a safe and efficient manner.

The Port of Stockton currently maintains a comprehensive environmental management program. The program includes guidance on water quality, air quality, hazardous waste/materials, underground and above ground storage tanks, environmental planning (NEPA/CEQA), dredging, and site remediation program requirements. The Port of Stockton's municipal storm water management program includes environmental education programs for Port tenants regarding storm water management practices and procedures. Through the environmental management program, the Port of Stockton continues to work with its tenants to share knowledge and expertise that will assist the entire Port community in understanding and complying with the various environmental programs.

The Port of Stockton also supports regional, statewide, and national efforts to minimize the risk of introduction of non-indigenous species into the San Joaquin Delta. The Port of Stockton's Ballast Water Management Program informs all vessels of their obligations under the current laws of the State of California. As part of this program, the Port of Stockton maintains an informational database to monitor the discharge of ballast water into its receiving water bodies.

**Stockton Rowing Club:**

Stockton Rowing Club is a non-profit corporation. It is member of the United States Rowing Association. It maintains its rowing facilities at River Point Landing Marina in Stockton at the west end of March Lane.

Stockton Rowing can trace its history back more than 100 years. Its modern expansion began in the early 1980s. They have six Vllls, including two brand new Vespoli's, several IVs including a brand new Kaschper, and now a quad IV as well, and several single sculling boats and trainers for the use of our members, as

well as storage for members' private equipment. Their boathouse is just a few steps from the launch ramp and the best rowing water around.

As part of their commitment to the development of downtown Stockton, Stockton Rowing holds an annual Head of the San Joaquin Regatta, The Original Stockton Sprints, and supports the City of Stockton Parks and Recreation Department by providing a free one week camp introducing to middle school children throughout Stockton. In the past they have had a community outreach program implementing programs such as taking 9 kids out of Juvenile Hall and training them for a week to develop their competitive spirit, nurture team development, open doors, provide positive leadership and encourage tenacity in conquering challenges. The Club also participates in Coastal Clean-up Day and provides donations to the Delta Blood Bank.

**California Cougars Soccer:**

The California Cougars are a professional soccer team.

**Stockton Ports Baseball Club:**

Affiliate team to the Oakland A's, the Stockton Ports are dedicated to supporting the community that supports them. It is the team's goal to be a responsible, proactive force in the community, championing causes and helping people. In 2007, the Ports implemented the first of what will no doubt be many new community-targeted programs, "The Ports: Baseball ByThe Books Program", a program designed to get children excited about reading!

**Stockton Thunder:**

This is an affiliate team to the Springfield Falcons, the Stockton Thunder is very active within the community hosting several awareness raising fundraisers.

**Stockton Lightning:**

This arena football team is very supportive of its community and supports events to raise money and awareness in the community.

**Jackson Rancheria:**

The Jackson Rancheria Band of Miwuk Indians supports the Native American Indian tradition of sharing and contributing to the community. The Tribe and its employees are dedicated to supporting charitable programs, providing a safe and diverse workplace, protecting the environment, and contributing to the community.



# CITY OF STOCKTON

# STANDARD

# SPECIFICATIONS

The following Standard Specifications and Standard Drawings have been adopted by the City of Stockton as a guide for standardization of public works installations within the City.

THEY ARE NOT INTENDED TO BE A SUBSTITUTE FOR PROFESSIONAL ENGINEERING KNOWLEDGE, EXPERIENCE, OR JUDGMENT.

Any deviations from what is contained herein must be approved by the City Engineer.

This book also contains Countywide Standards that have been accepted by the City Council upon the recommendation of the City Engineer.

## CITY OF STOCKTON

### DEPARTMENT OF PUBLIC WORKS

\*\*\*IMPORTANT\*\*\*

REVISIONS ARE AVAILABLE IN THE CITY OF STOCKTON WEBSITE  
AT [WWW.STOCKTONGOV.COM](http://WWW.STOCKTONGOV.COM)

Adopted 11/25/2003

Revised 11/25/2003



**CITY OF STOCKTON  
DEPARTMENT OF PUBLIC WORKS  
STANDARD SPECIFICATIONS**

**NOTICE**

The following sections together with the Latest Edition of the State of California, Business and Transportation Agency, Department of Transportation (Caltrans), Standard Specifications, as modified except the metric units and/or supplemented herein shall be the Standard Specification for public works construction in the City of Stockton.

To the extent the Department of Transportation Standard Specifications implement the STATE CONTRACT ACT, (or certain provisions of the Public Contracts code which are inapplicable to charter cities) they shall not be applicable.

A copy of the Latest Edition of the State of California, Business and Transportation Agency, Department of Transportation, Standard Specifications is on file in the Office of the Director of Public Works of the City of Stockton. Copies may be obtained from the State of California, Department of Transportation, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95819, or by calling (916) 445-3520.

The Standard Detail Drawings attached are the Standard Plans of the City of Stockton and take precedence over the Caltrans Standard Specifications in case of any conflicts.

These Specifications and Plans may be modified in special cases on an individual project basis by special engineering analysis if approved by the City Engineer.

Amendments to the Specifications of the Department of Transportation may be issued by the State of California from time to time and will require adoption by the Director of Public Works to become a part of the City of Stockton Standard Specifications.

The Director of Public Works may also issue clarifications and amendments to these Standard Specifications and Standard Detail Plans as required.

Revised 11/25/2003

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# **SECTION 1**

## **DEFINITIONS AND TERMS**

### **1-1.02A Abbreviations - (Organizational)**

The following contains additions to Section 1-1.02A of the Caltrans Standard Specifications:

<b>AAMA</b>	Architectural Aluminum Manufacturer's Association
<b>AAN</b>	American Association of Nurserymen
<b>AASHTO</b>	American Association of State Highway and Transportation Officials
<b>ACI</b>	American Concrete Institute
<b>AGA</b>	American Gas Association
<b>AIEE</b>	American Institute of Electrical Engineers
<b>AISC</b>	American Institute of Steel Construction
<b>AISI</b>	American Iron and Steel Institute
<b>AITC</b>	American Institute of Timber Construction
<b>AMA</b>	Acoustical Materials Association
<b>ANSI</b>	American National Standards Institute
<b>APA</b>	American Plywood Association
<b>API</b>	American Petroleum Institute
<b>AREA</b>	American Railway Engineering Association
<b>ASA</b>	American Standards Association
<b>ASCE</b>	American Society of Civil Engineers
<b>ASHRAE</b>	American Society of Heating, Refrigerating and Air Conditioning Engineers
<b>ASME</b>	American Society of Mechanical Engineers
<b>ASTM</b>	American Society for Testing and Materials
<b>AWG</b>	American Wire Gage
<b>AWPA</b>	American Wood-Preservers' Association
<b>AWS</b>	American Welding Society
<b>AWWA</b>	American Water Works Association
<b>Caltrans</b>	State of California, Department of Transportation
<b>CLFMI</b>	Chain Link Fence Manufacturers Institute
<b>CRA</b>	California Redwood Association
<b>COS</b>	City of Stockton
<b>CS</b>	Commercial Standards
<b>DEPA</b>	Grade Trademark of American Plywood Association
<b>EIA</b>	Electronic Industries Association
<b>ESO</b>	Electrical Safety Orders
<b>FHA</b>	Federal Housing Administration
<b>FS</b>	Federal Specifications

<b>GSA-FSS</b> .....	General Services Administration-Federal Supply Services
<b>IEEE</b> .....	Institute of Electrical Electronics Engineers
<b>IES</b> .....	Illuminating Engineering Society
<b>IPCEA</b> .....	Insulated Power Cable Engineers Association
<b>MFMA</b> .....	Maple Flooring Manufacturer's Association
<b>MLMFA</b> .....	Metal Lathe Manufacturer's Association
<b>NBFU</b> .....	National Board Fire Underwriters
<b>NBS</b> .....	National Bureau of Standards
<b>NEC</b> .....	National Electrical Code
<b>NEMA</b> .....	National Electrical Manufacturers Association
<b>NFPA</b> .....	National Fire Protection Association
<b>NPDES</b> .....	National Pollution Discharge Elimination System
<b>PCA</b> .....	Portland Cement Association
<b>PLIB</b> .....	Pacific Lumber Inspection Bureau
<b>PUC</b> .....	Public Utilities Commission
<b>RWQCB</b> .....	Regional Water Quality Control Board
<b>SCPI</b> .....	Structural Clay Products Institute
<b>SDI</b> .....	Steel Deck Institute
<b>SJI</b> .....	Steel Joist Institute
<b>SMACCNA</b> .....	Sheet Metal and Air Conditioning Contractors National Association
<b>SPR</b> .....	Simplified Practice Recommendation
<b>SWPPP</b> .....	Storm Water Pollution Prevention Plan
<b>SWRCB</b> .....	California State Water Resource Control Board
<b>TCA</b> .....	Tile Council of America
<b>UBC</b> .....	Uniform Building code - International Conference of Building Officials
<b>UL</b> .....	Underwriters's Laboratories, Inc.
<b>USCE</b> .....	United States Corps of Engineers
<b>USC&amp;GS</b> .....	United States Coast and Geodetic Survey
<b>USGS</b> .....	United States Geological Survey
<b>WCLIB</b> .....	West Coast Lumber Inspection Bureau
<b>WIC</b> .....	Woodwork Institute of California
<b>WWPA</b> .....	Western Wood Products Association

Reference in the Standard Specifications or special provisions to any of the publications of the above listed associations, organizations or authorities as a specification included, shall be taken to mean the latest current edition at time of bidding unless specifically stated otherwise.

### **1-1.02B Abbreviations (Word)**

<b>#4</b> .....	1/2" Rebar
<b>AB</b> .....	Aggregate base
<b>ABS</b> .....	Acrylonitrile-butadiene-styrene
<b>AC</b> .....	Alternating current
<b>AC</b> .....	Asphalt concrete
<b>ACP</b> .....	Asbestos cement pipe
<b>AKA</b> .....	Also Known As
<b>AMP</b> .....	Ampere
<b>AS</b> .....	Aggregate sub-base
<b>AV</b> .....	Average
<b>Ave</b> .....	Avenue
<b>BC</b> .....	Beginning of curve
<b>Blvd</b> .....	Boulevard
<b>BM</b> .....	Bench mark
<b>BMP</b> .....	Best Management Practice
<b>BTU</b> .....	British Thermal Unit
<b>BVC</b> .....	Beginning of vertical curve
<b>BWG</b> .....	Birmingham Wire Gage (iron and steel wire)
<b>CB</b> .....	Catch basin
<b>CC or C/C</b> .....	Center to center
<b>CF</b> .....	Cubic feet
<b>CFM</b> .....	Cubic feet per minute
<b>CFS</b> .....	Cubic feet per second
<b>CIP</b> .....	Cast in place
<b>CIPCP</b> .....	Cast in place concrete pipe
<b>CL or CL</b> .....	Center line
<b>cm</b> .....	Centimeter
<b>CMP</b> .....	Corrugated metal pipe
<b>Conc</b> .....	Concrete
<b>Const</b> .....	Construct
<b>Cu</b> .....	Cubic
<b>CY</b> .....	Cubic yard
<b>D</b> .....	Diameter of pipe inside height of semi-elliptical conduit, or D-load
<b>d</b> .....	Penny
<b>Deg.</b> .....	Degree or degrees
<b>DF</b> .....	Douglas fir
<b>Dia</b> .....	Diameter
<b>Dwg</b> .....	Drawing
<b>E</b> .....	East
<b>Ea</b> .....	Each

<b>EC</b> .....	End of curve
<b>El or Elev</b> .....	Elevation
<b>EP</b> .....	Edge of pavement
<b>Eq</b> .....	Equation
<b>ESCP</b> .....	Extra strength concrete pipe
<b>EVC</b> .....	End of vertical curve
<b>EW</b> .....	Each Way
<b>Ex or Exist</b> .....	Existing
<b>FC (or FOC)</b> .....	Face of Curb
<b>FH</b> .....	Fire hydrant
<b>FL or L</b> .....	Flow line
<b>fpm</b> .....	Feet per minute
<b>fps</b> .....	Feet per second
<b>ft</b> .....	Foot or feet
<b>g</b> .....	Gram
<b>Ga</b> .....	Gauge
<b>Gal</b> .....	Gallon
<b>Galv</b> .....	Galvanized
<b>General Permit</b> .....	General Construction Activity Storm Water Permit
<b>GL</b> .....	Ground line
<b>GPM</b> .....	Gallons per minute
<b>Gr</b> .....	Grade
<b>H</b> .....	High or height
<b>HP</b> .....	Horsepower
<b>HR</b> .....	Hour
<b>Hor</b> .....	Horizontal
<b>IN</b> .....	Instrument Number
<b>IP</b> .....	Iron pipe
<b>KVA</b> .....	Kilo Volt Amps
<b>KW</b> .....	Kilowatts
<b>L</b> .....	Length
<b>Lb</b> .....	Pound
<b>LF</b> .....	Linear foot
<b>LH</b> .....	Lamp hole
<b>LS</b> .....	Lump sum
<b>Lin</b> .....	Linear
<b>Long</b> .....	Longitudinal
<b>Lt</b> .....	Left
<b>M</b> .....	Meter
<b>Max</b> .....	Maximum
<b>MEP</b> .....	Maximum Extent Practicable
<b>MFBM</b> .....	Thousand feet board measure
<b>MGD</b> .....	Million gallons per day

<b>MH</b> .....	Maintenance Hole
<b>M Gal</b> .....	Thousand gallon
<b>Mi</b> .....	Mile
<b>Min</b> .....	Minimum
<b>mm</b> .....	Millimeter
<b>Mon</b> .....	Monument
<b>N</b> .....	North
<b>NE</b> .....	Northeast
<b>NW</b> .....	Northwest
<b>No</b> .....	Number
<b>NOI</b> .....	Notice of Intent
<b>OC</b> .....	On center
<b>OG</b> .....	Original ground
<b>OD</b> .....	Outside diameter
<b>OR</b> .....	Official Records of County
<b>Oz</b> .....	Ounce
<b>PCC</b> .....	Point of compound curve or Portland Cement Concrete
<b>PG&amp;E</b> .....	Pacific Gas & Electric Co.
<b>PI</b> .....	Point of intersection
<b>P/L or <math>\overline{PL}</math></b> .....	Property line
<b>PP</b> .....	Power pole
<b>pphm</b> .....	Parts per hundred million
<b>ppm</b> .....	Parts per million
<b>PRC</b> .....	Point of reverse curve
<b>Prop</b> .....	Proposed
<b>psf</b> .....	Pounds per square foot
<b>psi</b> .....	Pounds per square inch
<b>PT</b> .....	Point of tangency
<b>PacBell</b> .....	Pacific Bell
<b>PUE</b> .....	Public Utility Easement
<b>PVC</b> .....	Polyvinyl chloride
<b>Pvmt</b> .....	Pavement
<b>Q</b> .....	Rate of flow or quantity
<b>Qt</b> .....	Quart
<b>R</b> .....	Radius
<b>RP</b> .....	Reduced Pressure
<b>RCP</b> .....	Reinforced concrete pipe
<b>Rdwy</b> .....	Roadway
<b>Ret Wall</b> .....	Retaining wall
<b>Rt</b> .....	Right
<b>R/W</b> .....	Right of way
<b>S</b> .....	South or slope

<b>San</b> .....	Sanitary
<b>SC</b> .....	Sewer Connection
<b>SD</b> .....	Storm drain (aka Storm Sewer)
<b>Sec</b> .....	Seconds
<b>SF</b> .....	Square foot
<b>SE</b> .....	Southeast
<b>Spec</b> .....	Specifications (aka Standard Specifications)
<b>Sq</b> .....	Square
<b>Sq Ft</b> .....	Square foot
<b>Sq Yd</b> .....	Square yard
<b>SS</b> .....	Sanitary sewer
<b>St</b> .....	Street
<b>Sta</b> .....	Station
<b>Std</b> .....	Standard
<b>SY</b> .....	Square Yard
<b>SW</b> .....	Southwest
<b>SWPPP</b> .....	Storm Water Pollution Prevention Plan
<b>T</b> .....	Tangent distance
<b>T<sub>a</sub></b> .....	Total Asphalt or Full Depth Asphalt
<b>TBM</b> .....	Temporary Bench Mark
<b>V</b> .....	Velocity of flow
<b>VC</b> .....	Vertical Curve
<b>VCP</b> .....	Vitrified clay pipe
<b>Vert</b> .....	Vertical
<b>W</b> .....	West or width
<b>W/</b> .....	With
<b>WPJ</b> .....	Weakened Plane Joint
<b>WWF</b> .....	Welded Wire Fabric
<b>Yd</b> .....	Yard or Yards

### **1-1.02C Symbols**

<b>E</b> .....	Degree (s)
<b>/</b> .....	Per
<b>%</b> .....	Percent
<b>'</b> .....	Feet, Minutes
<b>"</b> .....	Inches, Seconds
<b>x</b> .....	By
<b>@</b> .....	At

### **1-1.03 Definitions**

The following are additional definitions or definitions included in Caltrans Standard Specifications, which have been added to or modified for City of Stockton uses.

**Acceptance (Caltrans Section 1-1.03)** - The formal written acceptance by the City of Stockton of an entire contract which has been completed in all respects in accordance with the Standard Specifications and Plans and any modifications thereof previously approved.

**Arterial (Street Classification)** - That part of the roadway system serving as the principal network for through traffic flow. The routes connect areas of principal traffic generation and important rural highways entering the city.

Classification questions should be directed to the Traffic Engineering Section of the Public Works Department of the City of Stockton.

**Attorney General** - This term is to be interpreted to mean the City Attorney for the City of Stockton.

**Auxiliary Lane** - That portion of the roadway adjoining the traveled way for speed change or other purposes supplementary to through traffic movement

**California** - Shall be interpreted to mean Stockton where it is used as a point of delivery.

#### **California Storm Water Best Management Practice Handbooks;**

**Volume 1: Municipal BMP Handbook;**

**Volume 2: Commercial/Industrial BMP Handbook;**

**Volume 3: Construction BMP Handbook;** - Refer to Chapter 13, Stockton Municipal Code

**Caltrans** - The State of California, Business & Transportation Agency, Department of Transportation.

**City** - The City of Stockton, California.

**City Attorney** - The City Attorney of the City of Stockton. Any reference to the Attorney General in Caltrans specifications shall mean the City Attorney of the City of Stockton.

**City Council** - The Stockton City Council.

**Code** - The terms Government Code, Labor Code, etc. refer to codes of the State of California.

**Collector** (Street Classification) - A collector street is defined as a street which serves traffic movements within subdivision and connects this area with an arterial street or other collector street.

Classification questions should be directed to the Traffic Engineering Section of the Public Works Department of the City of Stockton.

**Commercial** - Refer to Chapter 16 of the Stockton Municipal Code.

**Contract Price** - The total amount of money for which the contract is awarded.

**Contract Unit Price** - The contractor's original bid for a single unit of an item of work in the Proposal.

**Days (Caltrans Section 1-1.12)** - Unless otherwise designated, days as used in the Standard Specification will be understood to mean working days.

**Deeplift Asphalt Concrete** - (See Full Depth Asphalt Concrete)

**Deep Strength Asphalt Concrete** - (See Full Depth Asphalt Concrete)

**Department (Caltrans Section 1-1.13)** - The Department of Public Works of the City of Stockton. Any reference to the terms "Department" or "Department of Transportation" in Caltrans Standard Specifications shall mean the Department of Public Works of the City of Stockton when referring to the administration of the project.

**Director of Public Works** - The executive officer of the Department of Public Works as created by law or the executive officer's assigned representative. Any reference to the terms "Director" or "Director of Transportation" in Caltrans Standard Specifications shall mean the Director of Public Works of the City of Stockton. Any reference to the terms "Director" or "Director of Public Works" shall also mean the Director of Municipal Utilities or Director's assigned representative on projects or contracts for which the Municipal Utilities Department is the responsible department.

**Electrolier** - Street light assembly complete, including foundation, standard, luminaire arm, luminaire, etc.

**Engineer (Caltrans Section 1-1.18)** - The City Engineer of the City of Stockton acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them. Any reference to the terms "Engineer" or "City Engineer" shall also mean the Director of Municipal Utilities on projects or contracts for which the Municipal Utilities Department is the responsible department.



**Engineer's Estimate** - The list of estimated quantities of work to be performed as contained in the "Bid Proposal" under "Department of Public Works, City of Stockton Estimate."

**Full Depth Asphalt Concrete** - The term FULL-DEPTH (registered by The Asphalt Institute with the U.S. Patent Office) certifies that the pavement is one in which asphalt mixtures are employed for all courses above the subgrade or improved subgrade. A FULL-DEPTH asphalt pavement is laid directly on the prepared subgrade. (The mathematical symbol  $T_a$  denotes Full-Depth or Total Asphalt.) (May also be referred to as Deep Lift or Deep Strength Asphalt Concrete)

**Highway (Caltrans Section 1-1.24)** - The whole right-of-way or area which is reserved for and secured for use in constructing the roadway and its appurtenances. Where the work is not specifically highway or street work, the term "highway" or "highway right-of-way" shall be interpreted to mean the property line or the bounded area of the site of the improvement/work or be deleted, where applicable.

**Holiday** - An undesirable discontinuity or break in the anticorrosion protection on pipe or tubing.

**Industrial** - Refer to Chapter 16 of the Stockton Municipal Code.

**Laboratory (Caltrans Section 1-1.25)** - The established laboratory of the City of Stockton and/or the laboratory chosen by, or approved by the City of Stockton and authorized to test materials and work involved in the contract.

**Liquidated Damages (Caltrans Section 1-1.26)** - The amount prescribed in the special conditions to be paid to the City of Stockton or to be deducted from any payments due or to become due to the Contractor for each day's delay in completing the whole or any specified portion of the work beyond the time allowed in the Standard Specifications.

**Local (Street Classification)** - Roadways used primarily for direct access to residential, commercial, industrial or other abutting property. They do not include roadways carrying through traffic. A local street is defined as a facility having the sole function of providing access to immediately adjacent land.

Clarification questions should be directed to the Traffic Engineering section of the Public Works Department of the City of Stockton.

**Lowest Responsible Bidder** - The company or firm whose bid is arithmetically lowest and who meets the criteria set forth in Stockton Municipal Code Section 3-025.

**Luminaire** - The lamp housing including the optical and socket assemblies (and ballast if so specified).

**Other Agencies** - Whenever reference is made to any Federal, State or County agency or officer, such reference shall be deemed made to any agency or officer succeeding in accordance with law to the powers, duties, jurisdiction, and authority of the agency or officer mentioned.

**Plans** - (aka Standard Plans and/or Project Plans as applicable) Refer to the definitions under Standard Specifications and Plans later in this section.

**Project Plans** - The project plans are specific details and dimensions peculiar to the work and are supplemented by the Standard Plans insofar as the same may apply. The Standard Plans shall also be interpreted to mean those Standard Plans incorporated within the document.

**Proposal Form (Caltrans Section 1-1.32)** - The approved form upon which the City of Stockton requires formal bids be prepared and submitted for work. (See Section 2-1.05)

**Proposal Guaranty (Caltrans Section 1-1.33)** - The cash, cashier's check, certified check, or bidder's bond accompanying the proposal submitted by the bidder, as a guaranty that the bidder will enter into a contract with the City of Stockton for the performance of the work if the contract is awarded to the bidder.

**Residential** - Refer to Chapter 16 of the Stockton Municipal Code.

**Right-of-Way** - Any reference to the term "right-of-way" or "highway right-of-way" shall be interpreted to mean the property right-of-way, property line or the bounded area of the side of work, where applicable.

**Sand** - aka Class 4 aggregate subbase shall conform to the provisions of Sections 19 and 25 of Cal Trans standard specifications. Class 4 aggregate subbase material shall be clean and free from vegetable matter and other deleterious substances. The percentage composition by weight of Class 4 aggregate subbase material shall conform to the following grading when determined by test method No. California 202.

<b><u>Sieve Sizes</u></b>	<b><u>Percentage Passing</u></b>
2 1/2	100%
NO. 200	2 - 35%

Class 4 aggregate subbase material shall also conform to the quality requirements shown in the following table

<u>Tests</u>	<u>Test Method No. Calif.</u>	<u>Requirements</u>
Sand Equivalent	217	20 min.
Resistance	301	55 min.

**Service Connection** - Service connections are all or any portion of the conduit, cable or duct, including meter, between a utility distribution line and an individual consumer.

**Sewer** - Any conduit intended for the reception and transfer of sewage and fluid industrial waste.

**Sewer (Private)** - A sewer, wholly within private property and maintained privately.

**Sewer Connection** - A sewer, within a public street, a public utility easement right of way, proposed to connect any parcel, lot or part of a lot with a main line sewer.

**Specifications** - (aka Standard Specifications) The written directions, provisions, and requirements contained in the "Standard Specifications and Plans" as published by the City of Stockton and as supplemented by the Special Provisions.

**Special Provisions (Caltrans Section 1-1.37)** - The special provisions are specific clauses setting forth conditions or requirements peculiar to the work and supplementary to these Standard Specifications and Plans. The State of California, Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates and General Prevailing Wage Rates" are to be considered as a part of the special provisions.

**Standard Specifications and Plans (Caltrans Section 1-1.29)** - The official Project Plans and Standard Plans, profiles, typical cross sections, general cross sections, working drawings and supplemental drawings, or reproductions thereof signed by the City Engineer, which show the location, character, dimensions and details of the work to be performed. All such documents are to be considered as part of the Standard Plans whether or not reproduced in the special provisions.

In the above definition, the following terms are defined as follows:

- (a) Standard Plans - The Standard Detail Drawings of the Department of Public Works published as part of the Standard Specifications and Plans as may be adopted, or adopted and modified in the project plans.

- (b) Project Plans - The project plans are specific details and dimensions peculiar to the work and are supplemented by the Standard Plans insofar as the same may apply. The Standard Plans shall also be interpreted to mean those Standard Plans incorporated within the document.
- (c) Standard Specifications - The written directions, provisions, and requirements contained in the "Standard Specifications and Plans" as published by the City of Stockton and as supplemented by the Special Provisions.
- (d) Special Provisions (Caltrans Section 1-1.37) - The special provisions are specific clauses setting forth conditions or requirements peculiar to the work and supplementary to these Standard Specifications and Plans. The State of California, Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates and General Prevailing Wage Rates" are to be considered as a part of the special provisions.

**State** - The State of California. Any reference to the terms "State" or "State of California" in Caltrans Standard Specifications with reference to administration of the project, shall mean the City of Stockton, where applicable.

**State Treasurer** - Shall be interpreted to mean the City of Stockton Finance Department, where applicable.

**Storm Drain** - (aka Storm Sewer) Any conduit and appurtenances intended for the reception and transfer of storm water.

**Storm Water Management Program** - The City of Stockton's Storm Water Management Program as delineated in the City's NPDES Permit for Storm Water Discharges from Municipal separate storm sewer systems.

**Street** - Any road, highway, parkway, freeway, alley, walk, or way.

**Subcontractor** - The individual, partnership, corporation or other legal entity entering into a contract with the contractor to perform a portion of the work.

**Surety** - Any individual, firm or corporation, bound with and for the contractor for the acceptable performance, execution, and completion of the work, and for the satisfaction of all obligations incurred.

**Traveled Way** - That portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

**Utility** - Tracks, overhead or underground wires, pipe lines, conduits, ducts, or structures, sewers or storm drains owned, operated, or maintained in or across a public right of way or private easement.

**Welding Specifications** - The directions, provisions and requirements contained in these Standard Specifications as modified and as supplemented by the special provisions. Caltrans "Standard Specifications for Welding Structural Steel" dated January 1981 is to be considered a part of these Standard Specifications. Whenever the term "these specifications" is used in this book, it means the provisions set forth in the City of Stockton Standard Specifications and Plans and Caltrans "Standard Specifications for Welding Structural Steel."

## SECTION 2

### PROPOSAL REQUIREMENTS AND CONDITIONS

**2-1.01 Contents of Proposal Forms** - The following is to be added: Prospective bidders will be furnished with proposal forms which will state the location and description of the contemplated construction and if applicable show the approximate estimate of the various quantities and kinds of work to be performed or materials to be furnished, with a schedule of items for which bid prices are asked. All special provisions will be grouped together and attached to the proposal form.

**2-1.02 Approximate Estimate** - The following is to be added: The quantities given in the notice to contractors, and in the proposal and contract are approximate only, being given as a basis for the comparison of bids. The City does not expressly or by implication, agree that the actual amount of work will correspond therewith, and reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Engineer.

**2-1.03 Examination of Plans, Specifications, Contract, and Site of Work** - The following is to be added:

No oral interpretations or clarification of the Standard Plans and Specifications and special provisions will be made prior to the bid opening. Any such requests shall be made in writing and will be answered in writing. If errors are found, the bidder shall provide written notification as soon as possible prior to the bid opening in order that letters of clarification can be prepared and given to all bidders.

Where the City has made investigations of subsurface conditions in areas where work is to be performed under the contract, or in other areas, some of which may constitute possible local material sources, such investigations are made only for the purpose of study and design. Where such investigations have been made, bidders or Contractors may, upon written request, inspect the records of the City as to such investigations subject to and upon the conditions hereinafter set forth.

The records of such investigations are not a part of the contract and are shown solely for the convenience of the bidder or contractor. It is expressly understood and agreed that the City assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the investigations thus made, the records thereof, or of the interpretations set forth therein or made by the City in its use thereof and there is no warranty or guaranty, either express or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas or any part thereof, or that developments, not specifically looked for, may not occur, or that materials other than, or in proportion different from those indicated, may not be encountered.

**2-1.05 Proposal Forms** - The City will furnish to each bidder a standard proposal form, which when filled out properly, executed, and submitted shall be the bidder's bid. Bids, not presented on forms so furnished shall be considered non-responsive. Proposal forms are furnished with the Special Provisions and Project Plans and shall be obtained at the Public Works office of the City of Stockton, City Hall.

The proposal form is bound in a book together with the notice to contractors, special provisions, and contract. Neither the proposal form nor any other portion of the said book shall be detached therefrom. The proposal shall set forth for each item of work, in clearly legible figures, an item price and a total for the item in the respective spaces provided, and shall be signed by the bidder, who shall fill out all blanks in the proposal as therein required.

All bids shall be clearly and distinctly written and if any erasure or interlineation occurs therein, before the bid is filed with the City Clerk, said erasure or interlineation shall be initialed by the person authorized to prepare and execute the bid.

The proposal shall be submitted as directed in the "Notice Inviting Bids" under sealed cover plainly marked as a proposal, and identifying the project to which the proposal relates and the date of the bid opening thereof. Proposals that are not properly marked may be rejected at the discretion of the City.

**2-1.07 Proposal Guaranty** - All bids shall be presented under sealed cover and accompanied by one of the following forms of bidder's security:

The following shall be changed or added:

Cash, a cashier's check, a certified check, or a bidder's bond executed by an admitted surety insurer, made payable to the City of Stockton (rather than the Director of Transportation).

The security shall be in an amount equal to 10 percent of the amount of bid. A bid will not be considered unless one of the above described forms of bidder's security is enclosed with it.

**2-1.075 Affirmative Action** – All contract proposals and work on City of Stockton contracts utilizing federal funds (excluding DOT-assisted) shall conform to the City's Equal Employment Program as set forth in City Council Resolution 97-0393. Bidders and Contractors shall submit forms and documentation as required per City of Stockton Affirmative Action Guidelines.

For Federal DOT-assisted projects, the City's Disadvantaged Business Enterprise (DBE) program as set forth in Council Resolution 01-225 will apply. Bidders and Contractors shall submit forms and documentation as required by the City's DBE program.

There are no Affirmative Action or DBE requirements for projects funded solely with local and/or State funds.

**2-1.08 Withdrawal of Proposals** - Any bid may be withdrawn at any time prior to the time fixed in the public notice for the opening of bids only by written request for withdrawal of the bid filed with the City Clerk. The request shall be executed by the bidder or the bidder's duly authorized representative. The withdrawal of a bid does not prejudice the right of the bidder to file a new bid. Whether or not bids are opened exactly at the time fixed in the public notice for the opening of bids, a bid will not be received after that time, nor may any bid be withdrawn after the time fixed in the notice for the opening of bids.

**2-1.095 Relief of Bidders** - The following is to be changed: If the bidder claims a mistake was made in the bidder's bid, the bidder shall give the City written notice within 3 days after the opening of the bids of the alleged mistake, specifying in the notice in detail how the mistake occurred.

**2-1.10 Disqualification of Bidders** - The following is to be added: Nothing in this section shall prohibit material suppliers or subcontractors from quoting prices to more than one bidder.

**2-1.109 Competency of Bidders** - Attention is directed to Section 7.1.01E, "Contractor's Licensing Laws," and the requirements of law referred to therein relating to the licensing of Contractors.



## SECTION 3

### AWARD AND EXECUTION OF CONTRACT

**3-1.01 Award of Contract** - The right is reserved to reject any and all proposals.

The award of the contract, if it be awarded, will be to the lowest and best responsible bidder whose proposal complies with all the requirements prescribed. Such award, if made, will be made as stated in the special provisions. If the lowest and best responsible bidder refuses or fails to execute the contract, the City of Stockton may award the contract to the second lowest and best responsible bidder.

All bids will be compared on the basis of the Engineer's Estimate of the quantities of work to be done.

**3-1.02 Contract Bonds** - The Contractor will be required to furnish a surety bond for the faithful performance of the Contractor's contract and also a labor and material bond, each in the sum of one hundred percent (100%) of the contract price.

The Faithful Performance Bond will be retained by the City of Stockton for twelve (12) months following final acceptance by the City of the improvements to guarantee correction of failure attributable to workmanship and materials. Upon said final acceptance by the City, the amount of the Faithful Performance Bond may be reduced to twenty percent (20%) of the actual improvement construction costs.

The bonds required of the Contractor shall be furnished by a company authorized to do a surety business in the State of California: said bonds shall be executed by the Surety and Contractor before or concurrently with the signing of the contract. The form of said bonds shall be approved by the City Attorney and the surety of Sureties shall be approved by the Director of Finance.

All alterations, extensions of time, extra or additional work and other changes authorized by these Standard Specifications, or any part of the contract may be made without securing the consent of the Surety on the contract bonds.

**3-1.03 Execution of the Contract** - The contract shall be executed within ten (10) days not including Saturdays and Sundays and legal holidays, after the bidder has received the contract, via certified mail.

**3-1.04 Failure to Execute Contract** - Failure of the lowest and best, the second lowest and best, or the third lowest and best to execute the contract and file acceptable bonds as provided herein within 10 days not including Saturdays, Sundays and legal holidays, after the bidder has received the contract, via certified mail, shall be just cause for the forfeiture of the proposal guaranty. The successful bidder may file with the City Clerk a written notice, signed by the

bidder or the bidder's authorized representative, specifying that the bidder will refuse to execute the contract if presented to the bidder. The filing of such notice shall have the same force and effect as the failure of the bidder to execute the contract and furnish acceptable bonds within the time herein before prescribed.

**3-1.05 Return of Proposal Guaranties** - Within 10 days after award of the contract to the lowest responsible bidder, the City of Stockton will return the proposal guaranties accompanying the proposals no longer being considered.

The proposal guarantee of the lowest responsible bidder will be held until evidence of insurance, a current City of Stockton business license, and satisfactory bonds are provided and the contract is fully executed and filed with the City Clerk.

If the lowest responsible bidder fails or refuses to enter into the contract to do said work, furnish said supplies, or to furnish the required bonds within 10 business days after award of contract, the proposal guarantee shall be forfeited to the City of Stockton.

## SECTION 4

### SCOPE OF WORK

**4-1.02 Site Maintenance and Final Cleaning Up** - The following is to be added: The Contractor shall conduct and cause all working forces at the site to maintain the site in a neat orderly manner throughout the construction operations. The work shall be conducted in a manner that will control the dust. When ordered to provide dust control, the Contractor shall use water or turn soil to reduce the dusty conditions, all to the satisfaction of the Engineer and in accordance with Section 10 of the Standard Specifications. During construction, the Contractor shall remove all rubbish and debris as it is generated to the satisfaction of the Engineer.

Contractor's activities shall conform to the requirements of the Storm Water Management Program and/or BMPs delineated in the project SWPPP. All appropriate provisions of the General Permit including Post-Construction Storm Water Management shall be adhered to.

Nothing herein, however, shall require the Contractor to remove warning, regulatory, and guide signs prior to formal acceptance by the City.

Full compensation for all site maintenance and cleanup will be considered as included in the prices paid for the various contract items of work and no separate payment will be made therefor.

**4-1.03 Changes** - The following is to be added: For contracts approved by the City Council for initial prices of less than One Hundred Thousand Dollars (\$100,000), individual and/or cumulative change orders of Twenty-three Thousand Five Hundred Seventy-eight Dollars (\$23,578) or that amount approved by City Council Action or greater require City Council approval. For contracts approved by the City Council with initial prices of One Hundred Thousand Dollars (\$100,000) or more, individual and/or cumulative changes orders which exceed Twenty-three Thousand Five Hundred Seventy-eight Dollars (\$23,578) or that amount approved by city Council Action plus ten percent (10%) of the initial contract price over One Hundred Thousand Dollars (\$100,000) require City Council approval. Change orders not meeting the above criteria require approval by the authorized CITY official executing this contract. The dollar amounts of change orders approved by specific City Council action, plus the dollar amounts of any change orders which predate such specific City Council action, shall not be counted in computing the authority limits set forth above for CITY officials to approve change orders hereunder.

When the compensation for an item of work is subject to adjustment under the provisions of this Section 4-1.03, the Contractor shall, upon request, promptly furnish the Engineer with adequate detailed cost data for said items of work.

In emergency situations, the authorized City official may issue a change order beyond the authority limits described above in order to:

- (a) Prevent interruption of the work which would result in a substantial increase in the costs to, or liability of the City; or
- (b) Protect the work, equipment, materials to be used in the work, human safety, or the environment at or near the work from substantial and immediate danger or injury; or
- (c) Protect, where damage or injury has occurred, the work, equipment or materials to be used in the work, human safety, or the environment from further or additional damage or injury or deterioration.
- (d) The authorized City official shall have the authority to issue change orders in such sums as is reasonably necessary for such emergency purposes. After issuing a change order in an emergency situation described above, the authorized City Official shall report such action and the reasons therefor to the City Council in writing not later than its next regularly scheduled meeting or as soon thereafter as is practicable.
- (e) Upon receipt of an approved contract change order, the Contractor shall proceed with the ordered work. If ordered in writing by the Engineer, the Contractor shall proceed with the work so ordered prior to actual receipt of an approved contract change order therefor. In such cases, the Engineer will, as soon as practicable, issue an approved contract change order for such work and the provisions in Section 4-1.03A, "Procedure and Protest," shall be fully applicable to such subsequently issued contract change order.

**4-1.03A Procedure and Protest** - The paragraph is to be changed as follows: Proposed contract change orders may be presented to the Contractor for the Contractor's consideration prior to approval by the Engineer. If the Contractor signifies the Contractor's acceptance of the terms and conditions of such proposed contract change order by executing such documents and if such change order is approved by the City Manager or City Council and issued to the Contractor, payment in accordance with the provisions as to compensation therein set forth shall constitute full compensation for all work included therein or required thereby. A contract change order approved by the City Manager or City Council is an executed contract change order as that term is used in Section 4-103B to 4-1.03D, inclusive. An approved contract change order shall supersede a proposed contract change order covering the same work.

**4.103B Increased or Decreased Quantities** - This section of Caltrans Specifications is to be deleted.

**4-1.03B(3) Eliminated Items** - The following is to be added: The City reserves the right to eliminate any contract item of work prior to the award of the contract without incurring any obligation to pay therefor. Should any contract item of the work be eliminated in its entirety following the award of the contract and in the absence of an executed contract change order covering such elimination, payment will be made to the Contractor for actual costs incurred in connection with such eliminated contract item if incurred prior to the date of notification in writing by the Engineer of such elimination.

**4-1.04 Detours** - The following is to be added: Whenever work is performed within the right-of-way of any roadway classified as an "Arterial" or "Collector" type roadway, as defined in these Standard Specifications, a detailed detour plan shall be required.

Clarification questions should be directed to the Traffic Engineering Section of the Public Works Department of the City of Stockton. The plan shall be designed and signed by an engineer registered with the State of California as a Professional Civil or Traffic Engineer. This detour plan shall be submitted to the Public Works Department for approval a minimum of 10 working days before the beginning of any roadwork. The cost of implementing and maintaining the detour plan shall be borne by the Contractor, utility company, or developer.

## SECTION 5

### CONTROL OF WORK

**5-1.01 Authority of Engineer** - The following is to be added: Unless otherwise stated, the words *directed, required, permitted, ordered, instructed, designated, considered necessary, prescribed, reviewed, approved, acceptable, satisfactory*, or words of like import, refer to actions, expressions, and prerogatives of the Engineer.

**5-1.02 Plans and Working Drawings** - The following is to be changed and/or added: Record drawings of all improvements shall be provided by the Contractor involved in constructing the improvement. Record drawings shall be neatly and accurately done on a set of Project Plans and delivered to the Department of Public Works as a condition precedent to acceptance of the project.

The Engineer shall review working drawings before any work involving these plans is performed.

On private development work, at the conclusion of construction, the Engineer who prepared the improvement plans will add to the Project Plans, for City record purposes, construction data based on information compiled and furnished by the Engineer, contractors, inspector and others.

On those facilities that will be extended in the future (such as sanitary lines, storm drain lines, water lines and curb and gutter installations), the Engineer shall shoot the grades at the end of the facilities and include the "as constructed" grades on the record drawings.

**5-1.02A Trench Excavation Safety Plans** - The following is to supersede Caltrans Specification: Attention is directed to Section 7-1.01E, "Trench Safety." Excavation for any trench 5 feet in depth or more shall not begin until the Contractor has obtained a permit per State of California Construction Safety Orders Section 1539 and Chapter 3.2 Article 2, Section 341 of the California Occupational Safety and Health Regulations (Cal/OSHA). For information regarding this provision Contractor is directed to contact Cal/OSHA in Modesto. A copy of this permit shall be available at the construction site at all times.

**5-1.07 Lines and Grades** - The following is to be added: The Engineer will set one bench mark on the job site and at the option of the Contractor will either (1) stake the center line, (2) stake an offset line, or (3) stake a base line with necessary grades as required one time only. It is expected that on small projects the City will provide the field services. On all subdivisions, or on large and complicated projects, the special conditions will set forth the extent of field service to be provided by the City and whether or not a licensed surveyor or civil engineer shall perform all or part of the engineering work. On Public Works contracts, however, engineering layout will be provided by the City of Stockton as noted in Items 1, 2, or 3

above. Where the City of Stockton does provide staking, it shall be preserved carefully by the Contractor and will only be replaced by the City in the case of malicious mischief or vandalism perpetrated by a third party.

The Contractor shall preserve all monumentation potentially affected by the work in accordance with Section 8771 of the Professional Land Surveyors Act in the Business and Professions Code of the State of California. Locations of known existing monumentation within the area of work shall be indicated on the plans. If required, tie-out of existing monuments shall be completed and appropriate documentation submitted to the City Engineer prior to beginning work. Unless otherwise specified, all construction staking or survey work shall be performed by an appropriately licensed land surveyor or civil engineer.

**5-1.08 Inspection** - Add the following: Projects financed in whole or part with State funds shall be subject to inspection at all times by the State agency involved.

The contractor shall perform all wet weather and dry weather inspections required to determine if all BMPs implemented are adequate and being maintained in accordance with the SWPPP and the requirements of the General Permit. The project site shall be subject to inspection at all times by the City to verify conformance with the General Permit and provisions of the Storm Water Management Program.

**5-1.14 Cost Reduction Incentive** - This section is expressly deleted and is not applicable to work done for the City of Stockton. This will be applied on a case by case basis and shall be stated in the special provisions.

## SECTION 6

### CONTROL OF MATERIALS

**6-1.02 City Furnished Materials** - The following supersedes Caltrans Section 6-1.02 in total: Materials furnished by the City will be available at locations designated in the special provisions or if not designated in the special provisions they will be delivered to the project. Said materials shall be hauled to the site of the work by the Contractor at the Contractor's expense, including any necessary loading and unloading that may be involved. The cost of handling and placing City furnished material shall be considered as included in the price paid for the contract item involving such City-furnished material.

The Contractor will be held responsible for all materials furnished to the Contractor, and he shall pay all demurrage and storage charges. City-furnished materials lost or damaged from any cause whatsoever shall be replaced by the Contractor. The Contractor will be liable to the City for the cost of replacing City-furnished material and such costs may be deducted from any monies due or to become due the Contractor.

**6-1.03 Storage of Materials** – The following is to be added: Materials shall be stored in such a manner to reduce their potential to pollute storm water run off from the site. Storage practices and storm water management from the storage area shall conform to the BMPs in the SWPPP and the requirements of the General Permit.

**6-1.08 Foreign Materials** - The following is to be added: The Contractor, at no cost to the City, shall supply the facilities and arrange for any testing required in Stockton which the City is not equipped to perform. All testing by the Contractor shall be subject to witnessing by the Engineer.

Where structural materials requiring mill test reports are obtained from foreign manufacturers, such materials shall be furnished only from those foreign manufacturers who have previously established, to the satisfaction of the Engineer, the sufficiency of their in-plant quality controls, as deemed necessary by the Engineer or his representative, to give satisfactory assurance of their ability to furnish material uniformly and consistently in conformance with these Standard Specifications. At the option of the Engineer, such sufficiency shall be established either by submission of detailed written proof thereof or through in-plant inspection by the Engineer or the Engineer's representative or such testing, by a local laboratory certified to be capable to perform the testing, as is determined to be necessary by the Engineer.



## SECTION 7

### LEGAL RELATIONS AND RESPONSIBILITY

**7-1.01 Laws to be Observed** – The following is to be added: The Contractor shall observe and comply with all requirements of the Storm Water Management Program, and the General Permit.

**7-1.01A(2) Prevailing Wage** - The following is to be added: The general prevailing wage rates for each craft, classification or type of workman are on file at the City Hall, City of Stockton, 425 N. El Dorado Street, Stockton, California. A copy of said wage rates shall be posted by the Contractor in a prominent place at the site of the work.

**7-1.01A(4) Labor Nondiscrimination** - The following is to be added: Attention is also directed to the requirement in Section 1431 of the Labor Code and sections 300 and 317 through 323 of Title 8 of the California Administrative Code that the Contractor shall submit the Contractor's Equal Employment Opportunity Program and certification fee to the Fair Employment Practice Commission, in the event that the bid price for the contract exceeds \$200,000.

Attention is directed to the requirements of the Stockton Municipal Code, Chapter 3, Part V, as amended with reference to the affirmative action requirements for Contractors on Public Works projects of the City of Stockton. Such requirements shall be followed. Guidelines and the necessary reporting requirements are contained in the publication entitled: "City of Stockton Affirmative Action Guidelines" which is made a part of these Standard Specifications by this reference. Failure of the Contractor to conform to the provisions of the City of Stockton's Affirmative Action Program will result in the Contractor's being subject to the penalties set forth in Section 3-028 of Part V of Chapter 3 of the Stockton Municipal Code.

**7-1.01A(6) Worker's Compensation** - The following is to be added: Pursuant to the requirements of Section 1860 of the Labor Code, the Contractor will be required to secure the payment of Worker's Compensation to the employees in accordance with the provisions of Section 3700 of the Labor Code.

The successful bidder previous to the entering of the contract to do the said work shall take out and maintain in full force and effect worker's compensation insurance with an insurance carrier authorized to transact business in the State of California, covering the bidder's full liability for compensation to any persons employed who may be injured in the carrying out of said contract or the dependents thereof. Evidence of such worker's compensation insurance shall be furnished to the City of Stockton by certificates in duplicate prior to the commencement of the work and said certificate shall contain a provision that the coverage

thereunder will not be canceled until at least thirty (30) days prior written notice has been given to the City.

**7-1.01C Contractor's Licensing Laws** - The following shall be added: In additions to the Contractor's license, the Contractor shall obtain a business license from the City of Stockton.

**7-1.01D Vehicle Code** - The following sections of the California State Vehicle Code shall be added: The lighting requirements in Section 25803; the brake requirements in Division 12, the following sections of the State of California Vehicle Code; the splash apron requirements in Section 27600; and, when operated on completed or existing treated base, surfacing, pavement or structures, except as otherwise provided in Section 7-1.02, "Weight Limitations," the weight limitation requirements contained in Division 15. Any other requirements which the City will require compliance with, will be set forth in the special provisions.

**7-1.01E Trench Safety** - The following shall be added: The Contractor shall furnish all labor, equipment and materials required to design, construct and remove all shoring, sheeting, lagging, cribbing, piling, or types of support for the walls of the project.

In making excavations for any project, the Contractor shall be fully responsible for providing and installing adequate sheeting, shoring and bracing as may be necessary as a precaution against slides or cave-ins and to fully protect all existing improvements of any kind from damage.

The Contractor shall obtain a permit from the Division of Industrial Safety (Cal-OSHA) and shall submit a copy of the approved permit to the City Engineer prior to the start of excavation. The cost of the permit shall be included in the total bid cost. Nothing in this section shall be construed to impose tort liability on the awarding body or any of its employees.

The criteria given by the California Department of Industrial Relations are MINIMAL. In addition to shoring any excavation, it shall be the Contractor's responsibility to provide any and all additional shoring required to support the sides of the excavation against the effects of loads which may exceed those derived by using the criteria set forth by said governing agency. The Contractor shall be solely responsible for any damages which may result from the Contractor's failure to provide adequate shoring to support the excavations under any or all of the conditions of loading which may exist or which may arise during construction.

Full compensation for performing the work described above shall be considered as included in the lump sum payment for "Trench Shoring" and no additional compensation will be allowed therefor.

**7-1.01G Water Pollution** - The following is to be added: All water pollution control work performed in accordance with the accepted program which is not otherwise required under the contract and which is ordered by the Engineer will be paid for as follows:

1. Such water pollution control work that may be accomplished under the various contract items of work will be measured and paid for as provided for under the contract.
2. Such water pollution control work not covered by contract items will be paid for as extra work as provided for in Section 4-1.03D.

**7-1.02 Weight Limitations** - The following is to be added: The Contractor will be permitted to operate unladed vehicles and to haul Portland cement concrete for paving on completed cement treated base, provided that:

- (1) The cement treated base has cured for 7 days;
- (2) Hauling is limited to the lane immediately adjacent to the median in each direction;
- (3) Maximum weight limitations set forth in Division 15 of the Vehicle Code are not exceeded; and
- (4) Block cracking does not occur under hauling operations.

If block cracking occurs, the Engineer may order said loads to be reduced so that the maximum weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, will not exceed 9,000 pounds. The Contractor shall not be entitled to any additional compensation nor extension of contract time by reason of such load reduction.

**7-1.06 Safety & Health Provisions** - The following shall be added: In all operations connected with the work herein specified, the Contractor shall observe the provisions of the Worker's Compensation and Safety Laws of the State of California, Division IV and V of the Labor Code, and shall use all of the accepted and best safety practices for the public and/or the Contractor's employees.

**7-1.07 Sanitary Provisions** - The following is to be added: The Contractor shall conform to the rules and regulations pertaining to sanitary provisions established by the State of California as may be applicable.

**7-1.08 Public Convenience** - The following is to be added: Adequate ingress and egress shall be maintained for fire, police and other emergency vehicles. Adequate ingress and egress shall be maintained at all times for residents, property owners, and business owners. The Contractor may be required to cover certain signs which regulate or direct public traffic to roadways that are not open to traffic.

In the event of a suspension of the work, attention is directed to Section 8-1.05, "Temporary Suspension of Work."

**7-1.09 Public Safety** - The flagmen shall perform their duties, and the work of furnishing and placing such signs, lights, flags, and other warning and safety devices shall all be performed as set forth in the current "Work Area Traffic Control Handbook" as published by Building News, Inc., Los Angeles, California (310-202-7775, 8:30 AM.-5 PM, M-F).

All safety devices and their maintenance shall conform to the latest requirements of Cal-OSHA and to the applicable provisions of the "Work Area Traffic Control Handbook."

**7-1.092 Lane Closure** - The following is to be added: Whenever a lane closure is made, the Contractor shall close the lane by placing fluorescent traffic cones, portable delineator, or other devices reviewed by the Engineer, along a taper and along the edge of the closed lane adjacent to public traffic. One telescoping flag tree with flags shall be placed at the beginning and at the end of the taper.

Fluorescent traffic cones shall be of good commercial quality, flexible material suitable for the purpose intended. The outer section of the portion above the base of the cone shall be at least 28 inches. The base shall be of sufficient weight and size or shall be anchored in a manner such that the traffic cone will remain in an upright position.

Portable delineators shall conform to the provisions in Section 7-1.093, "Portable Delineators."

If the traffic cones or portable delineators are damaged, displaced or are not in an upright position from any cause, said cones or portable delineators shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

Telescoping flag trees shall be of good commercial quality material, suitable for the purpose intended and shall be capable of maintaining an upright position at all times while in use.

The fluorescent traffic cones or portable delineators shall be placed at intervals as directed by the Engineer, but not to exceed 50 feet.

If the work requires that fluorescent traffic cones or portable delineators be placed in the lane open to public traffic, said cones or portable delineators shall be placed on a 1-1/2 foot width of the lane open to traffic along the side adjacent to the lane to be closed.

Traffic cones or portable delineators, telescoping flag trees with flags, and signs shall be placed before beginning work each day and shall be removed from the site of the work at the end of each working day.

The contractor shall specify the time limits of lane closure upon approval by the City Engineer.

Full compensation for furnishing, placing, maintaining and removing the traffic cones and telescoping flag trees with flags required for lane closure, shall be considered as included in the contract prices paid for the items of work requiring the lane closure and no separate payment will be made therefor.

The provisions for lane closure in this Section 7-1.092 will nowise relieve the Contractor from the Contractor's responsibility to provide such devices or measures as may be necessary to comply with Section 7-1.09, "Public Safety."

**7-1.093 Portable Delineators** - The following is to be added: Portable delineators shall be furnished, placed and maintained in accordance with the provisions in Section 7-1.08, "Public convenience," and 7-1.09, "Public Safety," and as provided in the special provisions.

Portable delineators, including the base shall be composed of a material that has sufficient rigidity to remain upright when unattended and shall be either flexible or collapsible upon impact by a vehicle. The base shall be of such shape as to preclude roll after impact. The base shall be sufficient weight or shall be anchored in a manner such that said delineator shall remain in an upright position.

If the portable delineators are damaged, displaced or are not in an upright position, from any cause, said delineators shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

The vertical portion of the portable delineators shall be of a brilliant orange or predominantly orange color. The posts shall be not less than 2-1/4 inches in width or diameter or, if tapered, shall have a cross-sectional area of not less than 100 square inches, measured, through the vertical axis of the delineator normal to the roadway. The minimum height shall be 37 inches above the traveled way.

Two 4-inch nominal width reflective bands shall be mounted a minimum 1-1/2 inches apart and at a height on the post so that one reflective band will be between 2.5 feet and 3 feet above the roadway surface.

Reflective bands shall conform to the following:

Reflective bands shall be flexible vinyl plastic, either white or yellow, and shall have not less than the following dry reflectance values at a 0.2 degree divergence angle, expressed in units of candlepower per foot candle square foot. The wet reflectance values shall not be less than 90 percent of the dry values.

**Dry Reflectance Value**

Angle of Incidence	4°	15°	30°
White	250	165	50
Yellow	150	110	30

All tests for reflectance value shall be performed in accordance with Test Method No. Calif. 642.

Only one type of portable delineator shall be used on the project. The type of portable delineator proposed for use on the project shall be submitted to the Engineer for approval prior to placement on the project.

When work is in progress in a trench or other excavation adjacent to the traveled way, the portable delineators shall be placed on the edge of pavement. At other times, the portable delineators shall be placed off of and adjacent to the edge of pavement.

The portable delineators shall be spaced as necessary for proper delineation as directed by the Engineer but not to exceed 50 feet.

The requirements in this Section 7-1.093 will in no way relieve the Contractor from the Contractor's responsibility to provide such devices or measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety."

When no longer required for delineation, the portable delineators shall be removed from the site of the work. Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed therefor.

**7-1.094 Use of Private Property** - The following is to be added: Should the Contractor intend to use privately owned property for the storage of any type of material, or equipment, or for vehicle parking or for any other purpose related to the work, the Contractor shall make the necessary arrangements and shall, precedent to such use, provide the Engineer with satisfactory written evidence that the owner of such property has granted permission of such uses. Prior to the final acceptance of the work, the Contractor also shall provide to the Engineer an acceptable written release from such owner indicating that all of the conditions of such agreement are satisfied.

**7-1.12 Indemnification and Insurance** - The following is to be added: The duty of the Contractor to indemnify and save harmless, as set forth herein, shall include the duty to defend, as set forth in Section 2778 of the California Civil Code provided, however, that nothing herein shall be construed to require the Contractor to indemnify the City against any responsibility or liability in contravention of Section 2782 of the California Civil Code, including any loss arising from design defect which is the result of the sole negligence of the City.

The Contractor shall, during the life of the contract, take out and maintain insurance coverage with an insurance carrier authorized to transact business in the State of California as will protect the Contractor or any subcontractor or anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable, from claims for damages because of bodily injury, sickness, disease, or death of the Contractor's employees or any person other than the Contractor's employees, or for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom. Contractor shall be aware that the maintenance of proper insurance coverage is a material element of a contract with the City and that failure to maintain or renew coverage or to provide evidence of renewal may be treated as a material breach of contract.

The minimum limits of liability for such insurance coverage which shall include commercial general and automobile liability, including contractual liability assumed under the contract, shall be as follows:

1. Limit of Liability for Injury or Accidental Death

One Person	\$1,000,000
One Accident or Occurrence	\$1,000,000

2. Limit of Liability for Property Damage

Aggregate Liability for Loss	\$1,000,000
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Such liability insurance policies shall name the City as an additional insured by separate endorsement and shall agree to defend and indemnify the City against loss arising from operations performed under the contract and before permitting any subcontractors to perform work under the contract, the Contractor shall require subcontractors to furnish satisfactory proof that insurance has been taken out and is maintained similar to that provided by the Contractor as it may be applied to the subcontractor's work.

The Contractor shall, during the life of the contract, effect and maintain standard form builder's risk property insurance coverage with an insurance carrier authorized to business in the State of California, which shall include extended coverage, malicious mischief, vandalism, and windstorm coverage, and such coverage shall be applicable to those portions of the work that are subject, but not limited to, fire, theft, and vandalism. Coverage shall be

the amount of one hundred percent (100%) of the insured value thereof, including surplus materials and supplies incident to the work, and such scaffoldings, stagings, towers, forms and equipment as are not owned or rented by the Contractor, the cost of which is included in the cost of the work but shall not cover any tools owned by mechanics, any tools, equipment, scaffolding, staging, towers, and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the work. The City shall be named as loss payee with the Contractor in such builder's risk property insurance policies and they shall be open to City's inspection upon City's request. The foregoing Builders Risk Insurance will not be required on work being performed exclusively on public street right-of-ways or utility easements.

The City and the Contractor waive all rights against each other for damages caused by fire or other perils to the extent covered by insurance under such builder's risk property policies, except such rights as they may have to the proceeds of such insurance coverage and the Contractor shall require similar waivers by subcontractors.

If the Contractor fails to effect and maintain the required builder's risk property insurance coverage, the City may insure its own interest. The City may deduct the cost of taking out, effecting and maintaining such liability and/or builder's risk property insurance coverages from any sums which may be due, or become due, to the Contractor, under the contract.

Evidence of both liability and builder's risk property insurance coverages shall be furnished to the City with form of certificates with endorsements prior to the commencement of the work and said certificates with endorsements shall contain a provision that the coverage or coverages thereunder will not be canceled until at least thirty (30) days prior written notice has been given to the City. The form of the Certificate of Insurance shall be as shown on the following pages of these Standard Specifications.



## ***BROKER/AGENT INSURANCE CHECK LIST***

***Instructions:*** *Please follow the format below for issuing the Certificate of Insurance to the City of Stockton. Broker/Agent must return completed certificates and endorsement to Risk Management – 425 North El Dorado Street, Stockton, CA 95202, prior to the start of any job.*

### ***General Contract Information:***

- Name of Individual/Company: \_\_\_\_\_
- Address of Individual/Company: \_\_\_\_\_
- Contact Person: \_\_\_\_\_ Telephone: \_\_\_\_\_

***PLEASE LIST THE FOLLOWING INFORMATION ON THE CERTIFICATE OF INSURANCE IN THE AREA TITLED "DESCRIPTION OF OPERATIONS."***

- Contract Effective Date: \_\_\_\_/\_\_\_\_/\_\_\_\_
- Contract Expiration Date: \_\_\_\_/\_\_\_\_/\_\_\_\_
- Job Title: \_\_\_\_\_

### ***Risk Management Requirements:***

Fax completed Certificate of Insurance and "Additional Insured" Endorsement with original mailed to:

***CITY OF STOCKTON  
425 N. EL DORADO STREET  
STOCKTON, CA 95202  
(209) 937-8833 – FAX  
(209) 937-8629 - OFFICE***

## ***SAMPLE CERTIFICATE AND ENDORSEMENT ATTACHED***

***NOTE:*** BROKER IS RESPONSIBLE FOR NOTIFYING THE CITY OF STOCKTON IF ANY CHANGES IN INSURANCE OR EXPIRATION OF INSURANCE TAKES PLACE.

# ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY)

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

## INSURERS AFFORDING COVERAGE

INSURED

INSURER A.

INSURER B.

INSURER C.

INSURER D.

INSURER E.

## COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY				EACH OCCURRENCE	\$
	COMMERCIAL GENERAL LIABILITY				FIRE DAMAGE (Any one fire)	\$
	CLAIMS MADE <input type="checkbox"/> OCCUR <input type="checkbox"/>				MED EXP (Any one person)	\$
					PERSONAL & ADV INJURY	\$
					GENERAL AGGREGATE	\$
	GEN'L AGGREGATE LIMIT APPLIES PER:				PRODUCTS - COMPROP AGG	\$
	POLICY <input type="checkbox"/> PROJECT <input type="checkbox"/> LOC <input type="checkbox"/>					
	AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT (Ea accident)	\$
	ANY AUTO				BODILY INJURY (Per person)	\$
	ALL OWNED AUTOS				BODILY INJURY (Per accident)	\$
	SCHEDULED AUTOS				PROPERTY DAMAGE (Per accident)	\$
	HIRED AUTOS					
	NON-OWNED AUTOS					
	GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	\$
	ANY AUTO				OTHER THAN EA ACC	\$
					AUTO ONLY AGG	\$
	EXCESS LIABILITY				EACH OCCURRENCE	\$
	OCCUR <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/>				AGGREGATE	\$
						\$
	DEDUCTIBLE					\$
	RETENTION \$					\$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				WC STATUTORY LIMITS	OTH-ER
					E.L. EACH ACCIDENT	\$
					E.L. DISEASE - EA EMPLOYEE	\$
					E.L. DISEASE - POLICY LIMIT	\$
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS:

CERTIFICATE HOLDER

ADDITIONAL INSURED, INSURER LETTER:

CANCELLATION

CITY OF STOCKTON, RISK MGMT. DIVISION  
CITY HALL ANNEX  
6 EAST LINDSAY STREET  
STOCKTON, CA 95202

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT.

AUTHORIZED REPRESENTATIVE

**INSURED:**

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY

**THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY**

**ADDITIONAL INSURED--OWNERS, LESSEES  
OR CONTRACTORS (FORM B)**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART.

**SCHEDULE**

Name of Person or Organization:

CITY OF STOCKTON, ITS OFFICERS, AGENTS AND EMPLOYEES  
425 N. EL DORADO STREET  
STOCKTON, CA 95202-1997

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

WHO IS AN INSURED (Section II) is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of "your work" for that insured by or for you.

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Signature  
Authorized Representative

**7-1.125 Legal Actions Against the City** - In the event litigation is brought against the City concerning compliance by the City with State or Federal laws, rules, or regulations applicable to highway work, the provisions of this Section 7-1.125 shall apply.

**7-1.13 Disposal of Materials Outside the Street or Other Right of Way** - The following is to be added: Material disposal shall be in accordance with the requirements of the General Permit and/or the SWPPP, including the erosion and sediment control and post-construction storm water management requirement.

**7-1.15 Relief from Maintenance and Responsibility** - Delete the entire section in Caltrans and replace it with the following: Upon the request of the Contractor, the Director may relieve the Contractor of the duty of maintaining and protecting certain portions of the work which have been completed in all respects in accordance with the requirements of the contract and to the satisfaction of the Engineer, and thereafter except with the Contractor's consent, the Contractor will not be required to do further work thereon. In addition, such action by the Director will relieve the Contractor of responsibility for injury or damage to said completed portions of the work resulting from use by public traffic or from the action of the elements or from any other cause but not from injury or damage resulting from the Contractor's own operations or from the Contractor's negligence.

However, nothing in this Section 7-1.15 providing for relief from maintenance and responsibility will be construed as relieving the Contractor of full responsibility for making good defective work or materials found at any time before the formal written acceptance of the entire contract by the Director.

**7-1.165 Damage by Storm, Flood, Tidal Wave or Earthquake** - The following is to be added:  
G. Termination of Contract - If the City determines to terminate the contract and relieve the Contractor of further obligation to perform the work, a contract change order so providing will be issued. Such change orders may provide for the Contractor to perform any work deemed by the Engineer as necessary to put the project in satisfactory condition for the termination of all work, and the Contractor will be paid for such work in accordance with Section 9-1.03, "Force Account Payment." Upon the issuance of such change order the Contractor will be relieved of further responsibility for damage to the work (excluding materials) as specified in Section 7-1.16, "Contractor's Responsibility of the Work and Materials," and will not be required to perform any further work on the project other than that specified in the change order.

When the Engineer determines that the work specified in the change order has been completed, the Engineer will proceed as set forth in Section 7-1.17, "Acceptance of Contract," and the Contractor will not be required to perform any further work thereon, and shall be relieved of the Contractor's responsibility for injury to persons or property.

Payment after acceptance will be subject to the provisions in Section 9-1.07, "Payment After Acceptance." The Contractor will be paid for the work done prior to the Occurrence (as defined in Section 7-1.165 of Caltrans specifications) at the applicable contract prices; the Engineer will determine the value of partially completed work by apportioning such price. If the Contractor has placed orders prior to the Occurrence for materials specially manufactured for the project and which are not suitable for use in other City projects or sale to others in the ordinary course of the seller's business, the Contractor will be paid the actual cost to the Contractor for such material or the cancellation charges, if any, for such order made by the vendor. The determination of whether the order shall be completed or canceled shall be made by the Engineer. Any material paid for shall become the property of the City and actual cost of any further handling will be paid for. The actual cost or charges to be paid will be computed in the same manner as if the work were to be paid for on a force account basis, as provided in Section 9-1.03, "Force Account Payment." No payment will be made for materials which have been damaged and are not acceptable for incorporation in the work in accordance with the requirements of the contract. The Contractor shall pay the City any amounts previously paid for such unacceptable material, and agrees that the City may deduct the amount thereof from any moneys due or which may become due to the Contractor under the contract.

**7-1.17 Acceptance of Contract** - The following is to be added: When the Engineer has made the final inspection as provided in Section 5-1.13, "Final Inspection," and determines that the contract work has been completed in all respects in accordance with the Standard Specifications and Plans, the Engineer will file a "Notice of Completion" with the County Recorder and immediately upon and after such filing, the Contractor will be relieved of the duty of maintaining and protecting the work as a whole, and will not be required to perform any further work thereon, and the Contractor shall be relieved of the Contractor's responsibility for injury to persons or property or damage to the work which occurs after such filing.

**7-1.21 Repair of Equipment** – The following is to be added: Maintenance practices shall be in accordance with the BMPs in the SWPPP and requirements of the General Permit.

**7-1.23 Guaranty (General)** - The following is to be added: The Contractor hereby unconditionally guarantees that the work will be done in accordance with the requirements of the contract, and further guarantees the work of the contract to be and remain free of defects of workmanship and materials for a period of one (1) year from the date of acceptance of the work as complete, unless a longer guarantee period is specifically required. The Contractor hereby agrees to repair or replace any and all work, together with any other adjacent work which may be displaced in so doing, that may prove to be not in accordance with the requirements of the contract or that may be defective in its workmanship or material within the guarantee period specified, without any expense whatsoever to the City, ordinary wear and tear and unusual abuse or neglect excepted.

Contract bonds are to be in full force and effect during the guarantee period.

The Contractor further agrees, that within ten (10) calendar days after being notified in writing by the Department of Public Works of any work not in accordance with the requirements of the contract or any defects in the work, the Contractor will commence and prosecute with due diligence all work necessary to fulfill the terms of this guarantee, and to complete the work within a reasonable period of time, and in the event the Contractor fails to so comply, the Contractor does hereby authorize the City to proceed to have such work done at the Contractor's expense and the Contractor will pay the cost thereof upon demand. The City will be entitled to all costs, including reasonable attorneys fees, necessarily incurred upon the Contractor's refusal to pay such costs.

Notwithstanding the foregoing paragraph, in an event of an emergency constituting an immediate hazard to the health and safety of the City's employees, property or the public at large, the City may undertake at the Contractor's expense without prior notice all work necessary to correct such hazardous condition when it was caused by work of the Contractor not being in accordance with contract requirements.

**7-1.24 Guarantees (Specific)** - The following is to be added: In addition to the general guarantee specified in Section 7-1.23, certain specific guarantees or warranties in excess of one year may be required by the special conditions. In such case, the items of work requiring specific guarantees shall be listed in the general conditions together with the various specified tenures of guarantee.

The Contractor shall provide a written guarantee for those items specified in the special provisions. The form of the guarantee shall be approved by the City. A separate guarantee shall be provided for each item, and shall include the scope and tenure as specified in the special provisions. The guarantee shall be signed by the general Contractor and by the Subcontractor or supplier who furnished materials or did work on the item.

Irrespective of counter-signature on the guarantee form, it shall be the general Contractor's responsibility to replace any work, together with any other adjacent work displaced in so doing which may be necessary to comply with the terms of the contract or which may be defective in workmanship or material. For the purposes of this section, the City will only recognize the Subcontractor or supplier as an employee of the General Contractor.

Special non-cancelable bonds shall be provided by the General Contractor or the General Contractor's Subcontractor or supplier to hold specific guarantees or warranties in effect for the specified tenure and in a specified amount agreeable to the Director of Public Works.

Said forms shall be signed, notarized and delivered to the Director of Public Works along with the special bonds required prior to any final retention payment to the Contractor.

## SECTION 8

### PROSECUTION AND PROGRESS

**8-1.01 Subcontracting** - The following is to be added to the third paragraph: The Engineer may also determine, on a case by case basis, items to be designated "Specialty Items." Where an entire item is subcontracted, the value of work subcontracted will be based on the contract item bid price.

**8-1.02 Assignment** - The following is to be added: No contract or portion thereof may be assigned without consent of the City of Stockton except that the contractor may assign money due, or which will accrue to them, under the contract. If given written notice, such assignment will be recognized by the City of Stockton to the extent permitted by law, but any assignment of money shall be subject to all proper setoffs and withholdings in favor of the City of Stockton and to all deductions provided for in the contract. All money withheld, whether assigned or not shall be subject to being used by the City of Stockton for completion of the work, should the contract be in default.

**8-1.03 Beginning of Work** - The following includes changes and/or additions: The Contractor shall begin work after the contract has been approved by the City Attorney and within ten (10) days after being given notice to proceed or otherwise as may be stated in the Special Provisions. Once started the Contractor shall diligently prosecute the same to completion within the time limit provided in the special provisions.

The Contractor shall arrange a pre-construction conference with the Public Works Department. Notice shall be given to the Public Works Department at least 72 hours in advance of the Contractor's intent to have a pre-construction conference. No work may be performed prior to a pre-construction conference.

The following is to be added:

(See Caltrans Standard Specifications for numbers (1) through (4))

(5) Notice in writing of the Contractor's intentions to start work prior to approval, specifying the date on which the Contractor intends to start, shall be given to the Engineer at least 24 hours in advance.

(6) Attending a pre-construction conference.

**8-1.06 Time of Completion** - The following is to supersede Caltrans Specifications: A working day is defined as any day, except Saturdays, Sundays, and City of Stockton legal holidays and days on which the Contractor is specifically required by the special provisions to suspend construction operations, and except days on which the Contractor is prevented by

inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations, as determined by the Engineer, from proceeding with at least 75 percent of the normal labor and equipment force engaged on such operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations.

Should the Contractor choose to work on a Saturday, Sunday, or on a holiday recognized by the Labor Unions and/or the City, the Contractor shall reimburse the City of Stockton the actual cost of engineering, surveying, inspection, superintendence, and/or other overhead expenses which are directly chargeable to the contract. Should such work be undertaken at the request of the City, reimbursement will not be required.

**8-1.08 Termination of Control** - The following contains a change: The Contractor will be required to cooperate with the utilities and others during the rearrangement of utility and other improvements or street facilities, and any delay caused by the rearrangement will not be considered as right of way delays.



## SECTION 9

### MEASUREMENT AND PAYMENT

**9-1.00 Lump Sum Contracts** - The following is to be added: When required by the Special Provisions or requested by the Engineer, the Contractor shall submit to the Engineer within 15 days after award of contract, a detailed schedule in triplicate, to be used only as a basis for determining progress payments on a lump sum contract or any designated lump sum bid item. This schedule shall equal, in total, the lump sum bid and be in such form and sufficiently detailed as to satisfy the Engineer that it correctly represents a reasonable apportionment of the lump sum.

**9-1.045 Determination of Rights** - The following includes changes and/or additions: If the total monetary amount of all the Contractor's claims arising under or by virtue of the contract does not exceed \$25,000, such claims are subject to determination of rights under the contract by a hearing officer of the City Council of the City of Stockton.

The party seeking a determination of rights shall give notice in writing of the claim to the other party and to the City Council of the City of Stockton, setting forth therein the facts on which the claim is based. Such notice shall be given not later than 6 months after the issuance of the final estimate.

The City Council of the City of Stockton will appoint a hearing officer to hear such claim within 60 days after such notice but not before completion of the contract unless the City consents to earlier appointment. The hearing officer will hear and determine the controversy and render the hearing officer's decision in writing within 60 days after the hearing officer's appointment unless otherwise agreed to by the parties or unless for good cause the hearing officer extends such time. Each party shall bear its own costs and shall pay 1/2 of the cost of the hearing.

Rules and regulations adopted by the City Council of the City of Stockton pursuant to Section 14380 of the Government Code will govern the conduct of the hearings, including requirements as to pleadings and other documents to be filed. The rules and regulations may be obtained from the City Council of the City of Stockton.

Compliance with the notice requirements of this section does not relieve the Contractor of responsibility for complying with any notice or protest requirements specified in these Standard Specifications (e.g., Sections 4-1.03, "Changes," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," and 9-1.04, "Notice of Potential Claim") nor does compliance with the notice requirements of this section relieve the Contractor of responsibility for complying with the claims submission requirements in Section 9-1.07B, "Final Payment and Claims."

The notices required by this section shall be sent as follows: (a) to the City Council of the City of Stockton, 425 N. El Dorado Street, Stockton, California 95202; (b) to the Department; (c) to the Contractor: such notices will be sent to the business address set forth in the proposal.

If the address to which the notice to the City Council of the City of Stockton or to the Department is to be changed, the Department will notify the Contractor in writing of such change. The Contractor may change the address to which such notices are to be sent to the Contractor by giving the Department written notification of such change of address.

**9-1.06 Partial Payments** - Delete all of the third paragraph which states "The Department shall retain...file with the Department." Replace the third paragraph with the following: The City shall retain 10% of such estimated value of the work done and 10% of the value of materials so estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for the fulfillment of the contract by the contractor.

The 10% retention will remain with the City until 35 days after the date the notice of completion was recorded on.

**9-1.07B Final Payment and Claims** - Delete all of Section 9-1.07B from Caltrans Specifications and replace it with the following changes and additions:

After the work is completed, the Engineer will provide a proposed balancing change order, in writing, stating the total amount payable to the Contractor, including therein an itemization of said amount, segregated as to contract item quantities, extra work and any other basis for payment, and shall also show therein all dedications made or to be made for prior payments and amounts to be kept or retained under the provisions of the contract. All prior estimates and payments shall be subject to correction in the proposed balancing change order. The Contractor shall check the balancing change order and submit a written statement of all claims the Contractor has arising under or by virtue of the contract. No claim will be considered that was not included in which a notice or protest is required under the provision in Sections 4-1.03 "Changes," 8-1.06 "Time of Completion," 8-1.07 "Liquidated Damages," 8-1.10 "Utility and Non-Highway Facilities," and 9-1.04 "Notice of Potential Claim," unless the Contractor has complied with the note or protest requirements in said sections. On the Contractor's approval, or if the Contractor files no claim prior to signing the balancing change order, the following will take place:

1. The balancing change order, when signed by the Contractor, indicates that the Contractor agrees to the quantities contained therein as final quantities and the City of Stockton is then to pay up to 90% of the entire contract.
2. At this time, the City will file the Notice of Completion, which constitutes their acceptance of the work.

3. Thirty-five (35) days after the date the Notice of Completion is recorded, the Retention will be released and constitutes the final payment for the work.

If the Contractor files claims prior to signing the balancing change order, the City will revise the balancing change order accordingly if the claims are approved. Such balancing change order and payment shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor except as otherwise provided in Sections 9-1.03C "Records," and 9-1.09 "Clerical Errors."

The claims filed by the Contractor shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of said claims. The Engineer will consider and determine the Contractor's claims and it will be the responsibility of the Contractor to furnish within a reasonable time such further information and details as may be required by the Engineer to determine the facts or contentions involved in the Contractor's claims. Failure to submit such information and details will be sufficient cause for denying the claims.

The Director of Public Works will make the final determination of any claims, which remain in dispute after review by the Engineer administering the contract. A board or person designated by said Director will review such claims and make a written recommendation thereon. The Contractor may meet with the Review Board or their staff to make a presentation in support of such claims.

Upon final determination of the claims, the Engineer shall then make and issue the Engineer's final balancing change order in writing and within 30 days thereafter the City will pay the entire sum, if any, found due thereon. Such final balancing change order shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C "Records," and 9-1.09 "Clerical Errors."

**9-1.08 Adjustment of Overhead Costs** - This section in Caltrans specifications is to be deleted and is not applicable to projects with the City of Stockton, unless specified otherwise.

**SECTION 16**  
**CLEARING AND GRUBBING**

The following is added to Section 16-1.03 of the Caltrans Standard Specifications:

Where roots of existing trees are to be pruned, the following specification shall be followed:

All roots pruned shall be cut as smooth as possible with the least amount of surface wood exposed or at a 90 degree angle to the root end cut.

All root cuts made over one (1) inch in diameter shall be painted to seal with an approved type of tree seal paint.

## SECTION 19

### EARTHWORK

The following is to be added:

**19-1.01 General** - Lime stabilization may be acceptable as part of roadway structural section design, subject to approval by the Engineer. If approved, Lime Stabilization shall be in conformance with SECTION 24: LIME STABILIZATION.

**19-3.066 Controlled Density Fill** - CDF will be accepted in lieu of the standard backfill specifications. It shall be mandatory in all situations where the prevention of subsequent settlement after placement of backfill is required and in trenches eight (8) inches wide or less.

**19-3.066A Strength Requirements** - Non-structural controlled density fill that can be excavated by hand shall produce unconfined compressive 28-day strengths from 50 psi to a maximum of 200 psi. Controlled density fill that is to be excavated by hand shall contain aggregate no larger than 3/8" top size nor shall the 3/8" aggregate comprise more than 30% of the total aggregate content.

Structural controlled density fill shall produce unconfined compressive 28 day strengths from 200 - 1,200 psi, as determined by the project requirements. Coarse aggregate top size and coarse to fine aggregate ratios and contents shall be determined by the clearances surrounding embedded members and the workability requirements.

**19-3.066B Materials** - Cement shall meet the standards as set forth in ASTM C-150, Type II Cement.

Fly ash shall meet the standards as set forth in ASTM C-618, for Class F pozzolans. The fly ash shall not inhibit the entrapment of air.

Air entraining agent shall meet the standards as set forth in ASTM C-260.

Aggregates need not meet the standards as set forth in ASTM C-33. Any aggregate, producing performance characteristics of the CDF, for any project will be accepted for consideration as follows. The amount of material passing a #200 sieve shall not exceed 12% and no plastic fines shall be present.

**19-3.066C Mix Proportions** - CDF shall be a mixture of cement, Class F pozzolan, sometimes coarse aggregate, air entraining agent and water. CDF shall be batched by a ready mixed concrete plant and delivered to the job site by means of transit mixing trucks.

The actual mix proportions shall be determined by the producer of the controlled density fill to meet job site conditions, minimum and maximum strengths and unit weight. Entrained air content shall be established for each job with the materials and aggregates to be used to meet the placing and unit weight requirements. Entrained air content may be as high as 20% for fluidity requirements.

**19-3.066D Placement** - CDF shall be discharged from the mixer by any reasonable means into the area to be filled. CDF shall be brought uniformly to the elevation as shown on the Standard Plans. Trench sections to be filled with CDF shall be contained at either end by bulkheads of earth fill.

All CDF is to be protected (plated) from traffic loading for at least 72 hours. Exception 4-inch wide trenches need not be plated but may not be paved for 72 hours. All CDF is to be protected from freezing for at least 72 hours after placement and may not be placed at temperatures less than 40F. Nonstructural CDF is to be used for installations that may require future maintenance.

**19-3.066E Mix Design** - Mix design shall be reviewed and approved by the Engineer.

Structural (200-1200 psi) (current spec 150-1200 psi)

With Aggregate

100 lbs Cement  
450 lbs Fly Ash  
342 lbs (41 gal) Water  
1800 lbs Sand  
815 lbs Pea Gravel

Without Aggregate (4-inch wide trenches)

100 lbs Cement  
450 lbs Fly Ash  
342 lbs (41 gal) Water  
2625 lbs Sand

Nonstructural (50-200 psi) (current spec 50-150 psi)

With Aggregate

50 lbs Cement  
400 lbs Fly Ash  
342 lbs (41 gal) Water  
1900 lbs Sand  
815 lbs Pea Gravel

Without Aggregate (4-inch wide trenches)

50 lbs Cement

400 lbs Fly Ash

342 lbs (41 gal) Water

2725 lbs Sand

Note: Sand and pea gravel weights are dry weights. For all mixes, slump is greater than 8-inches. These are known to be loose, self-consolidating product / process. If for some reason a lower slump (stiffer mixture) is desired, the mix design and work process must be submitted for approval.

The engineer will select the appropriate mix design for the application at the site. The typical mix designs may be modified to suit local conditions and materials.

The following is substituted in place of Sections 19-5.03 and 19-5.04 of the Caltrans Standard Specifications:

**19-5.03 Relative Compaction (95 Percent)** - A Relative Compaction of not less than 95 percent shall be obtained for a minimum depth of 6 inches (0.5 foot) below the grading plane for the full width of any street and trench section.

**19-5.04 Relative Compaction (90 Percent)** - A Relative Compaction of not less than 90 percent shall be obtained in all material except as specified herein to be 95 percent or as may be otherwise specified in the Special Provisions, contract plans, or in the City of Stockton Standard Specifications and Plans.

## SECTION 24

### LIME STABILIZATION

The following are to be added to the appropriate sections of Section 24 of the Cal Trans Standard Specifications:

**24-1.03 General** – Add the following:

The use of lime stabilization shall be subject to submittal of a mix design prepared by a Contractor-provided licensed geotechnical engineer and approval of same by the Engineer. The approved mix design shall be based on the actual soils to be used and shall specify the type and amount of lime and the type and amount of curing seal to be applied.

The maximum allowable R-value attributable to lime-stabilized soil for purposes of roadway structural design shall be 50.

The maximum allowable design compressive strength attributable to lime-stabilized soil shall be 200 psi.

The gravel equivalency factor for lime-stabilized soil shall be 1.1.

The in-place moisture content of the soil immediately below the lime-stabilized layer shall be maintained above the optimum moisture content, as determined by California Test 373, prior to application of the lime.

A minimum of 4" of aggregate base shall be installed between lime-stabilized soil and asphalt concrete paving unless otherwise approved by the Engineer.

The preparation, spreading, mixing, compaction, rolling, grading and curing of lime-stabilized soil shall be completed under the observation of a Contractor-provided licensed geotechnical engineer who shall submit a Certificate of Compliance, in conformance with SECTION 6-1.07 CERTIFICATE OF COMPLIANCE, for the lime-stabilized soil prior to acceptance by the City.

**24-1.05 Spreading** - Add the following:

The area to be stabilized by lime treatment shall extend a minimum of two feet beyond the edge of pavement.



**24-1.06 Mixing** - Add the following:

The minimum depth of lime-stabilized soil shall be 12 inches. An additional three inches of lime-stabilized soil shall be added to all roadway structural design sections as a safety factor.

**24-1.07 Compaction** – Replace with the following:

Lime-stabilized soil shall be compacted to a relative compaction of not less than 95%.

## SECTION 39

### ASPHALT CONCRETE

The following is added to Section 39 of the Cal Trans Standard Specifications:

**39-9.01 Full Depth Asphalt Concrete** -Where a Full Depth section is specified, it shall be placed on a previously prepared subgrade as specified in 19-5.03 (Relative Compaction) to a tolerance of 0.05 foot above or below the subgrade established by the Engineer.

The final grade of the lift below the surfacing course shall not vary more than 0.05 foot above or below the planned grade for that course. The finished surface grade tolerance shall conform to Section 39-6.03 Compacting.

The thickness of the surface course shall be as specified in the Special Provisions, all other asphalt concrete below this point is considered base course.

Tack coat (paint binder) shall be SS-1h or CSS-1h type emulsion conforming to Caltrans Specifications Section 94 of the Standard Specifications. Tack coating as covered in Section 39-4.02, Paragraph 6 will be required before placement of the surface course. Tacking between base courses required at the rate of 0.01 to 0.03 gallons per square yard, if clean, heavier if dirty. Application in excess of .03 gallon per square yard will be at Contractor's expense.

Where Full Depth sections are placed in existing streets with established gutter sections, a continuous wedge shape section of asphalt paving shall be placed against the gutter edge, held below the gutter lip by the amount of the thickness of the surface course and feathered to subgrade in a width of not less than three feet before placement of the level courses, unless otherwise permitted by the Engineer.

Upon completion of all portions of the construction, including utility grade adjustments to finish grade, the surface course shall be placed, gutter lip to gutter lip, for the entire length of the project to provide a smooth uniform riding surface with a minimum of transverse joints for the entire project.

Paving shall feather smoothly into existing pavement. Side street construction shall have a section varying from a uniform cross-slope at ends of curb return to variable or parabolic section as required to match the existing street section. Transition shall be smooth and uniform between the points described above.

**39-9.02 Material** - Asphalt concrete shall conform to the provisions of Section 39 of the Caltrans Standard Specification. Unless otherwise specified, asphalt concrete shall be Type B.

For low or medium volume local streets, asphalt concrete for surface course paving shall be Type B, ½" maximum, coarse aggregate. Asphalt concrete shall have a viscosity grade of AR-4000 as specified by Caltrans Standard Specification Section 92. Asphalt concrete for base course paving for low or medium volume residential streets may be Type B, ½" maximum, coarse aggregate as specified above for surface course paving or as specified below for all other streets.

Unless otherwise specified or approved by the Engineer, asphalt concrete for base and surface course paving for all other streets shall be Type A, ¾" maximum, medium aggregate. Asphalt concrete shall have a viscosity grade of AR-8000 as specified by Caltrans Standard Specification Section 92.

For non-City projects, the precise asphalt binder content shall be in accordance with a mix design pre-approved by the City Engineer within six months of placement of the asphalt concrete. For City projects, the asphalt oil content shall be as specified in the project specification special provisions. Mix designs shall specify a target value for asphalt binder to be mixed with the aggregate in accordance with California Test No. 367 using proposed aggregate grading in conformance with Section 39-3.03.

Mix designs shall provide for a minimum stability value of 37 at the target asphalt binder value when measured in accordance with California Test No. 366. The minimum cohesiometer value of the fresh mix shall be 50, when measured in accordance with California Test No. 306. Mix designs shall provide not more than 5 percent and not less than 3 percent calculated air voids at the target value when measured in accordance with California Test No. 308A. The maximum swell for mix designs shall be 0.003 inches in 24 hours when measured in accordance with California Test No. 305. The minimum value of stability, after testing for Moisture Vapor Susceptibility (MVS) in accordance with California Test No. 307, shall be 30.

Cleaning and tacking for subsequent base courses will be required as stated in Section 39-9.01.

**39-9.03 Placement and Compaction** - The maximum compacted thickness of any one base course of asphalt concrete shall be six (6) inches. The maximum compacted thickness of the surface course (1½" aggregate) of asphalt concrete shall be two and one-half (2.5) inches, and the minimum thickness shall be one (1) inch after compaction. Minimum compacted base course shall be four (4) inches.

A mechanical paving machine shall only be required for spreading the surface course and any leveling courses required.

In lieu of the conflicting provisions of Caltrans Standards Specifications Sections 39-5 and 39-6, asphalt concrete base courses may be spread and compacted by such mechanical means as will provide a surfacing of uniform smoothness and texture in such a manner as to prevent segregation of materials. Approval will be based on demonstrated performance of such equipment.

A prime coat of SC250 or MC250 shall be applied to all aggregate bases to be surfaced. The prime coat shall be applied at an rate of 0.2 gallon per square yard over the entire roadway area to be surfaced.

Rolling of Full Depth base courses shall be from the center of the paving pass to the edge.

The Contractor shall furnish a minimum of one (1) 10-ton steel wheel tandem roller (as specified in Caltrans Section 39-5.02) and one (1) 15-ton pneumatic tired roller.

Alternate compacting equipment or substitution of a vibratory roller for a pneumatic-tired roller will not be permitted, approved or reviewed.

Tire pressure of the pneumatic tire roller at the time of breakdown rolling shall be 90 psi unless a lesser tire pressure is permitted by the Engineer. It is suggested that the pneumatic tire roller have twenty (20) inch rims to help prevent bogging down. The pneumatic tire roller shall be used to break down the spread of asphalt concrete bases and shall operate immediately behind the paver or spreader.

All mixtures shall be spread at a temperature of not less than 250 degrees F. Base material compaction shall be completed before the mix reaches 200 degrees F.

Roller tires shall be preheated and operated hot and dry or have proper spray equipment for use of Roller-Ease to prevent pick up of hot mix.

All courses shall be compacted with a pneumatic roller. In truck routes, each course shall be pneumatic and steel rolled. Rolling shall continue until ruts are eliminated and the proper degree of compaction is achieved. Final rolling of the surface course shall be accomplished with a steel wheel tandem roller.

The surface of the completed base course at any point shall not vary more than 0.02 feet above or below the grade established for surface course placement.

The Contractor will be responsible for construction grades. The City will set a base line and furnish cuts for gutter flowlines and pavement centerline or edge of pavement grade. Base course surface prior to placement of surface course which does not meet the above

requirements shall be planed or filled at the contractor's expense in a manner acceptable to the Engineer that will not damage the existing compacted base and will obtain the required material compaction at required temperature.

## **SECTION 63**

### **CAST-IN-PLACE CONCRETE PIPE**

#### **63-1.05 Construction** - Add the following:

The use of cast-in-place concrete pipe shall not be allowed in areas with ground water less than five feet below the pipe soffit.

## SECTION 71

### SANITARY SEWERS AND STORM SEWERS

**NOTE:**       **THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN THE CALTRANS STANDARD SPECIFICATIONS.**

Unless specifically differentiated herein, references to Sanitary Sewers also references Storm Sewers (aka. Storm Drains).

**71-1.01 Description** - This work shall consist of laying sewer pipe and constructing sewer structures as shown on the Project Plans, in accordance with these Standard Specifications and Plans, the Special Provisions and as directed by the Engineer.

The type of sewer pipe and sewer structures will be designated in the contract items.

**71-1.02 Materials** - Pipe, fittings, miscellaneous materials and the most common joint materials are described in this Section 71-1.02.

Portland cement used in the production of concrete products set forth in this Section 71-1.02 shall be Type II Modified cement conforming to the provisions in Section 90, "Portland Cement Concrete."

**71-1.02A Reinforced Concrete Pipe (RCP)** - Reinforced concrete pipe shall conform to A.S.T.M. Designation C-76 for the size and classes indicated on the Project Plans. For sanitary sewer applications, RCP shall be used only on sewer lines 36-inch and larger.

**71-1.02A(1) Plastic Lining** – All RCP used in sanitary sewer applications shall be lined with plastic lining. The full three hundred and sixty degrees (360°) of the interior circumference of all reinforced concrete pipe to be used in Sanitary Sewer Systems shall be sealed and protected with a polyvinyl chloride resin lining. Copolymer resins will not be permitted.

The plastic liner shall be impermeable to sewage gases and liquids and shall be nonconductive to bacterial or fungus growth. The lining shall be impact resistant, flexible, and shall have an elongation sufficient to bridge up to 1/8" settling cracks which may take place in the pipe or in the joint after installation without damage to the lining.

The lining shall be of a type that is permanently and physically embedded into the concrete pipe wall by the T-lock mechanism and shall not rely on an adhesive bond between the lining and pipe wall.

The lining at all pipe joints, and at all joints between individual sheets or sections of lines shall be continuously heat welded by the use of welding strips of the same kind and equivalent thickness of the material as the lines.

The contract shall submit for the Engineer's consideration written information as to the type, size, workmanship and other specifications for the plastic liner the Engineer proposes to use on any installation. Approval of this submission by the Engineer shall be obtained prior to any material being delivered to the job site.

**71-1.02B Clay Pipe** - Vitrified clay pipe shall conform to the specifications for extra strength pipe of A.S.T.M. Designation C-700 and C-301.

**71-1.02C Ductile Iron Pipe** - Ductile iron pipe shall comply with ANSI A21.51 (AWWA C151).

**71-1.02D Acrylonitrile-Butadiene-Styrene (ABS) Pipe (Sewer Pipe)** – Pipe sizes four (4) inch and six (6) inch diameter shall conform to ASTM D2751-80 with minimum wall thickness determined by SDR 35.

Pipe sizes eight (8) through fifteen (15) inch diameter shall conform to ASTM D2680-80 with Type OR or Type SC joints.

**71-1.02E Polyvinyl Chloride (PVC) Pipe** - All solid wall pipe and fitting in 4" through 15" diameters shall be type PSM SDR-35 PVC, ASTM 3034; 18" through 24" shall be type PS 46 PVC, ASTM F679. Pipe and fittings shall be marked as per ASTM requirements.

Profile wall polyvinyl chloride pipe (PWPVC) may be used for pipe sizes 21-inch through 48-inch.

PWPVC shall be manufactured from a PVC compound having a minimum cell classification of 12364A as defined in ASTM D 1784. Gasket shall meet the requirements of ASTM F 477.

PWPVC shall be closed profile, ASTM F 1803-97 for 21" – 48" diameters with a bell and spigot gasketed joint. The joint shall meet the requirements of ASTM D 3212. The pipe shall have a minimum pipe stiffness when tested in accordance with ASTM D 2412.

Tests for compliance with this specification shall be made according to the applicable ASTM Specifications at the time of manufacturing. The manufacturer shall provide a certificate of compliance with this specification. In addition, the CITY may, at his own expense, station a representative or third party inspector at the site of manufacture to continuously monitor the manufacturing process, and to independently test the pipe to verify conformance with the project specification. Pipe tests and frequency shall be determined by the City.



PWPVC Nominal Dimensions:

Nominal Diameter (in.)	Outside Diameter (in.)	Inside Diameter (in.)
21	22.110	20.75
24	25.040	23.50
27	28.232	26.50
30	31.430	29.50
36	37.800	35.50
42	44.200	41.50
48	50.57	47.50

Unless otherwise approved by the CITY, all pipe shall be unloaded in the original packaging using a forklift with fork arms long enough to reach beyond the last pipe bundle. Do not roll the pipe off of the truck. Pipe shall not be handled or secured using chains or cables; a nylon or textile strap is recommended.

In addition to the requirements reflected in Section 71-1.05 Pipe Laying, the pipe bedding shall be carefully placed and compacted in the haunching. The haunching area extends from the bottom of the pipe to the springline of the pipe. Bedding shall be placed in 6" loose lifts on alternate sides of the pipe. A Tamping bar or shovel shall be used to facilitate bedding consolidation on the lower quadrant of the pipe. The bedding shall be mechanically compacted using hand operated equipment in accordance with the manufacturer's recommendations. The bedding material and its proper placement are the most important factors affecting the performance (side support) of the pipe.

Initial Backfill shall be placed to protect the pipe from dropping of large rocks, large mechanical compaction equipment or other impact loads that may occur during final backfill.

Pipe Deflection Testing: Pipe testing shall be performed in accordance with Section 71-1.11B.

**71-1.02F Miscellaneous Iron and Steel** - Miscellaneous iron and steel items shall conform to the provisions in Section 75, "Miscellaneous Metal."

**71-1.02G Reinforcement** - Reinforcement shall conform to the provisions in Section 52, "Reinforcement."

**71-1.02H Concrete** - Concrete shall conform to the provisions in Section 51, "Concrete Structures," and Section 90, "Portland Cement Concrete."

**71-1.02I High Density Polyethylene Pipe (HDPE)** - HDPE pipe and fittings shall be made of high density, high molecular weight, Type III, Class C, Category 5, Grade P34 polyethylene meeting the requirements of ASTM D1248 and ASTM F894 unless specified otherwise herein. Wall configurations and thicknesses shall meet the deflection requirements of this section. Crushing and buckling strengths shall exceed that required from the loads anticipated. Pipe selection and deflection design shall also be based upon a pipe stiffness not less than 20 psi and a modulus of soil reaction no greater than 1400. Pipe stiffness shall be tested prior to installation in accordance with ASTM D2412 with a 5% deflection at a rate of 1/2 inches per minute.

**71-1.03 Excavation and Backfill** - Excavation and backfill shall conform to the provisions shown on City of Stockton Standard Plans No. 50 and 51.

The pipe shall be laid in a trench excavated to the lines and grades designated by the Engineer. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel.

Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to line and grade shall be made by scraping away or filling in with sand, gravel, or granular material under the body of the pipe, and not by wedging or blocking.

Trenches shall not be left open farther than 100 feet in advance of pipe laying operations or 100 feet to the rear thereof.

The excavation shall be supported so that it will be safe and that the ground alongside the excavation will not slide or settle and all existing improvements, either on public or private property, will be fully protected from damage.

All supports shall be removed after construction is completed and shall be withdrawn in a manner that will prevent the caving of the sides of the excavation. All openings caused by the removal of supports shall be filled with suitable material properly compacted.

**71-1.04 Bedding** - Bedding shall be defined as that material supporting, surrounding and extending to one foot above the top of the pipe. Where it becomes necessary to remove boulders or other interfering objects at subgrade for bedding, any void below such subgrade shall be filled with the bedding material designated on the Project Plans. Where concrete is specified to cover the pipe, the top of the concrete shall be considered as the top of the bedding.

If soft, spongy, unstable, or other similar material is encountered upon which the bedding material or pipe is to be placed, this unsuitable material shall be removed to the depth specified by the Engineer and replaced with bedding material suitably densified.

Bedding material shall first be placed so that the pipe is supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of 0.5 times the outside diameter of the barrel. Densification of bedding for pipe shall be accomplished after the sheeting or shoring has been removed from the bedding zone. Alternate methods of pipe laying which are recommended by the pipe manufacturer may be used if reviewed by the Engineer. The bedding zone for PVC, ABS, and HDPE pipe shall be mechanically compacted before the remainder of trench is compacted.

Bedding material shall be sand, gravel, crushed aggregate, native free-draining granular material having a sand equivalent of not less than 20 as specified on Standard Plans Nos. 50 and 51 for trench backfilling.

Pea gravel is not acceptable. No aggregate shall exceed 1".

In cases where native material is suitable for use as bedding, the trench may be excavated to point above the invert grade and the trench bottom hand-shaped so that the bottom segment of the pipe is firmly supported on undisturbed material.

Bedding material for HDPE pipe shall be 3/4" crushed rock. The portion of the material that is larger than will pass a 3/8" sieve shall contain at least 50% of particles having three or more fractured faces. Not over 5% shall be pieces that show no such faces resulting from crushing. The gradation of the crushed rock shall be as follows:

<u>Sieve Size</u>	<u>3/4"</u>
1 1/2"	-
1 "	100
3/4 "	90-100
1/2 "	30-60
3/8"	0-20
No. 4	0-5
No. 8	-

This material shall be compacted to the density and level shown on Drawing 51-A.

**71-1.05 Pipe Laying** - Pipe shall be protected during handling against impact shocks and free fall. Pipe will be carefully inspected in the field before and after laying. If any cause for rejection is discovered in a pipe after it has been laid, it shall be subject to rejection. Any corrective work shall be reviewed by the Engineer and shall be at no cost to the City.

When connections are to be made to any existing pipe, conduit, or other appurtenances, the actual elevation or position of which cannot be determined without excavation, the Contractor shall excavate for, and expose, the existing pipe improvement before laying any pipe or conduit. The Engineer shall be given the opportunity to inspect the existing pipe or conduit before connection is made. When the new facilities interfere with the existing flow

of sewage, the Contractor shall provide satisfactory bypass facilities at the Contractor's expense.

The pipe shall be laid without break upgrade from structure to structure, with bell end upgrade, unless otherwise permitted by the Engineer.

All joints shall be cleaned and then sealed with the type of materials specified or required by the City. In the absence of such requirements the pipe shall be jointed with materials recommended by the pipe manufacturer for the purpose intended, and reviewed by the Engineer, in order to obtain a watertight joint against leakage and infiltration under all conditions of expansion, contraction, and settlement.

Whenever the work ceases for any reason, the end of the pipe shall be securely closed with a tight fitting plug or cover.

Whenever existing pipes are to be cut or abandoned, the open ends of said pipes shall be securely closed by a tight fitting plug or wall of concrete not less than 0.5 foot thick, or by a tight brick wall 0.67 foot thick with cement mortar joints.

Where ground water occurs, the bottom of the trench shall be kept entirely free of water during the pipe laying, filling the joints, and as long thereafter as directed by the Engineer.

All joints shall be carefully cleaned on the inside.

Stoppers for pipes and branches left unconnected shall be made of the same material as the pipe or of resilient joint material conforming to Section 71-1.02J, "Resilient Joint Material." After placing the stopper, it shall be covered with a layer of sealant. The sealant shall be sufficiently fluid to insure free flow around the stopper.

Concrete pipe with elliptical reinforcement shall be laid with the minor axis of the reinforcement cage in a vertical position.

Pipe shall be laid true to line and grade. Any pipe, which is not in true alignment or shows any undue settlement after laying shall be taken up and re-laid at the Contractor's expense.

Pipe sections shall be laid and joined in such a manner that the offset of the inside of the pipe at any joint will be held to a minimum at the invert. The maximum offset at the invert of pipe shall be 1 percent of the inside diameter of the pipe or 3/8 inch (9.5 mm), whichever is smaller.

In joining socket and spigot pipe, the spigot of each pipe shall be so seated in the socket of the adjacent pipe as to give a minimum of 3/8 inch (9.5 mm) annular space all around the pipe in the socket. Unavoidable offsets shall be distributed around the circumference of the pipe in such a manner that the minimum offset occurs at the invert.

Pipe shall be laid true to line and grade. Any pipe which deviates from the engineering alignment by  $\frac{1}{2}$ " or grade by  $\frac{1}{4}$ " or results in a reverse slope or shows any undue settlement after laying shall be taken up and re-laid.

After the joints have been made, the pipe shall not be disturbed in any manner.

During installation, linear expansion and contraction shall be kept below the manufacturer's recommendations. Strutting shall be mandatory for size 36" and larger. A strutting detail shall be reviewed by the City Engineer prior to installation. Pre-deflecting the pipe shall only be permitted subsequent to approval from the City Engineer.

### **71-1.06 Pipe Joints**

**71-1.06A Vitrified Clay Pipe** - Either polyvinyl chloride or polyurethane compression joints may be used. Materials shall conform to A.S.T.M. Designation C-425.

Joints shall contain two sealing components, one bonded to the outside of the spigot and the other bonded to the inside of the socket. Sealing components shall be a plasticized polyvinyl chloride compound or polyurethane elastomer bonded to pipes and fittings at the pipe factory, and shall be cured to a uniform hardness and compressibility. The sealing components shall be shaped, sized, bonded, and cured in such a manner as to form a tight, dense, and homogenous compression coupling when the joint is assembled. Any imperfection in the sealing components will be cause for rejection.

Upon installation, the meeting surfaces shall be wiped clean of dirt and foreign matter, then an approved lubricant shall be applied to the joint surfaces. The spigot shall be positioned inside the socket and the joint shoved home. For large diameter pipe, a lever attachment or bar cushioned with a wooden block shall be used to shove the joint into place.

In no case shall a bar be used on an unprotected joint surface. Mating surfaces shall be in tight contact with each other upon completion of the joint installation.

Polyvinyl chloride joints may be used on curves, provided that the radius of curvature is not less than shown in the following table, unless beveled pipe or shorter lengths are provided:

<b>Pipe Size Inches</b>	<b>Maximum Pipe Length Feet</b>	<b>Minimum Radius of Curvature Feet</b>	<b>Maximum Deflection</b>
6	5	100	2° 00'
8	5	100	2° 00'
8	6	115	2° 00'
10	5	185	1° 33'
10	6	220	1° 33'
12	5	215	1° 20'
12	6	260	1° 20'
15	5	275	1° 03'
15	6	330	1° 03'

Polyurethane joints may be permitted for use on curves, provided that the radius of curvature is not less than shown in the following table, unless beveled pipe or shorter lengths are provided.

<b>Pipe Size Inches</b>	<b>Maximum Pipe Length Feet</b>	<b>Minimum Radius of Curvature Feet</b>	<b>Maximum Deflection</b>
6	5	100	2° 00'
8	5	100	2° 00'
8	6	115	2° 00'
10	5	170	1° 41'
10	6	205	1° 41'
12	5	150	1° 54'
12	6	180	1° 54'
15	5	190	1° 32'
15	6	225	1° 32'
18	5	225	1° 16'
18	6	275	1° 16'
21	5	265	1° 06'
21	6	315	1° 06'
24	5	240	1° 12'
24	6	290	1° 12'
27	5	270	1° 04'
27	6	325	1° 04'
30	5	300	0° 58'
30	6	360	0° 58'
33	5	275	1° 03'
33	6	330	1° 03'
36	5	295	0° 59'
36	6	355	0° 59'
39	5	325	0° 54'
39	6	385	0° 54'
42	5	345	0° 50'
42	6	415	0° 50'

**71-1.06B Reinforced Concrete Pipe.** All reinforced concrete sanitary sewer pipe shall be joined with rubber gasket joints.

Rubber gasket joints shall conform to the requirements of A.S.T.M. Designation: C443 and shall be flexible and able to withstand expansion, contraction and settlement.

All rubber gaskets shall be stored in as cool a place as practicable, preferably at 70° or less, and in no case shall the rubber gaskets be exposed to the direct rays of the sun for more than 72 hours.

Rubber gaskets, of the type requiring lubrication, shall be lubricated with the lubricant recommended and supplied by the manufacturer of the pipe.

The ends of the pipe shall be so formed that when the pipes are laid together and joined, they shall make a continuous and uniform line of pipe with a smooth and regular surface.

Joints shall be water-tight and flexible. Each joint shall contain a solid gasket of rubber or other material approved by the Engineer, which shall be the sole element responsible for water-tightness of the joint. This gasket shall be of circular cross section unless otherwise approved by the Engineer. The length and cross sectional diameter of the gasket, the annular space provided for the gasket, and all other joint details shall be such as to produce a water-tight joint. The slope of the longitudinal gasket contact surfaces of the joint with respect to the longitudinal axis of the pipe shall not exceed 2°.

Under ordinary laying conditions, the work shall be scheduled so that the socket end of the pipe faces in the direction of laying. Prior to placing the spigot into the socket of the pipe previously laid, the spigot groove, the gasket and the inside of the socket shall be thoroughly cleaned. Then the spigot groove, the gasket and the first 2 inches (50.8 mm) of the inside surface of the socket shall be lubricated with a soft vegetable soap compound.

The gasket shall be uniformly stretched when placing it on the spigot so that the gasket is distributed evenly around the circumference. The gasket shall be lubricated as per manufacturer's recommendations.

For pipe in which the inside joints are to be pointed, suitable spacers shall be placed against the inside shoulder of the socket to provide the proper space between abutting ends of the pipe.

After the joint is assembled, a thin metal feeler gage shall be inserted between the socket and the spigot and the positions of the gasket checked around the complete circumference of the pipe. If the gasket is not in the proper positions, the pipe shall be withdrawn, the gasket checked to see that it is not cut or damaged, the pipe relaid, and the gasket position again checked.



**71-1.06C Ductile Iron Pipe.** Ductile iron pipe joints shall comply with the following requirements:

<b><u>Type of Joint</u></b>	<b><u>Specification</u></b>
Rubber Gasket Push-On Joint	ANSI A21.11 (AWWA C111)
Mechanical Joint	ANSI A21.11 (AWWA C111)
Flanged Joint	ANSI B16.1, B.16.2, and A21.10 (AWWA C110)
Flanged Joint (Threaded Flanges)	ANSI B2.1

All rubber gasket, push-on, mechanical and flanged joint fittings for ductile iron pipe shall be manufactured in accordance with ANSI A21.10 (AWWA C110).

**Slip-On Joint** - The gasket and gasket seal inside the socket shall be wiped clean before the gasket is inserted. A thin film of soft vegetable soap compound shall be applied to the gasket and the outside of the spigot end of the pipe. The spigot shall then be positioned inside the socket and shoved home. Lubricant other than that furnished with the pipe shall not be used.

**Mechanical Joints** - The outside of the spigot and the inside of the socket shall be thoroughly cleaned of foreign matter. The gland and gasket shall then be slipped onto the spigot end of the pipe. The gasket shall be pressed evenly into the socket only after the spigot is seated in the socket. The gland shall be brought up evenly by tightening alternately the nuts spaced 180° apart. Bolts and nuts shall be coated with mastic following tightening.

**Flanged Joints** - Flanged Joints shall be firmly and fully bolted with machine bolts of proper size. Full circle reinforced neoprene rubber gaskets 1/16" thick shall be used at all flanged joints. Bolts and nuts shall be coated with mastic following tightening.

**71-1.06D ABS Sewer Pipe**

1. Pipe lengths and fittings shall be joined by utilizing elastomeric gaskets as referenced in A.S.T.M. D-2680 and D-2751 and meeting the requirements of A.S.T.M. D-3212 "Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals," or solvent weld joints.

Solvent weld joint or usage shall conform to A.S.T.M. F-402 "Safe Handling of Solvent Cements and Primers Used for Joining Thermoplastic Pipe and Fittings," and the following requirements:

- a. All ABS pipe joints, fittings and surfaces to be joined by solvent welding shall be connected with adhesive cement conforming to A.S.T.M. D2680 for ABS composite sewer pipe or to A.S.T.M. D2751 for 4-inch and 6-inch ABS solid wall pipe.
- b. Prior to joining ABS pipe joints, fittings and surfaces, dirt, mud or any other foreign material shall be thoroughly removed and cleaned from the joints, fittings and surfaces to be joined.
- c. A coat of adhesive cement shall be liberally and thoroughly applied to the joints, fittings and surfaces to be joined. After application of the adhesive cement, the pipe joints, fittings, and surfaces to be joined shall be immediately fitted and joined without interruption.

For bell and spigot connections, the spigot end of each pipe shall be fitted to the full depth of the bell socket.

- d. When the temperature is below 40° F., a primer shall be applied to the pipe surface to be cemented and joined.

2. Reducing Wyes:

- a. Reducing wyes for service laterals shall be either saddle type wyes or in-line bell and spigot type wye fittings. All reducing wyes shall be premoulded and factory fabricated.
- b. Saddle Fittings:
  1. In addition to the solvent welding of the saddle to the main pipeline, the saddle type wye shall be attached to the main pipeline with a stainless steel clamp.
  2. Tapping hole for saddle fittings shall be cut with a cutting instrument. The hole shall be of the same size and shape of the lateral pipe surface.

3. Exposed Pipe Cross-Sections:

Exposed cross-sections of the ABS composite sewer pipe shall be coated with adhesive cement prior to connection of pipe joints, fittings and surfaces.

4. Maintenance Hole Connections:

Maintenance hole connections shall be by rubber ring water stop installed on pipe and cast in center of maintenance hole wall or four (4) inches from outside face of maintenance hole base. Pipe section on water stop at maintenance hole shall have bell flush with outside of maintenance hole or no more than ten (10) inches outside maintenance hole.

**71-1.06E PVC Pipe**

1. All joints shall be integral wall bell and spigot configuration, factory formed in accordance with ASTM D3212. All rubber rings shall conform to A.S.T.M. F-477.
2. Reducing wyes for service laterals shall be in line bell and spigot type, factory moulded.
3. Saddle fittings for lateral connection will be permitted; solvent welded.
4. Maintenance hole connections shall be by rubber ring water stop installed on pipe and cast in center of maintenance hole wall or four (4) inches from outside face of maintenance hole base. Pipe section on water stop at maintenance hole shall have bell flush with outside of maintenance hole or no more than ten (10) inches outside maintenance hole.

**71-1.06F HDPE Pipe**

Joints for HDPE shall be bell and spigot or butt-fusion type. Bell and spigot types shall have an elastomeric gasket which will be compressed radially to form a watertight seal. The joint shall be designed to avoid displacement of the gasket when installed with the manufacturer's recommendations.

**71-1.07 Deformation Testing** - Following the placement and compaction of backfill and prior to placement of permanent pavement, the Contractors shall perform a deflection test on the pipe. If the pipe should fail the deflection test, the Contractor shall uncover the pipe and make adjustments in the bedding and/or backfill conditions that will be necessary to achieve a passing test. The trench shall be backfilled and street subgrade shall be recompact and the pipe retested. Any corrective measures found necessary to meet the deflection requirements, including recompaction and regrading of the street subgrade, shall be included in the unit price bid for the sanitary sewer pipe.

See Section 71-1.11 for method and extent required.

- a. Maximum deflection for ABS composite sewer pipe installed is 4%.

**71-1.08 Existing Maintenance Holes** - Existing maintenance holes shall be adjusted to grade, remodeled or abandoned as shown on the Project Plans and in accordance with the provisions in Section 15, "Existing Highway Facilities."

When designated on the Project Plans, or directed by the Engineer, existing maintenance hole frames and covers shall be reset on new structures. Upon completion of the adjustment of existing maintenance holes to grade, the maintenance hole cover shall conform to the planned surface as specified for the finished asphalt concrete surface, Section 39.

All existing maintenance holes, lampholes and terminal cleanout frames and covers that are removed become the property of the City of Stockton.

**71-1.09 Sewer Structures** - New maintenance holes, lampholes, terminal cleanout structures, and pipe chimneys for sewers shall be constructed in accordance with the details shown on the Standard Plans, as specified in this Section 71-1.09 and as directed by the Engineer.

Precast maintenance hole, pipe maintenance holes shall conform to the Standard Plans, the Project Plans, and the applicable sections in Section 70.

Maintenance hole frames shall be secured to the maintenance hole cover and riser barrels with full mortar bed or full circle concrete collar that will effectively secure the frame to the maintenance hole structure and provide a uniform bearing for the frame.

Concrete for sewer structures shall be Class A as described in Section 90-1.01. Concrete for sewer maintenance bases shall be Class B.

When the maintenance hole is located in the pavement area, it shall not be constructed to final grade until pavement has been completed.

Where new work is jointed to the surface of unfinished work, the latter shall be thoroughly cleaned.

All joints on the inside of structures and sewers shall be neatly struck and pointed where plastering is not specified on the plans.

The inside bottoms of existing maintenance holes, where new connections are made, and of new maintenance holes shall be shaped to provide channels conforming to the size and shape of the lower portion of the inlets and outlets of the maintenance holes. The channels shall vary uniformly in size and shape from inlet to outlet.

No pipe shall project more than 0.17 foot into a maintenance hole and in no case shall the bell of a pipe be built into the wall of a maintenance hole or structure.

All concrete shall be cured for a period of not less than 10 days after being placed and shall be protected from damage.

#### **71-1.09A Maintenance Hole Interior Linings and Coatings**

**General** - The interior of all new maintenance holes along sanitary sewer lines 24" and larger, which will be maintained by the City, shall be either lined or coated. In addition, the interior of any existing City Maintenance hole(s), downstream from a new Sanitary Sewer system, determined by the City Engineer, to be adversely affected by the additional sewage, shall be either lined or coated.

**Material** - If lined, the material shall be made of polyvinyl chloride and conform to the requirements as set forth in Section 71-1.02A(1).

If coated, the coating shall be resistant to attack from the following: bleaches; sulfuric, acetic, hydrochloric, phosphoric, nitric, chromic, oleic, and stearic acids; sodium and calcium hydroxides; ammonium, sodium, calcium, magnesium, and ferric chlorides; ferric sulfate, hydrogen sulfides, petroleum oils and greases, vegetable and animal oils, fats, greases, soaps and detergents. The coating shall be impermeable to sewage gases and liquids and shall be non-conductive to bacterial or fungus growth.

Acceptable coatings are as follows:

<b><u>PRODUCT NAME</u></b>	<b><u>PRODUCT TYPE</u></b>	<b><u>MANUFACTURER</u></b>
120 Vinester	Vinylester Mortar	Tnemic Company, Inc.
Chesterton 798	Epoxy Mortar	A.W. Chesterton Company
Concresive 1305	Epoxy	Adhesive Engineering Company
Hydro-pox	Epoxy	Con-Tech
I.E.T. System 3	Polyester Mortar	Integrated Environmental Technologies
I.P.I. Crystal Quartz	Epoxy Mortar	Integrated Polymer Industries, Inc.
Lining No. 210	Epoxy	Sauereisen Cements
Maga Quartz	Epoxy Mortar	Belzona Molecular, Inc.
Mainstay DS-4	Epoxy Mortar	Mainstay Corporation
Quantum	Polyester Mortar	Polymorphic Polymer's Corporation
Semstone 140S	Epoxy Mortar	Sentry Polymers

The City Engineer, at the City Engineer's discretion may , at any time, determine that a product is not suitable for specific applications. Additionally, this list may be reviewed annually by the Materials Review Committee and products may be determined not suitable for specific applications.

**Surface Preparation** - For coatings, it is the intent of this standard that the application surface be clean and dry. Surfaces shall be cleaned to achieve an ASTM D-4259 Standard by abrasive blast cleaning methods. All surfaces shall be cleaned to remove all dirt, dust, corrosion products, loose concrete, debris, grease, oils, growths and foreign matter. On new concrete and metal surfaces, a sandblasting shall be used to remove all laitance. Coatings shall be applied only to a sound clean surface profile consistent with the manufacturer's published recommendation.

New concrete shall be aged no less than 30 days prior to application.

Cracks, joints, eroded and damaged areas shall be sealed with a compatible grout/putty as recommended by the coating manufacturer prior to the application of the coating material.

**Application** - All coating materials shall be applied in a manner and thickness consistent with the manufacturer's published recommendation.

All coatings shall be applied in a manner consistent with all applicable environmental and health and safety regulations. At a minimum, during application, the applicators shall use protective clothing, eye protection, chemical resistant gloves, and air respirators.

The coating shall be free of blisters, pinholes, holidays, or discontinuities.

**Inspection** - All coating work shall be performed in the presence of the designated City construction inspector. All coating work done in the absence of the inspector is subject to rejection unless specifically allowed by the inspector. The inspector shall be provided access to the construction site and to those areas subject to the performance of work under this standard.

**Testing** - All testing shall be performed by the contractor in the presence of a City inspector. All lining and coating work shall be high-voltage spark tested at a minimum 125 volts per mil film thickness of coating. Contractor shall verify to the City that the test equipment is in proper working condition prior to spark testing. Use Tinker-Rasor AP-W test equipment or approved equal.

**Repairs of Holidays or Pinholes** - All areas to be repaired, as determined by inspection and testing, shall be repaired in accordance with the product manufacturer's recommendations.

**71-1.10 Trench Resurfacing** - Trenches in existing streets, except streets which are to be closed or abandoned, shall be resurfaced with the type and thickness of bases, surfacing or pavement, as shown in these Standard Specifications and Plans. The Contractor shall proceed immediately to resurface any part of any excavation upon notice from the Engineer without

waiting for completion of the full length of the sewer. All trenches shall be backfilled or covered at the end of each working day. Any temporary trench patching shall be approved by the City Engineer.

### **71-1.11 Testing:**

**71-1.11A Cleaning** - Prior to performing tests, the pipe installation shall be thoroughly cleaned. Cleaning shall be performed by the Contractor by means of an inflatable rubber ball. The ball shall be of a size that will inflate to fit snugly into the pipe to be tested. The ball shall be controlled with a tag line. The ball shall be placed in the last lamphole or maintenance hole on the pipe to be cleaned, and water shall be introduced behind it. The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first maintenance hole where its presence is noted. In the event cement or wedged debris or a damaged pipe shall stop the ball, the Contractor shall remove the obstruction.

**71-1.11B Deflection Test for ABS, PVC, (Solid Wall and Profile Wall), and HDPE Sanitary Sewer Pipe** – A short-term deflection test shall be conducted no sooner than 30 days after the placement and densification of backfill. The Contractor shall furnish all equipment needed to complete this test. The cost for the deflection test shall be included in the unit price bid for the sanitary sewer pipe.

For PVC pipe, the allowable short-term deflection shall be 5%. The minimum allowable I.D. (O.D. of the mandrel) shall be established by the pipe manufacturer.

For ABS Pipe - All mainline pipe shall be cleaned and then mandrelled to measure for obstructions (deflection, joint offsets, lateral intrusions, etc.). A rigid mandrel with a circular cross-section having a diameter at least 96% of the specified average inside diameter shall be pulled through the pipe. The method of measuring the deflection shall be reviewed by the City Engineer. Any pipe through which the mandrel will not pass shall be said to have failed and will be repaired by the Contractor at the Contractor's expense.

For HDPE pipe--maximum long term deflection for HDPE pipe shall be no more than 5%. Long-term deflection shall be calculated as the short-term deflection multiplied by a deflection lag factor based upon the average inside diameter of the pipe. In no case shall a deflection lag factor of less than 1.5 be accepted. Mandrel deflection tests may be required during installation as specified by the City Engineer. Mandrels used in testing shall have an odd number of legs totaling no less than nine. Pipe sections not meeting the deflection requirements shall be excavated, re-installed, and subject to an additional 30-day deflection test.

At the Engineer's option, the Engineer may require a sample of ten percent (10%) of the laterals randomly selected by the inspectors shall also be tested for deflection. If difficulty is encountered in passing the mandrel test, the inspector may direct that a larger sample of laterals be tested up to and including one-hundred percent (100%) of all laterals.

The Contractor shall furnish properly sized mandrels for size and type of pipe installed. Certification of proper mandrel size shall be required and mandrel identified in a manner to identify with certification.

At the Contractor's expense, all locations with deflection greater than allowable shall be excavated, repaired or replaced, backfilled and retested.

**71-1.11C General** - All leakage tests shall be completed and approved following the placement and densification of the back fill, but prior to placing of permanent surfacing.

When leakage or infiltration exceeds the amount allowed by the specifications, the Contractor at its expense shall locate the leaks and make the necessary repairs or replacements in accordance with the specifications to reduce the leakage or infiltration to the specified limits. Any individually detectable leaks shall be repaired, regardless of the results of the tests. Leakage tests shall be made on completed pipelines as follows:

1. Gravity Sanitary Sewer (24 inches (610 mm) or less in diameter where difference in elevation between inverts of adjacent maintenance holes is 10 feet (3.05 M) or less) - Water exfiltration test or water infiltration test as directed. The Engineer may allow substitution of an air pressure test for the water exfiltration test.
2. Gravity Sanitary Sewers (24 inches (610 mm) or less in diameter where difference in elevation between inverts of adjacent maintenance holes is greater than 10 feet (3.05 M) - Air pressure test.
3. Gravity Sanitary Sewers (greater than 24" (610 mm) in diameter) - Air pressure test or water infiltration test as directed.
4. Pressure Sewers (force mains) - Water pressure test at 50 psi (345 kPa) over pipe pressure classification or designation.

**71-1.11D Water Exfiltration Test** - Each section of sewer shall be tested between successive maintenance holes by closing the lower end of the sewer to be tested and the inlet sewer of the upper maintenance hole with stoppers. The pipe and maintenance hole shall be filled with water to a point 4 feet (1.22 M) above the invert of the sewer at the center of the upper maintenance hole; or if ground water is present, 4 feet (1.22 M) above the average adjacent ground water level.



The allowable leakage will be computed by the formulae:

$E = 0.0001 LD \sqrt{H}$  for mortared joints.

$E = 0.00002 LD \sqrt{H}$  for all other joints.

where:

L is the length of sewer and house connections tested, in feet.

E is the allowable leakage in gallon per minute of sewer tested.

D is the internal diameter of the pipe in inches.

H is the difference in elevation between the water surface in the upper maintenance hole and the invert of the pipe at the lower maintenance hole; or if ground water is present above the invert of the pipe in the lower maintenance hole, the difference in elevation between the water surface in the upper maintenance hole and the ground water at the lower maintenance hole.

However, the maximum shall not exceed 200 gallons per inch of internal diameter per mile per day.

The Contractor shall, at its expense, furnish all water, materials and labor for making the required test. All tests shall be made in the presence of the Engineer.

**71-1.11E Water Infiltration Test** - If, in the opinion of the Engineer, ground water is encountered in the construction of a section of the sewer, the Engineer may require the pipe be tested by the Water Infiltration Test as follows:

The end of the sewer at the upper structure shall be closed sufficiently to prevent the entrance of water, and pumping of ground water shall be discontinued for at least 3 days, or until the ground water has recovered its normal status level, after which the section shall be tested for infiltration.

The infiltration into each individual reach of sewer between adjoining maintenance holes shall not exceed that allowed by the formula in Section 71-1.11D where H is the difference in the elevation between the ground water surface and the invert of the sewer at the downstream maintenance hole.

Unless otherwise specified, infiltration will be measured by the Engineer using measuring devices furnished by the City.

All visible leaks shall be repaired by the Contractor regardless of volume involved.

**71-1.11F Air Pressure Test** - The Contractor shall furnish all materials, equipment and labor for making an air test. Air test equipment shall be approved by the City prior to the beginning of the test.

Each section of sewer shall be tested between successive maintenance holes by plugging and bracing all openings in the main sewer line and the upper ends of all sewer connections. Prior to any air pressure testing, all pipe plugs shall be checked with a soap solution to detect any air leakage. If any leaks are found, the air pressure shall be released, the leaks eliminated, and the test procedure started over again.

The final leakage test of the sewer main line and branching sewer connections, shall be conducted in the presence of the Engineer in the following manner:

1. Clean pipe to be tested by propelling snug fitting inflated rubber ball through the pipe with water.
2. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
3. If the pipe to be tested is submerged in ground water, insert a pipe probe by boring or jetting, into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.
4. Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig.
5. After an internal pressure of 4.0 psig is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
6. When pressure decreases to 3.5 psig, start stop watch.
- 6a. The following applies to all pipes other than PVC and ABS (see 6b):

Determine the time in seconds that is required for the internal air pressure to reach 2.5 psig. Minimum permissible pressure holding times are indicated by the following formula and table in seconds:

$$t = k \left( \frac{d}{g} \right)$$

where t = minimum required time in seconds  
k = constant 0.022

d = nominal pipe diameter in inches  
g = allowable air loss rate per unit  
area, 0.003 cu. ft./min./sq. ft.  
of internal/surface area

psig = pounds per square inch gage

**MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP  
FROM 3 ½ TO 2 ½ PSIG**

**PIPE DIAMETER**

		4"	6"	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	39"
L E N G T H  O F  L I N E  I N  F E E T	25	4	10	18	28	40	62	89	121	158	200	248	299	356	418
	50	9	20	35	55	79	124	178	243	317	401	495	599	713	837
	75	13	30	53	83	119	186	267	364	475	601	743	898	1020	1105
	100	18	40	70	110	158	248	256	485	634	765	851	935		
	125	22	50	88	138	198	309	446	595	680					
	150	26	59	106	165	238	371	510							
	175	31	69	123	193	277	425								
	200	35	79	141	220	317									
	225	40	89	158	248	340									
	250	44	99	176	275										
	275	48	109	194	283										
	300	53	119	211											
	350	62	139	227											
	400	70	158												
	450	79	170												
	500	88													
	550	97													
	600	106													
	650	113	170	227	283	340	425	510	595	680	765	851	935	1020	1105

NOTES: (1) TO BE USED WHEN TESTING ONE DIAMETER ONLY

(2) The above air pressure test procedure is based on ASTM C828. Any special situations or conditions shall conform to this ASTM Standard.

- 6b. For PVC and ABS lines the following table lists the minimum times allowed for a pressure drop from 3.5 psi to 3.0 psi in excess of the ground water pressure at the top of the pipe.

Pipe Dia (in)	Min Time (min sec)	Lgth for Min Time (ft)	Time for Lngr Lgth (sec)	Specification Time for Length (L) shown (min:sec)							
4	1:53		.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50		.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47		.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43		1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40		1.709L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05		2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02

#### SAFETY NOTE:

The air test may be dangerous if, because of ignorance or carelessness, a line is improperly prepared. It is extremely important that the various plugs be installed and braced in such a way as to prevent blowouts. Inasmuch as a force of 250 lbs. is exerted on an 8" plug by an internal pipe pressure of 5 psi, it should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous.

As a safety precaution, pressurizing equipment should include a regulator set at perhaps 10 psi to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the maintenance holes during testing.

IF THE TIME LAPSE IS LESS THAN THAT SHOWN IN THE TABLE, THE CONTRACTOR SHALL MAKE THE NECESSARY CORRECTIONS TO REDUCE THE LEAKAGE TO ACCEPTABLE LIMITS.

**71-1.11G Televising of Sanitary Sewers** - Following the placement and compaction of backfill and completion of other required testing, but prior to the placing of pavement, the Contractor shall televise all sewer lines for conformance to the Project Plans and specifications. A tape and log of the televising shall be delivered to the Engineer within a week of televising. If defective pipes or conditions are discovered they shall be corrected at no cost to the City. Any corrective work proposed shall be approved by the Engineer.

The City may also televise sewer lines prior to the expiration of the one year warranty. If a defective condition is found, it shall be presumed to be caused by defective workmanship or materials. The developer and/or Contractor shall be notified and shall correct the work in a manner approved by the Engineer.

**71-1.12 Measurement** - Sewer work performed under Section 71, "Sewers," will be designated in the contract item by size, type, thickness, quality, or whatever information is necessary for identification.

The lengths of the various types of sewer pipe to be paid for by the linear foot; measured from centerline of maintenance hole to center line of maintenance hole between structures or to end of line not terminated at a structure.

Pipe bends, wyes, tees and other branches will be measured by the linear foot for the sizes of pipes involved. Bends will be measured along centerlines. Wyes, tees, and other branches will be measured along centerlines to the point of intersections.

Quantities of precast concrete pipe sewer maintenance holes, lampholes, terminal cleanout structures, and pipe chimneys will be determined as units from actual count, except new frames and covers.

New frames and covers will be considered as a part of the structure to which the frame and cover is attached and no additional compensation will be allowed therefor.

The quantities of permanent trench resurfacing to be paid for shall be the actual quantities placed within limits up to a maximum width of 3 feet greater than the outside diameter of the pipe or structure. Temporary trench resurfacing shall be paid for by the Contractor.

Trench quantities in excess of the above shall be at the Contractor's expense unless approved otherwise by the Engineer.

**71-1.13 Payment** - Items of work, measured as provided in Section 71-1.12, "Measurement," will be paid for at the contract price per linear foot for the various sizes of pipes, types of sewer maintenance holes, lampholes, terminal cleanout structures, and the contract price per ton or square foot for the various types of surfacing.

Full compensation for structure excavation; structure backfill; bar reinforcing steel and concrete will be considered as included in the contract price paid for the various items of sewer work and no separate payment will be made therefor.

Shaping the bottoms of new maintenance holes will be considered as a part of the maintenance hole and no separate payment will be made therefor.

Full compensation for all tunneling and jacking of pipe, capping open ends of pipe, joining of pipe to other pipe or structure, shaping bottoms of existing maintenance holes, utility support and protective work operations required to accommodate or safeguard public traffic, testing the sewer line, furnishing and disposing of water and equipment used for testing and all other incidental work and material required to construct the sewer system shall be considered as included in the prices paid for the various contract items of sewer work and no additional compensation will be allowed therefor.

The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing sewers, complete in place, as shown on the Project Plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.

**71-1.14 Abandonment** - Sanitary sewer lateral abandonment shall be done at the property line. Provide bell end or collar with air tight plug, as specified in the U.P.C., at the end of the line.

## **SECTION 74**

### **STORM AND SANITARY SEWER PUMPING PLANT EQUIPMENT**

This section of Caltrans Standard Specifications is deleted in its entirety.

Replace with the following:

Specifications and Plans for pumping plant equipment shall be prepared in accordance with the Municipal Utilities Department Pump Station Guidelines and as approved by the Director of Municipal Utilities.

## SECTION 75

### MISCELLANEOUS METAL

The following is to be added:

**75-1.02 Miscellaneous Iron and Steel** - The following specification shall be added to this section of Caltrans Standard Specifications:

**75-1.02A Maintenance Hole Frames and Covers** - Gray iron castings shall conform to and/or exceed the requirements of ASTM A48-76, Class 30 and test bar size shall be as stated in Table I.

A "Certificate of Compliance" signed by an authorized agent of the manufacturer or supplier shall be required.

Each certificate so furnished shall be accompanied by a copy of test results stating that the material has been sampled, tested, and inspected in accordance with the provisions of the latest issue of ASTM A-48, Gray Iron Castings. Test bars shall be cast and tested for the first lot of casting and every four (4) months thereafter. If production is interrupted for any period longer than four months, test bars shall be cast and tested from the initial lot after production is resumed and every four (4) months thereafter. The first lot is defined as the first castings produced after January 1st of each year. The tension tests specified shall be performed and the results certified by an independent testing laboratory located in the United States of America.

In addition, current certified test reports for testing in accordance with AASHTO HS-20 loading shall be furnished.

Units furnished shall be identifiable with reference to the above tests.

Machined surface tolerances shall produce true, uniform bearing surfaces.

All frames and lids shall be interchangeable with like seat design. Dimensional fit tolerances shall not exceed those allowed on designated specified units detailed on Standard Drawing No. 54.

Maintenance hole frame and covers and catch basin frames and covers shall be wire brushed removing all dirt and loose mill scale and rust and given a coat of coal tar pitch at 180° F.



**75-1.02B Identifying Castings** - All gray iron castings shall be marked on the top surface with the English name of the country of origin; manufacturer's name, lot number, and initials or logo type. In addition, the month and year of manufacture shall be cast on the frame and cover adjacent to the name of the manufacturer. Such marking shall be made by means of stamping, cast-in-mold lettering, etching, or engraving.

## SECTION 76

### DOMESTIC WATER FACILITIES

**NOTE:**       **THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN CALTRANS STANDARD SPECIFICATIONS.**

**76-1.01 Description** - This work consists of furnishing and installing pressure water pipe control valves, thrust blocks, fire hydrant tees, fire hydrants and service lines, all as shown on the Project Plans or as directed by the Engineer, and as specified in the Standard Specifications and Plans and the special provisions.

**76-1.01A Right of Way** - All City owned domestic water facilities located on private property shall be installed within a 10' (min.) wide easement which shall have been dedicated to the City of Stockton.

**76-1.01B Facilities Standards** - Unless otherwise noted, all domestic water facilities shall be designed in accordance with the California Water Works Standards and the American Water Works Association.

**76-1.02 Materials** - All pipe and fittings (except valves) shall have a minimum working pressure of one hundred twenty five (125) pounds/square inch and conform to the following requirements:

**76-1.02B Ductile Iron Pipe** - Ductile iron pipe for water and other liquids shall be furnished in the sizes; classes; grades or nominal thicknesses; and joint types designated on the Project Plans or in the Special Provisions.

Ductile iron pipe shall comply with ANSI A21.51 (AWWA C151) and have cathodic protection and test stations.

Ductile iron pipe is to be used on all water crossings or where required by State Health Code sanitary sewer water line clearance regulations. Pipe shall utilize either flange, mechanical or push on rubber gasket joints. Pipe shall be minimum standard thickness with standard cement lining (USA Std. A21.4).

Ductile iron pipe joints shall comply with the following requirements for the types:

<b><u>Type of Joint</u></b>	<b><u>Specifications</u></b>
Rubber Gasket Push-on Joint	ANSI A21.11 (AWWA C111)
Mechanical Joint	ANSI A21.11 (AWWA C111)
Flanged Joint	ANSI B16.1, B.16.2 and A21.10 (AWWA C110)

Flanged Joint (Threaded Flanges)

ANSI B2.1.

All rubber gasket, push-on, mechanical and flanged joint fittings for ductile iron water pipe shall be manufactured in accordance with ANSI A21.10 (AWWA C110).

Unless otherwise specified, the internal surfaces of ductile iron water pipe and fittings shall be lined with a uniform thickness of cement mortar then sealed with a bituminous coating in accordance with ANSI A21.4 (AWWA C104). The outside surfaces of ductile iron pipe and fittings for general use shall be coated with a bituminous coating 1 mil (0.0254mm) thick in accordance with ANSI A21.6 or ANSI A21.51.

**76-1.02C Polyvinyl Chloride (PVC) Pipe** - Polyvinyl Chloride pipe shall be furnished in the classes, sizes, and grades designated on the Project Plans and Special Provisions.

Polyvinyl Chloride pipe shall meet the requirements of AWWA C-900 "Polyvinyl Chloride (PVC) Pressure Pipe." Pipe sized shall be 6" through 12" only - AWWA Class 150 minimum. All Class 150 pipe shall meet the requirements of DR 18 and Class 200 pipe shall meet the requirements of DR 14 with O.D.

However, pipe sizes from 16" through 24" may be used for transmission lines; no house service taps/laterals are allowed in these sizes. Pipe shall be DR-18 (235 psi) only, conforming to the requirements of AWWA C-905 "Polyvinyl Chloride (PVC) Water Transmission Pipe" in O.D. sizes. Pipe embedment zone (O.D. plus 12") shall conform to City of Stockton Standard Drawing No. 50.

All pipes shall be suitable for use as a pressure conduit. Provisions shall be made for expansion and contraction at each joint with an "O" ring elastomeric gasket seal meeting the requirements of ASTM D-1869 and F-477. Solvent welded joints will not be permitted. The bell section shall be designed to be at least as strong as the pipe wall.

**76-1.02D Valves** - This specification includes three (3) inch through twelve (12) inch diameter gate valves and twelve (12) inch or larger diameter butterfly valves and operators intended for buried service in a domestic water system.

Gate valves shall be double disc with non-rising stem meeting or exceeding the latest revisions of AWWA C-500 with a design working pressure of one hundred seventy-five (175) psi. Valve pattern shall be Metropolitan or Muller No. A-2380 with valve disc seats of Grade 1 bronze, double disc type with parallel seats.

Butterfly valves shall meet or exceed the latest revisions of AWWA C-504 with a design working pressure of 150 psi. Operators for butterfly valves twenty (20) inches and smaller shall be Class 150; larger operator will be as specified in the special provisions and designed for actual line conditions as covered in AWWA C-504, Appendix A.

Valve ends shall be mechanical joint or flanged in accordance with AWWA C-500 unless otherwise specified.

Valves for use with flanged pipe shall be cast with Class 125 flanges, dimensions and drilling shall conform to ASA B 16.1. Flange boltholes shall be spot faced if flange fillets interfere with both heads and nuts.

Tapping sleeves for A.C. and cast iron water mains shall be full body shell, with full body gasket or split sleeve, end and side gasket seal. Inlet flange and tapping gate valve flanges shall be Class 125 flange. Tapping sleeves shall be M & H 1174 and 1274 (all sizes); Romac SST and Clow 3490-AS (over 12 inch only) or an approved equal. Taps for steel pipe, CMC and/or CML, will require review and approval by the City Engineer.

All stem seals, gate valves and butterfly valves, shall be O-rings only.

Wrench nuts shall be made of top grade cast iron, fitting the top of the valve stem and secured by nut or key. Wrench nuts shall be one and fifteen sixteenth (1-15/16) inch square at the top and two (2) inches square at the bottom.

Valves requiring operating wrenches exceeding six (6) feet in length shall have extension and guides installed in valve boxes.

The open direction shall be left (counter-clockwise) and the closed direction right (clockwise).

**76-1.02F Valve Boxes** - Valve boxes and covers shall conform to City of Stockton Standard Plan No. 99.

**76-1.02G Gaskets** - Gaskets for flanged joints shall be full circle one-sixteenth (1/16) inch thick asbestos composition gaskets.

**76-1.02H Thrust Blocks** - Thrust blocks shall conform to City of Stockton Standard Drawings. Concrete for thrust blocks shall be Class B with one and one-half (1-1/2) inch max. size aggregate in accordance with Section 90 of the Standard Specifications.

**76-1.02I Fire Hydrants** - Fire hydrants shall conform to the requirements of the Fire Department of the City of Stockton as shown on the Standard Plan No. 101 and the following:

- a. All hydrants shall comply with AWWA C502, latest revision.
- b. All operating valves shall be located below grade and protected by "break-off" features so that no water flows if hydrant is knocked off.
- c. Hydrant main valve seat shall be a minimum 5-1/4 inches.

- d. Hydrant valve shall be molded non-swelling rubber.
- e. Hydrant main valve seat shall be threaded into a bronze to bronze subseat.
- f. Hydrant bury shall be 36 inches from connection to ground flange. Materials to extend the length of bury shall be readily available.

**76-1.02J Service Lines** - Service lines up to and including meter connection shall be as detailed in City of Stockton Standard Plan Nos. 93 and 94, as applicable for the service intended and with the AWWA Standard C-800.

- 1. Service line connections are not permitted on pipe sizes 16" and greater.
- 2. Threads for line pipes shall be as specified in the AWWA standard for threads for underground service line fittings.
- 3. Type of service line pipe shall be limited to the following:
  - a. Copper water tube, Type K or ASTM B-88.
  - b. Ultra High Molecular Weight (UHMW) P.E. 3406, P.E. 3408, CS 255-63, Polyethylene as manufactured by Driscopipe, Orangeburg or an approved equal in one (1) inch iron pipe sizes only. Plastic pipe larger than one (1) inch and up to and including two (2) inch iron pipe sizes shall be PB 2110 Polybutylene. Connection of plastic pipe shall be made using Mueller 110 compression connections or approved equal.
  - c. Services two (2) inches and larger shall be considered as a special condition and will require the prior approval of the Water Superintendent and City Engineer.
  - d. Saddles or service clamps shall be used on all PVC taps and shall be designed specifically for PVC pipe. Saddles or service clamps shall be Rockwell No. 381 or approved equal.
- 4. Service lines, if abandoned, must be severed at the main.

**76-1.02K Water Meters** - Unless otherwise specifically noted, water meters will be purchased and installed by the City of Stockton.

For meters larger than two inch it will be the Contractor's responsibility to contact the City of Stockton prior to installation of meter boxes to ascertain the dimensions of the meters currently in stock.

It shall be the Contractor's responsibility to set meter box and service fittings in such a manner that City meter can easily be dropped in place. See Standard Plans for minimum clearance dimensions.

### **76-1.03 Installation**

#### **76-1.03A Installation of Water Mains**

**76-1.03A(1) Description** - The Contractor shall, unless specified otherwise, furnish all material, equipment, tools and labor necessary to do the work required, and unload, haul and distribute all pipe, castings, fittings, valves, hydrants and accessories. The Contractor shall also remove pavement as stipulated; excavate trenches and pits to the required dimensions; excavate bell holes; construct and maintain all bridges for traffic control sheet, brace, and support the adjoining ground or structures where necessary; handle all drainage or ground water; provide barricades, guards, and warning lights; lay and test the pipe, castings, fittings, valves, hydrants, and accessories; backfill and consolidate the trenches and pits; restore the roadway surface unless otherwise stipulated; remove surplus excavated material; clean the site of the work; and maintain the street or other surface over the trenches as specified. All connections to existing lines shall be flanged by fittings with isolation plates.

**76-1.03A(2) Excavation** - Trench excavation shall conform to the requirements of the City of Stockton Standard Plans No. 50 and No. 51.

The bottom of the trench shall be carefully graded as indicated in Section 71-1.03 of the Standard Specifications.

**76-1.03A(3) Jacking** - Jacking shall conform to the City of Stockton Standard Plan No. 60.

**76-1.03A(4) Pipe Laying** - The pipe shall be handled with care at all times and in a manner that meets the approval of the Engineer. Extreme care shall be exercised in the use of any mechanical devices used in laying the pipe to avoid scarring or other damage.

The Engineer shall be the judge of whether a pipe is seriously damaged and any pipe so classified shall be permanently removed from the site of the work.

The inside of all pipes and couplings shall be free from dirt, grease, or other deleterious materials. The open ends of all pipe previously laid shall be adequately plugged water tight whenever pipe laying operations are suspended at the end of each work day, or for any other reason.

Select fine damp earth shall be placed and thoroughly compacted across the bottom of the trench to provide full support of all the pipe. Bells and/or couplings shall have soil removed to provide a uniform bearing.

In joining asbestos cement pipe, a thin coating of non-toxic and water soluble lubricant shall be applied to the entering level and back to the first machined shoulder of the pipe to be coupled. The rubber rings shall be set in the coupling grooves, and the couplings shall be placed between the pipe ends. The pipe shall be moved so that ends butt snugly against the rubber rings. A representative of the pipe manufacturer shall be present when the pipe laying commences in order to insure the proper installation of the pipe.

**76-1.03A(5) Backfilling** - Backfilling shall not be completed until the pipe has been properly installed to the satisfaction of the Engineer.

Backfill materials shall be placed on both sides of the pipe simultaneously to prevent any undue strain on the pipe.

Imported sand or an approved clean granular material free of all lumps and debris, passing 100% through the 3/4 inch sieve and having 5% to 20% passing the No. 200 sieve, with a minimum sand equivalent of 20 material shall be placed in the trench in six (6) inch layers to a depth of twelve (12) inches above the pipe and shall be hand tamped, or compacted to 85 percent relative compaction.

The balance of the trench shall be backfilled and compacted as shown by jetting or mechanical means on Standard Plans Nos. 50, 50A and 51, 51A, 51B. This Standard shall be used as a minimum in all new construction unless otherwise noted in the Special Provisions.

Backfilling and bedding for P.V.C. pipe shall be performed in accordance with Section 71-1.04 Bedding of these Standard Specifications for P.V.C. pipe.

The Contractor shall do all excavating, loading, hauling, placing and compacting of the material in place.

All pipe damaged during construction operations shall be replaced by the Contractor at the Contractor's expense to the satisfaction of the Engineer.

**76-1.03A(6) Trench Resurfacing** - Trenches in existing streets, except streets which are to be closed or abandoned, shall be resurfaced with the type of thickness of bases, surfacing or pavement shown on the Standard Plans.

The Contractor shall proceed immediately to resurface any part of any excavation upon notice from the Engineer without waiting for completion of the full length of line.

**76-1.03B(1) Testing** - The test for hydrostatic pressure shall commence no sooner than seven (7) days after the last concrete thrust block has been cast with standard cement or at least after thirty-six (36) hours with high early strength cement, and after backfilling and compacting the trench to the plane upon which the asphalt concrete surfacing is to be placed. The Contractor shall take the necessary precautions to insure that the pipe fittings, couplings,

valves, and other appurtenances are not displaced during the test. The pipe shall be filled with water at least twenty-four (24) hours prior to the time of the test. Each section of the completed pipe under test shall be subjected to a hydrostatic test pressure of one hundred twenty-five (125) pounds per square inch for two (2) hours. During this period of the test, all pipe shall be inspected for leaks, and any leaks failures, or imperfect construction revealed during the period of tests shall be corrected by the Contractor at the Contractor's own cost and expense.

After a satisfactory hydrostatic pressure test, the line shall be tested for leakage. The line shall be maintained at a sixty (60) pound per square inch pressure for seven (7) days. The leakage during this period shall not exceed 0.100 gallons for each inch of diameter for each joint for twelve (12) foot pipe lengths in the section under test in a twenty-four (24) hour period.

It shall be the Contractor's responsibility to locate and repair the points of line failure; fill, recompact the trench and retest the section of line in the event the line fails the leakage test.

**76-1.03B(2) Interruption of Service** - No valve or other control on an existing system shall be operated for any purpose by the Contractor. The City of Stockton will operate all valves, hydrants, blowoffs and curb stops.

### **76-1.03C Disinfecting Water Mains**

#### **76-1.03C(1) General** –

1. The interior of all pipe, fittings, and other accessories shall be kept as free as possible from dirt, foreign material and bacteria at all times. During pipe laying operations, when bacterial contamination of interior pipe surfaces is obvious or suspected by the Engineer, the Engineer may order said surfaces to be swabbed with an approved bactericidal solution.

Disinfecting chemicals and additives shall comply with the requirements of Title 22, Division 4, Chapter 18 as Regulated by the State of California, Department of Health Services.

2. Disinfection of water mains shall be insured before permission for their connection to the City's water distribution system will be granted.

Chlorinated water may be disposed of in the sanitary sewer with prior approval from the Municipal Utilities Department (MUD). Without MUD approval, water must be declorinated and disposed of in the sanitary sewer. Chlorinated water or declorinated water shall not be disposed of in the storm drain system.



Disinfecting water mains shall be performed after all water related appurtenances have been installed.

3. Bacteriological samples used to satisfy the disinfection requirement of section 76-1.03C shall be collected under the direction of a Public Works Department inspector, or the inspector's agent, by personnel trained in the proper techniques for obtaining bacteriological samples, and shall be analyzed by a laboratory certified by the California Department of Health Services. It is suggested that the project contractor be present to insure that all parties agree to the appropriateness of the sample locations.
4. The Municipal Utilities Department Laboratory is certified to perform the required bacteriological analyses and can provide properly trained personnel to collect samples.
  - a. It is not required that the City laboratory perform these tasks. The inspector or contractor may choose to use the services of a commercial laboratory as long as all technical requirements are met.
  - b. The City laboratory may be called upon, at no additional cost to the contractor, to collect and analyze one set of samples, and if that test fails, one set of retest samples after resterilization of the main as in section 76-1.03C4. Any sampling/analysis after the first retest will be billed to the contractor on a time and materials basis.
  - c. The City laboratory requires that scheduling be done at least 48 hours in advance of the sampling event. Normally this is sufficient time to allow the person assigned to this task to schedule the field work and to insure sufficient facilities exist in the laboratory to complete the analysis.
  - d. The City laboratory provides these services to the Public Works Department, not the contractor. There will be no direct communication of analysis results to the contractor; the report of the results of analyses will be made only to the inspector, or the inspector's agent, who requested the test, and to the Deputy Municipal Utilities Department Director/Water & Collection System.
  - e. If the City laboratory cannot accommodate the requested time schedule, the inspector or contractor may choose to use a commercial laboratory for sample collection and/or analysis.
5. If a commercial laboratory is used, a copy of the analysis report will be forwarded to the Deputy Municipal Utilities Department Director/Water & Collection System.

**76-1.03C(2) Isolation of New Mains** - All new water lines shall be completely isolated from any existing main until they have been tested and disinfected to the satisfaction of the Engineer. New mains may be filled from existing mains only by temporary tap thereto and through a State Department of Health approved backflow prevention unit so as to provide positive backflow prevention provided by City of Stockton. When new main is properly disinfected and the isolation dam is removed from connection flange or other type connection is made, extreme care shall be exercised to prevent the entry of contamination. Connection fittings shall be thoroughly swabbed with an approved bactericide immediately prior to their installation.

Flush the mains thoroughly at the end of the contact period. The orthotolidine test shall show no more chlorine in the water leaving the main than in the water entering the main.

The Engineer will collect a sample for bacteriological examination in a sterile bottle provided by the laboratory. On the label, give date, address, and the estimate number for the job. Where possible the sample should be taken from a service located near the end of the chlorination section, otherwise, it may be taken through the same blowoff used for flushing the heavily chlorinated water out of the main so that the blowoff is sterilized.

If the bacteriological tests are unsatisfactory, the main shall be resterilized using Method No. 2, and the sterilization repeated, if necessary, until satisfactory results are obtained.

**76-1.03C(3) Method No. 1 - H.T.H. Tablet Method** - This method is preferred for short jobs and for small diameter pipe of any kind. It cannot be used where trench water has entered the main. The main cannot be flushed prior to sterilization, so the method requires that the pipe be kept clean during installation.

Using Permatex No. 1 as an adhesive, fasten the required number of tablets (see Table I) to the inside top of each length of pipe. Tubes of Permatex may be purchased locally at any auto parts store. The tablets may be fastened to the pipe before it is placed in the trench providing the top of the pipe is marked to insure that the tablets are on the top of the pipe after installation.

When installing asbestos cement pipe, each butt end shall be treated by using a H.T.H. tablet as a piece of chalk. Fasten extra tablets to the beginning of the first length of pipe. To be sure that these tablets start to dissolve as the water enters the main, they should be placed in rows about half an inch above the bottom of the pipe. Use one tablet for each inch of diameter. For long runs, this should be repeated about every 500 feet.

When using dresser or similar couplings, an additional tablet shall be crushed and placed in the annular space between the coupling and the pipe. Fill the pipe very slowly and proceed as outlined under General Instructions.

**76-1.03C(4) Method No. 2 - H.T.H. Solution with Hand Pump Method** - This method is general in scope and shall be used when it is necessary to rechlorinate an existing main. When this

method is used on a main coupled with dresser or similar couplings, a pinch of H.T.H. powder shall be placed in each coupling as the main is laid.

Equipment required includes an ordinary hand test pump, solution hose, and a five gallon can to contain the chlorine solution.

A compact and convenient assembly can be made by mounting the solution can and the pump on suitable board with a pipe connection from the tank on the suction side of the pump.

H.T.H. comes as a powder which shall be dissolved in water. Strong chlorine solutions should be handled with care since they are irritating to the skin and will damage shoes and clothes.

Make up chlorine solution according to Table II. The quantity required is estimated from Table II. An excess volume should be prepared so as not to empty the container before the job is complete.

Connect pump to main. Use a corporation cock for this purpose and make connection at or ahead of the inlet end of the new line.

After flushing the line thoroughly adjust flow by timing the period required to fill a five-gallon can.

Pump chlorine solution into the line at a rate of one gallon of solution in three minutes.

Continue pumping until orthotolidine tests on a sample taken from discharge end of line being treated shows a red color, or until the odor of chlorine is noticed.

After finishing application of chlorine, close valve or blow-off. Disconnect and flush pump thoroughly with fresh water.

Refer to instruction flushing and sampling.

If the above procedure has to be varied because of some unusual condition, it will be necessary only to regulate the pump, control the water flow, or adjust the strength of the chlorine solution to give a dose of at least 50 ppm.

**TABLE I**  
**NUMBER OF TABLETS REQUIRED FOR**  
**MAIN STERILIZATION**

<b>Length of Section</b>	<b>Diameter of Pipe</b>					
	<b>2"</b>	<b>4"</b>	<b>6"</b>	<b>8"</b>	<b>10"</b>	<b>12"</b>
13' or Less	1	1	2	2	3	5
18'	1	1	2	3	5	6
20'	1	1	2	3	5	7
30'	1	2	3	5	7	10
40'	1	2	4	6	9	14

**TABLE II**  
**CHLORINE SOLUTION STRENGTH**  
**HAND PUMP METHOD OF MAIN CHLORINATION**

**Amount of Chemical in 5 Gallons of Solution**

<b>Discharge Rate</b>	
<b>GPM</b>	<b>H.T.H.</b>
10	0.25 lbs.
20	0.50 lbs.
35	0.75 lbs.
50	1.00 lbs.
75	1.50 lbs.
100	2.00 lbs.

Choose a suitable discharge rate and determine the time required to apply the chlorine from Table III.

Compute the gallons of solution required by dividing this time by 3.

Use the above table to determine the strength of solution required. Example: If the estimate time from Table III is 35 minutes, 11-2/3 gallons will be required; and if the discharge rate is 50 GPM, the solution should contain one pound of H.T.H. in five gallons. Prepare fifteen gallons of solution so as to be sure of having an adequate amount. Operate the hand pump at a rate of five gallons in fifteen minutes, or one gallon in three minutes.

**TABLE III**

**Time in Minutes to Apply Chlorine to 100 Feet of Pipe**

<b>Discharge Rate GPM</b>	<b>2"</b>	<b>4"</b>	<b>6"</b>	<b>8"</b>	<b>10"</b>	<b>12"</b>
10	2	7	15	26	41	59
20		3	7	13	20	29
35		2	4	8	12	17
50			3	5	8	12
75			2	4	6	8
100				3	4	6

The above table is used to estimate the time required to apply chlorine. For example: 700' of 8" main can be filled with chlorine solution in 35 minutes with a discharge rate of 50 GPM.

**76-1.04 Measurement** - The work to be performed under these Standard Specifications will be listed in the contract items by size, class type, or whatever information is necessary for identification.

The length of pipe to be paid for will be the slope length designated by the Engineer.

Pipe bends, wyes, tees, and other branches will be measured by the linear foot for the sizes of pipes involved.

**76-1.05 Payment** - Items of work, measured as provided in Section 70-1.04, "Measurement," will be paid for at the contract prices per linear foot for the various sizes and types of pipe; the contract unit prices per ton, cubic yard or square foot for the various types of surfacing required.

Full compensation for excavation, backfill, thrust blocks, testing, sterilizing and fittings will be considered included in the various contract items and no additional allowance will be made therefor.

## **SECTION 77**

### **STORM WATER BASINS**

**NOTE: THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN CALTRANS STANDARD SPECIFICATIONS DATED JULY 1992.**

#### **77-1.01 Definitions**

“Detention Basin” – A facility which stores storm water for a relatively short time designed with type of metered outlet.

“Wet Detention Basin” – A lake having a metered outlet utilizing differential water levels for storm water detention purposes.

“Retention Basin” – A facility which stores storm water for an indefinite period of time not usually designed with a metered outlet.

#### **77-1.02 Basin Notes**

1. Storm water basins, shall only be allowed if downstream improvements are either not feasible or impractical from a cost standpoint at the time of development. Unless otherwise approved by the City Engineer, basins will not be considered a permanent means for handling peak storm runoff flows. A plan may be required outlining the proper abandonment of the basin in the future.
2. Basins shall be constructed such that the collection system drains into the basin by gravity. Basins designed with surface berms or levees may be subject to additional design criteria other than that stated below.
3. Basins constructed in the proximity of the airport may be subject to additional design criteria due to avigational concerns.

#### **77-1.03 Detention Basin Design**

##### **77-1.03A Detention Basins With No Discharge Limitations**

**77-1.03A(1) Volume** – One 10yr – 48hr event calculated by  $V = CAR/12$ . The rainfall value for a 10yr – 48hr event in Stockton shall be 3.12 inches.

where, C = Runoff Coefficient

A = Area of Collection

R = Rainfall Value = 3.12 inches

**77-1.03A(2) Collection System** – The starting point for hydraulic grade calculations in collection system design shall be the water surface in the pond generated by the volume of 1 10yr – 48hr storm or the top of the inlet pipe, whichever is higher. Hydraulic grade shall be kept a minimum of 1 foot below the top of curb at any point in the subdivision.

**77-1.03B Detention Basins With Discharge Limitations** – Design criteria shall be the same as that listed for detention basins without discharge limitations except for as follows:

**77-1.03B(1) Volume** – 150% of the 10yr – 48hr storm calculated by  $V=CAR/12$ . The rainfall value for a 10yr – 48hr event in Stockton shall be 3.12 inches.

where, C = Runoff Coefficient

A = Area of Collection

R = Rainfall Value = 3.12 inches

**77-1.03B(2) Collection System** – The starting point for hydraulic grade calculations in collection system design shall be the water surface in the pond generated by the volume of 1 10yr – 48hr storm or the top of the inlet pipe, whichever is higher. Hydraulic grade shall be kept a minimum of 1 foot below the top of curb at any point in the subdivision.

**77-1.03B(3) Water Surface** – The maximum anticipated static water surface, determined by the volume criteria above. This water surface must remain at least 1 foot below the top of curb at the lowest point in the subdivision.

**77-1.03C Wet Detention Basins** – Basins designed as lakes with the fluctuation of water levels allowing detention of storm water runoff may be allowed where feasible. These basins, however, may not be allowed in certain areas of the City due to avigational hazards posed by waterfowl. Volume, collection system, and water surface design requirements for these basins shall be the same as for all other detention basins and will depend on the specific discharge requirements at the given location. Inlet lines and structures shall direct all storm water flows into the basin.

**77-1.03D Retention Basins** – Retention basins shall not be allowed unless approved by the City Engineer.

## SECTION 86

### SIGNALS, LIGHTING, AND ELECTRICAL SYSTEMS

The following are to be added to the appropriate sections of Section 86 of the Cal Trans Standard Specifications:

**86-2.08E Signal Interconnect Cable (SIC)** – Single mode fiber optic cable (minimum 12 strand) shall be installed from any new or modified traffic signal to the nearest available connection point on the City's fiber optic communication network. All electronic equipment necessary for the traffic signal to communicate with the City's central traffic control system shall be required.

2 ½" PVC (Schedule 80) interconnect conduit shall be installed between the new or modified traffic signal and the nearest available connection point on the City's fiber optic communication network. No. 6 pull boxes shall be installed at +/- 500 feet intervals over the length of interconnect conduit.

**86-2.09B Installation** - Traffic monitoring camera(s) shall be installed as part of new or modified traffic signals. Traffic monitoring camera(s) shall be either one pan-tilt-zoom (PTZ) camera or four fixed cameras per intersection. Fiber optic video/data modems (field and central) shall be installed to transmit the video images and data control (PTZ) between the traffic signal and the City's central traffic control system.

Emergency Vehicle Pre-emption detectors shall be installed on luminaire arms for each approach to a new or modified traffic signal. All accompanying electronic equipment necessary to send the pre-emption signal to the traffic signal controller shall be supplied and installed.



## **SECTION 90**

### **PORTLAND CEMENT CONCRETE**

The following is added to the appropriate sections of Section 90 of the Cal Trans Standard Specifications:

On reconstruction and removal projects which remove sidewalk, the sidewalk shall be replaced with a score pattern, either matching the existing pattern or meeting current sidewalk installation standards for new sidewalks, which most enhances the visual appearance of the whole sidewalk. The overall trend toward a specific pattern (new or existing) shall be considered in the decision. The Engineer shall make the final determination of the score pattern to be used.

The use of fly ash to improve the workability of concrete may be allowed subject to approval by the City Engineer. The amount of fly ash to be used shall be per an approved mix design. Substitution of fly ash or other mineral admixture in place of the required portland cement shall not be allowed.

## **SECTION 100**

### **STREET OPENING AND PAVEMENT RESTORATION REGULATIONS**

**NOTE: THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN CALTRANS STANDARD SPECIFICATIONS.**

**100-1.01 Excavation** - Any trench cuts within the street right of way to access **or install** a utility line or any related facility in excess of four (4) square feet or four (4) feet long, whichever is smaller, shall be considered an excavation and requires an excavation permit, which will be issued as part of an encroachment permit.

**100-1.011 Excavator** – The applicant/permittee to whom an encroachment permit is issued for the purposes of excavation may be referred to, for purposes within this section, as the excavator for the project.

**100-1.012 Excavation Permit** – The Encroachment Permit that is issued for any work within the street right of way that meets the definition of an excavation as described in Section 100-1.01, above, shall be referred to as an excavation permit for purposes within this section.

**100-1.013 Trench Cut Fee** - All excavations as defined above are subject to the trench cut fee. The fee shall be collected as part of the encroachment permit fee for the project.

#### **100-1.02 Moratorium**

1. Newly constructed or resurfaced streets shall be termed moratorium streets within this section. Permission to excavate in newly constructed or resurfaced streets will not be granted for three (3) years after the completion of street overlays. An overlay consists of a ½ inch or thicker layer of asphalt. For those streets with chip seal, slurry seal coatings, or micro paving with less than ½ inch of new pavement, the moratorium shall be for three (3) years. Utilities shall plan well enough in advance to determine alternate methods of making necessary repairs to avoid excavating in newly resurfaced streets. Exceptions to the above policy are as follows:
  - A. Emergencies which endangers life or property.
  - B. Interruption of essential utility service.
  - C. Work that is mandated by City, State or Federal legislation.

- D. Service for buildings where no other reasonable means of providing service exists.
  - E. Other situations deemed by the City Engineer to be in the best interest of the general public.
2. To excavate in a moratorium street a waiver must be obtained.
- A. To request a waiver, the applicant must submit a written request to the City Engineer or his designee. The request must include:
    - 1) The location of the excavation.
    - 2) Description of the work to be performed.
    - 3) Why the work was not performed before the street was paved.
    - 4) Why the work can not be deferred until after the moratorium
    - 5) Why the work can not be performed at another location.
    - 6) Why is it justified to excavate a moratorium street.
  - B. Any excavation in the moratorium streets will be repaired with full lane paving on the street as follows: (See Drawing No. 50-E, and refer to section 100-1.06 paving).
    - 1) Overlaid or reconstructed streets: All lanes that are affected shall be ground down 1.5 inches and repaved with 1.5 inches of asphalt concrete.
    - 2) Slurry sealed, chip sealed, or microsurfaced streets: All lanes that are affected shall be resurfaced per Section 100-1.06 paving.
    - 3) A minimum of one (1) ft. on either side of trench shall be resurfaced if the excavation is a lateral cut. For longitudinal trenches the entire length plus one (1) ft. on either end shall be resurfaced.
    - 4) Exception – Full lane width restoration shall not be required if the work is not considered an excavation as defined in section 100 – 1.01.

**100-1.03 Permits** - Any and all construction work within the city right of way shall be done by obtaining an encroachment permit. Anyone doing excavation work within the City of Stockton street right-of-way shall obtain an encroachment permit for the purposes of excavation in addition to any other permits required. This also applies to all City departments.

1. The permit application may be obtained at the City's Permit Center. A faxed copy may be obtained by calling 937-8900.
2. Except in an emergency, excavation permits shall be taken out in advance of excavation work. An emergency is considered to exist only when life or property is endangered or when an essential utility service is or may be interrupted during weekends, holidays, or between 5 p.m. and 8 a.m. of normal working days
3. The excavator shall notify the Permit Center and apply for an excavation permit for "emergency work" within four (4) hours after the Permit Center opens.
4. As a condition of the permit to excavate, the applicant shall have been provided an inquiry identification number by a regional notification center (Underground Service Alert, USA) pursuant to Section 4216, Chapter 1153, Assembly Bill #1606 of the California State Law.
5. Prior to applying for an excavation permit, the excavator must register with the Public Works Department. The owner or the contractor performing the work may apply for the permit. The owner of the facility shall determine who applies for the excavation permit. However, if the applicant is not the owner of the facility to be excavated, the applicant must provide documentation that the applicant is authorized to act on behalf of the owner.
  - A. The following must be provided to become registered to get an excavation permit:
    - 1) A Cash Deposit equal to 3% of the project cost with a minimum of \$1000 and a maximum of \$25,000. Companies working under a franchise agreement with the City are not required to post the cash deposit until they have violated the City standards or permit requirements.
    - 2) A current Business License.
    - 3) Current evidence of Insurance.
    - 4) 24 hr. Phone Number for emergencies.
    - 5) The name, telephone number, and mailing address (fax number, pager, and e-mail address if available) of the person who will receive all official correspondence from the Department.
  - B. If an account is past due or not in good standing, a permit cannot be issued until the account is brought into good standing. The account is past due if

the fines are not paid and are deducted from the deposit. To bring the account to good standing, all fees and fines must be paid.

6. If an excavator damages other facilities during their excavation work:
  - A. They do not need another excavation permit if no additional excavation is required to repair the damaged facility. In this case the original permittee shall maintain the site and restore the pavement.
  - B. They need an additional excavation permit if additional excavation and trenches are needed to repair the damaged facility.
7. All applications shall include a plan indicating the following:
  - A. Name of the street to be excavated and the nearest cross streets.
  - B. Distance from the face of the curb.
  - C. Distance from the intersection.
  - D. The size of the excavation (length and width).
  - E. The location of any above ground facilities to be installed, showing:
    - 1) Distance from curb and any street facilities/furniture.
    - 2) Purpose of the facility.
    - 3) Size of the facility.
    - 4) Location of doors and door swing.
  - F. The location of any underground facilities to be installed showing:
    - 1) Conduits vaults, maintenance holes, pipes, etc.
    - 2) Structural detail and additional information for installation of the structures such as vaults and maintenance holes.
    - 3) The construction method of the structure to be installed.
    - 4) Construction detail, locations, size, design criteria and the purpose of the facility.

- G. Cross section of a typical trench indicating:
    - 1) The approximate depth of the facility to be installed.
    - 2) Trench backfill depth, compaction and layer depths.
    - 3) Pavement section detail (type and depths)
    - 4) Plans, structural details, and trench cross section must be signed and stamped by a licensed Civil Engineer, when legally required.
  - H. The plan may show the approximate location of the excavation provided that on an "as-built" plan, the exact location of the excavation is shown. This shall be submitted prior to the permit being finalized and filed.
8. Pre-Construction meeting:
- A. A pre-construction meeting shall be held for all projects that are scheduled to take longer than 15 working days to complete.
  - B. The owner, contractor, any other agency that is involved and the Public Works Department shall attend this meeting.
  - C. There will be a fine for projects that are supposed to be completed within 15 days, and are not completed within the allowed time, if a pre-construction meeting was not held.
  - D. A traffic control plan shall be provided with the submittal of the application, and approved prior to the pre-construction meeting.
9. Permit duration shall be indicated on the permit:
- A. All permits shall include estimated start and completion dates. A permit is valid from the construction start date specified on the approved permit until the specified completion date.
  - B. Excavation permits are not valid if other required permits are not obtained or required notifications are not given.
  - C. No disruption of traffic is allowed after 3:00 PM and before 9:00 AM unless specifically approved for these hours.
  - D. Some permits may be valid on specific dates. They may be approved with special conditions specifying the dates:

- 1) When work shall not be done.
  - 2) When work must be completed.
  - 3) Before which work shall not start.
- E. Permits expire and become void unless otherwise amended:
- 1) Thirty days after the start date, if no work has begun.
  - 2) If the work is not diligently prosecuted and there are long delays after the work has started.
  - 3) When the excavation, including the trench restoration is not completed within the duration specified on the permit or on the date specified on the permit as the expiration date.
- F. The work is determined to be proceeding diligently if:
- 1) Once a project begins, work continues on a daily basis, except for weekends, holidays, inclement weather, labor disputes or any other emergency.
  - 2) Once a project begins, the work continues uninterrupted until such work no longer affects public convenience, health or safety. If the project is a multi agency project, a one-week time will be allowed for one agency to move out and another to move in to complete their work.
  - 3) The permittee ensures that all necessary materials and supplies are on hand and ready for use so as not to delay the excavation and the prompt restoration of the public right-of-way.
10. A valid permit may be extended by:
- A. Requesting an extension prior to the expiration date by:
- 1) Specifying the dates that need to be changed
  - 2) Explaining why an extension is needed.
11. All the excavation permit fees are due at the time the permit application is submitted.

- A. Checks should be made out to the City of Stockton. The check shall include:
  - 1) The permit number
  - 2) The type of fees being paid (Administration fee, Inspection, extension, reapplication, etc.)
  - 3) All the fees, fines and penalties, not collected with the application will be billed by the city and shall be paid within 30 days. If they are not paid within 30 days, then these fees, fines and penalties will be deducted from the deposit. Utility companies working under a franchise agreement have 90 days to pay. If a contractor working for a utility company does not pay, the owner/utility company will be responsible to pay these fees, fines, and/or penalties.
  - 4) If a violation occurs and the fines are deducted from the deposit, no other application will be processed until the deposit has been put in place with the city and all conditions are met. For companies without a deposit, if the fines are not paid on time, no other permit will be issued.
- 12. If an application has been withdrawn or an approved permit is cancelled prior to the start of work:
  - A. Inspection fee and trench cut restoration fees will be refunded.
  - B. To request a refund a written request must be submitted to the City Engineer.
  - C. The request shall include:
    - 1) The reason for cancellation or withdrawal
    - 2) The application number
- 13. By accepting an excavation permit, the permittee and the owner of the facility(ies) for which the permit has been issued agree:
  - A. To follow all rules, regulations, special conditions, and code requirements.
  - B. To assure that their employees, contractors, and subcontractors comply with all rules, regulations, permit conditions and code requirements.



C. To indemnify the city.

14. The excavation permit must be available during work periods at the excavation site, until the project is completed and signed off by the City. Permit must be shown to the city employees on request.
15. The City and various utility companies must coordinate their Capital Improvement Programs. This information shall be shared through the monthly utility coordination meeting.

The information about any planned work in the street right-of-way shall be shared at the earliest possible time.

Various utility owners are encouraged to coordinate their excavation of the streets so that all work is done simultaneously and that the street is not excavated frequently within the same year.

16. The excavator shall provide public notifications when excavating in the public right-of-way.
  - A. Provide 11"x17" posters with 1-inch minimum letters at beginning and end of the project and every 300 feet in between. Notes must contain:
    - 1) The names, address, and telephone number of the owner and the permittee.
    - 2) The start and completion dates of the project.
  - B. Major projects lasting 15 working days or longer, the excavator shall:
    - 1) Mail notices to or notify, after the permit has been issued but no more than 30 days before the anticipated start date of work:
      - a) Property owners, residents, or occupants of the affected blocks.
      - b) Schools and churches in the area and the San Joaquin Regional Transit District.
      - c) Provide the City with a copy of the notice.
    - 2) At least 5 days but not more than 15 calendar days prior to starting construction, post and maintain 11" X 17" notices at beginning and end of the project and every 300 feet in between and deliver a copy of same notice to each dwelling unit on the block. The notices must contain:

- a) The name, address, and telephone number of the owner and the permittee.
  - b) A description of the project.
  - c) The start and completion dates of the project.
  - d) The name, address and 24-hour telephone number of a contact person.
17. A project sign is required for all major projects to be installed at either end of the project. The location for the sign to be worked out by the excavator and the City.
- A. The sign shall be a minimum of 24" x 36" with 2" minimum letters. It shall be hung on 4" x 4" wooden posts or a standard metal sign posts and include:
- 1) Project name, description, and Permit number.
  - 2) Permittee's name, address and 24 hour phone.
  - 3) Owner's name.
  - 4) Start date and completion date of the project.

#### **100-1.04 Excavation Material**

- 1. Pavement shall be cut to a straight, neat, vertical line prior to excavation.
- 2. All excavated material not suitable for backfilling shall be removed from the job site within twenty-four (24) hours. Excavated material suitable for backfilling may be stored on the job site for a maximum of five (5) working days, provided it does not occupy any more street space than the permit allows and provided this material is completely prevented from blowing, washing, or being thrown about at all times. Material may be stored on the adjacent private property if a written approval from the property owner has been obtained.
- 3. No trench shall be opened on any street that is not backfilled or plated at the end of the same day. Fines will be charged if any trench is left open.

#### **100-1.05 Backfill**

- 1. Trenches shall be backfilled with sand or suitable site excavated material. Compaction of backfill shall be in accordance with Drawing No. 50 or 50-A.
- 2. When undermining occurs, remove existing pavement as required to compact the backfill and restore the pavement.

3. Each encroachment permit will specify the number of compaction tests required. Each compaction test shall be certified by an independent laboratory and submitted to the City Encroachment Permit Inspector. If the results of compaction test show generally poor or marginal compliance with City compaction requirements, the number of compaction tests may be increased by the Engineer to help insure that proper compaction is being achieved.
4. A CONTROL NUMBER SHALL BE OBTAINED by calling (209) 937-8900 one (1) day in advance of the start of work on any encroachment permit. A copy of the permit and control number shall be on site during the construction.

#### **100-1.06 Paving**

1. Trenches shall be paved as shown on Drawing No. 50 or 50-A. After the trench has been backfilled and immediately prior to placing asphalt concrete, the existing asphalt concrete shall be saw cut, or milled according to City Standards, to a vertical face. New AC paving shall be butt joined to the existing asphalt concrete vertical face. No feathering of new paving to existing paving is allowed. The vertical faces shall be tack coated. In moratorium streets, placement of the final one and one-half (1 ½) inches of AC wearing surface shall be done by a paving machine or spreader box. Asphalt concrete shall be delivered and compacted in accordance with the Standard Specifications and Plans

To allow for proper placement of the new pavement section, damaged pavement outside of the original trench cut lines shall be removed by cutting in lines perpendicular to or parallel to the original trench lines. No diagonal cuts are to be made. Undamaged pavement of three (3) feet or less between two damaged areas shall also be removed. (See Drawing No. 50-B)

2. Pavement will be restored using the "T Section" shown on Drawing No. 50.
3. For trenches in moratorium streets parallel to the centerline of the street, the entire lane shall be key-cut one and one-half (1 ½) inches, deep and repaved with asphalt concrete. For trenches in moratorium streets with chip seal or slurry seal coatings, the entire lane shall be resurfaced with these coatings.
4. Trenches in concrete streets shall be paved with concrete pavement. The thickness of the new pavement shall be equal to the thickness of the existing pavement with the minimum thickness to be six (6) inches in the roadway.
5. Trenches in arterial streets, with asphalt wearing surfaces, shall be paved with not less than eleven and one-half (11 ½) inches asphalt concrete topped with one and one-half (1 ½) inches of asphalt concrete wearing surface or match the existing pavement if it is more.

6. Trenches in local and collector streets shall be paved with not less than six and one-half (6 ½) inches asphalt concrete topped with one and one-half (1 ½) inches of asphalt concrete wearing surface or match the existing pavement if it is more.
7. Pavement shall be restored within fourteen (14) working days from the time the entire trench is backfilled. For minor excavations such as service installations, the pavement shall be restored within thirty (30) working days from the time the entire trench is backfilled. The asphalt concrete wearing surface shall be placed within five (5) working days after placement of asphalt concrete base, weather permitting.
8. Asphalt pavement shall be compacted to obtain a minimum of ninety-five percent (95%) of relative compaction. The asphalt concrete wearing surface shall have no irregularity greater than five-sixteenths of an inch (5/16") in ten feet (10') in any direction.
9. On collector and arterial streets steel plates shall be used when ordered by the permit inspector to facilitate traffic flow and to protect the excavation until finished pavement is restored. Steel plates used to bridge a street opening shall be ramped to the elevation of the adjacent pavement and secured against movement in any direction. Temporary ramps shall be constructed of asphalt and shall have a gradual slope. On all other streets, temporary asphalt cutback is permitted.
10. After trench paving, utility trenches shall be color-coded with the 4" stenciled initials of the company doing the trench. These initials will be prescribed by the City of Stockton as stated below and the color shall be as prescribed by the Underground Service Alert (USA). The initials shall be stenciled on the existing asphalt adjacent to the new trench. When paving is complete, the initials shall be painted, using Krylon (or an approved equal), at the beginning and end of each trench and at each intersection, if applicable. The use of colored identifying disks in place of painting is allowed.

Company	Color	Initials
PG&E - Electric	Red	PG&E
PG&E - Gas	Yellow	PG&E
Pacific Bell	Orange	PB
Cable TV	Orange	TV
Cal Water	Blue	CW
City of Stockton - Water	Blue	COS
City of Stockton - Electric	Red	COS
City of Stockton - Sewer	Green	COS

Any agency not listed above must contact Public Works to be assigned initials

before performing any excavation or trenching activities in the City of Stockton.

USA Codes are:

Electric	Red
Gas-Oil	Yellow
Communication - CATV	Orange
Water	Blue
Sewer	Green
Temporary Survey Markings	Pink
Proposed Excavation	White

All painted USA markings shall be removed by the permittee after the work has been completed.

11. Wheelchair ramps shown on Drawing No. 31 or 32 shall be constructed where any portion of the curb, at a legal pedestrian crosswalk or any portion of the sidewalk in immediate contact with such curb is removed, except where there is an existing wheelchair ramp in the cross-walk or where there is a subsidewalk basement behind the crosswalk.
12. All damaged pavement markings and striping shall be replaced and restored by the excavator.

#### **100-1.07 Defects**

1. Depressed trench pavement shall be repaired as follows:
  - A. Wearing surface defects - remove and restore wearing surface.
  - B. Major defects - excavate, remove and restore surface and base.
  - C. The Permit Inspector will determine the severity of the defect.
2. Work not complying with the above requirements shall be rejected, removed, and redone to the satisfaction of the City Engineer.
3. The owner of the facility/utility company is responsible for the roadway defects appearing after the permittee restores the trench (area adjacent to the trench). The owner is responsible for maintenance, repair or reconstruction of the excavation site's affected area until the city reconstructs, repaves, or resurfaces the street.
4. If there is a trench related failure after the work by the city, the owner of the facility/utility company is responsible for its repair.

5. The owner of the facility/utility company is responsible to maintain the trenches and repair any defects that may appear. The City Engineer will determine who is responsible for a defect when one is detected and will notify the responsible party and direct them to repair the facility.

When the City determines that an excavation or a defect is hazardous or constitutes a public nuisance or other imminent threat to public health, safety, or welfare, the City Engineer may order the responsible party to remedy the condition immediately.

- A. If the responsible party refuses or fails to make the needed repairs immediately, the City will make the repairs and:

- 1) The responsible party will be charged all the actual costs including administration, construction, consultant fees, equipment, inspection, notification, remediation made necessary by the action of the permittee, repair, and restoration.
- 2) The repair or restoration by the City does not relieve the responsible party from liability for future pavement failures.
- 3) If the responsible party fails or refuses to pay the restoration cost, the cost of the repair or restoration will be deducted from the responsible party's deposit.

6. If the owner/person responsible for the roadway defect does not make the required repairs, the City will make the repairs and the responsible party will be charged for all the actual cost of repair, including but not limited to administration, construction, consultant fees, equipment, inspection, notification, remediation made necessary by the action of the permittee, and restoration. Repairs or restoration by the City does not relieve the responsible party(s) from liability for future pavement failures. If the responsible party fails or refuses to pay the cost of the repair, the cost will be deducted from the responsible party's deposit.

### **100-1.08 Violations**

**100-1.08.1 Excavation Violations** - Any violation of the above regulations may result in the revocation of the encroachment permit and/or be subject to a citation process and/or fine. The fines for various violations are as follows:

VIOLETIONS	PENALTY (Not to exceed amount shown)
1. Working without a Permit(s),	\$1,000 and Stop Work

VIOLATIONS	PENALTY (Not to exceed amount shown)
control number not called in.	
2. Excavation without providing Public Notice	\$1,000 and Stop Work
3. Beginning a "Major Project" without having a Pre-Construction Meeting	\$500 per occurrence, per day
4. Violation of Permit Conditions	\$500 per occurrence, per day
5. Improper Site Protection: Improper plating, path of travel, barricading, etc.	\$500 per occurrence, per day
6. No permit on site	\$250 per occurrence, per day
7. Improper Trimming of Trench	\$250 per Trench
8. Any trench left open after the allowed work hours that is not back filled and covered.	\$250 per day
9. Improper Public Notice: No Project Sign, wrong information on sign/notice	\$100 per block, per day
10. Non-compliance with Trench Restoration Requirements	\$250 per trench, per day
11. Improper Housekeeping: Failure to remove spoil, dirty site, no sweeping, etc.	\$100 per block, per day
12. Other Excavation Code Violations	\$100 per occurrence, per day
13. Call for Inspection but not ready to be inspected	\$250 per occurrence, per day

The above fines, when assessed, shall be deducted from the cash deposit required by 100-

1.03 5A of this section or will be paid by the applicant if there is not a cash deposit.

To appeal any citations, fines, or other requirements, the Stockton Municipal Code procedure for appeal shall be followed. If there are any fines they must be paid and will be reimbursed if the appeal is valid.

**100-1.08.2 Other Violations**-Any violation of the above regulations and/or Chapter 9 of the Stockton Municipal Code may result in the revocation of the encroachment permit and/or be subject to an administrative citation per Stockton Municipal Code Sections 1.042-1.059.

Violations include but are not limited to working without a permit, failure to obtain a control number before starting work, no permit on the work site, failure to comply with the permit's conditions, provisions and requirements, improper work area housekeeping, and work left open after allowed work hours that is not filled/covered.



## SECTION 101

### STREET MICROSURFACING

**NOTE: THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN CALTRANS STANDARD SPECIFICATIONS.**

**101-1.01 Description** - The work shall consist of installing a specialized slurry seal – either Type II or Type III Microsurfacing - on streets as shown on the plans. The installation work shall generally consist of the following:

1. Cleaning of existing pavement surface.
2. Removal of existing pavement markers.
3. Mixing of a polymer modified, cationic microsurfacing emulsion (MSE) - water and additives, mineral filler, and aggregate - and spreading of the mixture on cleaned pavement surface
4. Re-instatement of pavement markings / markers.

#### **101-1.02 Materials:**

**101-1.02A Microsurfacing Emulsion (MSE)** – The MSE shall be homogenous. The polymer shall be milled or blended into the asphalt or blended into the emulsifier solution prior to the emulsification process. The MSE shall contain a minimum of 3 percent polymer solids based on mass of MSE residual asphalt. A Certificate of Compliance shall be furnished with each shipment of MSE in conformance with the requirements in Section 94-1.05, “Test Report,” of the Standard Specifications.

The MSE shall conform to the following requirements:

#### **Requirements for Polymer Modified, Cationic Microsurfacing Emulsion (MSE)**

Tests on MSE:

Test	Test Method	Requirement
Viscosity @ 25°C, SSF	AASHTO T 59	15-90 sec
Sieve Test, max.	AASHTO T 59	0.30%
Settlement, 5 days, max.	ASTM D 244	5%
Storage Stability, 1 day, max.	AASHTO T 59	1%
Residue by Evaporation, min.	California Test 331	62%

Tests on Residue from Evaporation Test:

Test	Test Method	Requirement
G* @ 20°C, 10 rad/sec, MPa	AASHTO TP 5	Report Only
Penetration @ 25°C	AASHTO T 49	40-90
Phase Angle @ 50°C, 10 rad/sec, PA (max) - PA base	AASHTO TP 5	Report Only
Softening Point, min.	AASHTO T 53	57°C
Stiffness @ -12°C, MPa, and M-value	AASHTO TP 1	Report Only

**101-1.02B Water and Additives -** Water shall be of such quality that the asphalt will not separate from the MSE before the microsurfacing is placed on the pavement. If necessary for workability, additives that will not adversely affect the microsurfacing product may be used.

**101-1.02C Mineral Filler -** Mineral filler shall be portland cement or hydrated lime that is free of lumps. Portland cement shall be either Type I, Type II, Type III or a combination thereof. The type of mineral filler shall be determined by the Contractor based on laboratory mix designs. The mineral filler will be considered part of the aggregate gradation requirement.

**101-1.02D Aggregate -** Type II aggregate may be used on low to moderate speed traveled ways, residential streets, pedestrian traffic areas, shoulders and areas where a smoother surface texture is desired. Generally, Type III aggregate is used on high speed traveled ways and areas where a coarse surface texture is desired. Type III aggregate must be used when filling wheel path depressions and on bridge decks. **The Engineer shall decide the aggregate type to be used on the project.** The aggregate shall be free from vegetable matter and other deleterious substances. Aggregate shall be free of lumps and oversize particles. One hundred percent of the parent aggregate shall be larger than the largest stone in the gradation to be used.

Aggregate shall conform to the grading and quality requirements prior to the addition of the MSE. If aggregates are blended, each component aggregate shall conform to the Sand Equivalent and Durability Index requirements.

The percentage composition by mass of aggregate, including mineral filler, shall conform to the following grading requirements:

TYPE II

Sieve Sizes	Percentage Passing
9.5-mm	100
4.75-mm	94 - 100
2.36-mm	65 - 90
1.18-mm	40 - 70
600-μm	25 - 50
75-μm	5 - 15

TYPE III

Sieve Sizes	Percentage Passing
9.5-mm	100
4.75-mm	70 - 90
2.36-mm	45 - 70
1.18-mm	28 - 50
600-μm	19 - 34
75-μm	5 - 15

The aggregate, excluding mineral filler, shall conform to the following quality requirements:

Test	California Test	Requirement
Sand Equivalent, min.	217	68
Durability Index, min.	229	55
Percentage of Crushed Particles, min. <sup>1</sup>	205	100%
Los Angeles Rattler Loss at 500 Rev., max. <sup>2</sup>	211	35%

Notes:

1. California Test 205, Section D, is amended to read: "Any particle having 2 or more freshly, mechanically fractured faces shall be considered a crushed particle."
2. California Test 211, Los Angeles Rattler, shall be performed on the parent aggregate before crushing

If the results of the aggregate grading do not meet the specified gradation, the microsurfacing represented by the test shall be removed. However, if requested in writing by the Contractor and approved by the Engineer, the microsurfacing may remain in place and the Contractor shall pay to the City \$2.00 per ton for the aggregate represented by the tests and left in place.

If the results of the Sand Equivalent test for aggregate do not meet the specified requirement, the microsurfacing represented by the test shall be removed. However, if requested in writing by the Contractor and approved by the Engineer, the microsurfacing may remain in place and the Contractor shall pay to the City \$2.00 per ton for the aggregate represented by the tests and left in place.

When the results of both the aggregate grading and the Sand Equivalent tests do not conform to the specified requirements and if the microsurfacing is allowed to remain in place, both payments to the City shall apply.

No single aggregate grading or Sand Equivalent test shall represent more than 275 tons or one day's production, whichever is smaller.

**101-1.03 Mix Design** - At least 10 days before the microsurfacing placement commences, the Contractor shall submit for approval of the Engineer a laboratory report of tests and a proposed mix design covering the specific materials proposed for use on the project.

The percentages of each individual material proposed in the mix design shall be shown in the laboratory report. Adjustments may be required during construction based on field conditions. Individual materials shall be within the following limits.

MSE Residual Asphalt	5.5% to 9.5% by dry mass of aggregate
Water and Additives	As needed
Mineral Filler	0% to 3% by dry mass of aggregate

The mix design and aggregate tests shall be performed by a laboratory capable of performing the applicable International Slurry Surfacing Association (ISSA) tests. The proposed microsurfacing mixture shall conform to the specified requirements when tested in conformance with the following tests:

Test	ISSA Test Method	Requirements
Wet Cohesion @ 30 Minute (Set), min. @ 60 Minute (Traffic), max.	TB* 139	12 kg-cm 20 kg-cm
Excess Asphalt, max.	TB* 109	540 g/m <sup>2</sup>
Wet Stripping, min.	TB* 114	90%
Wet Track Abrasion Loss 6-day Soak, max.	TB* 100	810 g/m <sup>2</sup>
Displacement Lateral, max. Specific Gravity After 1000 Cycles of 57 kg, max.	TB* 147A	5% 2.10
Classification Compatibility, min.	TB* 144	(AAA, BAA) 11 grade points
Mix Time @ 25°C, min.	TB* 113	Controllable to 120 Seconds

TB\* = Technical Bulletin

The laboratory that performed the tests and designed the mixture shall sign the laboratory report. The report shall show the results of the tests on individual materials and shall compare their values to those required by these special provisions. The report shall clearly show the proportions of aggregate, water (minimum and maximum), additive usage, mineral filler (minimum and maximum), and MSE residual asphalt content (minimum and maximum) based on the dry mass of aggregate. The laboratory shall report the quantitative

effects of moisture content on the unit mass of the aggregate (bulking effect) in conformance with the requirements of ASTM Designation: C 29M. Previous laboratory reports covering the same materials may be accepted provided the material test reports were completed within the previous 12 months. The mix design shall further show the recommended changes in water, additive, and mineral filler proportions for high temperature weather conditions by reporting proportions of materials required for 60 seconds of mix time with materials heated to 38°C. This 38°C mixing report will not be required for projects requiring nighttime application.

The component materials used in the mix design shall be representative of the microsurfacing materials proposed by the Contractor for use on the project.

Once the mix design is approved by the Engineer, no substitution of other material will be permitted unless the materials proposed for substitution are first tested and a laboratory report is submitted for the substituted design in conformance with these special provisions. Substituted materials shall not be used until the mix design for those materials has been approved by the Engineer.

The completed mixture, after addition of water and additives, if additives are used, shall be such that the microsurfacing mixture has proper workability. At the expiration of the time allowed by the Engineer for closure of lanes the microsurfacing mixture shall be sufficiently cured to support unrestricted traffic.

**101-1.04 Proportioning -** Aggregate, water, additives (if used), mineral filler, and MSE shall be proportioned by volume utilizing the mix design approved by the Engineer. If more than one kind of aggregate is used, the correct amount of each kind of aggregate to produce the required grading shall be proportioned separately, prior to adding the other materials of the mixture, in a manner that will result in a uniform and homogeneous blend.

The aggregate shall be proportioned using a belt feeder operated with an adjustable cutoff gate. The height of the gate opening shall be determinable. The MSE shall be proportioned by a positive displacement pump. Variable rate emulsion pumps, if used, shall be calibrated and sealed in the pump's calibrated condition in conformance with California Test 109 prior to usage.

The delivery rate of aggregate and MSE per revolution of the aggregate feeder shall be calibrated at the appropriate gate settings for each mixer-spreader truck used on the project in conformance with California Test 109.

The aggregate belt feeder shall deliver aggregate to the pugmill with such volumetric consistency that the deviation for any individual aggregate delivery rate check-run shall not exceed 2 percent of the mathematical average of 3 runs of at least 3 tons each. The emulsion pump shall deliver MSE to the pugmill with such volumetric consistency that the deviation for any individual delivery rate check-run shall be within 2 percent of the mathematical

average of 3 runs of at least 1135 L each. The water pump shall deliver water to the pugmill with such volumetric consistency that the deviation for any individual delivery rate check-run shall be within 2 percent of the mathematical average of 3 runs of at least 1135 L each.

The MSE storage tank shall be located immediately before the emulsion pump and shall be equipped with a device which will automatically shut down the power to the emulsion pump and aggregate belt feeder when the MSE level is lowered to a point where the pump suction line is exposed.

A temperature-indicating device shall be installed in the emulsion storage tank at the pump suction level. The device shall indicate the temperature of the MSE and shall be accurate to within 5°C.

The belt delivering the aggregate to the pugmill shall be equipped with a device to monitor the depth of aggregate being delivered to the pugmill. The device for monitoring the depth of aggregate shall automatically shut down the power to the aggregate belt feeder whenever the depth of aggregate is less than the target depth of flow. A second device shall be located where the device will monitor the movement of the aggregate belt by detecting revolutions of the belt feeder. The devices for monitoring no flow or belt movement shall automatically shut down the power to the aggregate belt when the aggregate belt movement is interrupted. The device to detect revolutions of the belt feeder will not be required where the aggregate delivery belt is an integral part of the drive chain. To avoid erroneous shutdown by normal fluctuation, a delay of 3 seconds will be permitted between sensing and shutdown of the operation.

**101-1.05 Mixing and Spreading Equipment -** The microsurfacing shall be mixed in continuous pugmill mixers of adequate size and power for the type of microsurfacing to be placed. All indicators shall be in working order prior to commencing mixing and spreading operations.

Mixer-spreader trucks shall be equipped to proportion the aggregate, water, additives (if used), mineral filler, and MSE by volume. Rotating and reciprocating equipment on mixer-spreader trucks shall be covered with metal guards.

The mixer-spreader truck shall not be operated unless low-flow and no-flow devices and revolution counters are in good working condition and functioning and metal guards are in place. The required indicators shall be visible while walking alongside the mixer-spreader truck.

Aggregate feeders shall be connected directly to the drive on the emulsion pump. The drive shaft of the aggregate feeder shall be equipped with a revolution counter reading to the nearest one-tenth of a revolution.

In addition to the provisions in the fourth paragraph of Section 5-1.10, "Equipment and Plants," of the Standard Specifications, the identifying number of mixer-spreader trucks shall

be at least 75 mm in height, located on the front and rear of the vehicle.

The microsurfacing mixture shall be spread by means of a spreader box. However, when wheel path depressions have a cross section that is deformed 12.5 mm or more, the individual wheel paths shall first be filled utilizing a wheel path depression (rut) box.

**101-1.05A – Spreader Box -** The spreader box shall be capable of placing the microsurfacing a minimum of 3.6 m wide and shall prevent the loss of microsurfacing from the box. Spreader boxes over 2.38 m in application width shall have baffles, reversible motor driven augers or other suitable means to insure uniform application on superelevated sections and shoulder slopes. Spreader box skids shall be maintained in such manner as to prevent chatter (wash boarding) in the finished mat. The spreader box shall be clean and free of microsurfacing and MSE at the start of each work shift.

The spreader box shall have a series of strike-off devices at the rear of the box. The leading strike-off device shall be fabricated of steel, stiff rubber or other suitable material. The number of strike-off devices shall be determined by the Contractor. The first strike-off device shall be designed to maintain close contact with the pavement during the spreading operations, shall obtain the thickness required, and shall be capable of being adjusted to the various pavement cross sections for application of a uniform microsurfacing finished surface. The final strike-off device shall be fabricated of flexible material suitable for the intended use and shall be designed and operated to ensure that a uniform texture is achieved in the finished surface of the microsurfacing. The final strike-off device shall be cleaned daily and changed if problems with longitudinal scouring occur.

Flexible fabric drags attached to the rear of the spreader box shall not be used.

**101-1.05B Wheel Path Depression (Rut) Box -** The wheel path depression (rut) box shall be designed to have adjustable strike-off devices to regulate the depth and shall have a width of between 1.52 m and 1.81 m. Hydraulic augers, or similar devices, shall be installed and shall be capable of moving the mixed material from the rear to the front of the filling chamber. These devices shall also be capable of guiding the larger aggregate into the center, deeper section of the wheel path depression, and forcing the finer material toward the outer edges of the spreader box. In areas inaccessible to the wheel path depression (rut) box, the microsurfacing mixture may be spread by other methods approval by the Engineer.

**101-1.06 Placing -** The microsurfacing mixture shall be uniformly spread on the existing surfacing within the rate specified without spotting, rehandling, or otherwise shifting the mixture. The microsurfacing mixture shall not be placed when directed otherwise by the Engineer, when the ambient temperature is below 10°C, or during unsuitable weather. Microsurfacing shall not be placed if rain is imminent or if there is the possibility that there will be freezing temperatures within 24 hours.

When wheel path depressions have a cross section that is deformed 12.5 mm or more, the individual wheel paths shall first be filled utilizing a wheel path depression (rut) box. The depth of the wheel path depression shall be determined after adjacent ridges have been removed. The maximum single application for wheel path depressions shall be 25 mm. Wheel path depressions of depths greater than 25 mm shall require multiple applications in each depression.

Wheel path depression repair shall be constructed with a slight crown to allow for initial compaction by traffic on the microsurfacing.

Freshly filled wheel path depressions shall be compacted by traffic for a minimum of 12 hours before additional lifts of microsurfacing material are placed for rut filling purposes or as surface courses.

Prior to placement of the microsurfacing, the pavement markers shall be removed and the surface shall be cleaned by sweeping, flushing or other means necessary to remove loose particles of paving, dirt, and other extraneous material. When required by local conditions, the roadway surface may be fogged with water ahead of the spreader box. The application of the fog spray may be adjusted to suit temperatures, surface texture, humidity, and dryness of pavement.

Microsurfacing shall be spread at a rate within the following ranges of kilograms of dry aggregate per square meter.

Microsurfacing Type	Location	Spread Rate
Type II	Full Lane Width	5.5 – 11.0
Type III <sup>1</sup>	Full Lane Width	11.0 – 17.5
Type III <sup>2</sup>	Full Lane Width	16.0 – 17.5

Notes:

1. For microsurfacing over asphalt concrete pavement.
2. For microsurfacing over portland cement concrete pavement and concrete bridge decks.

Longitudinal joints shall correspond with the edges of the final traffic lanes. The Engineer may permit other patterns of longitudinal joints if the patterns will not adversely affect the quality of the finished product.

Through traffic lanes shall be spread in full lane widths only. Longitudinal joints common to 2 traffic lanes shall be butt joints with overlaps not to exceed 76 mm. Building paper shall be placed at the transverse joints to avoid double placement of the microsurfacing. Other suitable methods to avoid double placement of the microsurfacing will be allowed. Hand tools shall be available to remove spillage.

The mixture shall be uniform and homogeneous after placing on the surfacing and shall not



show separation of the MSE and aggregate after setting. The completed surface shall be of uniform texture and free from ruts, humps, depressions, or irregularities. Adequate means shall be provided to protect the microsurfacing from damage by traffic until such time that the mixture has cured sufficiently so that the microsurfacing will not adhere to or be picked up by the tires of vehicles.

The microsurfacing shall be swept approximately 24 hours after placement to remove loosened or shed aggregate particles. Thereafter, the microsurfacing shall be swept, when directed by the Engineer, for up to 10 days after placement to remove loosened or shed aggregate particles. Sweeping shall be performed in such a manner that the microsurfacing will not be damaged.

**ENVIRONMENTAL SIGNIFICANCE CHECKLIST (Completed by Lead Agency or Authorized Consultant - - Check (4) Responses and Provide Supporting Documentation and References, as applicable):**

- *In completing this Checklist, the Lead Agency shall evaluate each environmental issue based on the preceding Sections A and B of this Initial Study and shall consider any applicable previously-certified or adopted environmental analysis. The decision as to whether a project may have one or more significant effects shall be based on substantial evidence in light of the whole record before the Lead Agency. All answers must take into account the whole action involved, including offsite as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*
- *Following each section of this Checklist is a subsection to incorporate environmental documentation and to cite references in support of the responses for that particular environmental issue. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources the Lead Agency cites (in parentheses) at the end of each section. This subsection provides (a) the factual basis for determining whether the proposal will have a significant effect on the environment; (b) the significance criteria or threshold, if any, used to evaluate each question; and (c) the new or revised mitigation measures and/or previously-adopted measures that are incorporated by reference to avoid or mitigate potentially significant impacts. Mitigation measures from Section D, "Earlier Analyses", may be cross-referenced. In addition, background and support documentation may be appended and/or incorporated by reference, as necessary. This section is required to support a "Mitigated Negative Declaration". If an Environmental Impact Report (EIR) will be prepared, this section shall provide an "EIR Scope of Work" in order to focus on issues to be addressed in the Draft EIR*
- *A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project site is not subject to flooding). A "No Impact" answer should be explained if it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).*
- *Once the lead agency has determined that a particular physical impact may occur, the checklist answers must indicate whether the impact is "Potentially Significant", "Less-than-Significant with Mitigation Incorporated", or "Less-than-Significant". "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant and mitigation measures to reduce the impact to a less-than-significant level have not been identified or agreed to by the project applicant. If there are one or more "Potentially Significant Impact" entries upon completing the Checklist, an Environmental Impact Report (EIR) is required.*
- *The "Less-than-Significant with Mitigation Incorporated" category applies when revisions in the project plans or proposals made, or agreed to, by the applicant would avoid or mitigate the effect(s) of the project to a point where, clearly, no significant adverse environmental effect would occur. The lead agency must describe the mitigation measures and briefly explain how they reduce the effect to a less-than-significant level. Upon completing the Checklist, if there is no substantial evidence in light of the whole record before the Lead Agency that the project, as revised, may have a significant effect on the environment, then, a "Mitigated Negative Declaration" shall be prepared.*
- *The Checklist shall incorporate references to common or comprehensive information sources [e.g., the City's General Plan, redevelopment plans, infrastructure master plans, zoning ordinance/development code(s), and related environmental documents, etc.] for potential regional (Citywide) and cumulatively considerable impacts. In addition, any prior site-specific environmental documents and/or related studies (e.g., traffic studies, geo-technical/soils reports, etc.) should be cited and incorporated by reference, as applicable. Reference to a previously prepared or outside document should, when appropriate, include a reference to the page or pages where the statement is substantiated. Referenced documents shall be available for public review in the City of Stockton Community Development Department, Planning Division, 345 N. El Dorado St., Stockton, CA.*
- *Supporting Information Sources: A source list should be attached and other sources used and/or individuals contacted should be cited in the discussion.*

## ENVIRONMENTAL SIGNIFICANCE CHECKLIST

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
--------------------------------------	---	-------------------------------------	--------------

1. **AESTHETICS** - Would the project:

- a. Have a substantial adverse effect on a scenic vista?
- b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?
- c. Substantially degrade the existing visual character or quality of the site and its surroundings?
- d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?


**Supporting Documentation/References Cited:**

2. **AGRICULTURAL RESOURCES** - Would the project:

- a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?
- b. Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?
- c. Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use?


**Supporting Documentation/References Cited:**

3. **AIR QUALITY** - Would the project:

- a. Conflict with or obstruct implementation of the applicable air quality plan?
- b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
- c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?
- d. Expose sensitive receptors to substantial pollutant concentrations?


Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
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Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact

- e. Create objectionable odors affecting a substantial number of people?

**Supporting Documentation/References Cited:**

**4. BIOLOGICAL RESOURCES - Would the project:**

- a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?
- b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?
- c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?
- d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?
- e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?
- f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?


**Supporting Documentation/References Cited:**

**5. CULTURAL RESOURCES - Would the project:**

- a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?
- b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?
- c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?
- d. Disturb any human remains, including those interred outside of formal cemeteries?


**Supporting Documentation/References Cited:**

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
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6. **GEOLOGY AND SOILS** - Would the project:

a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

(1) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

(2) Strong seismic groundshaking?

(3) Seismic-related ground failure, including liquefaction?

(4) Landslides?

b. Result in substantial soil erosion or the loss of topsoil?

c. Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?

d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1998), creating substantial risks to life or property?

e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?


**Supporting Documentation/References Cited:**

7. **HAZARDS AND HAZARDOUS MATERIALS** - Would the project:

a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

d. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?


	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
e. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?				
f. Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?				
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				
h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				

**Supporting Documentation/References Cited:**

**8. HYDROLOGY AND WATER QUALITY - Would the project:**

- a. Violate any water quality standards or waste discharge requirements?
- b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?
- c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?
- d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?
- e. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
- f. Otherwise substantially degrade water quality?
- g. Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?
- h. Place within a 100-year flood hazard area structures that would impede or redirect floodflows?


Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?			
j. Contribute to inundation by seiche, tsunami, or mudflow?			

**Supporting Documentation/References Cited:**

**9. LAND USE AND PLANNING - Would the project:**

- a. Physically divide an established community?
- b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?
- c. Conflict with any applicable habitat conservation plan or natural community conservation plan?
- d. Result in land use/operational conflicts between existing and proposed on-site or off-site land uses?


**Supporting Documentation/References Cited:**

**10. MINERAL RESOURCES - Would the project:**

- a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?
- b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?


**Supporting Documentation/References Cited:**

**11. NOISE - Would the project:**

- a. Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?
- b. Expose persons to or generate excessive groundborne vibration or groundborne noise levels?
- c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?


- d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?
- e. Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?
- f. Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact

**Supporting Documentation/References Cited:**

**12. POPULATION AND HOUSING - Would the project:**

- a. Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?
- b. Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?
- c. Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?


**Supporting Documentation/References Cited:**

**13. PUBLIC SERVICES - Would the project:**

- a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:

- (1) Fire protection?
- (2) Police protection?
- (3) Schools?
- (4) Parks?
- (5) Other public facilities?


**Supporting Documentation/References Cited:**



Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than- Significant Impact	No Impact
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14. **RECREATION** - Would the project:

- a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?
- b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?


Supporting Documentation/References Cited:

15. **TRANSPORTATION/TRAFFIC** - Would the project:

- a. Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?
- b. Cause, either individually or cumulatively, exceedance of a level-of-service standard established by the county congestion management agency for designated roads or highways?
- c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?
- d. Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
- e. Result in inadequate emergency access?
- f. Result in inadequate parking capacity?
- g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?


Supporting Documentation/References Cited:

16. **UTILITIES AND SERVICE SYSTEMS** - Would the project:

- a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?
- b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?
- c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?


	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements be needed?				
e. Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				
g. Comply with federal, state, and local statutes and regulations related to solid waste?				

**Supporting Documentation/References Cited:**

**17. OTHER ISSUE(S) - Would the project:**

- a. Result in, contribute to, or substantially affect other environmental issue(s)? If so, specify below and evaluate:

(1) No other issues have been identified.


**Supporting Documentation/References Cited:**

**18. MANDATORY FINDINGS OF SIGNIFICANCE**

- a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?
- b. Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)
- c. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?


**Supporting Documentation/References Cited:**

# STORM WATER POLLUTION PREVENTION PLAN for CITY OF STOCKTON MUNICIPAL SERVICES CENTER

City of Stockton
Facility name
1465 South Lincoln Street
Address
(209) 937-7416
Phone Number
City of Stockton
Facility Owner
City of Stockton
Facility Operator
August 20, 1997
Date Notice of Intent Filed
State Water Resources Board Permit Number
5S39S013358
Waste Discharge Identification Number

## General Facility Information

### FACILITY INFORMATION

Company Name: City of Stockton Municipal Services Center

Facility Address: 1465 South Lincoln Street

Stockton, CA 95206

Owner Address: As above

Telephone Number: ( 209 ) 937-7416

Types of Industrial Activities at Facility: Vehicle repair and storage

Standard Industrial Classification Code(s): 4213

Name of Facility Operator: Phil Burnside

Title: Supervising Mechanic

Name of Facility Manager: Jerry Cates

Title: Fleet Manager

### POLLUTION PREVENTION TEAM MEMBERS

### RESPONSIBILITIES

Phil Burnside

SWPPP Review and Annual Reports

Ed Thodore

Storm Sampling

Ed Rogers

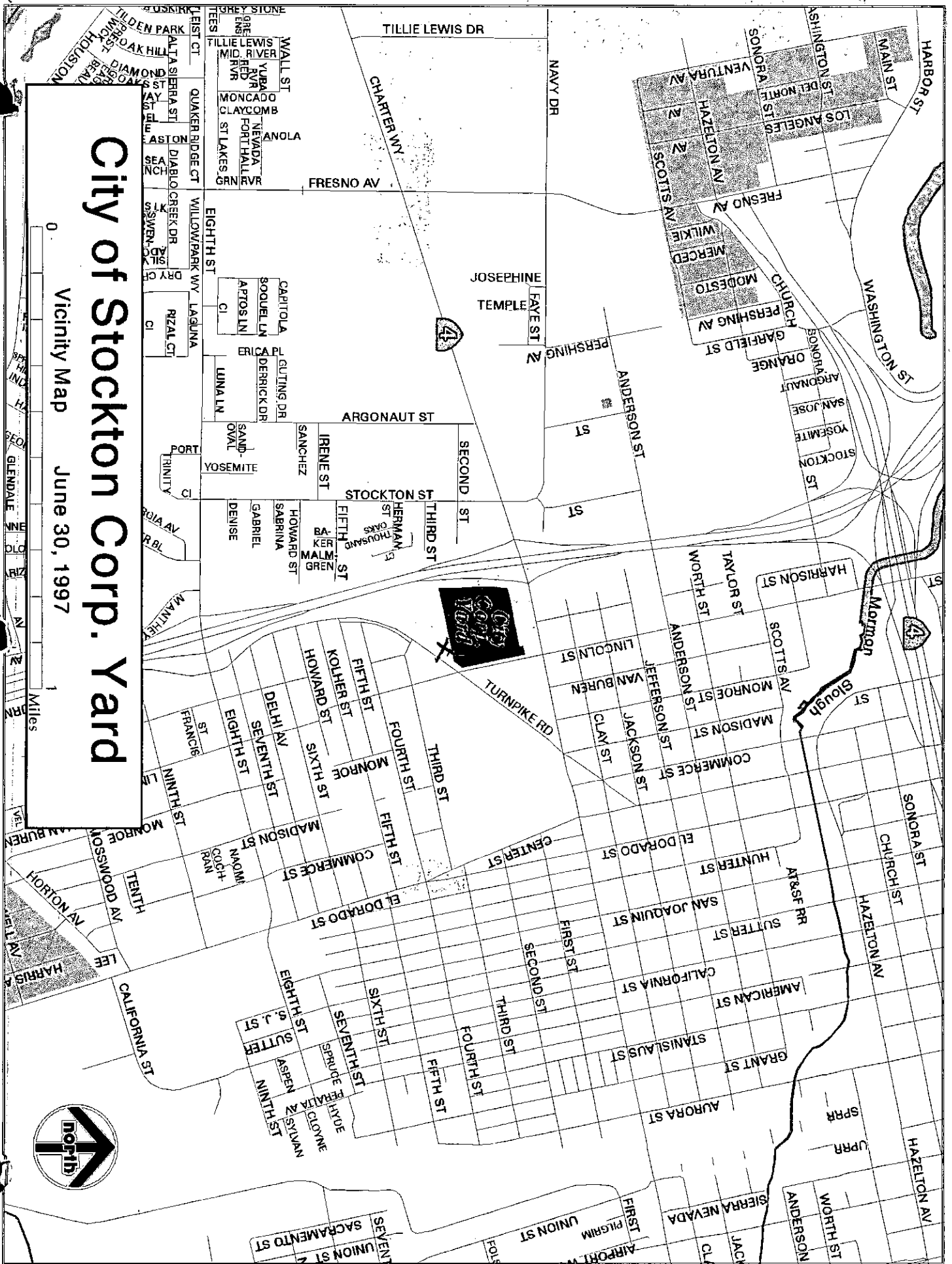
Storm Sampling

# City of Stockton Corp. Yard

Vicinity Map June 30, 1997

0

1 Miles



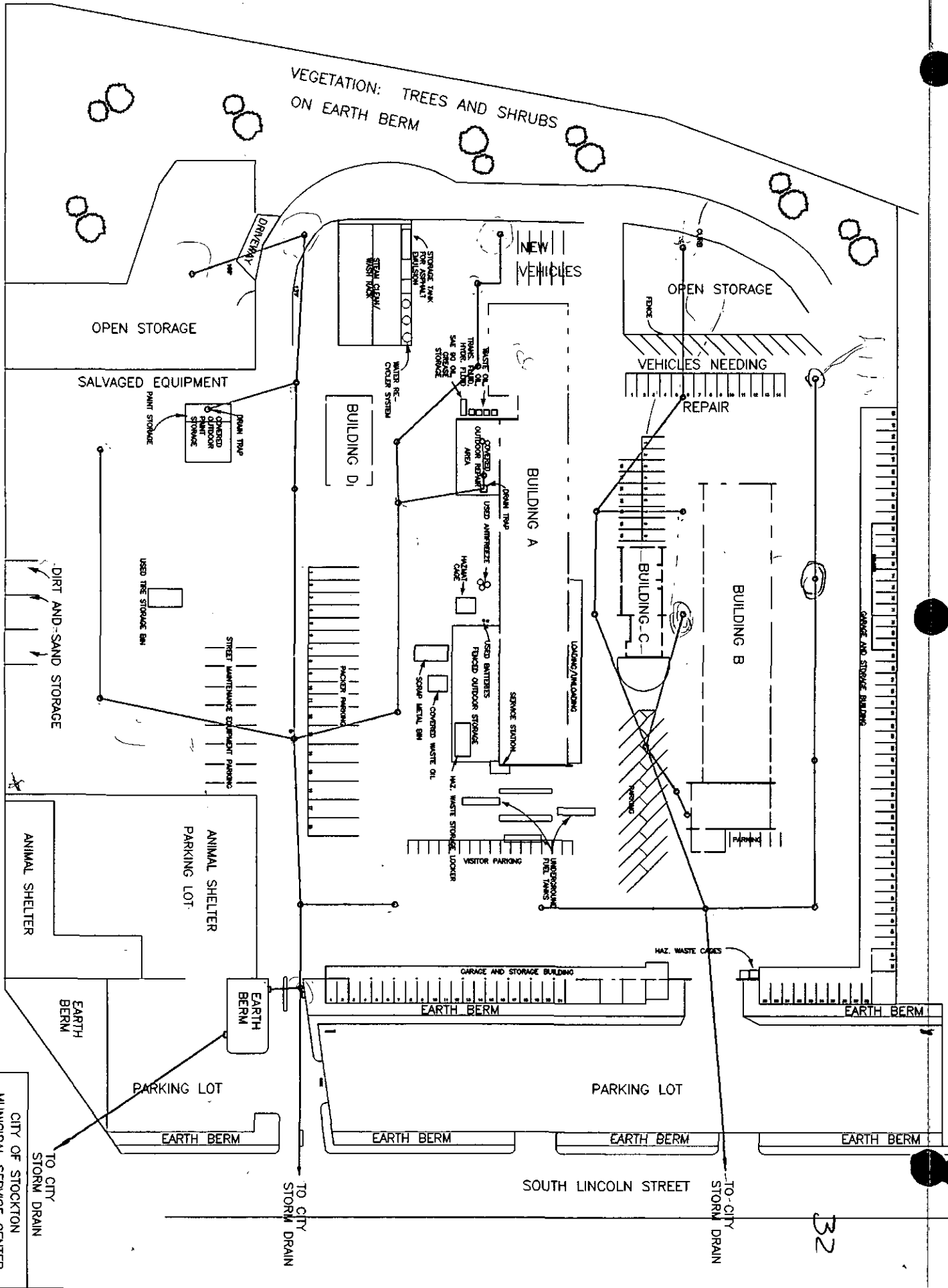


VEGETATION: TREES AND SHRUBS  
ON EARTH BERM

# CITY OF STOCKTON MUNICIPAL SERVICE CENTER

1465 S. LINCOLN STREET

## SITE MAP: STORM DRAIN SYSTEM



NAME:	DKK	DATE:	7/1/97
DESC:	CITY OF STOCKTON MUNICIPAL SERVICE CENTER	SCALE:	NONE
CHK. BY:		REV. NO.:	

## List of Significant Materials

### LIST OF SIGNIFICANT MATERIALS

SIGNIFICANT MATERIAL	LOCATION WHERE MATERIALS ARE STORED, HANDLED, RECEIVED, OR SHIPPED	QUANTITIES/FREQUENCY*
MOTOR OIL	FLEET MAINTENANCE BUILDING	300 GALLONS/WEEK
DIESEL FUEL	FUEL ISLAND	4000 GALLONS/WEEK
ANTIFREEZE	FLEET MAINTENANCE BUILDING	25 GALLONS/WEEK
HYDRAULIC OIL	FLEET MAINTENANCE BUILDING	50 GALLONS/WEEK
GASOLINE	FUEL ISLAND	4000 GALLONS/WEEK
TRANSMISSION FLUID	FLEET MAINTENANCE BUILDING	25 GALLONS/WEEK
SAND AND DIRT	SAND AND DIRT STORAGE AREA	10-20 TONS/WEEK

\*Frequency of material usage, handling, shipping, and receiving

## Potential Storm Water Pollutants and Sources

### INDUSTRIAL PROCESS\*

#### A. Narrative Description

Industrial process: **Vehicle repair and maintenance.**

Type, characteristics, and quantity of the significant material used in or resulting from the process:

**Petroleum products, vehicle fluids, paints, and cleaning fluids. Up to 8,000 gallons per week gasoline and diesel; 400 gallons per week automotive fluids, and lesser amounts of cleaning supplies and paint.**

Manufacturing, cleaning, rinsing, recycling, disposal, or other activities related to the process:

**Vehicle fluids are placed in covered containers and recycled. Paints and cleaning fluids are disposed of via a licensed waste hauler.**

Areas protected by containment structures and corresponding containment capacities:

**Fuel tanks are double contained 12,000 gallon each with leak detection. Vehicle steam cleaner drains into large sump which is discharged into the sanitary system. Solvents, paints, and cleaners are stored and used indoors.**

#### B. Narrative Assessment

Industrial process areas that are likely sources of pollutants and the corresponding pollutants that are likely to be present in storm water discharges and authorized non-storm water discharges:

**Maintenance shop has a potential for oils, fuels, and vehicle fluid leaks. Parking area has potential for oils and vehicle fluids.**

#### C. Best Management Practice(s)

BMP(s) identified in Pages 11-33 to address potential pollutants and sources:

**Refer to Pages 11-33.**

\*Make additional copies of this worksheet to describe each process.



## Potential Storm Water Pollutants and Sources

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### MATERIAL HANDLING AND STORAGE AREAS

#### A. Narrative Description

Handling and storage areas: **Loading area on the north east side of building A. Sand and dirt storage on the south side of the facility. Paint is stored in a separate storage building.**

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Type, characteristics, and quantity of each significant material handled or stored: **Gasoline and diesel- 8,000 gallons/wk. Automotive fluids-up to 400 gallons/week. Dirt and sand – 10 to 20 tons/wk. Lesser amounts of paints and solvents.**

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Material shipping, receiving, and loading procedures: **Move materials into covered area as soon as they arrive. Petroleum products are pumped directly into the UST's. Materials To be shipped materials (recyclable) are picked up by licensed contractors.**

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Spill or leak prevention and response procedures: **Spills are cleaned as soon as they occur. Clean up kits are kept in areas with a high potential for spills. Large spills are remediated in compliance with the spill response plan.**

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Areas protected by containment structures and corresponding containment capacities:  
**Fuel tanks are 12,00 gallons each and are double contained. Solvents, paints, cleaners, and vehicle fluids are stored under cover or on containment racks.**

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#### B. Narrative Assessment

Material handling and storage areas that are likely sources of pollutants and the corresponding pollutants that are likely to be present in storm water discharges and authorized non-storm water discharges:

**Maintenance shop has the potential for vehicle fluid and oils to enter the storm system.**

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**Paints and solvents can enter from the paint storage area. Dirt can come from the dirt and sand storage area.**

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## **Potential Storm Water Pollutants and Sources**

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### **C. Best Management Practice(s)**

BMP(s) identified in Pages 11-33 to address potential pollutants and sources:

**Please refer to Pages 11-33.**

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### SIGNIFICANT SPILLS AND LEAKS

#### A. Narrative Description

Type, characteristics, and approximate quantity of materials that have spilled or leaked in significant quantities in storm water discharges or non-storm water discharges since April 17, 1994.

**NONE.**

Cleanup or remedial actions that have occurred or are planned:

Approximate remaining quantity of materials that may be exposed to storm water or non-storm water discharges:

Preventive measures taken to ensure spills or leaks do not recur:

#### B. Narrative Assessment

Spill and leak areas that are likely sources of pollutants and the corresponding pollutants that are likely to be present in storm water discharges and authorized non-storm water discharges:

#### C. Best Management Practice(s)

BMP(s) identified in Pages 11-33 to address potential pollutants and sources:

**Refer to pages 11-33.**

## Potential Storm Water Pollutants and Sources

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### NON-STORM WATER DISCHARGES

#### A. Narrative Description

Authorized and unauthorized non-storm water discharges at the facility: **NONE**

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#### B. Narrative Assessment

Non-storm water discharges that are likely sources of pollutants, and the corresponding pollutants that are likely to be present. Identify the non-storm water discharge source, quantity, frequency, characteristics, associated drainage area; and discharge location:

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#### C. Best Management Practice(s)

BMP(s) identified in Pages 11-33 to address potential pollutants in authorized non-storm water discharges, and to eliminate unauthorized non-storm water discharges:

**Refer to Pages 11-33.**

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## Potential Storm Water Pollutants and Sources

### OTHER

#### A. Narrative Description

Additional industrial activities: **Soil and sand storage area.**

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#### B. Narrative Assessment

Areas that are likely sources of pollutants and the corresponding pollutants that are likely to be present in storm water discharges and authorized non-storm water discharges:

**Potential or sand and soil to wash to the storm system during storms. Pollutants could**

**Enter the system on the south side of the facility near the sand and dirt storage area.**

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#### C. Best Management Practice(s)

BMP(s) identified in Pages 11-33 to address potential pollutants and sources:

**Please refer to Pages 11-33.**

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BMP'S FOR VEHICLE AND EQUIPMENT FUELING (LIQUID FUELS ONLY)

Pollutant(s)/source(s) as identified in Pages 5-10:

NON-STRUCTURAL BMP's

**Fuel-1** Use dry cleanup methods for spills and leaks (e.g., kitty litter, absorbent fabrics)

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Stop materials from entering the storm system.

**Fuel-2** Store dry cleanup materials in areas where spills may occur

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Stop materials from entering the storm system.

**Fuel-3** Provide spill prevention and cleanup training to all employees responsible for conducting fueling activities

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Stop materials from entering the storm system.

**Fuel-4** Inspect and maintain underground and above-ground storage tanks and fueling apparatus to comply with state regulations

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for leaks.

## Best Management Practices

**Fuel-5** Implement Spill Prevention, Control, and Counter-measure (SPCC) Plan

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Stop materials from entering the storm system.

**Fuel-6** Use mobile fueling equipment only in designated areas and block storm drains when in use

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Fuel-7** Maintain oil and water separator every \_\_\_\_\_ weeks; inspect monthly and following spills.

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Fuel-8** Train staff to implement fueling BMP's. Training schedule and staff responsibilities:

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for spills and storm water  
pollution.

### STRUCTURAL BMP's

**Fuel-9** If necessary, upgrade fueling facility to comply with the Uniform Fire Code and the National Electric Code

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Fuel-10** Install roof over fuel islands, and, if possible, install perimeter drain or berm around fueling area and direct internal drainage to a sump or to an approved sanitary sewer connection

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Fuel-11** Install secondary containment around the storage tank filling area

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Fuel-12** Install automatic shut-off fueling nozzles

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for overfilling spillage.



## Best Management Practices

**Fuel-13** Post signs to discourage "topping off" of fuel tanks

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for overfilling spillage.

**Fuel-14** Install oil and water separator in storm drain(s) that drain the fueling area

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☒ New BMP
- ☐ N/A

Expected BMP effectiveness: Absorb petroleum products from the storm water.

**Fuel-15** Pave fueling area with concrete **OR** seal asphalt to prevent fuel spills from dissolving asphalt

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce pollution from dissolved asphalt oils in the storm water discharge.

BMP'S FOR VEHICLE AND EQUIPMENT MAINTENANCE

Pollutant(s)/source(s) as identified in Pages 5-10:

**NON-STRUCTURAL BMP's**

**Maint-1** Conduct routine inspections every day and maintain orderly vehicle/equipment areas

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for pollutants to enter the storm  
water.

**Maint-2** Use drip pans or drop cloths under engines and crank cases during maintenance

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Prevent vehicle fluids from running into the storm  
system.

**Maint-3** Use dry cleanup methods for spills and leaks

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Absorb spills before they can spread to the storm  
system.

## Best Management Practices

**Maint-4** Comply with all state, federal, and local regulations for solid and hazardous waste disposal

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for storm water pollution.

**Maint-5** Recycle used oil, antifreeze and other fluids when feasible

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for storm water pollution.

**Maint-6** Implement Spill Prevention, Control, Countermeasure (SPCC) Plan

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for storm water pollution.

**Maint-7** Maintain oil and water separator every \_\_\_\_\_ weeks; Inspect monthly and following spills.

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Maint-8** Train staff to implement maintenance BMP's. Training schedule and staff responsibilities:

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Raise awareness of storm water issues and workplace practices.

### STRUCTURAL BMP's

**Maint-9** Convey internal drainage from covered maintenance area to dead-end sump and install roof over vehicle and equipment maintenance areas

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce potential contact between pollutants and storm water.

**Maint-10** Install oil and water separator in storm drain draining maintenance area

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Maint-11** Pave maintenance area with concrete **OR** seal asphalt to prevent solvents and oil spills from dissolving asphalt

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Prevent asphalt oil from washing to the storm system.

**BMP'S FOR VEHICLE AND EQUIPMENT WASHING AND CLEANING**

Pollutant(s)/source(s) as identified in Pages 5-10:

**NON-STRUCTURAL BMP's**

**Wash-1** Conduct routine inspections every day and maintain orderly washing/cleaning areas

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Actively reduce the potential for storm water pollution.

**Wash-2** Prohibit uncontrolled on-site washing

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Eliminate spill over from entering the storm system.

**Wash-3** Take all vehicles and equipment off-site to commercial washing or steam cleaning facility

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Wash-4** Conduct pressure washing such that storm drains are blocked and wash waters drain to an approved sanitary sewer connection or are contained, pumped and properly disposed in the sanitary sewer. Ensure proper management of wash waters from mobile cleaning operations.

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Eliminate wash water from entering the storm system.

**Wash-5** Train staff to implement washing and cleaning BMP's. Training schedule and staff responsibilities:

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for employee caused storm water pollution.

### STRUCTURAL BMP's

**Wash-6** Conduct on-site washing and steam cleaning activities in designated area(s) only, as follows:

- ☐ inside a building, with water either recycled or discharged to an approved sanitary sewer connection (location: \_\_\_\_\_)
- ☒ within contained, concrete-paved outdoor wash facility in which water is filtered and recycled
- ☐ within contained, concrete-paved outdoor wash facility which discharges to an approved sanitary sewer connection (provide control valve to prevent entry of storm water when not washing) or sump
- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for storm water pollution.

**BMP'S FOR LOADING AND UNLOADING OF MATERIALS WHICH CAN POLLUTE  
STORM WATER (LIQUIDS, POWDERS, ETC.)**

Pollutant(s)/source(s) as identified in Pages 5-10:

**NON-STRUCTURAL BMP's**

**Load-1** Conduct routine inspections every     day     and maintain orderly loading/unloading areas.

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the possibility of trash and debris entering  
storm water.

**Load-2** Implement written operations and procedures plan and distribute to all contractors  
delivering and picking up materials at facility

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Eliminate contractor caused pollution problems.

**Load-3** Use dry cleanup methods for spills and leaks of liquids

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Absorb and dispose of spills before they can enter  
storm water.

**Load-4** Store dry cleanup materials near all loading and unloading areas

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Quickly clean spills before they can enter storm water.

**Load-5** Conduct loading and unloading during dry weather only

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce potential for loading accidents to wash to the storm system.

**Load-6** Implement Spill Prevention, Control, and Counter-measure (SPCC) Plan

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for spills to wash to the storm system.

**Load-7** For liquid transfer to storage tanks, place drip pans at locations where spillage may occur, such as hose connections, hose reels, and filler nozzles. Use drip pans when making and breaking connections.

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Catch pollutants before they can enter storm water.



**Load-8** Train staff to implement loading/unloading BMP's. Testing schedule and staff responsibilities:

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Raise storm water pollution prevention awareness.

Reduce the potential for spills and storm water pollution.

### STRUCTURAL BMP's

**Load-9** Install roof or awning over truck and rail loading areas

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Eliminate precipitation contacting pollutants during loading.

**Load-10** Install valve-controlled sump in storm drain beneath loading dock and keep closed during loading and unloading operations; do not discharge any spilled materials or contaminated liquids to storm drain.

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Load-11** Install berms or grade and repave as necessary to prevent storm water runoff and spilled material runoff

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Load-12** Pave areas where liquid transfers take place with Portland cement concrete. Design the transfer area to prevent runoff and drain the transfer area to a sump with a spill control valve.

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Eliminate oils from dissolving from asphalt.

**BMP'S FOR OUTDOOR EQUIPMENT AND MATERIAL STORAGE AREAS**

Pollutant(s)/source(s) as identified in Pages 5-10:

**NON-STRUCTURAL BMP's**

**Store-1** Conduct routine inspections every \_\_\_\_\_ day \_\_\_\_\_ and maintain orderly storage areas

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the possibility of trash and debris entering  
storm water.

**Store-2** Pick up litter, rags, and other debris regularly

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the possibility of trash, debris, and pollution  
entering the storm system.

**Store-3** Provide secondary containment for fluids (e.g., drums, 5-gallon plastic containers, etc.)

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Contain spills away from storm water..

**Store-4** Educate forklift operators about proper transfer and storage procedures and spill control and response

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

## Best Management Practices

**Store-5** Place drip pans or drop cloths under vehicles and equipment that will be stored for more than a week

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Contain spillage away from storm water.

**Store-6** Sweep storage areas weekly using portable vacuum sweeper or with brooms and dispose of the material properly

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the amounts of trash and debris exposed to storm water.

**Store-7** Reclaim, recycle or properly dispose of obsolete equipment, vehicles, and parts stored outdoors

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce pollution exposure to storm water.

**Store-8** Place dumpsters used to store wastes under cover to prevent corrosion and leaks

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce leakage to the storm system.

**Store-9** Train staff to implement storage BMP's. Training schedules and staff responsibilities:

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Raise storm water pollution prevention awareness.

Reduce the potential for storm water pollution.

### STRUCTURAL BMP's

**Store-10** Comply with Uniform Fire Code requirements for storage of reactive, ignitable, or flammable liquids

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for accidents resulting in storm water pollution.

**Store-11** Install roof over storage areas (especially chemical storage) and, if possible, install dead-end sump or direct internal drainage to an approved sanitary sewer connection

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce contact with materials from precipitation events.

**Store-12** Construct secondary containment for liquids storage areas. Do not release storm water from secondary containment if it has become contaminated

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential of releases to storm water.

**BMP'S FOR INDUSTRIAL PARKING LOTS, ACCESS ROADS, AND  
OTHER PAVED AREAS**

Pollutant(s)/source(s) as identified in Pages 5-10:

**NOTE:** Areas used only for temporary parking of employee or company vehicles are exempt from the State General Permit if the runoff from these areas are not co-mingled with runoff from industrial areas at the facility.

**NON-STRUCTURAL BMP's**

**Pave-1** Conduct routine inspections of paved areas every day.

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential for trash and debris to enter the storm water.

**Pave-2** Prohibit hosing off of driveways, parking lots, and other paved areas

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Eliminate washing of pollutants to the storm system.

**Pave-3** Educate employees not to perform vehicle maintenance in the parking lot

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce vehicle fluids from private vehicles from entering the storm system.

**Pave-4** Sweep paved areas using portable vacuum sweeper or with brooms

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Remove potential pollutants from the parking area.

**Pave-5** Maintain oil and water separator every \_\_\_\_\_ weeks; inspect monthly and following spills.

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Pave-6** Train staff to implement paved area BMP's. Training schedule and staff responsibilities:

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Raise storm water pollution prevention awareness.

Reduce the potential for storm water pollution.

### STRUCTURAL BMP's

**Pave-7** Grade parking lots and access roads so that runoff is directed to grass-lined swales or vegetated areas

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

## Best Management Practices

**Pave-8** At facilities with heavy truck traffic, install oil and water separators in storm drains

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☒ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the amount of oils and greases entering the  
storm water.

**Pave-9** Pave dirt parking lots and access roads that are subject to muddy conditions to facilitate maintenance and prevent offsite soil tracking

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the amount of sediment in storm water runoff.



**BMP'S FOR PAINTING**

Pollutant(s)/source(s) as identified in Pages 5-10:

**NON-STRUCTURAL BMP's**

**Paint-1** Conduct routine inspections every day and maintain orderly painting areas

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the potential of trash and paints entering the storm system.

**Paint-2** Do not discharge paints, solvents, or any other painting-related materials to the storm drain

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Eliminate paints from entering the storm system.

**Paint-3** Mix paint indoors or in a paved containment area

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Paint-4** Spread a ground cloth or tarpaulin to collect dust, paint chips, and residue from scraping and sand blasting activities. Chips and sand blasting grit from lead-, tributyl tin-, cadmium-, or chromium-based paints must be disposed of as hazardous waste; chips and grit from water-based paints may be disposed of as solid waste.

- ☐ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☒ N/A

Expected BMP effectiveness: \_\_\_\_\_

**Paint-5** Use impermeable ground cloths while painting to capture leaks and drips, place the paint buckets being used in a pan or on plastic sheeting. Avoid painting during windy or wet weather; when spray painting outdoors set up the work area to capture wind drift and drips.

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the amount of paint washed to the storm

System.

**Paint-6** For water-based paints, clean equipment in a sink connected to the sanitary sewer or into a container (e.g., 55 gallon drum) for proper disposal to the sanitary sewer. For oil-based paints, clean equipment in a designated containment area and ensure proper disposal of waste paint and solvents as hazardous waste. Whenever feasible, keep leftover paint, solvents, and other supplies for later use, or recycle through a solvent or paint recycler.

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Eliminate "dumping" to the storm system.

**Paint-7** In the event of a spill, protect storm drain inlets and promptly clean up and properly dispose of spilled materials; do not wash spilled paint down the storm drain with a hose.

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Reduce the amount of paint entering the storm

system.

**Paint-8** Train employees and subcontractors to implement painting BMP's. Training schedule and staff responsibilities:

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Raise storm water pollution prevention awareness.

Reduce the potential for spills and storm water pollution.

**BMP'S FOR RECORDKEEPING AND INTERNAL REPORTS**

**REC-1** Develop forms and procedures and assign responsibilities for documenting:

- facility inspections
- spills
- maintenance activities
- corrective actions
- visual observations

Include copies of forms and procedures as an appendix to this SWPPP.

- ☐ Existing BMP
- ☒ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

Expected BMP effectiveness: Allow scheduling of storm water monitoring items.

**REC-2** Retain copies of completed forms as an appendix to this SWPPP or in a separate notebook if necessary.

- ☒ Existing BMP
- ☐ Existing BMP to be revised
- ☐ New BMP
- ☐ N/A

## Summery of Pollutants, Sources, and BMP's

### SUMMARY OF POLLUTANTS, SOURCES, AND SELECTED BMP'S

Type of Industrial Activity	Facility Location(s) where Activity Occurs (also shown on site map)	Pollutant Sources	Potential Pollutants	Best Management Practices
Vehicle and Equipment Fueling	Fuel Station	Spills and Leaks	Gasoline and Diesel	Refer to Pages 11-33
Vehicle and Equipment Maintenance	Building A	Spills and Leaks	Vehicle Fluids	Refer to Pages 11-33
Vehicle and Equipment Washing	Wash Rack	Over Spray and Pipe Leaks	Soaps and Dirty Water	Refer to Pages 11-33
Loading and Unloading	Building A, Fuel Station, Paint Building	Spills and Leaks	Oils, Greases, Solvents, Petroleum Products, Paint	Refer to Pages 11-33
Outdoor Equipment and Material Storage	Parking and Outdoor Equipment Parking Areas	Leaks and Spills	Oils, Greases, Dirt and Soil	Refer to Pages 11-33

## Annual Comprehensive Site Evaluation

### ANNUAL COMPREHENSIVE SITE COMPLIANCE EVALUATION REPORT

Date of Evaluation: \_\_\_\_\_

Evaluation Personnel: \_\_\_\_\_

NECESSARY SWPPP REVISIONS	REVISION IMPLEMENTATION SCHEDULE
NON-COMPLIANCE INCIDENTS	CORRECTIVE ACTIONS TAKEN

#### COMPLIANCE RE-CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Title

## Compliance Requirements and Certifications

### COMPLIANCE CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Phil Burnside

Name of Facility Operator

12/9/02

Signature

Date

Fleet Operations Coordinator

Title

**CITY OF STOCKTON**  
**STORMWATER MANAGEMENT**  
2500 Navy Dr. Stockton CA 95206

INSPECTION	X
ANNUAL INSPECTION	
TELEPHONE CALL	
MEETING NOTES	

Company: City of Stockton, Corporation Yard	Inspector: Blaine Drewes
Location: 1465 South Lincoln Street	Date: 12/11/02 Time: 1030
Contact: Phil Burnside	Telephone: (209) 937-7416

The City of Stockton (COS) operates a vehicle repair staging facility at this site. There is also a fueling area, wash rack, and materials storage areas for the various City Departments. Since this COS site is primarily engaged in truck maintenance without storage facilities, they have a SIC code of 4212- LOCAL TRUCKING WITHOUT STORAGE. COS is considered a Level 2 Priority Industrial Facility by the City's Storm Water Program. COS is covered by the General Permit to discharge storm water associated with industrial activities because of the above listed enterprise. COS has submitted an NOI to the State and has received the WDID Number 5S39S013358. COS has submitted a 2001/2002 Annual Storm Water Report and a SWPPP to the City. COS has not received a COA as this facility is not a Level 1 Priority Industrial Facility.

Two storm systems direct water from the facility. The northern system drains the northern third of the facility. There are between 14 and 18 catch basins on this line. The southern system drains the remaining portion of the facility. There are between 18 and 20 catch basins on the southern system. All on site rainwater enters these catch basins. Additionally, run on water enters the southern system from the animal shelter. The storm systems drain individually to the City storm discharge system on Lincoln Street. Storm water from this site is released to Walker Slough by the City's Turnpike Storm Water Pump Station (WK-64). Storm sampling is conducted at the last catch basin prior to entering the employee parking area on the northern line, and at the last catch basin prior to entering the City storm system on the southern line.

The northern storm system drains water from around buildings B and C, the northern side of building A, the northern garage and storage building, the northern half of the east garage and storage building, the vehicle repair storage area, the fueling area, Public Work's traffic control devices storage area, Park and Recreation's plant storage area, and the employee parking lot. Inspection of this area found the area generally clean and well kept. Except as noted below, materials stored outside are manufactured to be exposed to precipitation and are not expected to contribute significant pollution



to storm water. The employee parking area was not inspected, as it does not contribute storm water to the regulated industrial storm water stream.

Three to four catch basins are located under the northern garage and storage area. The discharge locations for these drains are uncertain and must be determined. The Parks and Recreation plant storage area can contribute sediment to the storm water. BMP's need to be installed to reduce the risk of pollution from this area. The fueling area has an active spill response plan. Absorbent material and disposal drums are stored in areas where spills may occur. There were two 55-gallon drums marked "Hazardous Waste" in the fueling area. These drums should be stored in a controlled area until disposed of properly.

The southern storm system drains water from the south and west sides of building A, around building D, the wash rack, Parks and Recreation's open storage area, Central Building Maintenance's open storage area, Public Work's paint storage area, the dirt and sand storage area, the truck and maintenance equipment parking areas, and the southern half of the east garage and storage building.

Building A is used for vehicle repairs, materials storage, and offices. The repair facility is well kept and clean. There is a spill response plan in place. The recycled oils are kept in double contained concrete tanks on the southeast side of the building. New oil and grease is also stored in proper containment structures on the southeast side of the building. There is a covered outdoor repair area with 3-4 drains. These drains must be traced to determine their discharge locations. The filter compactor has oil on the ground around it. The oil must be cleaned up. The 55-gallon drums of antifreeze must be put within a double containment system. There were 55-gallon drums marked "Hazardous Waste" south of building A. These drums should be stored in a controlled area until disposed of properly.

The street painting crews use building D. There are numerous empty and partially empty 55-gallon paint drums outside the building. Most of these drums are not within double containment areas. Some of the double containment structures are cracked or broken. Other containment structures are partially or nearly filled with paint contaminated rainwater. The empty drums should be stored out of the rain, and the containment structures maintained and/or replaced as needed. The paint storage area is an open, covered area with a sump on the west side. The sump has been modified to drain directly to the storm system. The drain from the sump must be physically disconnected or properly valved to eliminate accidental discharges of paint to the storm system.

The open storage area on the southwest side of the facility is shared by Parks & Recreation and Central Building Maintenance (CBM). Most of the materials stored in this area are manufactured to be exposed to the weather. There is a small area in the Parks and Recreation Section where unknown liquids are exposed to the weather. Many of these liquids are leaking and pose an immediate health threat. These materials must be properly identified and contained. CBM has a double containment area with paint and solvent containers. The containment is filled with storm water. Other containers have been placed throughout the CBM area. Many do not have identifying labels. These materials must be properly identified and contained.

The dirt and sand storage area does not have any BMP's to contain or clean sediment from the storm water. Sweeping and/or sediment removal devices should be used to reduce the amount of sediment added to storm water.

The packer parking area is heavily oiled in places due to oil and hydraulic leaks in the equipment. The spills have been covered with an absorbent material, in accordance with the spill response plan. All absorbent must be swept up on a regular and frequent basis, and prior to any storm event.

Run on occurs from the Animal Shelter to the SOC site at the southeast corner of the facility. Most of this material is wash water and animal wastes originating from daily rinsing of the outside holding pens. Water from this source is a health hazard. SOC should meet with the Animal Shelter to discuss alternative cage cleaning and/or disposal methods.

A comparison of the sample results as reported in the 2001/2202 annual report with the EPA Benchmark Values showed sediment values were elevated. As a result, SOC will install sediment filters in the catch basins. It is believed this improvement, in conjunction with the suggestions made in this inspection report, should reduce the amounts of pollutants in the storm water to below EPA's recommended benchmark values.

*Blaine Drewes*

BLAINE DREWES  
ENVIRONMENTAL CONTROL OFFICER

# Emergency and Non-Emergency Fire Department Procedures

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## INTRODUCTION

Although fire department activities are not generally considered significant sources of stormwater pollution, some activities can result in the discharge of water containing pollutants that pose a threat to both human health and the quality of receiving waters if it enters the storm drain system. The two main types of fire department activities that pose potential problems are:

- Emergency Fire Fighting Flows; and
- Non-Emergency Fire Department Activities

Although the municipal stormwater permit recognizes that emergency fire fighting flows (i.e. flows necessary for the protection of life or property) can enter the storm drain system, fire department personnel should follow general Best Management Practices (BMPs) in order to minimize the impact of fire fighting flows to the environment.

The municipal stormwater permit also recognizes that non-emergency fire department activities (i.e. flows from training exercises that include controlled or practice fires) may be a source of pollutants and, as such, requires that the municipalities implement BMPs.

In developing these procedures, pollution prevention measures have been considered and incorporated as the first line of defense in protecting water quality. Implementation of these measures may be more effective and reduce or eliminate the need to implement other more complicated or costly procedures.

## EMERGENCY FIRE FIGHTING FLOWS

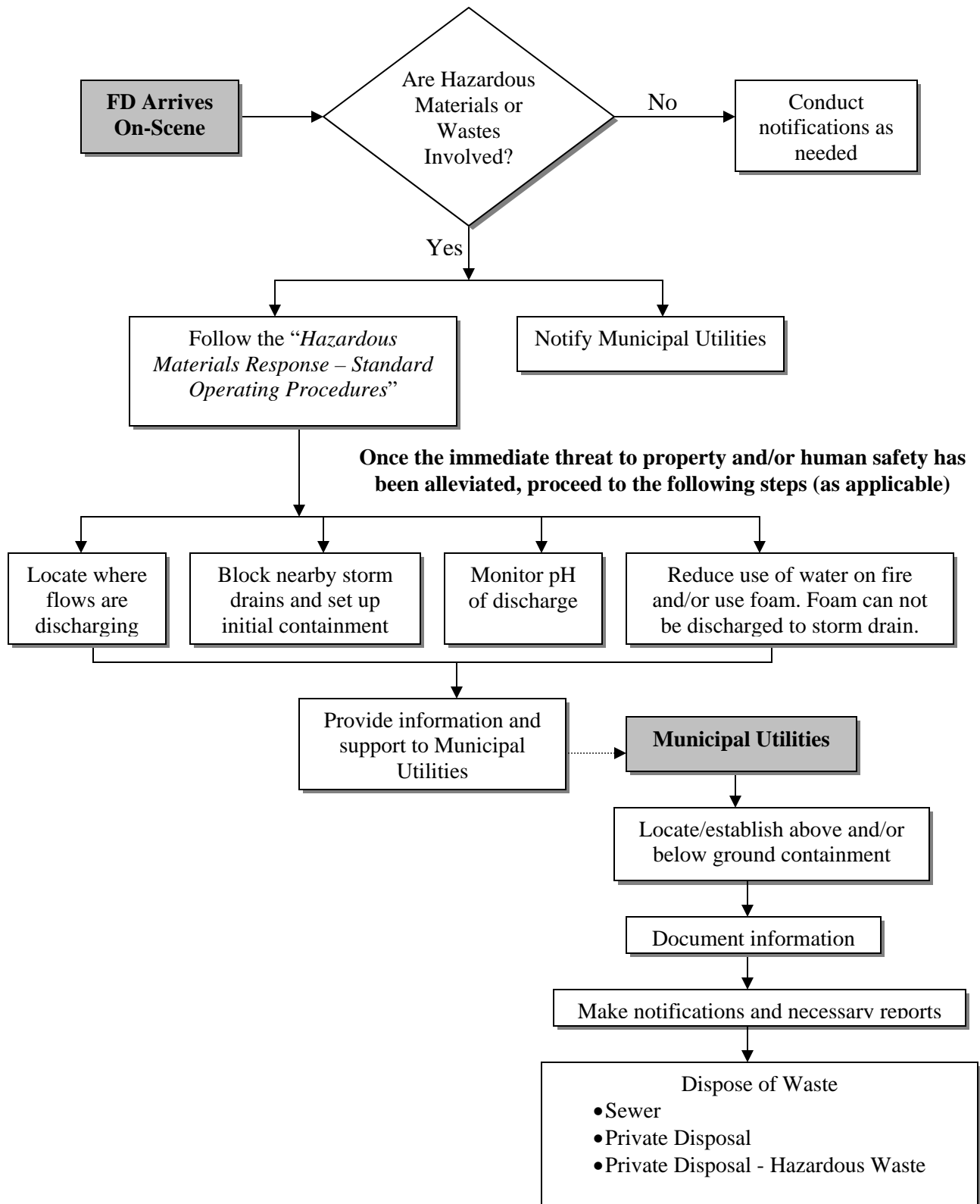
An “emergency” exists from alarm notification until, in the opinion of the incident commander, the emergency has concluded and emergency equipment is returned to the station. Discharges occurring during emergency fire fighting activities (i.e. flows necessary for the protection of life and property) do not require BMPs and are not prohibited. However, to the extent allowed by the circumstances at the scene and without compromising the health and safety of personnel or the public, emergency fire fighting activities should be performed in a manner that avoids or minimizes discharges to the storm drain system.

The basic procedures that should be followed by fire department and stormwater program personnel during an emergency situation are presented in **Figure 1** and in the “*Hazardous Materials Response – Standard Operating Procedures*”. These standard operating procedures provide the Fire Department with uniform and consistent response guidelines for hazardous material emergencies.

# Emergency and Non-Emergency Fire Department Procedures

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**Figure 1**  
**Emergency Fire Fighting Procedures**



# **Emergency and Non-Emergency Fire Department Procedures**

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## **POST-EMERGENCY FIRE DEPARTMENT ACTIVITIES**

Although the response equipment used in the emergency (tools, fire hoses, ladders, etc.) must be restored to a response ready state in a manner which does not delay the ability of the apparatus to be available for another emergency response, the post-emergency rehabilitation and maintenance of the response equipment should be performed in a manner that prevents discharges to the storm drain system. Whenever practical, the procedures used for post emergency activities shall include the following:

- Hoses shall be emptied into landscaped areas to allow the remaining potable water to infiltrate;
- Any equipment that can be cleaned by rinsing it off with potable water, can be rinsed in a grassy area or designated wash area that drains to the sanitary sewer;
- Any washing of tools or equipment that requires the use of soap must be cleaned in a designated wash area that drains to the sanitary sewer; and
- Any equipment that must be decontaminated must be cleaned in a designated area with the rinsate disposed of either to the sanitary sewer (with permission) or as hazardous waste.

## **FIRE DEPARTMENT TRAINING ACTIVITIES**

Fire Department training activities, which simulate emergency responses, must be performed in a manner that reduces or prevents discharges to the storm drain systems whenever practicable. In addition, when the elimination of discharges into the stormwater system is unavoidable (i.e. equipment failure), measures should be implemented to minimize the impacts to water quality.

The following BMPs should be implemented during fire department training activities to minimize/eliminate discharges to the storm drain system:

- Pre-plan live fire training activities to allow integration of barriers to off-site runoff, which could contribute to stormwater discharges;
- Conduct training activities using water on non-rainy days;
- Conduct fire training, where feasible, in facilities where runoff controls protecting the storm drain system have been engineered and built into the facility;
- Direct water flows to landscaped green areas whenever possible and safe to do so without causing damage, erosion or flooding; when spraying water over a landscaped area or greenbelt, spray in an arch so that the velocities are dissipated and erosion is minimized;

## **Emergency and Non-Emergency Fire Department Procedures**

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- If the water flows cannot be contained in the landscaped areas, survey and clean the area prior to the training exercise to ensure that debris and pollutants will not enter the stormwater system as a result of the flows generated during the drill;
- Fit storm drains where training is routinely practiced with a hydro screen fabric barrier and surround them with sand bags to collect any run-off generated debris. Inspect these drains prior to training and clean as needed. Also inspect these drains during rain events to ensure that the fabric and sand bags are not blocking flows and creating a potential flood hazard.
- Divert flows to the sewer with the permission of the local sewerage agency when practicable and necessary;
- Use fog streams for short durations;
- Use lower gallon per minute (GPM) nozzle settings; and
- Prevent discharges of foam to the storm drain system. Seal all potentially affected storm drain inlets with plastic sheeting and sandbags, or temporary berms if training activities involve the use of foam. Collect the runoff, apply a defoaming agent, and discharge to the sanitary sewer with the permission of the local sewerage agency. Vacuum up all residues after the foam has dried.

### **NON-EMERGENCY FIRE DEPARTMENT ACTIVITIES**

Discharges resulting from non-emergency fire fighting activities can potentially be sources of pollutants to the storm drain system. Although flows discharged during emergency fire fighting operations are allowed to enter the storm drain system, discharges related to non-emergency fire department activities must be conducted in a manner that does not result in discharges of pollutants to the storm drain system. Potential pollutant generating activities typically performed at fire stations that could result in discharge of pollutant to the storm drain system include the following:

- Building Maintenance and Repair:
- Vehicle & Equipment Repair
- Vehicle & Equipment Fueling
- Waste Handling & Disposal
- Spill Prevention, Control, and Cleanup
- Vehicle and Equipment Cleaning
- Housekeeping Practices

### **FIRE HYDRANT AND SPRINKLER TESTING**

Fire hydrant and fire sprinkler testing are normally performed by the water utility. However, in the event that such activities are performed by fire fighting personnel, the model procedures contained within Water & Sewer Utility Maintenance Fact Sheet.

# **Emergency and Non-Emergency Fire Department Procedures**

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## **EDUCATIONAL OUTREACH**

In developing educational outreach, all fire department personnel, permanent and temporary, should receive a basic introduction to stormwater pollution issues. Informational training to cover general stormwater runoff topics and permit requirements should be planned as a continuous effort, which can include direct training. New employees should be trained on stormwater runoff as part of their general introduction to government operations and services.

The objectives of the employee training program are to:

- Promote a clear understanding of the urban runoff and water quality issues, including activities that potentially pollute receiving water bodies;
- Identify and implement strategies for BMPs;
- Promote employees ownership of the problems and their ability to apply solutions; and
- Integrate employee's feedback into training and BMP implementation.

Educational materials that can be used include:

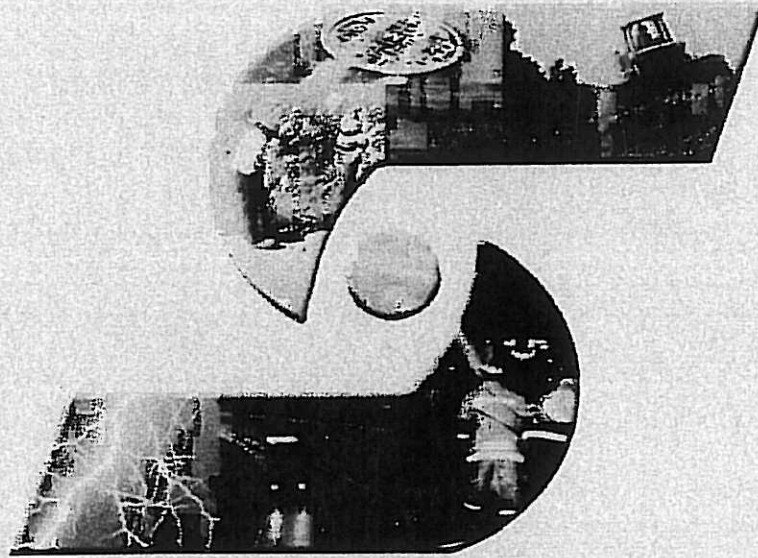
- BMP booklets, fact sheets, and other materials prepared for public dissemination;
- General stormwater training videos; and
- An Internet website.

The fire departments can work with the Stormwater Program staff to develop a training module for personnel and establish a system to update and improve the information and training materials available to the staff.

## Street Sweeping – City Facilities

Parks and Recreation	
Louis Park	Arnold Rue Community Center
Stribley Park	Stuart Gibbons Park
Oak Park	Sandman Park
Swenson Golf Course	McKinley Park
Anderson Park	Buckley Cove
Van Buskirk Community Center	Mckinley Park Community Center
Victory Park	Seifert Community Center
Grupe Park	Oak Park Ice Arena/Senior Center
Dentoni Park	Civic Auditorium
Panella Park	
Public Works	
MSC Garage	City Hall
Corporation Yard	Stewardt Eberhardt Building
Library	
Cesar Chavez Central	Margaret K Troke Branch Library
Fair Oaks Branch Library	Maya Angelou Branch Library
Fire Stations	
Company 1	Company 9
Company 2/Training Center	Company 10
Company 3	Company 11
Company 4	Company 12
Company 5	Company 13
Company 6	Company 14
Company 7	
Police	
Pistol Range	Animal Control
Police Main Facility	Police Annex
S.E. Facility	





**City of Stockton  
Maintenance Staff Guide**

**“Doing It For All The Right Reasons”**

COPY!

# Section 1

## Introduction

This City of Stockton (COS) "*Maintenance Staff Guide*" is not designed to, nor does it establish a legal standard of care. It is published solely for the information and guidance of the employees of the City of Stockton. It is subject to modifications as conditions warrant. It is not intended that any standard of conduct or duty toward the public shall be created or imposed by the publication of this *Maintenance Staff Guide*.

The City Operation and Maintenance Sections are assigned the care and upkeep of COS facilities such that the investment in facilities will be preserved and the maximum benefits afforded by and to be available to the public. The Maintenance employee should attempt to perform each operation in the safest and most efficient manner, while maintaining good relations with the public. The employee should understand the contents of this *Maintenance Staff Guide*.

### 1.1 Important Terms

In beginning the discussion of storm water quality management as it relates to COS maintenance activities, it is beneficial to know the meaning of some terms that will be used. Some of these terms may be completely new, whereas others may be recognized, but not very familiar. The definitions provided here are conceptual, and these terms may be more completely defined in subsequent portions of this document or in the glossary (Appendix A - Acronyms and Definition of Terms).

**Clean Water Act:** The Federal Clean Water Act (Clean Water Act) prohibits the discharge of pollutants to waters of the United States unless the discharge is covered by the terms of a discharge permit. The Clean Water Act includes guidelines for regulating discharges from storm water drainage systems for certain municipalities, industries, and construction activities.

**National Pollutant Discharge Elimination System (NPDES):** The national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing wastewater and storm water discharge permits under the Clean Water Act.

**Maximum Extent Practicable (MEP):** The extent of implementation of storm water management practices that are effective at reducing storm water pollution except when any of the following conditions are met: (1) other effective management practices would achieve greater or substantially the same pollution control benefits; (2) the management practice would not be technically feasible; (3) the cost of implementing the management practice would greatly outweigh the probable pollution control benefits; or (4) implementation of the management practice would compromise other legal and institutional constraints, expectations, or obligations imposed by federal and state statutes or case law.

**Storm Water Management Plan (SWMP):** The plan that describes COS program to reduce the discharge of pollutants from storm water drainage systems facilities, properties, and activities to the maximum extent practicable. The SWMP also describes assignment of responsibilities for implementing storm water best management practices, as well as training, public education and participation, monitoring, program evaluation, and reporting activities.

**Best Management Practice (BMP):** Means those storm water management practices selected for implementation under the SWMP by meeting the MEP criteria. The array includes: treatment requirements, operating procedures, and management practices to control site runoff. The array was selected from storm water management practices designed to control pollutants from typical COS activities.

**Maintenance Storm Water Protection Program (MSWPP):** The Maintenance Storm Water Protection Program is the component of the SWMP that describes:

1. The program to implement BMPs as part of the ongoing maintenance activities for existing properties, facilities, and activities;
2. Surveillance activities to help manage potential storm water pollution from accidental spills, illicit connections, illegal discharges, and illegal dumping within COS right-of-way; and
3. Implementation of BMPs to reduce the potential for storm water pollution at facilities by minimizing contact between storm water and the various substances used.

## 1.2 Purpose and Scope of This Maintenance Staff Guide

*This Maintenance Staff Guide* addresses the implementation of storm water BMPs during maintenance activities and during activities conducted at Maintenance facilities.

*The Maintenance Staff Guide* addresses BMPs for the following Maintenance activities:

- Flexible Pavement - A Family,
- Rigid Pavement - B Family,
- Slopes, Drainage, and Vegetation - C Family,
- Litter, Debris, and Graffiti - D Family,
- Landscaping - E Family,
- Environmental - F Family,

- Bridges - H Family,
- Other Structures - J Family,
- Electrical - K Family,
- Traffic Guidance - M Family,
- Storm Maintenance - S Family, and
- Management and Support - T Family.

BMPs to reduce the discharge of potential pollutants to storm water drainage systems or watercourses are also described for preventing, eliminating, or responding to:

- accidental spills,
- illicit connections, and
- illegal dumping.

Guidance is also provided to prevent or control the discharge of potential pollutants via non-storm water discharges or operations conducted at Maintenance facilities through implementation of BMPs related to:

- material storage controls,
- housekeeping practices,
- vehicle and equipment fueling,
- vehicle and equipment pressure washing,
- vehicle and equipment maintenance and repair,
- outdoor loading and unloading of materials,
- outdoor storage of materials,
- waste minimization, handling, and disposal, and
- building and grounds maintenance.



## 1.3 Organization of This Maintenance Staff Guide

The remainder of Section I provides an introduction to storm water quality management as it relates to maintenance activities for the facilities.

Section 2 describes the general objectives of the MSWPP and discusses potential pollutants of concern for maintenance activities and Maintenance facility activities that are related to water quality. Section 2 also provides a reference table that can be used to identify BMPs applicable to specific highway maintenance activities, highway surveillance activities, Maintenance facility operations, and public education activities.

Section 3 describes how Maintenance personnel will gather information about the implementation of BMPs, learn from the information that is collected, and provide feedback that will result in a continuous improvement of the MSWPP.

## 1.4 Background of Storm Water Regulation

Federal regulations for controlling the discharge of pollutants from storm water drainage systems were issued by the U.S. Environmental Protection Agency in 1990. These regulations require that storm water discharges from municipal storm water drainage systems, defined industrial facilities, and construction activities obtain NPDES permits.

The fundamental requirements of the regulations are:

- **Municipal.** The federal storm water regulations require the operators of municipal storm water drainage systems (including state highway systems) to develop and implement programs to: reduce pollutants from runoff from commercial and residential areas; detect and eliminate illicit connections and illegal discharges to the storm water drainage system; monitor and control the discharge of pollutants from landfills, hazardous waste treatment, disposal and recovery facilities, and certain industrial facilities; and reduce pollutants in storm water runoff from construction sites. Operators of municipal storm water drainage systems must also demonstrate adequate legal authority to control discharges to their system, develop and implement a storm water quality monitoring program, identify fiscal requirements of the various programs and the associated funding sources, and prepare annual reports describing program implementation.
- **Industrial.** The federal storm water regulations [40 Code of Federal Regulations, Section 122.26(b)(14)] define 11 categories of industries subject to storm water permitting requirements. Some examples of such industrial activities are manufacturing facilities, hazardous waste treatment, storage, or disposal facilities, landfills, recycling facilities steam electric power generating facilities, and transportation facilities. The

basic requirements of the regulations are elimination of most non-storm water discharges to storm water drainage systems and receiving waters, preparation and implementation of both a storm water pollution prevention plan and a monitoring program, recordkeeping, and annual reporting.

- Construction. The federal regulations apply to storm water discharges associated with construction activities. The basic requirements of the regulations are elimination of most non-storm water discharges to storm water drainage systems and receiving waters, preparation and implementation of a storm water pollution prevention plan, inspections of the site to verify adequacy and proper implementation and maintenance of best management practices, and record keeping.

Any person who violates a NPDES permit condition is subject to a civil penalty not to exceed \$25,000 per day per violation. The Clean Water Act also provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under an NPDES permit, including reports of compliance or non-compliance, is subject to a fine of not more than \$10,000 or to imprisonment for not more than 2 years, or both. Additionally, the State's Porter-Cologne Water Quality Act provides for civil and criminal penalties, that in some cases may be greater than those under the Clean Water Act.

In California, the U.S. Environmental Protection Agency has delegated its authority to issue National Pollutant Discharge Elimination permits to the State Water Resources Control Board and the nine Regional Water Quality Control Boards.

The Clean Water Act and the federal storm water regulations require that storm water best management practices be implemented to control pollutants to the maximum extent practicable. Although the concepts of maximum extent practicable and "practicability" are not explicitly defined in the Clean Water Act or the federal regulations, the meaning of these concepts is evolving and becoming progressively clearer through emerging case law and regulatory practice.

COS is committed to implementing the BMP's described in the SWMP. As part of implementing its SWMP, COS will regularly review its activities, inspect its facilities, oversee and guide its personnel, and conduct focused studies in order to refine, enhance, and improve best management practices. Information obtained will support responsible management of the limited resources available to implement the best management practices and control pollutants from entering storm water drainage systems to the MEP. This monitoring and evaluation program serves as a quality control mechanism to help assess the effectiveness of the implementation of activities as required by the statewide SWMP. The program evaluation will be an iterative process--a continuous loop of gathering information about implementation, evaluating and learning from the information that is collected, and providing feedback that will result in continuous improvement.



## Section 2

# Objectives of Maintenance Storm Water Protection Program

### 2.1 Purpose of this Section

This section describes the general objectives of the MSWPP. The COS Storm Water Discharge Permit (Permit) [pending] and regulatory background are discussed and the pollutants of concern are described. These pollutants are the constituents which the BMPs are intended to control.

### 2.2 Permit and Regulatory Background

The Permit, like other storm water and wastewater permits, is intended to protect the rivers, streams, lakes, bays and other surface waters in California. The Central Valley Regional Water Quality Control Board (CVRWQCB) has established specific standards and criteria which apply to local surface waters. The standards vary depending on the location and the sensitivity of the surface waters.

The standards and objectives for each surface water are found in the RWQCB Basin Plan for each region. For example, a Sierra stream will have different standards than ocean waters. A classification by the RWQCB of a surface water as "cold freshwater habitat" means that it should generally support trout and may also support anadromous (migrating) fish, such as salmon and steelhead. This classification sets a much lower limit on the amount of various constituents that can be discharged to surface waters, such as nutrients that could adversely affect oxygen levels.

### 2.3 General Objectives of the Program

The objective of the MSWPP is to ensure that maintenance activities are conducted in a manner which prevents or controls the amount of pollutants discharged to surface waters. The COS has been prepared to facilitate this objective and to comply with the Permit.



The Permit and SWMP require that COS use BMPs to control potential pollutants that could be discharged to storm water drainage systems. Maintenance field personnel perform a key role in this program: they observe and correct situations such as roadside dumping that could cause water pollution. In addition, they conduct activities such as road and bridge repair and vegetation management utilizing BMPs described in this *Maintenance Staff Guide*. Other BMPs described herein are intended for use at COS maintenance facilities. The BMPs described in this *Maintenance Staff Guide* have been selected to focus on those storm water related pollutants of concern most likely to come from maintenance activities or facilities. The following sections discuss these pollutants of concern in storm water discharges. Successful implementation of these BMPs will mean that COS is complying with the Permit and doing its part in protecting waterways.

## 2.4 Pollutants of Concern for Maintenance Activities and Facilities

Maintenance activities are organized into several families, each of which is concerned with various elements of maintenance. Within each family, there are numerous specific activities, each of which may contribute pollutants via the storm water drainage system. Many of these activities are also conducted at COS Maintenance facilities.

"Pollutants of concern" include a broad range of materials that could result in adverse impacts if discharged to receiving waters. COS maintenance activities involve the use of a wide variety of products. Under normal, intended conditions of use, these materials are generally not considered "pollutants of concern." However, if these products are used, stored, spilled, or disposed of in a way that may cause them to contact storm water, they may become a concern for water quality. The typical pollutants generated by COS maintenance activities and at COS maintenance facilities are described below.

### 2.4.1 Petroleum Products

Petroleum products (e.g., gasoline, diesel fuel, motor oil, other lubricants, asphalt) are common pollutants deposited on the traveled highway. Some fuels and lubricants contain additives, which may themselves be toxic to humans and aquatic life.

Potential sources of petroleum products from COS activities include leaks from vehicles and machinery and maintenance activities such as fueling or changing oil, and washing. Although petroleum products are commonly used on a daily basis, it is important to be careful about how they are used and disposed of. Another common petroleum product used extensively in COS maintenance activities is asphalt (especially cold mix), which, while not a pollutant under normal conditions of use, could potentially contribute pollutants to surface waters if mishandled or disposed of improperly.

### *2.4.2 Sediment*

In general, sediment is considered a pollutant when it significantly exceeds natural concentrations. Sometimes other potential pollutants (e.g., lead) may become attached to sediments and are transported with the sediments to receiving waters, increasing the potential for water quality impacts.

Possible sources of sediment in runoff from Maintenance facilities and highway maintenance activities include the tracking, transport, and storage of loose bulk materials (e.g., sand or other aggregate), in addition to construction-related and soil erosion.

### *2.4.3 Litter and Debris*

Litter and debris includes items such as paper, aluminum cans, styrofoam cups, and other items commonly discarded which can be transported by wind and storm water into the storm drainage system. In addition to impacting water quality, these items may obstruct the storm water drainage system.

### *2.4.4 Metals*

The term "metals," as used here, refers to dissolved and suspended metals. Metals found in highway storm water runoff are considered pollutants, because above a certain threshold even low concentrations of these materials may harm aquatic life.

These metals come from various sources and activities, including fuel combustion, brake pad wear (copper), tire wear (cadmium and zinc), metal corrosion, pressure treated wood and creosote posts used for guard rails (arsenic), paints, herbicides, and other materials.

### *2.4.5 pH*

The pH of a water sample is a measure of its acidity or alkalinity. Water that is acidic or alkaline potentially causes harm to aquatic organisms or consumers of the water, and may even result in damage to equipment and materials.

Some COS maintenance activities that may change the pH of runoff include the storage of cracked batteries resulting in leaking battery acid, underpass washing and management of concrete wastes.

#### *2.4.6 Nutrients*

Certain forms of nitrogen and phosphorous are used as nutrients by aquatic plants. Plant growth in surface water systems is often limited by available phosphorous. While some levels of nitrogen and phosphorus are necessary for aquatic plant life, high levels of these nutrients may cause abnormal algal blooms which contribute to low dissolved oxygen levels and can result in fish kills.

Some of the possible sources of nitrogen and phosphorous from COS maintenance activities and facilities include storage of fertilizers, decaying plant materials from tree trimming and vegetation management, and gasoline and diesel exhaust (nitrous oxides).

#### *2.4.7 Organic Compounds*

Common materials used in a variety of maintenance activities including motor fuels, solvents (such as paint thinner, degreasers, and parts cleaning fluids), and certain paints, deicing chemicals, crack and joint repair products, and asphalt.

#### *2.4.8 Other Pollutants*

Other pollutants originating from COS maintenance facilities and activities include pesticides and herbicides, detergents, and epoxy resins.

Pesticides and herbicides are organic chemicals that are usually toxic above certain concentrations and can be persistent in the environment. This means that these materials biodegrade slowly and may accumulate through the food chain, causing harm to certain organisms. Pesticides and herbicides are used in COS chemical weed control and integrated pest management activities.

Synthetic detergents and their additives also contain a variety of chemicals that are potentially harmful in the environment. Some of these additives, such as bleaches, dyes, fragrances, and enzymes, are toxic to aquatic life. Detergents are commonly used in cleaning and washing activities as part of routine maintenance of vehicles and equipment.

Some bonding and adhesive materials, and protective coatings contain epoxy resins. COS maintenance activities that may use epoxy resins include repairs of cracks, joints, bridges, barriers, and irrigation lines. Some of the constituents of epoxy products may be toxic to aquatic life, and some are potentially carcinogenic (cancer-causing) to humans.

## 2.5 Incorporation of BMPs into Maintenance Programs and Activities

As described above, the potential pollutants of concern for COS maintenance activities include petroleum products, sediments, trash and debris, metals, pH, nutrients, organics, and other pollutants. Many of these potential pollutants can be prevented from being discharged via the storm water drainage system. This can be achieved by selecting and implementing appropriate BMPs. There are two types of BMPs which may be used as appropriate: source controls, and treatment controls.

*Source controls* are designed to keep pollutants from coming in contact with storm water, and are generally the most cost-effective approach to storm water pollution control. Maintenance personnel are encouraged to use source controls whenever possible.

*Treatment controls* capture and remove pollutants from storm water before the runoff leaves the facility. These should only be considered in cases where the pollutant types or amounts are such that a treatment control may solve the problem more efficiently, and/or where there is a nearby sensitive receiving water that requires back-up controls. Treatment controls (e.g., oil/water separators) are typically more expensive to construct and maintain, and, as such, require careful review of their financial feasibility.

COS maintenance personnel should consider implementing both source control BMPs and treatment control BMPs at maintenance facilities and during maintenance activities that potentially contribute pollutants to storm water runoff.

COS has developed a wide range of BMPs described in Appendix B (Maintenance BMP Cut-Sheets) that are suitable for implementation by maintenance personnel.

## 2.6 How to Use Table 2-1 and Appendix B

**Table 2-1** provides a matrix that identifies BMPs that are applicable to maintenance activities, operations at maintenance facilities, and public education activities conducted by Maintenance. Detailed descriptions and guidance regarding each BMP is provided in the "cut sheets" in Appendix B.

**Table 2-1  
Recommended BMPs for Maintenance Activities**

<b>Maintenance Activities</b>	<b>Related SWMP BMP</b>	<b>Activity-Specific Cut Sheet</b>	<b>Page No.</b>
<b>A Family (Flexible Pavement)</b>			
Bridge and Road Surface Maintenance	MD 14 Bridge and Road Surface Maintenance	A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-3
Crack and Joint Repair	MD 14 Bridge and Road Surface Maintenance	A1 Crack and Joint Repair A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-5 B-3
Asphalt Work	MD 14 Bridge and Road Surface Maintenance	A2 Asphalt Work A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-6 B-3
Fog Seals/Chip Seals	MD 14 Bridge and Road Surface Maintenance	A2 Asphalt Work A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-6 B-3
Pothole Repairs	MD 14 Bridge and Road Surface Maintenance	A4 Pothole Repairs A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-7 B-3
Pavement Grinding and Removal	MD 14 Bridge and Road Surface Maintenance	A9 Pavement Grinding and Removal A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-8 B-3

**Table 2-1**  
**Recommended BMPs for Maintenance Activities**

Maintenance Activities	Related SWMP BMP	Activity-Specific Cut Sheet	Page No.
<b>B Family (Rigid Pavement)</b>			
Concrete Work	MD 14 Bridge and Road Surface Maintenance	B2 Concrete Work A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-9 B-3
Mudjacking and Drilling	MD 14 Bridge and Road Surface Maintenance	B9 Mudjacking A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-10 B-3
<b>C Family (Slopes/Drainage/Vegetation)</b>			
Drainage Culverts and Apputenances	MD 11 Sorm Water Drainage System Facilities Inspection and Cleaning	C Storm Water Drainage System Facilities Inspection and Cleaning	B-11
Lateral Support (Roadway Shoulder Maintenance)	MD 14 Bridge and Road Surface Maintenance	C1 Lateral Support (Roadway Shoulder Maintenance	B-13
Detention/Retention Basin and Infiltration Device Maintenance	MD 15 Detention/Retention Basin and Infiltration Device Maintenance	C5 Detention Basin and Infiltration Device Maintenance C Storm Water Drainage System Facilities Inspection and Cleaning	B-14 B-11



**Table 2-1**  
**Recommended BMPs for Maintenance Activities**

<b>Maintenance Activities</b>	<b>Related SWMP BMP</b>	<b>Activity-Specific Cut Sheet</b>	<b>Page No.</b>
<b>C Family (Slopes/Drainage/Vegetation) - continued</b>			
Illicit Connection Detection and Removal	MD 9 Illicit Connection Detection, Reporting and Removal C9 Illicit Connection Detection, Reporting and Removal C Storm Water Drainage System Facilities Inspection and Cleaning		B-16 B-11
<b>D Family (Litter/Debris/Graffiti)</b>			
Street Cleaning	MD 10 Street Cleaning	D Street Cleaning	B-20
Illegal Dumping Control	MD 8 Illegal Dumping Control	D2 Illegal Dumping Control D Street Cleaning	B-22 B-20
Sweeping Operations	MD 10 Street Cleaning	D3 Sweeping Operations D Street Cleaning	B-26 B-20
Litter and Debris Removal	MD 10 Street Cleaning	D4a Litter and Debris Removal D Street Cleaning	B-27 B-20
Anti-Litter Signs	MD 34 Anti-Litter Signs	D4b Anti-Litter Signs D Street Cleaning	B-28 B-20
Unidentified Spills	MD 1 Emergency Response and Cleanup Practices	D5a Emergency Response and Clean-Up Practices D Street Cleaning	B-29 B-20

**Table 2-1**  
**Recommended BMPs for Maintenance Activities**

<b>Maintenance Activities</b>	<b>Related SWMP BMP</b>	<b>Activity-Specific Cut Sheet</b>	<b>Page No.</b>
<b>D Family (Litter/Debris/Graffiti)</b>			
Graffiti Removal	MD 10 Street Cleaning	D6 Graffiti Removal D Street Cleaning	B-31 B-20
Adopt-a-Street Program	MD 35 Adopt-a-Street/Adopt-a-Wall	D9 Adopt a Street Program D Street Cleaning	B-32 B-20
<b>E Family (Landscaping)</b>			
Vegetation Management	MD 12 Vegetation Management	E Vegetation Management	B-33
Chemical Weed Control	MD 12 Vegetation Management	E1a Chemical Weed Control E Vegetation Management	B-35 B-33
Mechanical Weed Control	MD 12 Vegetation Management	E1b Mechanical Weed Control E Vegetation Management	B-36 B-33
Tree and Shrub Pruning	MD 12 Vegetation Management	E2a Tree and Shrub Pruning E Vegetation Management	B-37 B-33
Tree and Shrub Removal	MD 12 Vegetation Management	E2b Tree and Shrub Removal E Vegetation Management	B-38 B-33
Brush Chipping	MD 12 Vegetation Management	E2c Brush Chipping E Vegetation Management	B-39 B-33
Irrigation (Water) Line Repairs	MD 20 Non-Storm Water Discharges	E3a Water Line Repairs E Vegetation Management	B-40 B-33



**Table 2-1**  
**Recommended BMPs for Maintenance Activities**

<b>Maintenance Activities</b>	<b>Related SWMP BMP</b>	<b>Activity-Specific Cut Sheet</b>	<b>Page No.</b>
<b>E Family (Landscaping)- continued</b>			
Irrigation (Watering) Potable and Non-Potable	MD 20 Non-Storm Water Discharges	E3b Irrigation (Watering) Potable and Non-Potable E Vegetation Management	B-41 B-33
Erosion Control	MD 12 Vegetation Management	E9 Erosion Control E Vegetation Management	B-42 B-33
<b>F Family (Environmental)</b>			
Non-Storm Water Discharges	MD 20 Non-Storm Water Discharges	F2 Non-Storm Water Discharges	B-43
<b>H Family (Bridges)</b>			
Welding and Grinding	MD 14 Bridge and Road Surface Maintenance	H2 Welding and Grinding A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-46 B-3
Sand Blasting and Hydro Blasting	MD 14 Bridge and Road Surface Maintenance	H7a Sand Blasting, Wet Blast with Sand Injection, and Hydro Blasting A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-47 B-3
Painting	MD 14 Bridge and Road Surface Maintenance	H7b Painting A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-48 B-3
Irrigation (Water) Line Repairs	MD 20 Non-Storm Water Discharges	E3a Water Line Repairs E Vegetation Management	B-40 B-33

**Table 2-1  
Recommended BMPs for Maintenance Activities**

<b>Maintenance Activities</b>	<b>Related SWMP BMP</b>	<b>Activity-Specific Cut Sheet</b>	<b>Page No.</b>
<b>H Family (Bridges)- continued</b>			
Bridge Repairs	MD 14 Bridge and Road Surface Maintenance	H9a Bridge Repairs A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-49 B-3
<b>J Family (Other Structures)</b>			
Pump Stations	MD 31 Pump Station Cleaning	J1 Pump Station Cleaning A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-50 B-3
Tube and Tunnel Washing	MD 10 Street Cleaning	J2 Underpass Washing A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-52 B-3
Tow Truck Operations	MD 1 Emergency Response and Cleanup Practices	J5 Tow Truck Operations A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-53 B-3
Lane Scrubbing Operations	MD 10 Street Cleaning	J7 Lane Scrubbing Operations A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-54 B-3

**Table 2-1**  
**Recommended BMPs for Maintenance Activities**

Maintenance Activities	Related SWMP BMP	Activity-Specific Cut Sheet	Page No.
<b>K Family (Electrical)</b>			
Saw Cutting for Detector Loops	MD 14 Bridge and Road Surface Maintenance	K6 Saw Cutting for Detector Loops A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-55 B-3
<b>M Family (Traffic Guidance)</b>			
Thermoplastic Striping and Preheaters	MD 14 Bridge and Road Surface Maintenance	M1a Thermoplastic Striping and Preheaters A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-56 B-3
Paint Striping and Markings	MD 14 Bridge and Road Surface Maintenance	M1b Paint Striping and Markings A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-57 B-3
Raised/Recessed Pavement Marker Applicant and Removal	MD 14 Bridge and Road Surface Maintenance	M3a Raised/Recessed Pavement Marker Application and Removal A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-58 B-3
Thermoplastic Grinding	MD 14 Bridge and Road Surface Maintenance	M3b Thermoplastic Grinding/Removal A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-59 B-3
Sign Removal and Replacement	MD 14 Bridge and Road Surface Maintenance	M4 Sign Removal and Replacement A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-60 B-3

**Table 2-1**  
**Recommended BMPs for Maintenance Activities**

<b>Maintenance Activities</b>	<b>Related SWMP BMP</b>	<b>Activity-Specific Cut Sheet</b>	<b>Page No.</b>
<b>M Family (Traffic Guidance) - continued</b>			
Median Barrier Repair	MD 14 Bridge and Road Surface Maintenance	M7 Median Barrier Repair A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-61 B-3
<b>S Family (Storm Maintenance)</b>			
Minor Slides and Slipouts	MD 14 Bridge and Road Surface Maintenance	S3 Minor Slides and Slip-Outs A/B/C/H/J/K/M/S Bridge and Road Surface Maintenance	B-62 B-3
<b>T Family (Management and Support)</b>			
Oil Water Separators	MD 16 Oil Water Separators	T4a Oil/Water Separators	B-63
Waste Minimization Handling and Disposal	MD 28 Waste Minimization, Handling and Disposal	T4b Waste Minimization, Handling, and Disposal	B-65
Used Oil Recycling	MD 19 Used Oil Recycling	T4c Used Oil Recycling	B-66
Maintenance Facility Housekeeping Practices	MD 18 Maintenance Facility Housekeeping Practices	T5a Maintenance Facility Housekeeping Practices	B-68

**Table 2-1**  
**Recommended BMPs for Maintenance Activities**

<b>Maintenance Activities</b>	<b>Related SWMP BMP</b>	<b>Activity-Specific Cut Sheet</b>	<b>Page No.</b>
<b>T Family (Management and Support)</b>			
Building and Grounds Maintenance	MD 30 Building and Grounds Maintenance	T5b Building and Ground Maintenance	B-70
Material Storage Controls	MD 17 Material Storage Controls (Hazardous Materials)	T7a Storage of Hazardous Materials (Working Stock)	B-72
Outdoor Loading and Unloading of Materials	MD 24 Outdoor Loading and Unloading of Materials	T7b Outdoor Loading/Unloading of Materials	B-75
Outdoor Container Storage of Liquids Material Storage Controls	MD 25 Outdoor Container Storage of Liquids (Hazardous Materials)	T7c Material Storage Controls (Hazardous Waste)	B-77
Outdoor Storage of Raw Materials	MD 27 Outdoor Storage of Raw Materials	T7d Outdoor Storage of Raw Materials	B-79
Safer Alternative Products	MD 5 Safer Alternative Products	T7e Safer Alternative Products	B-81
Vehicle and Equipment Fueling	MD 21 Vehicle and Equipment Fueling	T9a Vehicle and Equipment Fueling	B-83
Vehicle and Equipment Pressure Washing	MD 22 Vehicle and Equipment Pressure Washing	T9b Vehicle and Equipment Pressure Washing	B-85
Vehicle and Equipment Maintenance and Repair	MD 23 Vehicle and Equipment Maintenance and Repair	T9c Vehicle and Equipment Maintenance and Repair	B-87
Above Ground Leak and Spill Control	MD 7 Above Ground Tank Leak and Spill Control	T9d Above Ground Tank Leak and Spill Control	B-90



## Section 3

# Program Evaluation

### 3.1 Introduction

This section of the *Maintenance Staff Guide* describes how Maintenance field personnel will provide information on the implementation of the BMPs described in Appendix B and how COS Stormwater Division will evaluate the information.

### 3.2 Purpose of Providing Information on the Implementation of BMPs

Providing information on the implementation of the BMPs described in Appendix B will serve as the feedback loop for Stormwater Division to identify the following:

- BMPs that are in need of revision or improvement
- New BMPs that need to be developed
- BMPs that are effective in reducing the discharge of potential pollutants
- BMPs that are cost-effective
- Studies or research activities that could be conducted to advance the state of knowledge regarding the design and implementation of storm water management practices.

### 3.3 Feedback Process

Evaluation of the implementation of BMPs by field personnel is key to the process of continually improving the MSWPP. Field personnel are encouraged to complete the BMP Questionnaire on page 3-2 and forward to their Supervisor, who will forward it to the Stormwater Division. (Figure 3-1 Feedback Process). The Stormwater Division Storm Water Coordinator will review the questionnaires and identify BMPs requiring modification.

## Maintenance BMP Questionnaire

BMP:

Date:

Name:

Title:

Maintenance Facility:

Can any of the BMP procedures being implemented be improved? Please describe new or improved BMP procedures. (Attach additional comments as necessary)

If the BMP is not being implemented as described in the Maintenance Staff Guide, what is the cause:

\_\_\_\_ Safety Concern      \_\_\_\_ Lack of Training

Describe:

\_\_\_\_ Operational

Describe:

\_\_\_\_ Equipment or material availability

Describe equipment or material needs:

\_\_\_\_ Personnel (additional personnel are needed)

Estimate additional PYs required:

\_\_\_\_ Financial Resources

Describe the category of financial resources:

Reviewed by: Supervisor \_\_\_\_ Superintendent \_\_\_\_ Storm Water Coordinator \_\_\_\_





# Appendix A

## Acronyms, & Definition of Terms

### Acronyms

<b>BMP</b>	Best Management Practice
<b>Cal/OSHA</b>	California Occupational Safety and Health Administration
<b>CCR</b>	California Code of Regulations
<b>CHP</b>	California Highway Patrol
<b>CWA</b>	Clean Water Act
<b>EPA</b>	U.S. Environmental Protection Agency
<b>FRO</b>	First Responder Operational
<b>MEP</b>	Maximum Extent Practicable
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>OES</b>	Office of Emergency Services
<b>PCC</b>	Portland Cement Concrete
<b>RWQCB</b>	California Regional Water Quality Control Board
<b>SPCC</b>	Spill Prevention Control and Countermeasure
<b>SWMP</b>	Storm Water Management Plan
<b>SWRCB</b>	California State Water Resources Control Board

### Definition of Terms

**Basin Plan:** A water quality control plan developed by a Regional Water Quality Control Board (RWQCB) for a specific geographic area. It identifies beneficial uses of waters and the water quality objectives needed to maintain these beneficial uses.

**Beneficial uses:** Reasonable use of water for a purpose consistent with the laws and best interest of the people of the state. Such uses include, but are not limited to, the following: instream, out of stream, and groundwater uses, domestic, municipal, industrial water supply, mining, irrigation, fish and aquatic life, hydropower and commercial navigation.

**Best Management Practice (BMP):** Means those storm water management practices selected for implementation under the SWMP by meeting the MEP criteria. The array includes: treatment requirements, operating procedures, and management practices to control site runoff. The array was selected from storm water management practices designed to control pollutants from typical COS activities.

**Clean Water Act:** The Federal Water Pollution Control Act enacted by Congress in 1972 by Public Law 92-500 and amended by the Water Quality Act in 1987. The Clean Water Act prohibits the discharge of pollutants to waters of the United States unless the discharge is covered by the terms of a discharge permit. The Clean Water Act is probably best known for its stated objective of "fishable and swimmable" waters. The 1987 amendment to the Clean-Water Act includes guidelines for regulating discharges from storm water drainage systems for certain municipalities, industries, and construction activities.

**Compliance Monitoring:** Refers to various information gathering activities that COS will use to assess its efforts to comply with the requirements in the Permit and the SWMP. Compliance monitoring will involve a broad variety of observations and inspections that will help COS managers know whether the storm water management procedures and practices described in the SWMP are being implemented as intended.

**Detention basin:** Facilities designed to collect and temporarily detain the initial volume of storm water runoff for a specified period of time, to permit settlement of particulate pollutants.

**Drain inlet:** A drainage structure which collects surface runoff and conveys it to an underground storm water drainage system.

**Erosion:** The wearing away of land surface primarily by wind or water. Erosion occurs naturally as a result of weather or runoff, but can be intensified by clearing, grading or excavation of the land surface.

**Existing vegetation:** Any vegetated area that has not already been cleared and grubbed.

**Fire protection strips:** Buffer strips adjacent to the right-of-way where vegetation is controlled to reduce the risk of fire.

**Good housekeeping:** A common practice related to the storage, use, or cleanup of materials, performed in a manner that minimizes the discharge of pollutants.

**Grubbed:** Removal of vegetation by mechanical or manual methods.

**Hazardous waste:** A waste or combination of wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics, may either cause or significantly contribute to,

an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA or state lists. Regulated under the federal Resource Conservation and Recovery Act and the California Health and Safety Code.

**Herbicide:** Chemical compounds that are used to control weeds.

**Hydrologic unit:** A subunit of a basin as defined by a Regional Water Quality Control Board (RWQCB).

**Illicit connections:** Permanent, usually underground pipe connections to the COS storm water drainage system that have not been approved by COS under an encroachment permit.

**Illicit discharge:** Any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges pursuant to a NPDES permit and discharges resulting from fire fighting activities. Some illicit discharges are non-prohibited if they are not polluted.

**Maintenance activities:** Routine maintenance activities that may require clearing, grading, or excavation to maintain original line and grade, hydraulic capacity, or original purpose of the facility.

**Maintenance facilities:** Facilities under COS ownership or control that contain such areas as fueling areas, waste storage or disposal facilities, wash racks, equipment or vehicle storage, and materials storage areas.

**Maintenance Staff Guide:** A Handbook for COS Maintenance personnel designed to provide guidance on potential pollutant sources and BMPs for COS maintenance facilities and activities.

**Maintenance Storm Water Protection Program (MSWPP):** The component of the Storm Water Management Plan that describes: the program to implement best management practices as part of the ongoing maintenance activities for existing highways and highway-related properties, facilities, and activities; surveillance activities to help manage potential storm water contamination from accidental spills, illicit connections, illegal discharges, and illegal dumping on COS property; and implementation of best management practices to reduce the potential for storm water pollution at existing highway maintenance facilities by minimizing contact between storm water and the various substances used at maintenance facilities.

**Maximum Extent Practicable (MEP):** Means the extent of implementation of storm water management practices that are effective at reducing storm water pollution except when any of the following conditions are met: (1) other effective management practices would achieve greater or substantially the same pollution control benefits; (2) the management practice would not be technically feasible; (3) the cost of management practice implementation would greatly outweigh pollution control benefits; or (4) implementation of the management practice would compromise other legal and institutional constraints, expectations, and obligations imposed by Federal or State statute or case law.

**Median area:** The portion of a divided highway separating the traveled ways for traffic in opposite directions. Often contains storm drain system facilities, such as ditches and swales.

**Monitoring:** Refers to a variety of activities and processes through which COS will obtain information relevant to its implementation of the storm water quality management program and to identify the need for and/or opportunities for revising or refining its program.

**National Pollutant Discharge Elimination System (NPDES):** The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits under the Clean Water Act. In California, the NPDES permits are incorporated into Waste Discharge Requirements.

**Non-point source discharge:** Discharge from a diffuse pollution source (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet.)

**Non-storm water discharge:** Any discharge to a storm drain system or receiving water that is not composed entirely of storm water.

**Nutrients:** Nitrogen and phosphorus and possibly other substances such as iron in highway runoff due to atmospheric deposition and roadside fertilizer application. In urban areas, landscaping activities that may yield nutrient organic matter such as lawn clippings, leaves, street dirt, automobile exhaust and excess fertilizer.

**Oil waste:** Oil of any kind or in any form, including but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged soil.

**Outfall:** The point source where a wastewater discharges to waters of the United States.

**Permit:** Refers to a NPDES Permit and is an authorization, license, or equivalent control document, issued by the U.S. Environmental Protection Agency (EPA) or an approved state, to implement the requirements of the NPDES. In California refers to Waste Discharge Requirements issued by the RWQCB or SWRCB.

**Pump station:** A complete pumping installation including a storage box, pump or pumps, standby pumps, connecting pipes, electrical equipment, pumphouse and outlet chamber.

**Receiving waters:** All surface water bodies within the permit area.

**Regional Water Quality Control Board (RWQCB):** California agencies that implement and enforce Clean Water Act section 402(p) NPDES permit requirements, and are issuers and administrators of these permits as delegated by EPA. There are nine regional boards working with the State Water Resources Control Board.

**Reporting:** Refers primarily to information COS will report to the SWRCB, although there also will be instances where information will be reported or otherwise communicated within COS.

**Retention basin:** An infiltration basin designed to capture runoff volume from the water quality design storm and infiltrate it prior to a significant storm event.

**Sanitary sewer system:** Underground pipes that carry off only domestic or industrial waste, not storm water.

**Sediment:** Organic or inorganic material that is carried by or is suspended in water and that settles out to form deposits in the storm drain system or receiving waters.

**Site:** The land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity.

**Spill:** An accidental dumping or spilling of a potential pollutant onto the ground or into a waterway.

**State Water Resources Control Board (SWRCB):** As delegated by EPA, California agency that implements and enforces Clean Water Act Section 402(p) NPDES permit requirements, and is issuer and administrator of COS NPDES Storm Water Permit. Works with the Regional Water Quality Control Boards.

**Storm water:** Rainfall runoff, snow melt runoff, and surface runoff and drainage. It excludes infiltration and runoff from agricultural land.

**Storm Water Management Plan (SWMP):** The plan that describes COS program to reduce the discharge of pollutants from storm water drainage systems associated COS facilities, properties, and activities to the maximum extent practicable. The Storm Water Management Plan also describes assignment of responsibilities for implementing BMPs, as well as training, public education and participation, monitoring, program evaluation, and reporting activities.

**Storm water management practice:** Any activities, prohibitions or modifications of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State.

**Storm water drainage system:** Streets, gutters, conduits, artificial drains, channels and watercourses, or other facilities that are owned, operated, maintained and used for the purpose of collecting, storing, transporting, or disposing of storm water.

**Sump:** In drainage, any low area which does not permit the escape of water by gravity flow. In practice, these often occur by design at pumping stations.

**Surface runoff:** Precipitation, snow-melt, or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions; a major transporter of non-point source pollutants.

**Vista point:** A paved area beyond the shoulder which permits travelers to safely exit the highway to stop and view a scenic area. In addition to parking areas, trash receptacles, interpretive displays, restrooms, drinking water, and telephones may also be provided.

**Watercourse:** Surface water bodies including streams, lakes, bays, estuaries, lagoons, reservoirs, and ponds.

**Water Quality Standards:** State adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality objective that must be met to protect designated uses.

**Waters of the State:** Any water, surface or underground, including saline waters, within the boundaries of the state.





# Appendix B

## Maintenance BMP Cut-Sheets

The following BMP cut-sheets are intended to be used as a guideline for implementing BMPs for highway maintenance activities, highway surveillance activities, Maintenance facility activities, and public education activities.

<b>BMP Number</b>	<b>BMP Title</b>	<b>Page</b>
A/B/C/H/J/K/M/S	Bridge and Road Surface Maintenance	B-3
A1	Crack and Joint Repair	B-5
A2	Asphalt Work	B-6
A4	Pothole Repairs	B-7
A9	Pavement Grinding and Removal	B-8
B2	Concrete Work	B-9
B9	Mudjacking	B-10
C	Storm Water Drainage System Facilities	B-11
	Inspection and Cleaning	
C1	Lateral Support (Roadway Shoulder Maintenance)	B-13
C5	Detention Basin and Infiltration Device	B-14
	Maintenance	
C9	Illicit Connection Detection, Reporting and	B-16
	Removal	
D	Street Cleaning	B-20
D2	Illegal Dumping Control	B-22
D3	Sweeping Operations	B-26
D4a	Litter and Debris Removal	B-27
D4b	Anti-Litter Signs	B-28
D5a	Emergency Response and Clean-Up Practices	B-29
D6	Graffiti Removal	B-31
D9	Adopt-a-Street Program	B-32
E	Vegetation Management	B-33
E1a	Chemical Weed Control	B-35
E1b	Mechanical Weed Control	B-36
E2a	Tree and Shrub Pruning	B-37
E2b	Tree and Shrub Removal	B-38
E2c	Brush Chipping	B-39
E3a	Water Line Repairs	B-40
E3b	Irrigation (Watering) Potable and Non-Potable	B-41
E9	Erosion Control	B-42
F2	Non-Storm Water Discharges	B-43

<b><u>BMP Number</u></b>	<b><u>BMP Title</u></b>	<b><u>Page</u></b>
H2	Welding and Grinding	B-46
B-2H7a	Sand Blasting, Wet Blast with Sand Injection, and Hydro Blasting	B-47
H7b	Painting	B-48
H9a	Bridge Repairs	B-49
J1	Pump Station Cleaning	B-50
J2	Underpass Washing	B-52
J5	Tow Truck Operations	B-53
J7	Lane Scrubbing Operations	B-54
K6	Saw Cutting for Detector Loops	B-55
M1a	Thermoplastic Striping and Preheaters	B-56
M1b	Paint Striping and Markings	B-57
M3a	Raised/Recessed Pavement Marker Application and Removal	B-58
M3b	Thermoplastic Grinding/Removal	B-59
M4	Sign Removal and Replacement	B-60
M7	Median Barrier Repair	B-61
S3	Minor Slides and Slip-Outs	B-62
T4a	Oil/Water Separators	B-63
T4b	Waste Minimization, Handling, and Disposal	B-65
T4c	Used Oil Recycling	B-66
T5a	Maintenance Facility Housekeeping Practices	B-68
T5b	Building and Grounds Maintenance	B-70
T7a	Storage of Hazardous Materials (Working Stock)	B-72
T7b	Outdoor Loading/Unloading of Materials	B-75
T7c	Material Storage Controls (Hazardous Waste)	B-77
T7d	Outdoor Storage of Raw Materials	B-79
T7e	Safer Alternative Products	B-81
T9a	Vehicle and Equipment Fueling	B-83
T9b	Vehicle and Equipment Pressure Washing	B-85
T9c	Vehicle and Equipment Maintenance and Repair	B-87
T9d	Above Ground Tank Leak and Spill Control	B-90

## Bridge and Road Surface Maintenance

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Asphaltic emulsion
- Concrete or asphalt grindings and cuttings
- Sediment
- Sealant material
- Grout
- Oil
- Asphalt concrete binder
- Liquid asphalt
- Cleaning products
- Metal products
- Paint products
- Animal wastes
- Thermoplastic
- Asphalt concrete
- Asphalt cement
- Portland cement concrete (PCC)
- Equipment wash water
- Process water
- Bitumen adhesive
- Litter and debris
- Wood products

### Definition and Purpose

Bridge and road surface maintenance activities include A Family Flexible Pavement, B Family - Rigid Pavement, C Family - Lateral Support, H Family - Bridges, J Family - Other Structures, K Family - Electrical, M Family - Traffic Control, and S Family - Storm Maintenance. Proper control and disposal of materials and waste products from bridge and road surface maintenance will reduce the discharge of potential pollutants to the storm water drainage system or watercourses.

### Appropriate Applications

These BMPs should be implemented on a site-specific basis whenever bridge and road surface maintenance activities are performed.

## Bridge and Road Surface Maintenance

- Limitations**
- To minimize the discharge of potential pollutants to the storm water drainage system, it is recommended that bridge and road surface maintenance be avoided during wet weather. However, it is recognized that during periods of rain, bridge and road surface maintenance may be necessary.
  - BMP implementation will depend on traffic, weather, available resources, and safety conditions.

- Drainage Protection and Equipment Operation**
- When possible and practical, pre-plan your work to protect storm water drainage systems and watercourses from discharge of potential pollutants and keep equipment in good operating condition:
- Look to see where the flow of a leak, spill, or other runoff would go.
  - Identify drain inlets and watercourses, both upstream and downstream of the work site.
  - All vehicles and equipment should be clean and in good operating condition. Perform a thorough pre-operational inspection of vehicles and equipment.
  - Set-up the work area to minimize the tracking of material by vehicles and equipment in or out of the work area.

- Housekeeping and Spill Control**
- Practice good housekeeping at the work site:
- Litter and debris should be collected and properly disposed of.
  - Containers of liquids should be secured with lids until needed.
  - Any spills should be controlled promptly. Transport collected materials back to a Maintenance facility or approved storage site.
  - If a leak or spill occurs, protect drainage systems and watercourses from spilled material. For example, by covering or blocking drain inlets with sand bags, plastic bags filled with native material or absorbent booms. Remove covers/blocks once clean-up is completed.

## Crack and Joint Repair

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or receiving waters:

- Asphalt concrete binder
- Asphalt cement
- Liquid asphalt
- Asphalt concrete Sediment
- Asphaltic emulsion
- Sealant material

### Definition and Purpose

Crack and joint repair involves the sealing and filling of cracks and joints in flexible pavement. This work is done to prevent the entrance of moisture and foreign material into the subgrade, and to maintain the integrity of the pavement surface.

### Operational Procedures

- When possible, avoid crack and joint repair during rainfall.
- Avoid applying excess sealant material.
- When cleaning out equipment, use an appropriate container to capture any excess material.
- Transport the collected excess material to a Maintenance facility or approved storage site.

## Asphalt Work

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or receiving waters:

- Asphalt concrete binder
- Asphalt cement
- Liquid asphalt
- Asphalt concrete
- Sediment
- Asphaltic emulsion
- Sealant material

### Definition and Purpose

Asphalt work involves the patching or resurfacing of the roadbed with a mixture of mineral aggregate and asphalt concrete binder. The purpose is to repair degraded asphalt surfaces or to cover a new road with asphalt pavement.

### Operational Procedures

- Protect drain inlets, the storm water drainage system, and watercourses from loose asphalt concrete and sealant materials. For example, by covering or blocking drain inlets with sand bags, plastic bags filled with native material or absorbent booms. Remove covers/blocks once clean-up is completed.
- Stockpile material away from drain inlets and watercourses.
- When cleaning out application equipment use appropriate container to collect any excess material that is not re-used or recycled.
- Transport collected materials back to a Maintenance facility or approved storage site.
- Dispose of removed asphalt at an approved storage site or Maintenance facility asphalt pile; recycle when possible.

## Pothole Repairs

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or receiving waters:

- Asphalt concrete binder
- Asphalt cement
- Liquid asphalt
- Asphalt concrete
- Sediment
- Asphaltic emulsion
- Sealant material

### Definition and Purpose

Pothole repairs involve the filling and resurfacing of potholes along the flexible pavement portions of roadways and highways. The purpose of these repairs is to eliminate holes and cuts in the pavement.

### Operational Procedures

- Avoid performing pothole repairs in wet weather, if possible.
- Where practical, remove excess asphalt concrete material from the roadway.

## Pavement Grinding and Removal

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Concrete
- Asphalt
- Sediment

### Definition and Purpose

During resurfacing activities sections of roadway are removed (dug out) using graders and grinders.

### Operational Procedures

- Collect digout material by mechanical or manual methods. This material should be recycled whenever possible, for use as shoulder backing or base material at approved locations.
- If digout material cannot be recycled, transport the material back to a Maintenance facility or approved storage site.
- When possible, avoid conducting digout activities in the rain.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses.



## Concrete Work

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Portland cement concrete (PCC)
- Concrete rinse water
- Concrete grindings and cuttings
- Concrete waste

### Definition and Purpose

Concrete work procedures and practices are designed to reduce the discharge of concrete waste materials (e.g., concrete grindings and cuttings, concrete rinse water, and concrete waste) to the storm water drainage system or to watercourses by implementing rinsing procedures and disposal practices.

### Operational Procedures

- Do not dump concrete grindings into drain inlets, the storm water drainage system or watercourses.
- When washing equipment or vehicles to remove PCC, minimize water use. For example, use a positive shutoff on the washout hose.
- Where appropriate, designate areas to be used for concrete washout.
- Locate washout areas away from drain inlets or watercourses. Contain runoff from this area. For example, by constructing a temporary pit, or discharging to an appropriate container or bermed area large enough to contain the liquid and solid waste generated during washout procedures,
- Perform washout of equipment, tools or vehicles in designated areas only.

## Mudjacking

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Grout
- Concrete or asphalt grindings and cuttings
- Equipment wash water
- Oil
- Drilled out materials

### Definition and Purpose

Mudjacking is the maintenance and repair of rigid type surfacing, its associated base and any portland concrete cement (PCC) shoulders less than two feet in width.

### Operational Procedures

- When washing equipment or vehicles to remove mudjack material, minimize water use. For example, use a positive shutoff on the washout hose.
- Where appropriate, designate areas to be used for mudjack washout.
- Locate washout areas away from drain inlets or watercourses. Contain runoff from this area. For example, by constructing a temporary pit, discharging to an appropriate container or bermed area large enough to contain the liquid and solid waste generated during washout procedures.
- Perform washout of equipment, tools or vehicles in designated areas only.
- Remove all excess mudjack or other material by mechanical or manual methods.
- When cleaning out equipment use appropriate container to collect any excess material that is not re-used or recycled.
- Transport collected materials back to a Maintenance facility or approved storage site.
- Cover broken mudjack material bags while traveling.

## Storm Water Drainage System Facilities Inspection & Cleaning

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Sediment
- Litter and debris
- Illegally dumped material
- Hazardous material

### Definition and Purpose

Culverts, ditches and gutters, underdrains, horizontal drains and downdrains require inspection and cleaning to prevent flooding and provide for unobstructed flows.

### Appropriate Applications

These procedures are applicable to Maintenance personnel who conduct storm water drainage system facilities inspection and cleaning.

### Limitations

- BMP implementation will depend on traffic, weather, available resources, and safety conditions.
- Access to the storm water drainage system and worker safety.

### Operational Procedures

- Observe culverts and drain inlets and outlets annually in the fall, and as needed during the winter season to determine if cleaning is required or if damage has occurred. Remove litter and debris from drain inlet grate to prevent flooding and where practical dispose of the debris at an approved location.
- Make sure water is not overflowing or ponding onto inappropriate areas (e.g., active traffic lanes, material storage areas, etc.).
- Clean culverts when sediment accumulation impairs the culvert function.
- Inspect ditches and gutters periodically to maintain unobstructed flow. Seal or repair when structural integrity is directly endangered.
- Inspect downdrains once a year and clean or repair as necessary.

## Storm Water Drainage System Facilities Inspection & Cleaning

- Inspect ditches for accumulation of sediment and other materials as needed. If possible, schedule routine ditch-cleaning activities designed to maintain the hydraulic capacity of ditches prior to the rainy season.
- When cleaning drainage ditches below cut slopes or steep slopes, where practical, avoid cutting the toe of the slope. Operate equipment in a slow, controlled manner. This can also prevent damage to the ditch.
- Inspect and clean storm water drainage facilities that have a history of frequent obstruction.
- Report damaged drainage facilities to your supervisor and schedule repair as needed.
- Inspect protected stream channel banks and known trouble locations prior to the winter season, and as needed during the winter season. Schedule repair as needed.

**Drainage Protection and Equipment Operation** When possible and practical, pre-plan your work to protect storm water drainage systems and watercourses from discharge of potential pollutants and keep equipment in good operating condition:

- Look to see where the flow of a leak, spill, or other runoff would go.
- Identify drain inlets and watercourses, both upstream and downstream of the work site.
- All vehicles and equipment should be clean and in good operating condition. Perform a thorough pre-operational inspection of vehicles and equipment.
- Set-up the work area to minimize the tracking of material by vehicles and equipment in or out of the work area.

**Housekeeping and Spill Control** Practice good housekeeping at the work site:

- Litter and debris should be collected and properly disposed of.
- Containers of liquids should be secured with lids until needed.
- Any spills should be controlled promptly. Transport collected materials back to a Maintenance facility or approved storage site.
- If a leak or spill occurs, protect drainage systems and watercourses from spilled material. For example, by covering or blocking drain inlets with sand bags, plastic bags filled with native material or absorbent booms. Remove covers/blocks once clean-up is completed.

## Lateral Support (Roadway Shoulder Maintenance)

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or receiving waters:

- Sediment
- Asphalt
- Asphalt concrete
- Sealant materials

### Definition and Purpose

Areas adjacent to surfaced and unsurfaced road shoulders require maintenance to prevent the loss of lateral support, the deterioration or failure of the edge of road surfaces, and to maintain roadside drainage patterns.

### Operational Procedures

- Minimize grading shoulders in the rain.
- Minimize placing asphalt grindings in locations where they can be transported to drain inlets, the storm water drainage system or watercourses by runoff. Consult your local Department of Fish & Game (or responsible agency) for approved locations.
- If grading occurs during periods of rain, where necessary protect storm water drainage systems and watercourses from the discharge of excess material generated by grading. For example, by covering or blocking storm drain inlets with sand bags or plastic bags filled with native material. Remove covers/blocks once grading is completed.

## Detention Basin and Infiltration Device Maintenance

### Environmental Concerns

Discharge of the following materials  
into the storm water drainage system  
or watercourses:

- Sediment
- Litter and debris

### Definition and Purpose

Detention basins and infiltration systems collect and temporarily detain the initial volume of storm water runoff for a specified period of time. Regular inspection and maintenance will remove accumulation of sediments and debris so the systems will continue to function as designed.

### Appropriate Applications

This BMP applies to maintenance personnel who inspect and maintain detention and retention basins.

### Limitations

- If upstream erosion is not properly controlled, extended detention basins can become maintenance intensive with respect to sediment removal, nuisance odors, and insects.
- Breeding of disease-carrying insects such as mosquitoes, due to the presence of stagnant water.
- Frequent inspection is necessary to maintain the life of the device. Systems will typically plug and fail if a significant erosion area develops upstream of the facility.
- Drywells have additional regulatory requirements. Check with the Supervisor.

## Detention Basin and Infiltration Device Maintenance

### Operational Procedures

- **Detention Basin Maintenance**
  - Detention basins should be inspected annually and following significant storm events. Maintenance should be performed on an as needed basis to maintain BMP performance.
  - Vegetation should be controlled as needed including periodic removal of aquatic plants that may potentially impact nutrients in the water.
  - Maintain the embankment as needed to prevent erosion, damage by rodents, or seepage.
  - Debris should be removed as needed to prevent outlet clogging.
  - Sediment should be removed as needed, re-used or disposed of properly.
- **Infiltration System Maintenance**
  - In order to prevent clogging or overflow of a dry well downspout, clean the gutters, gutter screens, and downspout screens of the buildings connected to the drywell as-needed.
  - Inspect to ensure that trees are not planted on or near dry well boundaries.

## Illicit Connection Detection, Reporting & Removal

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Hazardous materials
- Detergents
- Sanitary wastes
- Waste water
- Sediment
- Nutrients
- Bacteria and viruses

### Definition and Purpose

Procedure for Maintenance field staff to detect, correct, and report illicit connections and associated discharges into COS storm drain facilities. Illicit connections are usually permanent, underground pipe connections to the COS storm water drainage system that have not been approved by COS.

This management practice is directed at continuous, or recurring discharges through direct connections to the drainage system or as run-on from an adjacent property. Management practice D2 Illegal Dumping Control, focuses on single incident dumping or spills.

### Appropriate Applications

Detecting, reporting and removing illicit connections applies to all COS existing facilities and construction sites.

### Limitations

Discharges resulting from illicit connections may include unknown or hazardous materials. If the nature of the discharge is unknown, or known or suspected to be a hazardous substance, applicable hazardous substances procedures must be followed as described below.

### Operational Procedures

Maintenance Supervisors and personnel, as part of their routine inspection, or maintenance work shall report all observed suspected illicit connections to the Stormwater Division.



## Illicit Connection Detection, Reporting & Removal

- **Methods for Detecting Illicit Connections**

Improper physical connections to the storm drain system are relatively rare at freeway and rural drainage facilities because of the generally restricted access. Illicit connections at COS facilities are more likely to be found on streets in urbanized or otherwise developed areas. However, occasional illicit connections and run-on can occur in a number of ways, such as:

1. Surface runoff from graded properties or construction projects;
2. Contaminated areas adjacent to COS right-of-way;
3. Overflows from sanitary sewers;
4. Roof and floor drain connections from businesses and residences.

- Illicit connections are detected by several general methods:

1. Observation of discharges - A connection is suspected as a result of actual evidence of ongoing or previous discharges.
2. Observation of connections - Maintenance staff can observe actual connections (pipes, ditches) during routine drainage system inspection and maintenance procedures, even though there may not be any observable discharges. This primarily involves heightened awareness by the Maintenance staff.
3. Underground search - This is not recommended as a normal procedure, except as necessary to locate the source of a previously observed, significant discharge. Connections are detected through a more rigorous, dedicated effort to search for connection points (TV, surveys, etc.).

- **Evidence of Illicit Connections**

- If a discharge is observed from an illicit connection, and the nature is unknown or suspected of being a hazardous substance, no further investigation should be conducted and the incident reported as described below.

- Urban Areas - Evidence of illicit connections is usually best detected at storm drain outfall locations or at manholes - Signs of an illicit connection can include:

- Abnormal water flow during the dry weather season.
- Unusual flows in subdrain systems used for dewatering.
- Pungent odors coming from the drainage systems.
- Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes.

## Illicit Connection Detection, Reporting & Removal

- Excessive sediment deposits, particularly adjacent to or near active off-site construction projects.
- Rural Areas - Illicit connections involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit connection can include:
  - Abnormal water flow during the dry weather season.
  - Non-standard junction structures.
  - Broken concrete, disturbed soil, removed vegetation, or other disturbances at or near junction structures.
- Construction Sites - undocumented or unmapped underground connections to COS drainage facilities discovered during construction on the site.
- **Reporting**

Any field maintenance employee who observes or discovers a suspected illicit connection into any COS storm water drainage system shall report such activities to a supervisor. If a discharge is observed from an illicit connection and the nature is unknown or suspected of being a hazardous substance, the Fire Department shall be notified. Any illicit connections or evidence of off-site run-on shall be reported to the supervisor who will forward the report to the Stormwater Division.
- **Investigation**
  - Storm drain investigations requiring detection and isolation processes or physical entry into pipes and other confined areas shall be performed by trained personnel only.
  - Investigations of potential illicit discharges will be conducted by the Stormwater Division.
    - All discharges known to be hazardous, suspected of being hazardous, or of unknown nature shall be responded to according to all applicable procedures.
  - A field review and evaluation will be conducted by the Maintenance Staff. This may include contacting local agencies responsible for the downstream receiving waters.
  - When available, "as-built" plans of the facility will be examined for identification of existing drainage system.
  - The City Engineer will be consulted to determine if the connection has an encroachment permit.

## Illicit Connection Detection, Reporting & Removal

- If for any reason it is necessary to sample a discharge, the Stormwater Division will develop an appropriate sampling procedure.
- Once a discharge is determined to be illicit, remedial actions shall be taken to identify the source, to cease and/or re-route ongoing flows, and to remove any illegal encroachments. The actions will depend on the nature of the discharge.
- Pinpointing principal responsible parties, serving formal notices of violation, and remedying any problems may be done by the county or other local agency health specialists, or by local City code enforcement officials.

- **Illicit Connection Removal**

Illicit connection removal involves the clean-up of any discharges, the removal of the connection and the repair of the highway facilities.

- Clean-Up - Clean-up of discharged materials on COS rights-of-way from an illicit connection shall be performed as follows:
  - Non-hazardous and hazardous materials shall be cleaned up in accordance with existing COS practice.
- Removal of Connection - Established legal procedures may be used to remove illegal encroachments into COS right of way.

After the illicit discharge is halted or re-routed, pipes or other connections shall be removed from the COS right-of-way or as far as practicable and plugged or capped to prevent leakage and soil contamination. Connection points shall be patched or otherwise repaired to maintain the line, grade, and material of the original facility by COS.

- **Follow-Up**

Maintenance Supervisors with responsibility for clean-up removal activities must follow-up on the incident to ensure corrective actions have taken place per applicable COS procedures, and report to the Stormwater Division.

## Street Cleaning

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Litter and debris
- Sweeper wastes
- Paint products
- Sediment (sand blasting grit)
- Cleaning products
- Equipment wash water
- Process water
- Wash water

### Definition and Purpose

Street cleaning activities include D Family - Sweeping Operations, Graffiti Removal, and Litter and Debris Removal, and J Family - Lane Scrubbing Operations and Underpass Washing. The use of proper cleaning procedures for highway/freeway surfaces, conducted on a regular basis, will reduce the discharge of potential pollutants into the storm water drainage system and watercourses.

### Appropriate Applications

This BMP should be implemented whenever graffiti removal, sweeping operations, litter and debris removal, lane scrubbing operations, and underpass washing activities are conducted.

### Limitations

BMP implementation will depend on traffic, weather, available resources, and safety conditions.

### Drainage Protection and Equipment Operation

When possible and practical, pre-plan your work to protect storm water drainage systems and watercourses from discharge of potential pollutants and keep equipment in good operating condition:

- Look to see where the flow of a leak, spill, or other runoff would go.
- Identify drain inlets and watercourses, both upstream and downstream of the work site.
- All vehicles and equipment should be clean and in good operating condition. Perform a thorough pre-operational inspection of vehicles and equipment.

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## Street Cleaning

- Set-up the work area to minimize the tracking of material by vehicles and equipment in or out of the work area.

### Housekeeping and Spill Control

Practice good housekeeping at the work site:

Litter and debris should be collected and properly disposed of.

- Containers of liquids should be secured with lids until needed.
- Any spills should be controlled promptly. Transport collected materials back to a Maintenance facility or approved storage site.
- If a leak or spill occurs, protect drainage systems and watercourses from spilled material. For example, by covering or blocking drain inlets with sand bags, plastic bags filled with native material or absorbent booms. Remove covers/blocks once clean-up is completed.

## Illegal Dumping Control

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Paint
- Oil
- Vehicle fluids
- Solid wastes
- Hazardous materials
- Litter and debris
- Sediment

### Definition and Purpose

Procedure for Maintenance field staff to detect, correct, and report illegal dumping and spills of pollutants on COS properties and facilities. This management practice is directed at incidences of dumping or spills that effect stormwater.

### Limitations

- Illegally dumped material must be clearly identified to determine the appropriate personnel to perform the clean-up (e.g., Maintenance personnel or Hazmat Response Team).
- In the event of a spill of hazardous material, COS personnel should refer to BMP D5a Emergency Response and Clean-up Practices for more specific information.
- Where adjacent properties drain to COS properties or where private storm drain systems tie into COS drainage systems, pollutants from offsite dumping or spills could also enter COS properties or storm drains.

### Operational Procedures

Maintenance Supervisors and field personnel shall report observed illegal dumping as part of their routine inspections, and maintenance.

Illegal dumping may occur on highways and freeways or at roadside rest areas, vista points, park-and-ride lots, and weigh stations. Illegal dumping on highway facilities typically occurs in the following locations:

## Illegal Dumping Control

- **Storm Water Drainage Systems**
  - Inlets - A typical problem is the dumping of paints, used oils, and other automotive fluids into storm drain inlets. Though not commonly a problem on freeways due to limited access, this type of dumping is most prevalent on highways in both rural and urbanized areas.
  - Open Channels - Solid wastes including landscape trimmings, concrete wastes, old furniture, and household rubbish are often found in open channels in rural areas or in "out of sight" locations in urban areas.
- **Freeways and Roadways**

Roadways in urban areas are commonly littered by motorists and pedestrians. Roadway shoulders and turnouts in rural areas, and "out of sight" locations in urban areas, are sometimes used to illegally dispose of landscape trimmings, construction wastes, old furniture, bio-hazardous wastes, and household rubbish.
- **Other Off-Highway Facilities**

Rest areas, park-and-ride lots, vista points, brake check areas, weigh stations, and on/off ramps are often subjected to illegal dumping of waste oils and other debris.
- **Adjacent Properties**

Dumping or spills on adjacent properties could impact COS property or drainage systems if the dumping results in a discharge and the property drains toward COS right-of-way.
- **Evidence of Illegal Dumping**

All instances of illegal dumping shall be approached with extreme caution, in accordance with all applicable health and safety guidelines, until the substance can be identified.

  - Solids - Look for debris, or rubbish piles on roadway shoulders, at turnouts, in open channels or in other areas. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.

## Illegal Dumping Control

Approach containers, such as bottles or barrels, with caution as they may contain hazardous liquids or solids.

- **Liquids** - Signs of illegal liquid dumping can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems.
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes.
  - Abnormal water flow during the dry weather season.

- **Reporting**

Any field Maintenance employee who observes or discovers a suspected illegal dumping incident on any COS roadway or into any COS storm water drainage system shall report such activities to a supervisor.

If illegally dumped material is known to be hazardous, suspected of being hazardous, or cannot be identified, the Fire Department shall be notified.

Local enforcement agencies shall be notified in accordance with existing COS practice.

Staff from other agencies that are stationed at COS facilities should also be requested to cooperate in observing illegal dumping incidents and reporting them.

If any pollutants or evidence of dumping or spills are observed in a COS storm drain facility (i.e., pipes, channels or culverts) and it can be traced to a connecting storm water drainage system, then a representative of the owner shall be contacted as soon as possible for follow-up.

If an illegally dumped substance reaches a receiving water via a COS storm water drainage system, then the incident should be reported to the proper authorities.



## Illegal Dumping Control

- **Clean-Up**

Clean-up or other corrective action on COS right-of-way shall be performed as follows:

All materials must be identified before Maintenance personnel or a Hazmat contractor can start clean-up.

- **Follow-Up**

Maintenance personnel with responsibility for sites where an illegal dumping incident has occurred shall follow-up on the incident to ensure corrective actions have taken place according to relevant COS procedures.

If a site experiences repeated dumping, the reporting supervisor should determine if a "no dumping" sign, or other corrective action is needed, and follow-up as necessary.

## Sweeping Operations

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Litter and debris
- Equipment wash water
- Sweeper wastes

### Definition and Purpose

The primary purpose of sweeping operations is to remove litter and debris from the traveled way to reduce traffic hazards and improve aesthetics. Sweeping is usually performed when the amount of accumulated debris is between one-half cubic yard and one cubic yard per mile.

### Operational Procedures

- Be careful not to sweep up an unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently to maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.
- Clean sweepers in an approved area to capture solid materials. For example, use a pre-wash area located away from the wash rack.
- When water is used to clean sweepers ensure that wash water is contained and disposed of in accordance with local regulations. (See T9b Vehicle and Equipment Pressure Washing.)

## Litter and Debris Removal

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Litter and debris

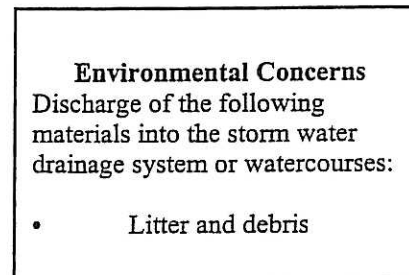
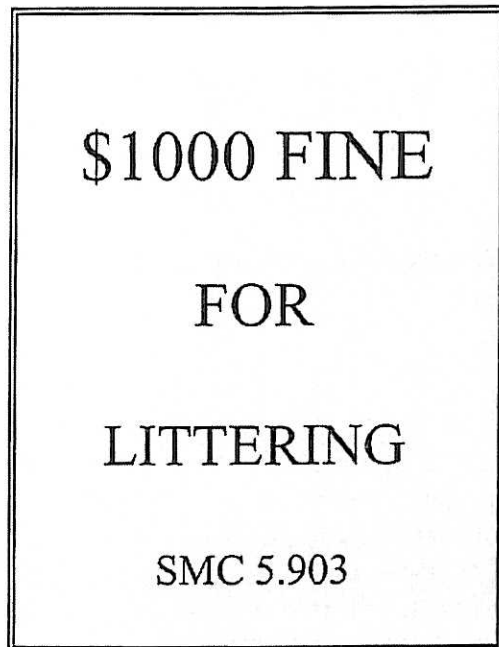
### Definition and Purpose

Litter and debris removal will be performed on COS right-of-way to ensure that the highway has a neat, clean, attractive appearance.

### Operational Procedures

- Pick up litter and debris as needed.
- Consider litter and debris removal from drainage grates, trash racks, and ditch lines a top priority, to prevent clogging of the storm water drainage system.
- Do not place collected litter and debris in or next to drain inlets, the storm water drainage system, or watercourses.
- When possible, load litter and debris directly into a truck for proper disposal at an approved dumpsite.
- City Employees while traveling in their assigned areas should observe overall conditions and assess the need for litter removal. If you observe increased rates of litter deposition notify your supervisor.

## Anti-Litter Signs



<b>Definition and Purpose</b>	COS conducts a signage program which warns against littering. These signs are found along streets and parks where littering violations are frequent. The purpose of this program is to discourage littering by educating the Public.
<b>Appropriate Applications</b>	<ul style="list-style-type: none"><li>• Along corridors which receive an unsightly amount of litter.</li><li>• Along streets susceptible to dumping activities (litter fine only).</li><li>• At parks.</li></ul>
<b>Limitations</b>	Not a high maintenance priority.
<b>Operational Procedures</b>	Maintenance Supervisors will travel streets in their assigned section to observe overall conditions and assess the need for litter removal. If you observe increased rates of litter deposition notify your supervisor.

## Emergency Response and Clean-Up Practices

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Hazardous materials
- Powder or granular materials
- Liquid materials
- Vehicle fluids

### Definition and Purpose

Emergency response and clean-up practices address the isolation, containment, identification, hazard assessment, proper removal, and disposal of spilled substances on highway rights-of-way. Proper containment and clean-up of spilled material, especially material that is spreading rapidly, will reduce the discharge of potential pollutants to the storm water drainage system or watercourses.

### Appropriate Applications

This BMP is to be used when COS personnel spill or encounter spilled materials. After proper hazard assessment, action is to be taken to safely contain spilled material, to remove it or have it removed by the responsible party or by a qualified contractor, and to assure proper disposal.

### Limitations

- COS actions will be based upon the information available at the time of an emergency.
- COS does not have legal responsibility for clean-up outside of the operating right-of-way in cases where the spill is generated by a third party.

### Operational Procedures

- Maintenance staff and supervisors shall determine the appropriate spill response after proper assessment of the spilled material.

## Emergency Response and Clean-Up Practices

### Special Concerns

- **Drain inlet protection.** Look to see where the flow of the spill would go. Identify drain inlets and outlets and watercourses, both upstream and downstream. Where safe to do so, protect downstream drainage systems and water courses from spilled material by covering or blocking storm drain inlets. For example, cover storm drain inlets with sand bags, plastic bags filled with native material or absorbent booms or other appropriate devices. Remove covers/blocks once clean-up is completed.
- **Hazardous material in the storm water drainage system.** If hazardous materials enter the storm water drainage system, the municipal/county storm water management is to be notified.
- **Spills on roadways.** For spills on roadways, minimize further tracking of spilled material.

## Graffiti Removal

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Anti-graffiti coating
- Paint products
- Sediment (sand blasting grit)
- Cleaning products (solvents)

### Definition and Purpose

Graffiti is removed or painted over. This activity is performed to ensure that the street/highway has a neat, clean, attractive appearance.

### Operational Procedures

- When painting or removing graffiti take every precaution to prevent spillage of paint, cleaning products, or anti-graffiti coatings onto the ground. If necessary, use plastic sheeting to protect the ground, and clean the area thoroughly after work is completed (See H7b Painting).
- If sandblasting is used to remove the graffiti, remove grit by mechanical or manual methods after the job is completed (See H7a Sand Blasting and Hydro Blasting).
- Dispose of solvent application materials (rags, sponges), and empty paint and solvent containers at a Maintenance facility according to waste disposal procedures commonly used at the facility.

## Adopt-a-Street Program

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Litter and debris
- Sediment
- Cleaning products (solvents)
- Paint products

### Definition and Purpose

To encourage volunteer community involvement, COS welcomes community groups to adopt a street. Upon assignment of an area, the community group is issued an encroachment permit (valid for two years) and is required to pick up litter between 4 and 52 times per year or plant native trees/flowers, or remove graffiti. In recognition of the group's efforts, COS displays the group's name on signage along the adopted street or in the adopted area.

### Appropriate Applications

- COS Streets.
- COS walls or structures.

### Limitations

- Some sections of highways are not safe for volunteer activities.
- Volunteers often only pick-up litter the minimum requirement of four times per year.

### Operational Procedures

- Bagged litter and debris should be removed as soon as possible.
- When overseeing volunteer groups that are conducting litter pickup and graffiti removal, review D4a Litter and Debris Removal and D6 Graffiti Removal with the groups.
- If volunteer groups will be conducting landscaping and/or native plant revegetation projects, review E family BMPs as they apply to the group.



## Vegetation Management

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Pesticides and herbicides
- Fuel and oil
- Sediment
- Organic material

### Definition and Purpose

Vegetation management is the management of roadside vegetation within COS rights-of-way by chemical treatment, cutting and removal by manual and mechanical methods, and irrigation. The purpose of vegetation management is fire protection, driver safety, weed control, aesthetics and erosion control. Vegetation management BMPs minimize the use of herbicides, encourage the use of nonchemical vegetation control methods, and reduce erosion and sediment discharges by stabilizing disturbed soil areas. Other practices serve to minimize the discharge of dead vegetation, clippings, sediment, irrigation water, and wood chips into the storm water drainage system.

### Appropriate Applications

This BMP should be implemented whenever vegetation management is performed.

### Limitations

- Vegetation management can result in reduced erosion control effectiveness.
- BMP implementation will depend on traffic, weather, available resources, and safety conditions.

### Drainage Protection and Equipment Operation

When possible and practical, pre-plan your work to protect storm drainage systems and watercourses from discharge of potential pollutants and keep equipment in good operating condition:

- Look to see where the flow of a leak, spill, or other runoff would go.
- Identify drain inlets and watercourses, both upstream and downstream of the work site.

## Vegetation Management

- All vehicles and equipment should be clean and in good operating condition. Perform a thorough pre-operational inspection of vehicles and equipment.
- Set-up the work area to minimize the tracking of material by vehicles and equipment in or out of the work area.

### Housekeeping and Spill Control

Practice good housekeeping at the work site:

- Litter and debris should be collected and properly disposed of.
- Containers of liquids should be secured with lids until needed.
- Any spills should be controlled promptly. Transport collected materials back to a Maintenance facility or approved storage site.
- If a leak or spill occurs, protect drainage systems and watercourses from spilled material. For example, by covering or blocking drain inlets with sand bags, plastic bags filled with native material or absorbent booms. Remove covers/blocks once clean-up is completed.

## Chemical Weed Control

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Pesticides
- Fuel and oil
- Herbicides

### Definition and Purpose

This method of weed control uses herbicides to eliminate and prevent weed growth. The purpose is to control weed growth that would pose a harm to the growth and health of preferred vegetation or that may become a fire hazard, or other safety concern.

### Operational Procedures

In order to achieve effective vegetation control through chemical means, Maintenance personnel should consider: (1) use of the correct herbicide or pesticide, (2) seasonal timing of applications, (3) speed of travel when applying chemical treatment, and (4) proper agitation of the spray tank. Maintenance personnel should implement the following procedures:

- Apply pesticides only as specified on the "Pesticide Use Recommendation" on the label. The pesticide label is considered to be the law. Use of a pesticide inconsistent with the label is considered to be a violation. Follow safety and application methods as specified in the Annual Pesticide Safety Training.
- Apply herbicides as recommended by the City Pest Control Manager.
- Minimize the use of post-emergent herbicides in and near the storm water drainage system or watercourses.
- Calibrate the spray rig as needed, to ensure accurate applications of pesticides.
- Record the use of all pesticides.
- Avoid using overhead irrigation for as long as the chemical manufacturer recommends after applying pesticides or post-emergents.
- Avoid applying post-emergents prior to a predicted rain event.

## Mechanical Weed Control

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Organic material (dead or decaying vegetation)
- Sediment
- Oil
- Fuel

### Definition and Purpose

Mechanical weed control is the removal of weeds growing within the highway right-of-way using machinery and/or mobile equipment. The purpose is to control grass and weeds for aesthetics and fire prevention.

### Operational Procedures

- When possible, keep any removed vegetation out of drain inlets, the storm water drainage system, and watercourses.
- Do not stack or leave removed weeds or other debris on or near drain inlets or in the storm water drainage system or watercourses.
- Do not fuel equipment next to drain inlets.
- Leave organic material from mechanical weed control operations in place or spread on flat, non-landscaped areas to provide protection from erosion.
- Do not place fuel or oil cans in watercourses, the storm water drainage system or next to a drain inlet.

## Tree and Shrub Pruning

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Organic material (dead or decaying vegetation)
- Oil
- Fuel

### Definition and Purpose

Tree and shrub pruning is the trimming of trees and native shrubs to preserve the health and structure of trees and shrubs, to maintain sight distances and aesthetics, and to prevent property damage.

### Operational Procedures

- Do not stack or leave organic material (dead or decaying pruning wastes) on or near drain inlets, or in the storm water drainage system or watercourses.
- Remove prunings as soon as practicable.
- When possible, chip removed vegetation (See E2c Brush Chipping).
- Do not fuel equipment next to drain inlets.
- Do not place fuel or oil cans in watercourses, the storm water drainage system or next to a drain inlet.
- When loading vegetative debris into a cargo truck, tarp or cover the load if required.
- Do not leave debris on a paved shoulder or location where they could be transported by storm water runoff into the storm water drainage system or watercourses.

## Tree and Shrub Removal

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Organic material (dead or decaying vegetation)
- Fuel
- Oil

### Definition and Purpose

Dead trees and shrubs and those that are diseased or dying are removed to maintain safety by preventing any part of the dead tree or shrub from falling or blowing onto the roadway. Trees and shrubs are also removed to maintain a healthy landscape alongside the roadside.

### Operational Procedures

- Do not stack or leave organic material (dead or decaying vegetation) near drain inlets or in the storm water drainage system or watercourses.
- Clear all prunings and stump grindings as soon as practicable.
- When possible, chip removed vegetation (See E2c Brush Chipping).
- When loading vegetative brush into a cargo truck tarp or cover the load if required.
- Do not fuel equipment next to drain inlets.
- Do not place fuel or oil cans in watercourses, the storm water drainage system or next to a drain inlet.

## Brush Chipping

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Organic material (chips)
- Fuel
- Oil

### Definition and Purpose

Chipping is the mechanical cutting of limbs into chips. The purpose of this operation is to transport tree and shrub limbs away from the roadside in an efficient manner and to use the chipped material as mulch.

### Operational Procedures

- When chipping into the back of the truck, do not leave chips on the paved shoulder where they could be transported to the storm water drainage system or watercourses.
- When chipping onto the ground, do not chip into the storm water drainage system or watercourses.
- Do not fuel equipment next to drain inlets.
- Do not place fuel or oil cans in watercourses, the storm water drainage system or next to a drain inlet.
- Place/spread chipped material over non-landscaped areas (bare soil) to prevent or reduce soil erosion.
- Do not place chips in areas where high flows or runoff will transport them into the storm water drainage system. For example, steep slopes.

## Water Line Repairs

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses: a Sediment

- Litter and debris
- Fertilizers
- Pesticides and herbicides
- Chlorine

### Definition and Purpose

Water line repairs includes maintenance (water line flushing) and repair activities on broken water lines, sprinklers, or valves.

### Operational Procedures

- When flushing water lines, the rinse water should be reused for landscaping purposes if possible. Note that a storm water drainage system discharge from water line flushing is considered to be a permissible non-storm water discharge.
- Shut off the water source from a broken line, sprinkler, or valve as soon as possible to prevent excess water from flowing.
- Schedule necessary repairs on broken water lines as soon as possible.
- When digging out the irrigation line, return the soil to the same area after repair is complete.
- Protect downstream storm water drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines. For example, cover or block drain inlets with sand bags or plastic bags filled with native material. Remove covers/blocks once clean-up is completed.



## Irrigation (Watering) Potable and Non-Potable

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Sediment
- Litter and debris
- Fertilizers
- Pesticides and herbicides
- Chlorine from potable water sources
- Salts

### Definition and Purpose

Irrigation or watering activities are conducted on landscaped areas using potable and non-potable water.

### Operational Procedures

- Inspect irrigation system to ensure the appropriate amount of water is used and runoff is minimized. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.
- Make necessary repairs on broken water lines, sprinkler, valves, or nozzles as soon as possible (See E3a Water Line Repairs).
- Avoid overwatering.
- Irrigation controllers should be programmed to minimize runoff and encourage deep rooting of vegetation.

## Erosion Control

**Environmental Concerns**

Discharge of the following materials into the storm water drainage system or watercourses:

- Sediment
- Organic material

**Definition and Purpose**

Erosion control/soil stabilization practices refers to the stabilization of cut and fill slopes and other areas within the highway right-of-way by means of establishing a vegetative cover or placing chips. The purpose is to maintain a vegetative cover to prevent erosion.

**Operational Procedures**

- Where possible, avoid removing vegetation from erodible surface areas.
- Utilize erosion control measures that are appropriate for the area you are working in.

## Non-Storm Water Discharges

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Cleaning products
- Litter and debris
- Pesticides
- Nutrients
- Wash water from painting, concrete mixing or vehicle washing activities
- Sanitary wastes

### Definition and Purpose

This BMP is intended to help Maintenance personnel determine which non-storm water discharges are allowed and which are prohibited according to the COS Storm Water Permit and to control discharges from allowed non-storm water discharges.

### Appropriate Applications

This BMP provides guidance to Maintenance personnel in the field when they encounter non-storm water discharges into COS storm water drainage system. This also provides guidance to ensure that maintenance facilities are in compliance with the non-storm water provisions of the Permit. Because this is a complex issue, COS personnel should consult with the Stormwater Division for assistance in determining which discharges are allowed.

### Limitations

COS District Maintenance staff should consult with the Stormwater Division.

## Non-Storm Water Discharges

### List 1 - Prohibited discharges, connections or dumping to the storm water drainage system

This category includes illegal waste dumping and prohibited illicit connections. These discharges are not allowed in storm water drainage systems under any situation. Notify the Storm Water Division whenever these discharges are encountered.

- **Waste dumping** - Wastes deposited by citizens or contractors on or adjacent to COS property. *Examples:* waste solvent drum discovered on right-of-way; crankcase oil discharged by contractor to the ground; painting wastes dumped by contractor; concrete wash water discharged by contractor.
- **Floor drains** - Floor drains in Maintenance facilities or other industrial-type facilities that are connected to the storm water drainage system.
- **Industrial-type waste water discharges** - Discharge of waste water from an industrial process on COS property to the storm water drainage system or to a watercourse unless covered by a separate NPDES permit (Waste Discharge Requirements).
- **Vehicle and equipment wash water** - Commercial vehicle or equipment wash water containing cleaning solutions such as detergents and degreasers, or hydrocarbons, if the water is discharged to a storm water drainage system or watercourse.
- **Sanitary wastes** - Connections or overflows from sanitary sewer systems or septic tanks and leach fields.
- **Construction wastes** - Includes slurry from saw cutting operations and concrete work.
- **Other prohibited illicit connections** - Any other permanent connection to the COS storm water drainage system not permitted by law. Any other direct discharge to a waterway from COS property not included in List 2.
- **Spills** - Accidental spills on roadways or construction sites. This includes spilled vehicle fluids at accident locations.
- **Intentional releases** - Any dumping which presents immediate risks to human health or the environment similar to those from a spill.

## Non-Storm Water Discharges

### List 2 - Acceptable non-storm water discharges

The following discharges are allowed as long as they are not identified as a source of potential pollutants by COS.

#### *Lower threat non-prohibited discharges:*

- Diverted stream flows (*potential pollutant: sediment*)
- Ground water infiltration
- Uncontaminated pumped ground water
- Springs
- Flows from riparian habitats and wetlands
- Rising ground water (*potential pollutant: hydrocarbons or septic wastes from leaky tanks*)
- Foundation drains
- Footing drains
- Water from crawl space pumps (*potential pollutant: oil*)
- Air conditioning condensation

#### *Higher threat non-prohibited discharges:*

- Water line flushing (*potential pollutant: chlorine, sediment*)
- Discharges from potable water sources (*potential pollutant: chlorine*)
- Irrigation water (*potential pollutant: fertilizer, salts, pesticides, sediment, chlorine*)
- Street wash waters related to cleaning and maintenance (*potential pollutant: sediment, detergents, metals*)
- Runoff from fire fighting (*potential pollutant: sediment, other contaminants from fire*)
- Construction-related dewatering (*potential pollutant: sediment, soil contaminants*)
- Other similar discharges on approval of the Executive Officer of the applicable RWQCB.

*The following sources may be encountered adjacent to COS roadways or within rights-of-way:*

- Irrigation or watering of vegetation (*potential pollutant: fertilizer, salts, pesticides, sediment, chlorine*)

## Welding and Grinding

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Slag
- Metal grindings

### Definition and Purpose

Welding and grinding is used during field and shop work on maintenance activities conducted on structures, such as bridges and roads, and individual service facilities

### Operational Procedures

- Use appropriate protective measures when working near a drain inlet or a watercourse to prevent debris from entering the storm drain water drainage system or surface waters.
- Use fire blankets or fire proof tarps when welding over the side of a bridge to capture slag and metal grindings.
- When cleaning-up use appropriate container to collect any excess material.
- Transport collected materials back to a Maintenance facility or approved storage site.

## Sand Blasting, Wet Blast with Sand Injection, and Hydro Blasting

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Sediment (sand blasting grit)
- Dust
- Paint chips
- Process water (hydro blasting)
- Paint products (paint chips)
- Rust
- Steel

### Definition and Purpose

Sand blasting and hydro blasting is used to clean residue from concrete walls and structural steel and for graffiti removal.

### Operational Procedures

- Where possible, when hydro blasting, collect as much process water as possible using a vacuum or other system, and return bulk materials and waste water to a Maintenance facility in an appropriate container. Dispose of the material in accordance to waste disposal procedures commonly used at the facility.
- Where possible while performing hydro blasting, reduce sediment and metal loading as much as possible using appropriate or approved methods.
- When sand blasting meter sand to use the minimum amount necessary to complete the job.
- Collect as much sand blasting grit as possible.
- Transport collected materials back to a Maintenance facility or approved storage site.
- When sand blasting to remove lead-based paint use approved removal and disposal procedures.

## Painting

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Paint products (paint, thinner, chips)
- Cleaning solutions (solvents)
- Equipment wash water

### Definition and Purpose

Painting operations include the application of paint to facilities and highway and bridge surfaces and the routine maintenance of painting equipment.

### Operational Procedures

- Transport paint and materials to and from work sites in containers with positive locking lids. Secure the paint containers to the transport vehicle using approved methods (e.g., ropes and straps). When using conventional spray equipment monitor weather and wind direction to ensure that paint is not entering drain inlets, the storm water drainage system or watercourses.
- Do not transfer or load paint near drain inlets, the storm water drainage system or watercourses.
- If possible, use canvas or plastic tarps under work area to capture excess paint or paint chips. Transfer material captured by canvas or tarps into a waste container for disposal at a Maintenance facility.
- Collect all paint equipment wash water and return it to a Maintenance facility. If possible, dispose of the equipment wash water in waste water evaporation trays at the facility. After the liquid evaporates, dispose of the remaining paint solids according to approved waste disposal procedures.
- If waste water evaporation trays are not available, consult the Supervisor for proper disposal.



## Bridge Repairs

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Epoxies
- Metal grindings
- Concrete grindings and cuttings
- Expansion joint filler
- Concrete mix water
- Concrete rinse water

### Definition and Purpose

Bridge maintenance activities include repairing bent or damaged steel beams, cracked or spalled concrete, damaged expansion joints, and bent or damaged railings.

### Operational Procedures

- When working over watercourses stage the operation to capture and collect as much debris as possible.
- Transport the waste back to a Maintenance facility or approved storage site.
- When repairing cracked or spalled concrete, see B2 Concrete Work.
- Collect broken or damaged treated bridge pier fender posts and bring them back to a Maintenance facility. Dispose of the posts according to approved waste disposal procedures.

## Pump Station Cleaning

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Litter and debris
- Petroleum products
- Sediment
- Metals

### Definition and Purpose

Pump stations are used to dewater depressed highway sections where water routinely collects. Maintenance work includes structural repairs, removal of material from sumps, and periodic servicing or repairs of electrical and mechanical equipment. Periodic pump station inspection and cleaning will reduce the discharge of potential pollutants to the storm water drainage system or watercourses.

### Appropriate Applications

This BMP provides guidance to Maintenance personnel involved in inspecting and cleaning pump stations

### Operational Procedures

- Inspect pump stations to determine if cleaning or repairs are required:
  - During the rainy season, pump stations should be inspected at least once every two weeks.
  - During the off-season, stations should be inspected at least monthly.
- During each inspection visit, check for the following:
  - Inspect sump screen to ensure that it is free of debris which could block the flow of water to the pumps.
  - Check the level of solids in sumps. When solids accumulate to approximately 50% of the basin capacity, schedule sumps to be cleaned.

## Pump Station Cleaning

- When large amounts of dirt or debris are entering the storage box or pump sump, take measures (such as the use of sandbags, gravel barriers or filter berms) to intercept the dirt or debris before it reaches drain inlets, the storm water drainage system, or watercourses.
- Inspect and clean (if necessary) pump outfall facilities to ensure a free flow of water beyond the pumping system.
- Keep pump station swept and cleaned up. Miscellaneous supplies and tools, other than those used frequently for the pump station, should not be stored in the pump station or building.
- Do not dump material removed from pump station, sumps or storage cistern alongside the roadway. Material removed from pump station facilities should be disposed of at an approved site.
- Contain and collect pumping equipment drips or leaks by using drip pans or absorbent materials to absorb the oil or petroleum products.
- During maintenance and repair of pump stations, remove all waste oil and place it in an approved container. Transport the waste oil to an approved site for recycling or disposal. Do not leave waste oil at the pump station.

## Underpass Washing

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Wash water
- Litter and debris
- Cleaning products (detergents)

### Definition and Purpose

Underpass washing reduces the accumulation of dirt, debris, and potential pollutants in these passageways; preserves the capital investment; and improves aesthetics.

### Operational Procedures

- If feasible, sweep underpass prior to conducting wash operations and properly dispose of swept material.
- Dispose of wash water to the sanitary sewer system.

## Tow Truck Operations

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Fuel
- Oil
- Antifreeze
- Battery fluid
- Plastics
- Rubber
- Glass
- Metal fragments

### Definition and Purpose

Tow truck operations involve the removal of vehicles from COS rights of rights of way.

### Limitation

COS does provide tow truck service in all areas.

### Operational Procedures

- When possible, collect loose vehicle parts that have fallen onto the roadway and bring them back to a Maintenance facility or approved storage site.

## Lane Scrubbing Operations

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Process water
- Cleaning products (detergents)

### Definition and Purpose

Lane scrubbing operations reduce the accumulation of dirt and oily buildup from vehicles.

### Operational Procedures

- If feasible, use lane scrubber with vacuum capability to remove process water from pavement during lane scrubbing operations.
- Properly dispose of waste water and swept material. Waste water should be discharged to a sanitary sewer system. The swept material should be transported to a Maintenance facility or approved storage site.
- When feasible use safer alternative products for cleaning products (See T7e Safer Alternative Products).

## Saw Cutting for Detector Loops and/or Underground Utilities

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Concrete or asphalt cuttings
- Loop sealant

### Definition and Purpose

Detector loops are electrical sensors used to trigger a traffic signal at an intersection and/or for long-term traffic counts. Installation of detector loops is accomplished by cutting into the road surface with a concrete saw, inserting the electric wire into the cut, and sealing the cut with loop sealant.

### Operational Procedures

- Minimize the use of water. Apply water only to the cutting site.
- Avoid cutting concrete and installing loop detectors in wet conditions (See B2 Concrete Work).
- Clean-up concrete or asphalt cuttings.
- Use appropriate container to collect asphalt cuttings.
- Minimize the use of loop sealant by carefully estimating the amount needed. Return excess loop sealant to a Maintenance facility and store this material according to approved storage procedures.
- Clean-up excess loop sealant and place the collected material in an approved container.
- Transport collected materials back to a Maintenance facility or approved storage site.

## Thermoplastic Striping and Preheaters

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Thermoplastic material
- Oil

### Definition and Purpose

Pavement marking with thermoplastic materials is used for pavement delineation to guide or control vehicular traffic. Thermoplastic material is heated in preheater equipment then applied to pavement by thermoplastic striper or applicators.

### Operational Procedures

- Make certain that all thermoplastic striper and preheater equipment shutoff valves are working properly to prevent leaking thermoplastic from entering drain inlets, the storm water drainage system, or watercourses.
- Preheater should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the preheater container when filling thermoplastic to allow room for material to move when the vehicle is deadheaded.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible recycle thermoplastic material. Dispose of unused material place thermoplastic waste in an appropriate container.
- Transport collected materials back to a Maintenance facility or approved storage site.



## Paint Striping and Markings

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Paint products
- Clean products (solvents)

### Definition and Purpose

Pavement striping is used to supplement traffic signs and to guide and control vehicular traffic. Longitudinal pavement striping delineates the separation of traffic flow on highways and freeways. Water-based paints are applied using striper paint systems.

Pavement paint markings are used to supplement traffic signs and to guide and control vehicular and pedestrian traffic. Water-based paints are applied to pavement by using stencil or striper paint systems. Stencils are also used to place pavement paint markings.

### Operational Procedures

- Do not transfer or load paint near drain inlets, the storm water drainage system, or watercourses.
- Monitor weather and wind direction to ensure that paint is not entering drain inlets, the storm water drainage system, or watercourses.
- Be sure no pressure remains in paint striper system when setting up, cleaning, pulling filters, or servicing spray guns. Release pressure on bead tank before removing lid.
- Check to ensure that the paint spray gun remains closed when not in use to prevent leaks.
- Check for leaking or ruptured paint containers.
- Small paint spills should be wiped up immediately with rags. Use dry absorbent material for larger spills. Dispose of absorbent and rags at a Maintenance facility or approved site.

## Raised/Recessed Pavement Marker Application and Removal

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Bitumen adhesive
- Oil
- Pavement markers
- Epoxy

### Definition and Purpose

Pavement markers are used to supplement traffic signs and convey messages or directions to motorists. Pavement markers are either surface mounted (raised) or placed in recessed slots in the pavement. Markers are applied using bitumen/epoxy adhesives. Damaged or old markers are removed for replacement using hand tools or special attachments on a motor grader.

### Operational Procedures

- Do not transfer or load bituminous material near drain inlets, the storm water drainage system or watercourses.
- Melting tanks should be loaded with care and not filled to beyond three inches from the top to leave room for splashing when vehicle is deadheaded.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.
- Transport collected materials back to a Maintenance facility or approved storage site.

## Thermoplastic Grinding/Removal

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Thermoplastic grindings (yellow thermoplastic may contain lead)
- Asphalt grindings
- Concrete grindings

### Definition and Purpose

Thermoplastic material is applied to the road surface to delineate lanes, pedestrian crosswalks, turn pockets, and to convey other information to the motorist. Damaged or obsolete thermoplastic material is removed by grinding, hand removal, heating and scraping, etc. the material off the pavement surface.

### Operational Procedures

- Collect excess asphalt, concrete, and thermoplastic grindings.
- Transport collected materials back to a Maintenance facility or approved storage site.

## Sign Removal and Replacement

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Building products (wood post material)
- Concrete
- Flow from damaged water lines

### Definition and Purpose

Sign installation may range from digging a hole for a small one-post sign to more complex activities such as mounting large multi-panel signs on overhead sign structures. When signs are damaged or obsolete, they are replaced or removed.

### Operational Procedures

- Be careful when digging in landscaped areas to avoid damaging buried water lines (call USA at 1-800-277-2600, or 1-800-422-4133), so as to prevent work area debris from being transported by flow from damaged water lines to drain inlets, the storm water drainage system, or watercourses.
- Collect debris from broken sign posts.
- Transport collected materials back to a Maintenance facility or approved storage site.
- When sign replacement involves the use of concrete refer to B2 Concrete Work.

## Median Barrier Repair

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Concrete, metal and bituminous debris

### Definition and Purpose

Median barriers may require repair following an accident, or as part of routine maintenance activities.

### Operational Procedures

- When working over water, avoid dropping work materials (concrete, bituminous materials, metals, wood, etc.) into watercourses or leaving work materials in an area where they could be washed into drain inlets or the storm water drainage system.
- Transport the waste back to a Maintenance facility or approved storage site and dispose of properly.
- When median barrier repair requires concrete work, see B2 Concrete Work.

## Minor Slides and Slip-Outs

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or receiving waters:

- Sediment
- Organic material (dead vegetation)
- Asphalt

### Definition and Purpose

Repair of minor slides and slip-outs includes cleaning up or backfilling minor slides, slip-outs, or other minor damage to the roadside, the removal of materials (soil, rock, boulders) that have been deposited on the roadway by wind, water, or minor landslides, placing dikes or otherwise controlling drainage at minor slides and slip-outs, filling and repairing minor erosion damage to cut and fill slopes, and clearing the roadside of downed or damaged vegetation.

### Operational Procedures

- Locate watercourses, drain inlets, and drainage ditches downstream of the area where minor slides and slip-outs are being repaired or cleared.
- When practical, protect watercourses, drain inlets, and drainage ditches from discharges of sediment or organic material. For example, by installing temporary sediment barriers such as rock filter berms or sand bag barriers.
- When clearing the roadside of downed or damaged vegetation avoid placing the vegetation near drain inlets, or in watercourses or drainage ditches.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses.
- Where appropriate consider installing temporary sediment barriers around stockpiled materials in the winter season after the clean-up and repair of the minor slide and slip-out is completed.
- Where feasible, apply a temporary around cover of protective mulch to protect the soil surface from rain and wind erosion. See E9 Erosion Control.
- Where possible, set-up the work area such that vehicles will not track materials in or out.

## Oil/Water Separators

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Oil
- Grease

### Definition and Purpose

Maintenance facilities which have vehicle wash racks or other vehicle washing areas typically have oil/water separators installed at the vehicle wash areas. Additionally, Maintenance facilities may have portable oil/water separators for pretreatment of mop water and other wash waters prior to disposal to the sanitary sewer. Oil/water separators may be used when floating product or high concentrations of oil and grease are present in waste water and source controls will not be effective. This BMP promotes proper maintenance of oil/water separators, which reduces the potential for water pollution.

### Appropriate Applications

The procedures are for oil/water separators which use gravity separation using baffles. Oil/water separators using other media may require other maintenance guidelines.

### Limitations

Oil/water separators do not directly apply to storm water protection because the waste water is required to be disposed to the sanitary sewer system. Oil/water separators may be installed in the storm water drainage systems; however, the typically low concentrations of oil in most storm water limit the effectiveness of removal by an oil/water separator. In addition, the oil that accumulates in oil/water separators is usually considered a hazardous waste.

## Oil/Water Separators

### Operational Procedures

Oil/water separators require frequent maintenance throughout the life of the structure. The following procedures should be implemented by Maintenance personnel who are responsible for operation and maintenance of oil/water separators:

- Oil/water separators should be inspected and cleaned on a regular basis. Scheduled maintenance includes removal of accumulated oil and grit to maintain effective performance.
- Dispose of oil properly, following all applicable hazardous waste disposal guidelines. Recycle the oil if possible.
- Grit removed from the oil/water separator may be classified as hazardous waste if it is contaminated with oil or heavy metals. Check with the Supervisor for proper procedures for disposal.
- Record maintenance dates of oil/water separators in order to track upkeep and to prolong the life of the device.



## Waste Minimization, Handling, and Disposal

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Litter and debris
- Sediment
- Organic and inorganic material

### Definition and Purpose

This BMP is intended to reduce the potential for the discharge of potential generated during waste handling and disposal activities to the storm water drainage system or watercourses by minimizing exposure of the waste to storm water.

### Appropriate Applications

This BMP provides general waste minimization guidance for non-hazardous and hazardous wastes handled at Maintenance facilities.

### Limitations

Hazardous waste generators have specific waste minimization requirements which must be documented.

### Operational Procedures

- Methods for reducing the discharge of potential pollutants in waste include source reduction, reuse and recycling, tracking of waste generation, safe storage and disposal practices, and minimizing contact between storm water and waste.
- When possible, purchase or order supplies in smaller quantities to minimize excess or expired materials.
- Closely evaluate waste streams: processes generating waste, chemical spill records, shelf life expiration, and product or raw material inventory records.
- Inspect waste storage areas to ensure that materials stored in the area are not leaking, and if they do leak, take immediate measures to repair the leak.
- Train staff to minimize wastes (e.g., use all paint, stop leaks and spills, and recycle all oil).
- Reduce or minimize waste handling activities when it is raining, the ground is frozen, or the ground is saturated.
- Store hazardous materials in approved labeled containers.

## Used Oil Recycling

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Oil

### Definition and Purpose

This BMP applies to vehicle and equipment maintenance activities and other activities occurring at Maintenance facilities which generate oil. Used oil is classified as a hazardous waste and is harmful to the environment. It is COS policy to recycle all used oil. Recycling waste oil in conformance with State regulations removes it from classification as a hazardous waste.

### Appropriate Applications

This BMP applies to uncontaminated used crankcase oil and waste equipment oil. It does not apply to waste oil containing chlorinated hydrocarbons (e.g., methylene chloride) or other hazardous substances.

### Limitations

Waste oil is to be handled following the requirements for hazardous waste generators (manifest, accumulation time, biennial report, etc.). Waste oil which is contaminated with chlorinated hydrocarbons or other hazardous substances must be handled as a hazardous waste. Check with the Supervisor for specific guidelines.

### Operational Procedures

Maintenance facilities should implement the following procedures for all activities that use oil:

- A designated waste oil drum or tank should be located near the activities which generate used oil.
- Designate containers for used oil filters.
- All waste oil containers stored outside shall be covered and have secondary containment.
- All containers must be clearly labeled "Used Oil," or "Used Oil Filters," and should include the accumulation start date.
- Waste oil should not be mixed with any other type of waste or material, so that the oil can be recycled.

## Used Oil Recycling

Maintenance/Equipment Shop personnel involved in activities which produce waste oil should manage the waste oil and filters in the following way:

- Drain the oil in the used filters into the waste oil drum or tank, and close the drum/tank cover securely after use.
- Place the used oil filter in the designated drum and close the cover securely.

### Other Guidelines

- Oily rags and wipes are a potential fire hazard. Place oily rags and papers in a fire-proof can designated for this purpose. Use a rag cleaning service for disposal of the rags if possible. If the rag or wipe is potentially contaminated with a listed hazardous waste, handle it as a hazardous waste.
- Typically, empty oil containers can be disposed of as solid waste if the containers are smaller than 5 gallon size. If the container size is 5 gallons or larger, it should be sent for metal reclamation or reconditioning.

## Maintenance Facility Housekeeping Practices

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Fuel
- Oil
- Chemicals (acids, solvents)
- Hazardous Waste
- Heavy metals
- Nutrients
- Sediments

### Definition and Purpose

Daily activities occurring at Maintenance facilities often involve the use of materials and products which are potentially harmful to the environment. Good housekeeping practices are intended to reduce the potential for discharge of pollutants to the storm water drainage system or watercourses by promoting efficient and safe storage, use, and clean-up methods of potentially harmful materials.

### Appropriate Applications

Proper housekeeping practices apply to all Maintenance personnel who participate in activities which have the potential to generate materials that can be discharged to the storm water drainage system or watercourses.

### Operational Procedures

The following procedures should be implemented by all personnel at Maintenance facilities:

#### General

- Sweep or vacuum maintenance facility floors and pavement to prevent tracking of materials outdoors. Use mopping as an alternative to hosing down work areas when possible.
- If mopping is used to clean floors or pavement, contain and dispose of the mop water to the sanitary sewer system following these guidelines:
  - Remove any spilled oil or other liquids using dry sweep or rags.
  - Do not dispose of mop water into the parking lot, street, gutter, or drain inlet.

## Maintenance Facility Housekeeping Practices

- If an oil/water separator is available, pour the mop water into the separator so that the wastewater is treated before being discharged to the sanitary sewer system
- Use drip pans or absorbent material under leaking vehicles and equipment to capture fluids.
- Promptly remove absorbent material or drip pan after use.

### Recycling

- Recycle materials such as used oil, antifreeze, solvents or asphaltic emulsion whenever possible.
- Ensure containers are clearly labeled.

## Building and Grounds Maintenance

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Litter and debris
- Organic material
- Fertilizer
- Pesticides
- Herbicides

### Definition and Purpose

Permanent Maintenance facilities require building and grounds maintenance. Building and grounds maintenance includes care of landscaped areas around the facility, cleaning of parking areas and pavements other than in the area of industrial activity, and maintenance of the storm water drainage system. Minimization of water use, proper handling and disposal of waste collected and wash waters used during building and grounds maintenance, and immediate clean-up of spills are key elements in the protection of storm water quality.

### Appropriate Applications

This BMP is applicable to Maintenance personnel involved in building and grounds maintenance activities.

### Limitations

If a large spill should occur, it may be necessary to utilize a private company or Hazmat team for clean-up.

### Operational Procedures

- **Building Maintenance**
  - Minimize water use in washing activities.
  - Properly dispose of wash water and sediment generated by building maintenance activities. Dispose of wash water to the sanitary sewer system. Dispose of sediment as solid waste.
  - Regularly inspect, clean, and maintain the storm water drainage system. This is particularly important in the fall prior to the first rains (in areas with seasonal wet weather).
  - Dispose of sweepings and cleaning wastes as solid waste.

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## Building and Grounds Maintenance

- **Grounds Maintenance**
  - Apply fertilizers and pesticides in accordance with the label instructions (See E1a Chemical Weed Control). Utilize integrated pest management where appropriate.
  - Avoid excessive irrigation of landscaped areas to minimize runoff containing nutrients, pesticides, and herbicides (See E3b Irrigation (Watering) Potable and Non-Potable).

## Storage of Hazardous Materials (Working Stock)

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Acids
- Solvents
- Paint Products
- Pesticides
- Fertilizers
- Fuels
- Oils

### Definition and Purpose

Maintenance facilities store a variety of products which may be harmful to the environment if they come in contact with surface waters. This BMP is intended to reduce the potential for the discharge of materials from hazardous material storage sites to the storm water drainage system or watercourses by minimizing exposure of the materials to storm water and safeguarding against accidental release of materials.

### Appropriate Applications

This BMP is applicable to Maintenance facilities that store hazardous materials.

### Limitations

This BMP only provides hazardous materials storage procedures for the purposes of storm water pollution prevention.

### Procedure

Proper hazardous materials storage procedures can be found in the following documents.

**Hazardous Materials Management Plan** - In most cases, a Maintenance facility will have a Hazardous Materials Management Plan as required by state law. Hazardous materials storage must conform to this plan.

The following should be implemented at Maintenance facilities:



## Storage of Hazardous Materials (Working Stock)

### Hazardous Materials Storage (General)

- Store hazardous materials in a designated area containing similar and chemically compatible materials. Do not store incompatible products in the same storage area without some type of physical barrier separating the containers. For example, do not store oxidizers, such as hydrogen peroxide, with organics, or flammable materials such as oil.
- Where feasible, store hazardous materials under cover and away from areas that might drain into the storm water drainage system or watercourses.
- Keep labels on containers and ensure that covers or caps are secure.
- Install safeguards to prevent accidental releases such as overflow protection devices, automatic shutdown transfer pumps, protection guards around tanks and piping to prevent vehicle or forklift damage, labeling, and limit access to unauthorized persons.
- Comply with all federal and state requirements for the storage of hazardous materials and oil, including a Spill Prevention Control and Countermeasure (SPCC) Plan when required.
- Train personnel on proper handling procedures and familiarize them with the procedures in the emergency response plan.
- Maintain hazardous materials storage areas to minimize exposure to storm water by storing materials on paved surfaces, minimizing storage and handling of materials, and regularly inspecting storage facilities.
- Maintain an ample inventory of appropriate spill clean-up materials near the storage area. Keep absorbent and baking soda on hand to soak up spilled fluids and to neutralize spilled acid from cracked batteries.
- Any spills should be attended to immediately.
- Store hazardous liquid and solid materials with secondary containment (Uniform Fire Code Article 80, Section 8003.1.3.3).
- Store used lead acid batteries, including cracked batteries in secondary containment.

## **Storage of Hazardous Materials (Working Stock)**

### **Regular Maintenance of Outdoor Container Storage Area**

- Inspect storage areas regularly. Ensure all containers are labeled, covered, and in good condition.
- If a container is corroded or leaking, have trained and qualified personnel or the Supervisor transfer wastes to a new clean container. Label the new container appropriately and properly dispose of the old container. The old container may be classified as hazardous waste.

### **Paint Storage Area**

- Inspect all pallets of paint to ensure that they are securely fastened before moving.
- Load and off load paint on level ground when using a forklift to minimize possible spills and ruptures of paint containers.
- Where feasible, store paint materials in an area with a canopy or roof designed to direct runoff away from the area.

### **Wood Post Storage Area**

- Cover wood post storage areas during the rainy season.

## Outdoor Loading/Unloading of Materials

### Environmental Concerns

Discharge of the following materials into the storm water drainage system

or watercourses:

- Pesticides
- Fertilizers
- Cleaning products
- Petroleum products
- Asphalt
- Concrete
- Paint products

### Definition and Purpose

This BMP describes procedures and practices for the loading and unloading of materials in a manner which minimizes the discharge of the materials to the storm water drainage system or watercourses.

### Appropriate Applications

This BMP is applicable to Maintenance facilities where facility activities involve loading and/or unloading of the following materials:

- Pesticides
- Fertilizers
- Cleaning products
- Petroleum products such as fuels, oils, greases
- Asphalt and concrete compounds
- Hazardous materials such as acids, lime, glues, adhesives, paints, solvents, and curing compounds (Also see T7a Hazardous Material Storage Controls [Working Stock])
- Paint products

### Operational Procedures

Outdoor loading/unloading areas should meet the following requirements:

- It is desirable to conduct outdoor loading/unloading on paved surfaces.
- An ample supply of spill clean-up materials should be stored in readily accessible locations in the vicinity of the loading/unloading area.
- If feasible and appropriate, a dead-end sump should be installed beneath loading docks where large quantities of liquids are handled.

## Outdoor Loading/Unloading of Materials

Maintenance facility personnel involved in outdoor loading/unloading of materials should implement the following procedures:

- Limit exposure of the materials to precipitation.
- Regularly check loading and unloading equipment for leaks before and after use.
- Contain leaks during the transfer of materials.
- If practical, place drip pans under hoses when making connections and during liquid material
- Inspect loading/unloading areas before and after precipitation events, and as needed during other times to promote good housekeeping.
- Repair and replace perimeter controls, containment structures, and covers as needed to keep them properly functioning.

## Material Storage Controls (Hazardous Waste)

### Environmental Concerns

Discharge of the following waste into the storm water drainage system or watercourses:

- Any material considered by the State of California or Federal regulations to be hazardous waste.

### Definition and Purpose

Maintenance facilities store a variety of products which may adversely impact water quality if they come in contact with surface waters. This BMP is intended to reduce the potential for the discharge of hazardous waste from hazardous waste storage sites to storm water drainage systems or watercourses by providing safeguards against accidental releases and minimizing exposure of the hazardous waste to storm water.

### Appropriate Applications

This BMP is applicable to all Maintenance facilities that store and/or any material considered by the State of California or Federal regulations to be hazardous waste.

### Limitations

Major contamination, large spills, and other serious hazardous waste incidents require immediate response from specialists such as private clean-up companies or Hazmat teams.

### Operational Procedures

Maintenance facility Supervisors should ensure that all equipment and materials required for proper storage of hazardous waste are available and the following items are implemented as appropriate:

- Maintain hazardous waste storage areas to minimize exposure to storm water by storing waste on paved surfaces, minimizing storage and handling of waste, and regularly inspecting storage facilities.
- Ensure that existing storage areas meet regulatory standards.
- Maintain an ample inventory of appropriate spill clean-up materials near the storage area. Keep absorbent and baking soda on hand to soak up spilled fluids and to neutralize spilled acid from cracked batteries.

## Material Storage Controls (Hazardous Waste)

Regulations that apply to the management of self-generated hazardous waste include the Code of Federal Regulations Title 40, Part 262, the California Code of Regulations (CCR) Title 22, Sections 66262, and 66265, and the Uniform Fire Code (UFC) Articles 79 and 80. These regulations mandate proper procedures for identification, accumulation, record keeping, and storage (e.g., management of containers) of hazardous substances. With consideration to these regulations, those responsible for handling hazardous waste in storage areas should:

- Ensure all containers are covered, securely fastened, and properly labeled.
- Ensure that hazardous waste storage areas are properly secured to prevent unauthorized access and to prevent accidental spillage, or any other unauthorized access.
- Store hazardous liquid and solid waste with secondary containment (UFC Article 80, Section 8003.1.3.3).
- Store used lead acid batteries, including cracked batteries, in a covered area with secondary containment.
- Conduct weekly routine inspections and check for external corrosion or other signs of wear of material containers (CCR Title 22 Section 66265.174).
- Any spills should be attended to immediately.
- Place collected waste in an approved container. Dispose of the contents according to approved waste disposal procedures.

## Outdoor Storage of Raw Materials

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Soils
- Aggregates
- Asphalt and concrete products
- Mulches
- Road abrasives
- Salt
- Wood products

### Definition and Purpose

Maintenance facilities and activities based out of Maintenance facilities store a variety of products which may be harmful to the environment if they come in contact with storm water runoff. This BMP is intended to reduce the potential for the discharge of products from outdoor raw materials storage sites to the storm water drainage system or watercourses by minimizing exposure of the products to storm water.

### Appropriate Applications

This BMP is applicable to Maintenance facilities that store raw materials such as asphalt, sand, soils, treated wood posts, and mulch outdoors.

### Limitations

Hazardous materials and wastes have special requirements for outdoor storage (See T7a Storage Hazardous Materials (Working Stock)).

### Operational Procedures

The following procedures should be implemented at outdoor storage areas:

- Store materials away from areas that might drain into the storm water drainage system or other watercourses, or
- Where feasible, cover the storage area with a canopy or roof that is designed to direct the runoff away from the storage area, or
- Where practical cover (tarp) dry materials to prevent water intrusion during the winter season, or
- Protect storm drain inlets with sand bags, geotextile dams, filtration socks, berms and hay bales etc.

## Outdoor Storage of Raw Materials

Maintenance facility personnel involved with outdoor storage of raw materials should implement the following procedures:

- Promote good housekeeping procedures (See T5a Maintenance Facility Housekeeping Practices) including sweeping of surfaces where material is blown or washed from the storage area, keeping materials covered, and keeping storage containers in good condition.
- Inspect storage areas regularly.



## Safer Alternative Products

### YES

- ✓ Non-caustic detergents
- ✓ Water based degreasers

### No

- X Organic solvents
- X Toxic materials

#### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Automotive products
- Cleaning products
- Paint products
- Pesticides
- Fertilizers
- Building products

#### Definition and Purpose

A variety of products which may be harmful to the environment if they come in contact with surface waters are used in maintenance facilities and activities. In some cases, a harmful product may be replaced by a less harmful product which serves the same purpose. The less harmful product is referred to as a safer alternative product. The primary purpose of using safer alternative products is to reduce the potential for the discharging toxic products to storm water drainage systems or watercourses.

#### Appropriate Applications

When safer alternative products exist for cleaning products, paints, pesticides, automotive products, and fertilizers, they should be used where practical and effective.

#### Limitations

Alternative products may not be available, effective, or cost effective in every situation.

#### Operational Procedures

Supervisors responsible for ordering products should select products based on the guidelines below. When available, Maintenance personnel should use safer alternative products:

- *Automotive products* -In some cases, less toxic alternatives are not available for all automotive products (e.g., lubricants, coolants, and hydraulic fluids), but there are less toxic alternatives to car polishes, degreasers, and windshield washer solutions.

## Safer Alternative Products

- *Cleaning products* - Vegetable-based or citrus-based soaps and asphalt release agents are available to replace petroleum-based soaps/detergents.
- *Paint products* - Water-based paints, wood preservatives, stains, and finishes are available.
- *Pesticides/Herbicides* - Specific alternative products or methods exist to control most insects, fungi, and weeds. Use "general use" (non-restricted use) herbicides.
- *Fertilizers* - Compost and soil amendments are natural alternatives to chemical fertilizers.
- *Building products* - Pressure treated wood posts are alternatives to wood posts treated with creosote.

### Other Guidelines

- Avoid accumulating and storing unnecessary products. Use up existing products before additional products are purchased or used.
- When using pesticides, comply with all EPA and California environmental regulations and COS policies, procedures, and regulations.
- Use training to create awareness among employees regarding the use of safer alternatives.
- Even safer alternative products can result in the discharge of harmful materials to storm water drainage systems or watercourses. Use safer alternative products in strict accordance with manufacturers recommendations and T5a Maintenance Facility Housekeeping Practices and T4b Waste Minimization, Handling, and Disposal.

## Vehicle and Equipment Fueling

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Fuel
- Vehicle fluids
- Oil

### Definition and Purpose

When vehicle and equipment fueling takes place at a Maintenance facility there is the potential for fuel to be leaked or spilled at the site. The procedures for vehicle and equipment fueling are designed to minimize contact between storm water runoff and spilled fuel, oil, or other leaked vehicle fluids at equipment fueling areas.

### Appropriate Applications

These procedures should be implemented at all equipment fueling areas.

### Operational Procedures

All maintenance facilities should implement the following practices for vehicle and equipment fueling activities:

- An ample supply of spill clean-up materials, and spill control equipment should be kept near fueling areas to clean-up spills.
- Proper fueling and spill clean-up instructions should be posted at fueling areas.
- Automatic shut off valves should be installed at each pump, and manual shut off valves should be installed inside shop buildings.
- Fuel tanks and fuel dispensers should have current permits with the appropriate agencies.

Maintenance facility personnel who are involved in vehicle and equipment fueling activities should adhere to the following guidelines:

- When cleaning the area, use a "dry shop" principle (a damp cloth on the pumps and damp mop on the pavement).
- Avoid hosing off the area.

## Vehicle and Equipment Fueling

- Inspect portable fueling tanks regularly for cracks and leaks. Repair as necessary.
- Handle and dispose of used spill pillows and other absorbents as hazardous waste. Be on the alert for possible fire hazards.
- Spills should be cleaned-up. For example, use absorbent material or a dry mop method. Place absorbent material collected by sweeping in a waste container. Dispose of the contents according to approved disposal procedures.

## Vehicle and Equipment Pressure Washing

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Oil
- Fuel
- Cleaning products (detergents)
- Vehicle fluids
- Sediment
- Metals

### Definition and Purpose

When vehicle and equipment pressure washing is conducted at a Maintenance facility it is essential that the wash water not be disposed to the storm water drainage system. Alternative disposal methods include recycling or discharge to a sanitary sewer system. Proper vehicle and equipment pressure washing minimizes contact between storm water runoff and the equipment washing area, and ensures that the wash water is not discharged to the storm water drainage system or watercourses.

### Appropriate Applications

This BMP is applicable to all pressure washing operations for vehicles and equipment.

### Limitations

COS may require permits, pretreatment and/or monitoring of wash water discharges.

### Operational Procedures

Where vehicle and equipment pressure washing activities occur at Maintenance facilities, the activity should be located within a structure or building equipped with a connection to the sanitary sewer system or closed loop system. If a washing area must be located outside, the area should have the following characteristics:

- The area should be surrounded by berms or graded to minimize contact with storm water running onto the area.
- The area should be paved with concrete.

## Vehicle and Equipment Pressure Washing

- The pressure washing area should drain to a dead-end sump or directly into the sanitary sewer system.
- Wash water containing cleaning solutions such as detergents and degreasers, or hydrocarbons, should be prevented from entering the storm water drainage system or watercourses.

Other procedures which should be implemented by Maintenance facility personnel involved with vehicle and equipment pressure washing operations include:

- Where feasible, designate an area for pre-wash of vehicles and equipment to capture solid materials.
- Vehicle and equipment washing areas should be inspected periodically.
- The sump should be serviced regularly.
- Good housekeeping practices should be implemented according to T5a Maintenance Facility Good Housekeeping Practices.
- Water usage should be minimized.

## Vehicle and Equipment Maintenance and Repair

### Environmental Concerns

Discharge of the following materials into the storm water drainage system

or watercourses:

- Oil
- Vehicle fluids
- Fuel
- Paint products
- Metals

### Definition and Purpose

Vehicle and equipment maintenance and repair may include vehicle fluid removal, engine and parts cleaning, body repair, and painting. This BMP is intended to reduce the discharge of potential pollutants from areas in which vehicle maintenance and repair activities are conducted by employing controls which minimize contact between storm water and the activity areas and products used in each activity.

### Appropriate Applications

This BMP is applicable to Maintenance and Equipment Shop personnel who are involved in vehicle and equipment maintenance and repair activities both at maintenance facilities and in the field.

### Operational Procedures

Specific maintenance and repair activity procedures are described below:

- **Vehicle fluid removal**
  - Transfer contents to designated vehicle waste fluid storage barrels or tanks as soon as possible (See T4c Used Oil Recycling).
  - If required, drain the fluid into a pan and immediately transfer the fluid to the designated waste vehicle fluid storage barrel or tank. A larger drip pan may be placed under the primary drain pan to catch any spilled fluids.
  - Promptly remove drip pan after use.
  - Ensure safeguards, such as oil shut-off valves, are installed and maintained.

## Vehicle and Equipment Maintenance and Repair

- **Engine and Parts Cleaning**
  - Use self-contained sinks or tanks when working with solvents. Periodically check degreasing solvent tanks for leaks. Make necessary repairs as soon as possible.
  - Allow parts to drain over the solvent sink or tank, rather than allowing the solvents to drip or spill onto the floor.
  - Allow parts to dry over the hot tank if available. If rinsing is required, rinse over the hot tank.
  - Recycle waste water from steam-cleaning or pressure washing procedures as much as possible. Waste water from steam-cleaning cannot be poured into storm drains. Discharges of this wastewater to the sanitary sewer system may require permits and/or pretreatment (oil/water separator).
  - Designate specific areas in service bay for parts cleaning. Do not wash or rinse parts outdoors, since the discharge may enter a storm drain. Drains should be appropriately labeled to indicate whether they flow into a treatment system such as an oil/water separator, the sanitary sewer, or directly to the storm water drainage system.
- **Body Repair and Painting**
  - When receiving damaged vehicles, inspect for fluid leaks and use drip pans, if necessary.
  - Minimize use of hose-off degreasers to clean body parts before painting. Instead, brush off loose debris and use rags to wipe down parts. Dispose of rags as solid waste.
  - Use a shop vacuum to clean-up dust from sanding material. Do not use vacuums for flammable liquids. Debris from wet sanding can be allowed to dry overnight then swept or vacuumed. Dispose of dust as solid waste.
  - Minimize waste paint and thinner by carefully calculating paint needs based on surface area and using proper sprayer cup size.
  - Do not use water to control overspray or dust in the paint booth unless you collect this wastewater. This water is to be treated prior to discharge into the sanitary sewer system.
  - Clean spray guns in a self-contained cleaner. Recycle the cleaning solution when it becomes too dirty to use. Do not discharge cleaning waste to the sewer or storm drain.



## Vehicle and Equipment Maintenance and Repair

- **Drain Control**
  - Keep internal floor drains plugged unless they drain to the sanitary sewer. Use dry clean-up methods, such as sweeping, when possible.
  - Keep spill control equipment and covers available to protect external drain inlets.

## Above Ground Tank Leak and Spill Control

### Environmental Concerns

Discharge of the following materials into the storm water drainage system or watercourses:

- Fuel
- Oil
- Paint
- Herbicides
- Asphaltic emulsion

### Definition and Purpose

Maintenance facilities may utilize above ground storage tanks for storage of bulk quantities of liquids. Often the liquids stored are potentially harmful to the environment. This BMP is intended to reduce the discharge of potential pollutants to the storm water drainage system or watercourses from above ground storage tanks by installing safeguards against accidental releases

### Appropriate Applications

This BMP should be implemented at all above ground storage tank locations by personnel responsible for above ground storage tank operation, inspection and maintenance.

### Limitations

If a large spill should occur, it may be necessary to utilize a private clean-up company or Hazmat team for clean-up. If a large spill or rupture occurs, call 911, contact supervisor and Stockton Fire Department. Any large spill from an above around storage tank shall be reported to the supervisor and Fire Department.

### Operational Procedures

Maintenance facility supervisors should ensure that the following procedures are implemented as appropriate:

- Inspect existing above ground storage tanks, secondary containment, and associated valves and piping for external corrosion, structural failure, and loose connections.
- Keep an appropriate spill kit near above ground tanks. (*Insert size of spill kit*) This includes an ample supply of clean-up materials (absorbent materials, shovel, rags, and plastic bags) near above

## Above Ground Tank Leak and Spill Control

ground tanks. Update and replenish the spill kit as changes occur in the types of materials stored.

- When required, review appropriate Spills Prevention Countermeasures and Control (SPCC) plan for the Maintenance facility.
- Any spills should be controlled immediately. For example, wet spills should be absorbed using an absorbent material or dry mopped. Place absorbent material collected in a waste container and dispose of the contents according to approved waste disposal procedures.
- Inspect or test rain water in secondary containment prior to releasing.
- After releasing rain water from secondary containment ensure that drain valve is closed.



This Fact Sheet provides Best Management Practices (BMPs) that are recommended for the sweeping, cleaning and repair of municipally-owned parking lots.

## Potential Pollutant Sources

The following activities are potential sources of pollutants:

- Waste disposal
- Surface Cleaning
- Maintenance and Repair

Pollutants may include:

- Bacteria
- Heavy metals (copper, lead, nickel and zinc)
- Sediment
- Hydrocarbons (oil and grease)
- Organics
- Trash

## Pollution Prevention

Implementation of pollution prevention measures may reduce or eliminate the need to implement other more costly or complicated procedures.

The following pollution prevention principles apply to most facilities:

- Use alternative, safer, and/or recycled products;
- Reduce storm water flow across the site and redirect flows away from areas of concern;
- Reduce the use of water and/or use dry methods;
- Recycle and reuse waste products and waste flows; and.
- Provide on-going employee training.

## Best Management Practices and Procedures

### GENERAL

- Minimize the use of water for cleaning.
- If water is being used for cleaning, contain the wash water and dispose of in the sanitary sewer (with permission **customize to include local phone number**) or for offsite disposal, do not dispose of in the gutter or street.
- Maintain parking lot and move or cover activities and materials to prevent contact with storm water.
- Keep the parking and storage areas clean and orderly. Remove debris in a timely manner.
- Allow sheet runoff to flow into vegetated strips and swales and/or infiltration devices.

- Utilize sand filters or oleophilic collectors for oily waste in low concentrations.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable landscape.

## WASTE DISPOSAL - CONTROLLING LITTER

- Post “No Littering” signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Routinely sweep, shovel, and dispose of litter in the trash.

## SURFACE CLEANING

- Clean oil/water/sand separators regularly, especially after heavy storms.
- Establish a frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Inspect and clean if necessary, storm drain inlets and catch basins within the facility boundary before October 1 each year.
- Use dry cleaning methods (i.e. sweeping, vacuuming) to prevent the discharge of pollutants into the storm drain conveyance system.
- If water or cleaning agents are used for cleaning (even biodegradable cleaners) :
  - Block the storm drain or contain runoff.
  - Wash water should be collected and pumped to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains. If wash water does not contain soap or other cleaning agents, discharge to a pervious surface.
  - Dispose parking lot sweeping debris and dirt at a landfill.
- When cleaning heavy oily deposits:
  - Use absorbent materials on oily spots prior to sweeping or washing.
  - Dispose used absorbents appropriately.
  - Vacuum/pump discharges to a tank or discharge to a sanitary sewer (with permission **customize to include local phone number**).

Industrial Inspection Checklist - Stormwater Management Program  
Condor Earth Technologies, Inc.  
188 Frank W. Circle, Ste. I, Stockton, CA 95206  
Phone: (209)234-0518 Fax: (209)234-0538

Business Name: \_\_\_\_\_  
Location: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
\_\_\_\_\_

SIC Code(s): \_\_\_\_\_  
Date: \_\_\_\_\_  
Inspector(s): \_\_\_\_\_

Facility Contact: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_

First Inspection ☐  
Second Inspection ☐  
Follow-Up Inspection ☐

Verbal Notice to Correct Issued? Yes / No (circle)

Weather at time of inspection: ☐ Sunny ☐ Cloudy ☐ Windy ☐ Drizzle ☐ Steady Rainfall

Part A - Administrative Evaluation:							Is the facility within the County unincorporated area? Yes / No (circle)	
	Yes	No	NA	UNK	VW	↓	Check if Active BMP	
1							Has the facility been issued a WDID Number by the SWRCB? If yes - provide ID number:	
2							Is there a SWPPP on file at the facility? If yes - provide date of last review:	
							Is there a site map on file in SWPPP?	
							If yes, are storm water monitoring locations clearly marked?	
							Are there storm water sampling locations for all facility discharge?	
3							Is there a current Annual Report on-site?	
4							Employee training on pollution (spill) prevention, storm water issues, and good housekeeping measures? If yes (circle) and provide last training date (if applicable):	
5							Spill prevention and control procedures in place?	
6							Are there air or water (recirculation / reclamation system) treatment units in operation at the facility? (circle)	
							If yes, can waste (particulates / dust / condensation / wastewater) enter the storm water system? (circle)	
7							Are all Facility activities conducted indoors and/or under cover?	
Part B - Indoor Evaluation:								
	Yes	No	NA	UNK	VW	↓	Check if Active BMP	
8							Does the facility have interior floor drains?	
							If yes, are floor drains connected to the sanitary sewer / septic system / detention basin? (circle)	
Part C - Outdoor Evaluation:								
	Yes	No	NA	UNK	VW	↓	Check if Active BMP	
9							Is there visual evidence of materials spills at this facility? If yes - circle location and type: processing area / loading & unloading areas / storage area / vehicle maintenance & repair / parking areas / driveways active spills (note type) / mobilized particulates / cleaning materials / staining / oil & grease / automotive fluids / fueling spills / soil	
							Are absorbent and cleaning materials available and in the appropriate areas?	
10							Are there catch basins / storm water detention basins at this facility? (circle)	
11							Are catch basins, gutters, storm drain inlets, and surfaces free of debris / trash / dirt? If no, indicate area and type (circle)	
							Regular cleaning of storm drainage system conducted ( pavement sweeping / regular litter removal )? If yes - (circle)	
							Storm drains stenciled to indicate they are not to receive liquid or solid wastes? (i.e. " No Dumping - Flows to Delta")	
12							Can dirt /debris from vehicle traffic/landscape irrigation/building cleaning enter storm drains? If yes - (circle)	
							Does pavement sweeping / pressure washing occur on-site? If yes - (circle)	
							Is dust and wash water residue discharged into the storm drain system? If yes - (circle)	
							Are sediment filters in/around storm drain inlets?	
13							Are trash receptacles covered and leak resistant?	
14							Are "materials mobilized by storm water contact" undercover and kept from contact with storm water runoff?	
15							Does the facility have outdoor processing / vehicle maintenance and repair? If yes - (circle)	
							If yes, are these activities conducted under cover or within secondary spill containment? If yes - (circle)	
16							If present, does fueling area design minimize storm water exposure? If yes, circle method: Covered/perimeter pavement sloped to containment sump / UST with spill and overfill protection / double-walled AST with secondary	
17							Does the site have designated covered / exposed wash area? If yes - (circle)	
							If yes, is discharge sewerred or directed to a containment sump or portable containment & vacuum collection? (circle)	
							Does on-site washing by vendor occur? If yes, is wastewater disposed off-site or sewerred on-site (circle)	
							Does the facility use off-site commercial washing and cleaning businesses?	
18							Are spill control kits located and clean-up procedures clearly posted in the above listed areas? If yes - (circle)	
19							Materials stored on paved or impervious surfaces / under fixed or temporary cover / within containment berms? If yes - (circle)	
20							Does the Site have single-walled above ground storage tanks (ASTs) exposed to storm water?	
							If yes, are secondary containment structures in-place?	
21							If there are outdoor construction activities at the facility, are BMPs in place? If yes, circle type: soil erosion control / sediment filters / covered materials / secondary containment / sand bags / litter removal / trash containment	
22							If present, does any used water (cooling tower blowdown, boiler blowdown, etc.) discharge to the storm water system?	
Part D - Additional BMPs:								
	Yes	Need	NA					
23					Storm water runoff routed around operating, processing, fueling, cleaning, and storage areas?			
24					Process wastes piped directly to sewer pretreatment system?			
25					Recycle greases, used oil, oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids? (circle)			
26					Idle equipment stored kept clean or stored under cover?			
27					Are soil erosion control BMPs in place to prevent landscape irrigation runoff and debris from entering the storm water system?			

**Industrial Inspection Checklist - Stormwater Management Program**  
**Condor Earth Technologies, Inc.**  
**188 Frank W. Circle, Ste. I, Stockton, CA 95206**  
**Phone: (209)234-0518 Fax: (209)234-0538**

<b>Business Name:</b>			<b>SIC Code(s):</b>		
28			Is pet waste prevented from entering the storm water system?		

VW = Verbal Warning to Correct Issued in this area



## WGR Southwest, Inc.

### Stormwater Pollution Prevention Evaluation

Business Name: \_\_\_\_\_

Telephone No.: \_\_\_\_\_

Location: \_\_\_\_\_

Date of Visit: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

WGR Representative: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Business Representative: \_\_\_\_\_

Follow-up Visit Needed: Yes / No

#### Evaluation Checklist

Y	N	NA	General	Y	N	NA	Laundry Mats & Dry Cleaners
			Are outside area surfaces "dry cleaned"?				Are cleaning chemicals, detergents, and other cleansers kept under cover?
			Are drains and surfaces free of debris and trash?				Is wash water discharged to the sanitary sewer?
			Is facility surface stabilized to prevent erosion?				Are hazardous liquid materials, including drums of solvents, cleansers, or detergents maintained in secondary containment?
			Are trash receptacles covered and leak resistant?				Are the areas outside of the store relatively trash free?
			Are parking spaces free of excessive oil, grease, and other automotive fluids?	Y	N	NA	<b>Nurseries and Garden Centers</b>
			Have unauthorized non-storm water sources been eliminated?				Has the facility signed up to participate in a water coalition for the monitoring and BMP program for the irrigated runoff?
			Are spills of chemicals or other pollutants immediately cleaned up?				Is soil erosion and the resulting sedimentation prevented from reaching the storm drains?
			Are storm drains properly labeled?				Are BMPs in place to prevent track of mud and sediment by vehicles?
			Have employees been trained about pollution prevention and good housekeeping measures?				Are fertilizers, manure, pesticides, and other chemicals used in such a way to minimize contact with storm water?
			Are pollution sources undercover and kept from coming into contact with storm water runoff?	Y	N	NA	<b>Kennels</b>
			Is over-irrigation of the landscaping prevented?				Are areas exposed to storm water free of pet waste?
			Are landscape chemicals and pesticide use kept to a minimum?				Is biohazard waste kept in a contained and covered area?
			If pressure washing of surfaces is done, is the wash water prevented from flowing to the storm system?				Are cages and equipment cleaned so that wash water does not flow onto storm water drainage areas?
			Is the site free of signs of dumping liquid wastes?				Are spill clean up equipment and supplies readily available?
			Are janitorial liquids / wash water disposed of properly?				Do floor drains flow to the sanitary sewer?
			Have appropriate measures been taken to prevent spills?				

#### Recommendations for Improved Pollution Prevention

1. \_\_\_\_\_

4. \_\_\_\_\_

2. \_\_\_\_\_

5. \_\_\_\_\_

3. \_\_\_\_\_

6. \_\_\_\_\_





WGR Southwest, Inc.  
Storm Water Pollution Prevention Evaluation



Business Name: \_\_\_\_\_

Site Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Telephone No.: \_\_\_\_\_

Date of Visit: \_\_\_\_\_

WGR Representative: \_\_\_\_\_

On-site contact: \_\_\_\_\_

Re-inspection needed: Yes \_\_\_\_\_ No \_\_\_\_\_

Restaurants & Food Service Facilities - Inspection Checklist

Y	N	N/A	
			Does the outside area of the facility show evidence of good housekeeping?
			Are dry sweeping methods used on outside area surfaces?
			Are outside areas pressure washed and is the wash water prevented from flowing to the storm system?
			Are outside drains and surfaces free of debris and trash?
			Are parking lots paved?
			Are parking spaces free of excessive oil, grease and other automotive fluids?
			Are trash receptacles covered and leak resistant? Are lids kept closed at all times?
			Have unauthorized or illicit discharges to storm water sources been eliminated?
			Have appropriate measures been taken to prevent spills?
			Is spill cleanup equipment on hand in case of a spill?
			Are spills of chemicals or other pollutants immediately cleaned?
			Are storm drains properly labeled?
			Have employees been trained about pollution prevention and good housekeeping measures?
			Is over-irrigation of the landscaping prevented?
			Are landscape chemicals and pesticide use kept to a minimum?
			Are there visible signs of stains?
			Are janitorial liquids and wash water disposed of in the sanitary sewer?

Y	N	N/A	
			Are floor mats rinsate and other wash water directed away from the storm water system?
			Does the facility prevent the onsite washing of the trash bins?
			Are trash bags used to prevent liquids from leaking out of the trash bins?
			Are containers of oil, grease, soaps and cleansers, and other fluids stored under cover, and if so, are they secure from vandalism or unauthorized use?
			If the facility allows groups to perform fundraising car washes in its parking areas, is the carwash water kept from entering storm drains?
			<b>FOG compliance – Fats, Oils, Grease</b>
			Are proper equipment, spouts and buckets used to transfer oils to prevent spills?
			Is a tallow recycling company used to dispose of tallow waste?
			Does the tallow bin have a secure top that is kept closed, and is it kept away from water bodies and storm drains?
			Is there a grease trap? More than one? How many?
			Are the grease traps clean?
			Is there a grease interceptor? Where is it located?
			Is the grease interceptor surface clean?
			Is a dishwasher used?
			Is there a garbage disposal used on site?
			Is the City's Green Waste/Food Waste Cart in use?

Recommendations:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



# WGR Southwest, Inc.

## Stormwater Pollution Prevention Evaluation

Business Name: \_\_\_\_\_

Telephone No.: \_\_\_\_\_

Location: \_\_\_\_\_

Date of Visit: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

WGR Representative: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Business Representative: \_\_\_\_\_

Follow-up Visit Needed: Yes / No

### Evaluation Checklist

Y	N	NA	General
			Are outside area surfaces "dry cleaned"?
			Are drains and surfaces free of debris and trash?
			Is facility surface stabilized to prevent erosion?
			Are trash receptacles covered and leak resistant?
			Are parking spaces free of excessive oil, grease, and other automotive fluids?
			Have unauthorized non-storm water sources been eliminated?
			Are spills of chemicals or other pollutants immediately cleaned up?
			Are storm drains properly labeled?
			Have employees been trained about pollution prevention and good housekeeping measures?
			Are pollution sources undercover and kept from coming into contact with storm water runoff?
			Is over-irrigation of the landscaping prevented?
			Are landscape chemicals and pesticide use kept to a minimum?
			If pressure washing of surfaces is done, is the wash water prevented from flowing to the storm system?
			Is the site free of signs of dumping liquid wastes?
			Are janitorial liquids / wash water disposed of properly?
			Have appropriate measures been taken to prevent spills?
Y	N	NA	<b>Vehicle Washing/Detailing Operations</b>
			Is wash water prevented from flowing to a storm drain and solvents and cleansers kept from discharging to the storm system?

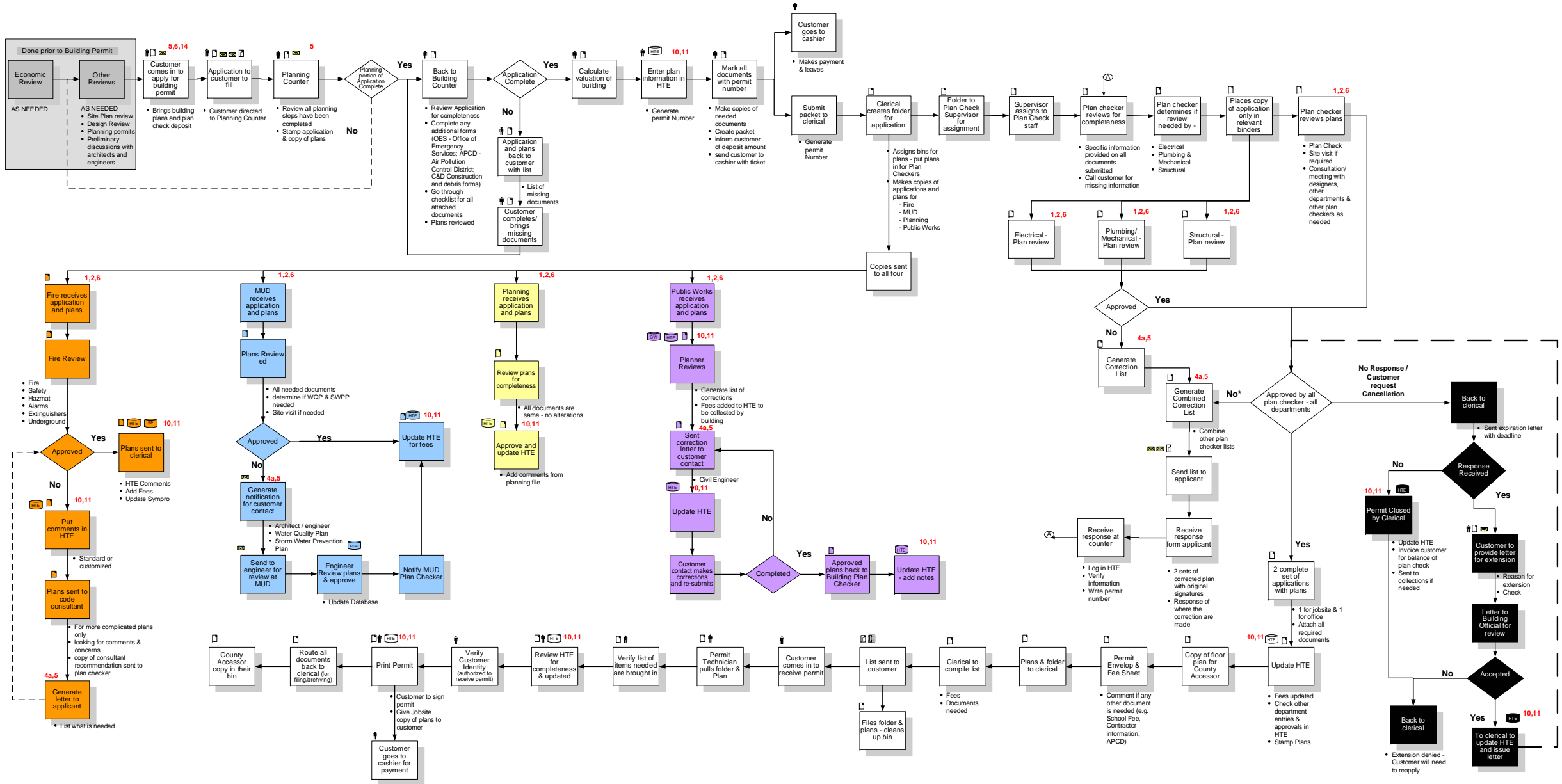
Y	N	NA	Vehicle Maintenance/Repair Facilities
			Is maintenance work performed under a covered structure and kept from creeping outside?
			Are oily parts stored within rain proof coverings?
			Are hazardous liquid materials, including parts washing solvents, maintained within a secondary containment and under cover?
			Are batteries stored under cover?
			Are hazardous waste accumulation areas and storage areas within secondary containment and under
			Is scrap metal stored under cover?
			Are liquids transferred directly from the vehicle to the designated waste storage area as soon as possible?
			Have fluids been drained from leaking or wrecked vehicles and engines covered?
			Is the shop swept, mopped, or vacuumed regularly?
			Is spill clean up equipment and supplies readily available?
			Do floor drains flow to the POTW through an oil/water separator?
Y	N	NA	<b>Food Service Facilities</b>
			Is equipment and floors cleaned so that wash water does not flow onto storm water drainage areas?
			Is a tallow bin used to dispose oils and greases instead of trash bins?
			Is proper equipment, spouts and buckets used to transfer oils and prevent spills?
			Are floor mat rinsate and other wash water directed away from the storm water system?
			Are trash bags used to prevent liquids from leaking out of the trash bins?
			Does the grease trap appear to be functioning properly? (Check cleaning records.)

### Recommendations for Improved Pollution Prevention

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

## Rapid Workflow Session 1: Community Development - As Is - Commercial Office Building (Over 6,000 sq. ft.) Permit Process



\* Will need to go back to department that requested correction

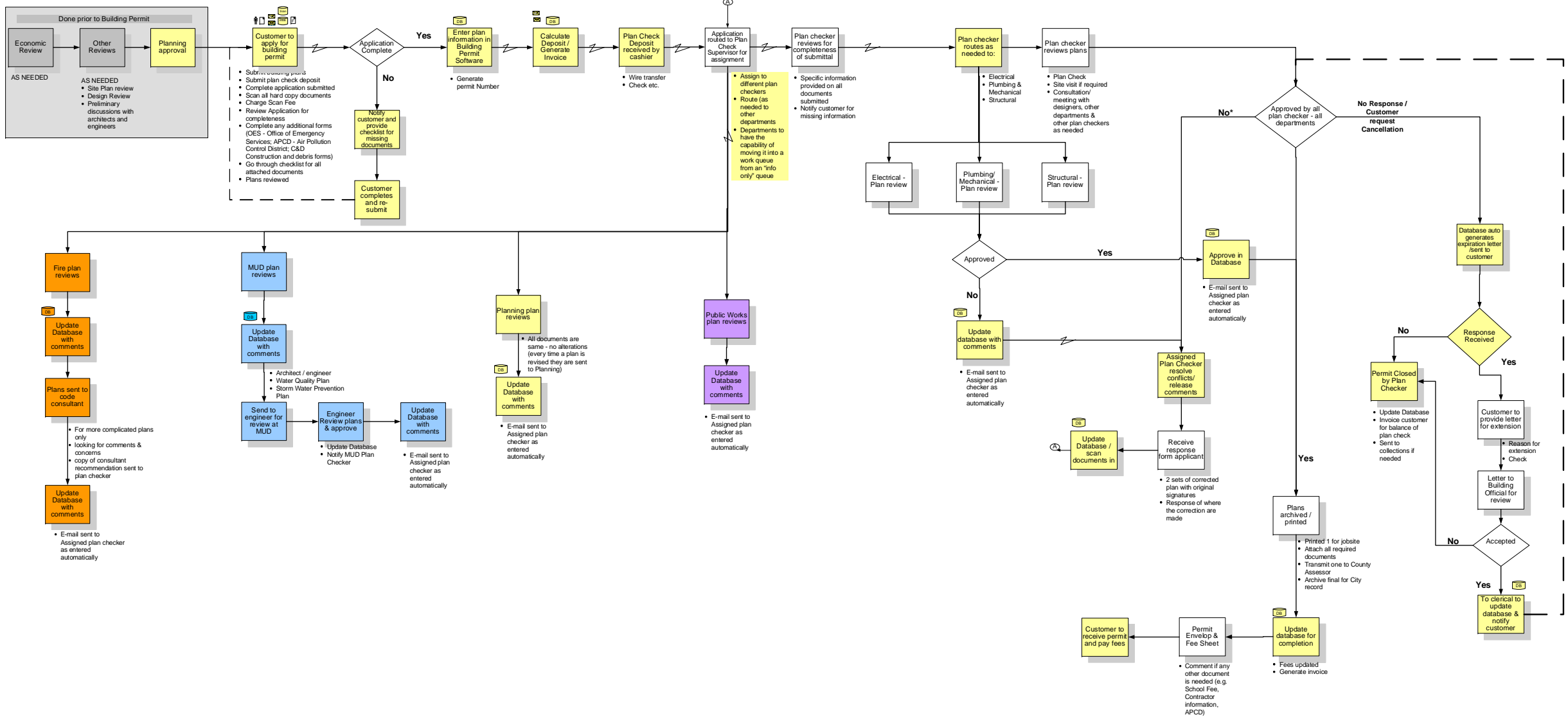
Problems	
1.	Departments not signing off holds up process
2.	The exact location of the plans is not always known - who has the application at this time - not tracked
3a.	Application attachment are not in HTE - no capability in HTE to attach document being sent to the file
3b.	Other departments cannot see the documents being issued by one department
3c.	No electronic/central storage for all documents related to the permit for all departments
3d.	Conversations with developers are not documented for future reference - not attached to any parcel/address etc.
4a.	Different departments send there own correction letters- customers never know if they have been notified by all departments for plan check comments
4b.	Different departments are working on different response deadlines (staffing, re-submittals, political environment)
5.	Conflicting comments being issued to the customer from different departments
6.	Disconnect between first thing reviewed (underground) and last thing being reviewed (sprinklers) and second can cause changes in the first
7.	No formal communication process to update other departments on project phases
8a.	Multiple partial permits on same project create problems - hard to find what has been issued previously
8b.	Customer driven partial permits created inefficiencies - need political and City upper management support
8c.	Current process does not provide consistent results - generates more partial permits
8d.	Developer schedules also generate partial permits - effect review schedules
8e.	Partial permit information does not get added to the full permit - inspectors need to do additional research
8f.	Additional costs for City to issue partial permits
9a.	One person is assigned to multiple in-compatible tasks - Staffing issues
9b.	Volume of plans exceed staffing level
9c.	Field personnel are also doing office work - effects customer service and field customer service
10.	In HTE same information has to be entered in multiple places - redundant work
11.	Field inspectors do not have access to information in the field - office staff has to enter information in multiple places to print it for them
12a.	Office configuration does not meet needs of the staff and customers
12b.	Office setup - makes it hard to make forms & information available in lobby
12c.	Equipment (e.g. printers and copiers) not close by counter staff - create a delay in customer time
12d.	Inadequate space for centralized filing method - hard to track down plans etc.
13.	Multiple revisions of plans are hard to track
14.	Quality and completeness of plans causes additional work for checkers
15.	Log in for different system - Windows, HTE, Onbase
16a.	Interruptions (phones/walk ins/meetings etc) create additional work load
16b.	No quiet time available to complete tasks
16c.	Public hours not conducive to completion of tasks
17.	Non project/permits/applications tasks draw on staff time effect the availability for current process being documented
18.	Due to political pressure - many projects are labeled as priority (take care of this before anything else), creating bad customer service for people waiting in

Impacts	
1 - i	Additional Staff time
1 - ii	Reduced customer service
1 - iii	Adverse effect on City's public image
1 - iv	Lack of consistency
2	Same as 1
3a, c, d	Same as 1
3b - i	Same as 1
3b - ii	Can result in installation of non standard improvements
4	Same as 1
5	Same as 1
6 - i	Same as 3b
7	Same as 1
8	Same as 1
9	Same as 1
10	Same as 1
11	Same as 3b
12 - i	Same as 1
12 - ii	Create ergonomic issues - effects employees health
13	Same as 1
14	Same as 1
15	Same as 1
16 - i	Same as 1
16 - ii	Reduced employee morale
17	Same as 1
18 - i	Same as 16

Solutions	
1.1	Accept complete applications only with upper management support consistently
1.2	Create a methodology for determining applications complete
1.3	Set up standards for complete application
1.4	Create/emphasize customer accountability
2.1	Central filing location for plans, to include a layout table for quick plan reviews
2.2	Using technology, create a check-in/check out system for plans
2.3	All departments should log the name of the person assigned to plan checking (HTE/other software)
2.4	Increase cubicle size to provide more working area, and some additional storage area for all staff working with plans
2.5	Create a small conference rooms to meet with customers, have a computer available for customers to use - have it outside the counter
3.1	Obtain a Permit tracking software that allows to attach documents, comments, applications etc. and have it linked for all departments to use
3.2	Use the permit tracking software to document future plans (conversations with developers) - use judgment in what needs to be documented - and attach it to the parcel/address
4.1	Make one person responsible for correspondence to the customer - who should also have one point of contact for the project.
4.2	Create an inter-departmental coordination system, where all plan checkers are can provide input. (Reid Campbell (Chair), John Wotilia, Jay Coffey, Mark Martin, Julie Lorch - to coordinate and come up with a plan on this)
5.	Same as 4
6.1	Educate clients on when and how to make submittals (Pre-meeting)
6.2	Make all contractors to work with what has been approved in the initial plans, unless critically important
6.3	Public Works and Fire to work together on these issues
7.1	Same as 3
8.1	Same as 3
8.2	Need upper management support in eliminating/limiting partial permits
8.3	Look at additional costs that City incurs due to partial submissions and have additional fees for partial permits (currently being done) - additional fees could be used to hire more staff to manage the work load
9.1	Designate staff for office and field work separately
9.2	Counter staff trained for multi discipline
10.	Same as 3
11.	Same as 3 - to have field devices
12.1	Same as 2
12.2	Involve staff in planning for the move/office layout to the new City Admin Building
13.1	All information submitted through one point of contact at the City and then be routed to relevant plan checkers
13.2	All sets of plans to be updated for all department to review.
13.3	Have changes submitted electronically before new plans are submitted.
13.4	Provide online access for customers to review plans
13.5	Same as 2.5
14.	Same as 1
15.	Being evaluated by IT - will probably get solved when HTE is replaced
16.	Revisit office hours to provide a better solution (Richard, Brenda, Valerie (Chair), Julie, Gregg)
17.	Review staff assignments and establishing priorities related to non-cost recovery activities (Upper Management)
18.1	Create awareness for Upper Management and Council Members on permit center capabilities/limitations
18.2	Solicit upper management/council support in prioritizing projects
18.3	Create communication channel between Permit center and Council/Management (when a developer complains, give permit center staff a chance to discuss before decision is made)

Benefits	
1.i	More efficient process that saves time
1.ii	Better customer service
1.iii	Saves employee time
1.iv	Increased accuracy
1.v	More positive public image for the City
2.i	Same as 1
2.ii	Increase staff morale
3.	Same as 1
4.	Same as 1
5.	Same as 1
6.	Same as 1 and decrease in employee time off
7.	Same as 1
8.i	Same as 1
8.ii	Additional revenue generated to fund additional staff needed
9.	Same as 1
10.	Same as 1
11.	Same as 1
12.	Same as 1
13.	Same as 1
14.	Same as 1
15.	None identified
16.	TBD
17.	TBD
18.	Same as 2

**Rapid Workflow Session 1: Community Development - To Be - Commercial Office Building (Over 6,000 sq. ft.) Permit Process**

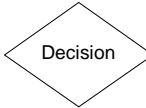


\* Will need to go back to department that requested correction

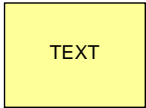
# LEGEND



Task Box -  
Original Process



Decision Box



Task Box -  
Revised Process

2,3

Problems



Data Flow - Direction



Electronic Transfer



Phone



Hard Copy



Walk-in



Facmisile



Electronic Mail



Regular Mail



Database / System

**Facilitator**  
Mahin Shah

**Participants**  
**Session 3 (May 12, 2008)**  
Brenda McIntosh  
Blake Froberg  
Eric Elias  
Gregg Meissner  
Jeff Willett  
John Wotila  
John Freitas  
Julie Lorch  
Mark Martin  
Richard Larrouy  
Vicky Flores  
Reid Campbell

**Session 4 (May 22, 2008)**  
Brenda McIntosh  
Blake Froberg  
Eric Elias  
Gregg Meissner  
Jay Coffey  
Jeff Willett  
John Gaukel  
John Wotila  
John Freitas  
Julie Lorch  
Mark Martin  
Richard Larrouy  
Vicky Flores  
Reid Campbell

**Participants**  
**Session 3 (May 12, 2008)**  
Brenda McIntosh  
Blake Froberg  
Eric Elias  
Gregg Meissner  
Jeff Willett  
John Wotila  
John Freitas  
Julie Lorch  
Mark Martin  
Richard Larrouy  
Vicky Flores  
Reid Campbell

**Session 4 (May 22, 2008)**  
Brenda McIntosh  
Blake Froberg  
Eric Elias  
Gregg Meissner  
Jay Coffey  
Jeff Willett  
John Gaukel  
John Wotila  
John Freitas  
Julie Lorch  
Mark Martin  
Richard Larrouy  
Vicky Flores  
Reid Campbell

**Participants**  
**Session 5 (June 2, 2008)**  
Antonio Tovar  
Brenda McIntosh  
Blake Froberg  
Ed O'Reilly  
Eric Elias  
Gary Cathcart  
Gregg Meissner  
Jay Coffey  
Jeff Willett  
John Freitas  
Julie Lorch  
Mark Martin  
Richard Larrouy  
Reid Campbell



## Storm Water Inspection Checklist

Waste Discharge Identification Number:

Date:

### WEATHER CONDITIONS:

#### TYPE OF INSPECTION (CHECK ONE):

☐  
☐  
☐

Routine Compliance Inspection  
Reinspection  
Notice of Termination Inspection

MAP NUMBER :

#### A. STORM WATER POLLUTION PREVENTION PLAN

1. Is there a current SWPPP on site and complete?
2. Are all BMPs effective & being maintained?
3. Has the contractor identified & implemented site specific best management practices (BMPs) ?
4. Are amendments to the SWPPP clearly documented?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>

#### B. WIND & SOIL EROSION / SEDIMENT CONTROL

1. Are erosion & sediment control BMPs identified / installed properly?
2. Are wind erosion control measures (BMPs) identified in the SWPPP such as Water trucks and dust palliatives, in place?
3. Are drainage ditches or the area around the outfall free of erosion / sediment ?
4. Do implemented BMPs appear effective in controlling erosion / sediment?
5. Is the cities MS4 system free from any construction debris?
6. Did the contractor properly stencil all stormwater drains with " Only rain down the drain. Flows to delta"?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>

#### C. VEHICLE/EQUIPMENT

1. Were the vehicle/equipment maintenance areas inspected?
2. Are vehicle/machinery leaks and drips properly managed?
3. Are current BMPs in vehicle/equipment/fueling areas adequate?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>

#### D. WASTE MANAGEMENT / TRACKING CONTROLS

1. Are containers for temporary storage of wastes labeled?
2. Are waste materials recycled?
3. Are construction areas free from debris and scrap material?
4. Are current waste management BMPs adequate?
5. Are public roads, adjacent to the site ingress & egress points, reasonably free from sediment?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>

#### E. SPILL CONTROL

1. Are there procedures for spill response and cleanup?
2. Are current spill BMPs adequate?
3. Is there a sampling kit onsite for spills and/or storm event?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>

#### F. Other

1. Has there been a storm event which required sampling in the past 14 days?
2. Is there a SWPPP training program for all employees? If so, when was the last training date.
3. Were photos taken?
4. Are port-o-potties 5' behind sidewalks, level and 50' away from drain inlets?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
YES	<input type="checkbox"/>	NO	<input type="checkbox"/>

#### G. DEFICIENCIES AND CORRECTIVE ACTIONS

( SMC Chapter 13 UNIFORM ADMINISTRATIVE PROVISIONS FOR CONSTRUCTION CODES )

#### Section 3 Erosion & Sediment Control BMPs

- |                          |                                    |
|--------------------------|------------------------------------|
| <input type="checkbox"/> | Scheduling EC-1                    |
| <input type="checkbox"/> | Hydraulic Mulch EC-3               |
| <input type="checkbox"/> | Hydroseeding EC-4                  |
| <input type="checkbox"/> | Soil Binders EC-5                  |
| <input type="checkbox"/> | Geotextiles & Mats EC-7            |
| <input type="checkbox"/> | Velocity Dissipation Devices EC-10 |
| <input type="checkbox"/> | Streambank Stabilization EC-12     |
| <input type="checkbox"/> | Silt Fence SE-1                    |
| <input type="checkbox"/> | Check Dams SE-4                    |
| <input type="checkbox"/> | Fiber Rolls SE-5                   |
| <input type="checkbox"/> | Gravel Bags Berm SE-6              |
| <input type="checkbox"/> | Street Sweeping& Vacuuming SE-7    |
| <input type="checkbox"/> | Sandbag Barrier SE-8               |

#### Section 4 Non-Stormwater Management Material BMP

- |                          |                                       |
|--------------------------|---------------------------------------|
| <input type="checkbox"/> | Water Conservation Practices NS-1     |
| <input type="checkbox"/> | Dewatering Operations NS-2            |
| <input type="checkbox"/> | Paving and Grinding Operations NS-3   |
| <input type="checkbox"/> | Temporary Stream Crossing NS-4        |
| <input type="checkbox"/> | Clear Water Diversion NS-5            |
| <input type="checkbox"/> | Illicit Connection/Discharge NS-6     |
| <input type="checkbox"/> | Potable Water/Irrigation NS-7         |
| <input type="checkbox"/> | Vehicle and Equipment Cleaning NS-8   |
| <input type="checkbox"/> | Vehicle and Equipment Fueling NS-9    |
| <input type="checkbox"/> | Vehicle & Equipment Maintenance NS-10 |
| <input type="checkbox"/> | Pile Driving Operations NS-11         |
| <input type="checkbox"/> | Concrete Curing NS-12                 |
| <input type="checkbox"/> | Concrete Waste Management WM-8        |
| <input type="checkbox"/> | Demolition Adjacent to Water NS-13    |



- ☐ Storm Drain Inlet Protection SE-10
- ☐ Wind Erosion Control WE-1
- ☐ Stabilized Construction Entrance/Exit TC-1
- ☐ Stabilized Construction Roadway TC-2
- ☐ Entrance/Outlet Tire Wash TC-3

- ☐ Material Delivery and Storage WM-1
- ☐ Material Use WM-2
- ☐ Stockpile Management WM-3
- ☐ Spill Prevention and Control WM-4 & Contaminated Soil WM-7
- ☐ Solid /Hazardous/Sanitary Waste Management WM-5/WM-6/WM-8
- ☐ Liquid Waste Management WM-10

Notes:

RECEIVED BY: \_\_\_\_\_

INSPECTED BY: R.Ramirez

TELEPHONE NUMBER: ( 209 ) 993-1449

**PFS-3.6 Wastewater Reuse**

The City shall continue to discharge treated effluent to the Delta and reuse that water through the City's California Water Code Section 1485 water right.

**PFS-3.7 Security**

City shall seek to minimize vulnerability of its wastewater collection and treatment systems to unauthorized tampering.

**PFS-3.8 Timing of Future Development**

Prior to approval of any tentative subdivision map for a proposed residential project, the City shall formally consult with the wastewater system provider that would serve the proposed subdivision to make a factual showing or impose conditions in order to ensure an adequate wastewater removal system necessary for the proposed development. Prior to recordation of any final small lot subdivision map, or prior to City approval of any project-specific discretionary approval or entitlement required for nonresidential land uses, the City or the project applicant shall demonstrate, based on substantial evidence, the availability of a long-term, reliable wastewater collection system for the amount of development that would be authorized by the final subdivision map or project-specific discretionary nonresidential approval or entitlement. Such a demonstration shall consist of a written verification that existing treatment capacity is or will be available and that needed physical improvements for treating wastewater from the project site will be in place prior to occupancy.

## 9.4 Stormwater

The City depends on its creeks, rivers and sloughs to collect and convey storm runoff to the San Joaquin River and the Delta. The primary channels that drain the City include: San Joaquin River; Bear Creek (including Pixley Slough); Mosher Slough (including South Bear Creek); Five Mile Slough; Fourteen Mile Slough; Calaveras River and Stockton Diverting Canal; Smith Canal; and French Camp and Walker Sloughs (including North Littlejohns and Duck Creeks). Storm drains collect and convey runoff to the pumps that lift the runoff into one of the creeks, sloughs or rivers. Anecdotal information and City records indicate that most storm drains and pump stations have adequate capacity.

The quality of stormwater runoff discharging to creeks and sloughs, which is governed by the requirements of the National Pollutant Discharge Elimination System (NPDES), is now a paramount planning and design issue. Several streams within the Stockton area have been identified as "toxic hot spots" by the State because of the presence of diazinon and chlorpyrifos. They include Mosher Slough, Five Mile Slough, Calaveras River and Mormon Slough. The designation of these streams triggers the requirement for an urban stormwater cleanup plan for these "hot" spots.

The State considers stormwater discharges from the Stockton urbanized area to be significant sources of pollutants. Five Mile Slough, Mosher Slough, the Deep Water Channel, and the San Joaquin River are listed as "water quality impaired."

The following goal (PFS-4) emphasizes the management of stormwater infrastructure within the City.

### PFS-4

To manage stormwater in a manner that is safe and environmentally sensitive to protect people and property and to maintain the quality of receiving waters.

**PFS-4.1 Creek and Slough Capacity**

The City shall require detention storage with measured release to ensure that the capacity of downstream creeks and sloughs will not be exceeded.

To this end:

- Outflow to creeks and sloughs shall be monitored and controlled to avoid exceeding downstream channel capacities;
- Storage facilities shall be coordinated and managed to prevent problems caused by timing of storage outflows.

**PFS-4.2 Watershed Drainage Plans**

The City shall require the preparation of watershed drainage plans for proposed developments within the urban services boundary. These plans shall define needed drainage improvements and estimate

construction costs for these improvements. The plans will also identify a range of feasible measures that can be implemented to reduce all public safety and/or environmental impacts associated with the construction, operation, or maintenance of any required drainage improvements (i.e., drainage basins, etc.).

### **PFS-4.3 Best Management Practices**

The City shall require, as part of watershed drainage plans, Best Management Practices (BMPs), to reduce pollutants to the maximum extent practicable.

- As of November 25, 2003, the City shall require that all new development and redevelopment projects to comply with the post-construction Best Management Practices (BMPs) called for in the Stormwater Quality Control Criteria Plan (SWQCCP), as outlined in the City's Phase 1 Stormwater NPDES permit issued by the California Water Quality Control Board, Central Valley Region (Order No. R5-20020-0181). Also the owners, developers, and/or successors-in-interest must establish a maintenance entity acceptable to the City to provide funding for the operation, maintenance, and replacement costs of all post-construction BMPs.
- The City shall require, as part of its Storm Water NPDES Permit and ordinances, to implement the Grading Plan, Erosion Control Plan, and Pollution Prevention Plan (SWPPP) during construction activities of any improvement plans, new development and redevelopment projects for reducing pollutants to the maximum extent practicable.

### **PFS-4.4 Regional Basins**

The City shall define drainage service areas and encourage and support the use of regional stormwater facilities, including stormwater detention and stormwater quality basins within these service areas.

### **PFS-4.5 Public Facilities Fees**

The City shall develop a Stormwater Management Utility fee that will financially support the stormwater system operation, the Stormwater

Management Plan, and maintenance and management program activities.

### **PFS-4.6 Stormwater Facility Sizing**

The City shall ensure through the development review process that public facilities and infrastructure are designed to meet ultimate capacity needs, pursuant to a master plan, to avoid the need for future replacement to achieve upsizing. For facilities subject to incremental sizing, the initial design shall include adequate land area and any other elements not easily expanded in the future.

### **PFS-4.7 Storm Water Discharge**

The City shall require for new development within the horizontal surface boundary of the Stockton Metropolitan Airport that any storm water detention basin be designed to discharge as rapidly as possible to minimize the attraction of birds in the vicinity of the airport.

### **PFS-4.8 Low Impact Development**

The City shall incorporate low impact development (LID) alternatives for stormwater quality control into development requirements. LID alternatives will include: (1) conserving natural areas and reducing imperviousness, (2) runoff storage, (3) hydro-modification (to mimic pre-development runoff volume and flow rate), and (4) public education.

---

## **9.5 Solid and Hazardous Waste**

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The City's solid waste is transported and stored in the privately-owned Forward landfill, County-owned Foothill landfill and North County Sanitary landfill.

Prior to transport to the landfills, the City's solid waste is transported to transfer stations in the region. All residential waste is transported to either the East Stockton Transfer Station (2435 E. Weber Avenue, Stockton) or the Lovelace Material Recovery Facility (2323 E. Lovelace Road, Manteca). At the transfer stations, recyclable materials are separated out and then transported to a recyclable materials processing plant. The remaining residential waste at each transported to the Forward landfill.



## **POST-CONSTRUCTION PRIORITY PROJECT PLAN REVIEW CHECKLIST**

Priority projects must adhere to the requirements contained within the Stormwater Quality Control Criteria Plan (SWQCCP).

Identify whether measures on the checklist are applicable and whether they are applied through a project design revision prior to permit approval and/or a condition of project approval. If the measure is not feasible or applicable, indicate why not.

Facility Name:\_\_\_\_\_

Site Area (sq. ft.):\_\_\_\_\_

Facility Address:\_\_\_\_\_

Disturbed Area (sq. ft.):\_\_\_\_\_

Date:\_\_\_\_\_

Existing Impervious Surface (sq. ft.):\_\_\_\_\_

Priority Project Type:\_\_\_\_\_

New Impervious Surface:\_\_\_\_\_

### **General Site Design Control Measures**

☐ Conserve Natural Areas (G-1): \_\_\_\_\_

\_\_\_\_\_

☐ Protect Slopes and Channels (G-2) (not applicable if project is not adjacent to stream and does not include substantial slopes):\_\_\_\_\_

\_\_\_\_\_

☐ Minimize Impervious Area (G-3):\_\_\_\_\_

\_\_\_\_\_

☐ Minimize Effective Imperviousness (G-4): \_\_\_\_\_

\_\_\_\_\_



**Site-specific Source Control Measures**

☐ Storm Drain Message and Signage (S-1):\_\_\_\_\_

\_\_\_\_\_

☐ Outdoor Material Storage Area Design (S-2):\_\_\_\_\_

\_\_\_\_\_

☐ Outdoor Trash Storage Area Design (S-3):\_\_\_\_\_

\_\_\_\_\_

☐ Outdoor Loading/Unloading Dock Area Design (S-4):\_\_\_\_\_

\_\_\_\_\_

☐ Outdoor Repair/Maintenance Bay Design (S-5):\_\_\_\_\_

\_\_\_\_\_

☐ Outdoor Vehicle/Equipment/Accessory Washing Area Design (S-6):\_\_\_\_\_

\_\_\_\_\_

☐ Fueling Area Design (S-7):\_\_\_\_\_

\_\_\_\_\_



### **Treatment Control Measures**

- ☐ Treatment Control Measures (T-1 through T-13) meeting the Stormwater Quality Design Volume (SQDV) will be incorporated into the project development (80% or more of the average annual runoff volume))
- ☐ Treatment Control Measures (T-1 through T-13) meeting the Stormwater Quality Design Flow (SQDF) will be incorporated into the project development design (85<sup>th</sup> percentile hourly rainfall intensity)
- ☐ BMPs will be applied as follows:
  - Project design as proposed (with condition of approval requiring project implementation as proposed and ongoing maintenance of BMPs)
  - Revised project design submitted as part of the plan review process (and application of condition of approval requiring project implementation as revised, and ongoing maintenance of BMPs).
  - Application of a condition of approval requiring feasible project design changes and/or other BMPs and ongoing maintenance of BMPs

The constituents below, with the exception of volatiles and semi volatiles, bacteria indicators, and oil and grease, are taken as composites at urban discharge sites during wet weather. All the constituents below are taken as grab samples at urban discharge sites during dry weather or at receiving water sites during both wet and dry weather.

Conventional Pollutants	Bacteria
Oil and Grease pH Dissolved Oxygen	Fecal coliform E. coli (fresh waters)
General	Metals
Turbidity Total Suspended Solids Total Dissolved Total Organic Carbon Biochemical Oxygen Demand Chemical Oxygen Demand Total Kjeldahl Nitrogen Alkalinity Total Ammonia-Nitrogen Nitrate-Nitrite Total Phosphorus	Aluminum, Dissolved Aluminum, Total Copper, Dissolved Copper, Total Iron, Total Lead, Dissolved Lead, Total Mercury Zinc
	Organophosphate Pesticides
Specific Conductance Total Hardness Methylmercury Pyrethroids	Chlorpyrifos Diazinon

The following table shows the types of samples that are collected at baseline monitoring sites during wet and dry weather. The entries are “C” for composite and “G” for grab sample. Where a composite is taken during wet weather and a grab sample is taken during dry weather a “C/G” is listed.

Sites	Water Quality Parameters as listed in Appendix H-1	Water Column Toxicity
MS-14	C/G	
CR-46	C/G	
DC-65	C/G	
SC-1	C/G	
MS-1R	G	G
MS-14R	G	G
CR-46RU	G	G
CR-46R	G	G
DC-65RU	G	G
DC-65R	G	G
SC-1R	G	G



Site ID	Site Location
14-34	Brookside Estates and Fourteen-Mile Slough
14-35	Fort Donelson and Fourteen-Mile Slough
14-36	I-5 and Fourteen-Mile Slough
14-37	Alexandria & Fourteen-Mile Slough P.S.
14-38	Black Oak & Fourteen-Mile Slough P.S.
5M-118	Five-Mile Slough at Pershing Ave.
5M-119	Five-Mile Slough 119
5M-129	Five-Mile Slough 129
5M-134	Five-Mile Slough at Caran Ave.
5M-164	Five-Mile Slough near Leesburg
5M-25	Lighthouse & Five-Mile Slough P.S.
5M-26	Plymouth & Five-Mile Slough P.S.
5M-27	Swenson & Five-Mile Slough P.S.
5M-28	Alexandria & Five-Mile Slough P.S.
5M-30	Pacific & Five-Mile Slough P.S.
5M-31	Hammer and Five-Mile Slough
AA-169	Arch Airport Road east of Airport Rd.
AA-170	Arch Airport Road at Airport Rd.
CR-39	Brookside Estates and the Calaveras River
CR-40	I-5 and Calaveras River P.S.
CR-41	Brookside & Calaveras River P.S.
CR-42	Bianchi & Calaveras River P.S.
CR-43	West Lane and the Calaveras River (north)
CR-45	West Lane and the Calaveras River (south)
CR-46	West Lane and the Calaveras River
DC-167	Duck Creek near Bieghle Alley
DC-65	Western Pacific Industrial Park and Duck Creek
DC-69	Stagecoach and Duck Creek
DV-50	Singuinetti and the Diversion Channel
DW-101	Deep Water Channel near Commerce St.
DW-108	Wilshire at the Deep Water Channel
DW-111	San Jose at the Deep Water Channel
DW-113	Edison at the Deep Water Channel
DW-114	Deep Water Channel north of Weber St. and 50 ft west of Center St.
DW-116	Van Buren at the Deep Water Channel
DW-117	Madison at the Deep Water Channel
DW-120	Commerce at the Deep Water Channel
DW-121	Deep Water Channel at McLeod Park
DW-122	Deep Water Channel 122
DW-123	Deep Water Channel at Weber Point

Site ID	Site Location
DW-126	Deep Water Channel 126
DW-128	Deep Water Channel 128
DW-129	Deep Water Channel at Weber and Center Sts.
DW-130	Deep Water Channel 130
DW-131	Deep Water Channel 131
DW-133	Deep Water Channel near Weber Park
DW-138	Deep Water Channel at Fremont St.
DW-139	Deep Water Channel near East Lindsay St.
DW-156	Deep Water Channel near Edison St.
DW-163	Deep Water Channel 100 ft west of DW-114
FC-72	Grube Business Park and French Camp Slough
LB-106	Little Bear Creek near Hacienda Ct.
LB-107	Little Bear Creek at Thornton Rd.
LB-109	Little Bear Creek 30 ft. west of Davis Rd.
LB-11	Royal Oaks & Little Bear Creek P.S.
LB-110	Hacienda and Little Bear Creek
LB-12	Lower Sacramento and Little Bear Creek
LB-124	Little Bear Creek at Davis Rd.
LB-127	Little Bear Creek northeast of Davis Rd.
LB-129	Little Bear Creek south east of Davis Rd.
LJ-173	Little John Creek at Hwy 99 West Frontage Rd.
MM-140	Mormon Slough 140
MM-141	Mormon Slough 141
MM-142	Mormon Slough 142
MM-143	Mormon Slough near Lincoln and Washington Sts.
MM-149	Mormon Slough 149
MM-152	Mormon Slough 152
MM-153	Mormon Slough 153
MM-154	Mormon Slough 154
MM-155	Mormon Slough 155
MM-157	Mormon Slough 157
MM-158	Mormon Slough at Commerce St.
MM-162	Mormon Slough on Lincoln St. near Sonora St.
MS-13	Twin Creeks & Mosher Slough P.S.
MS-14	Kelly & Mosher Slough P.S.
MS-15	Bainbridge & Mosher Slough P.S.
MS-16	Yarmouth & Mosher Slough P.S.
MS-17	Don & Mosher Slough P.S.
MS-172	Mosher Slough 172
MS-18	Thorton & Mosher Slough P.S.

Site ID	Site Location
MS-19	Cayuga & Mosher Slough P.S.
MS-20	Cherbourg & Mosher Slough P.S.
MS-21	El Dorado at Mosher Slough
MS-22	La Morada and Mosher Slough
PS-105	Pixie Slough near Deep Water Lane
SC-102	Occidental at Smith Canal
SC-103	Smith Canal near 2922 Shimizu
SC-104	Kingsley at Smith Canal
SC-57	Legion Park & Smith Canal P.S.
SJ-160	Buckley Cove and the San Joaquin River
SJ-161	Buckley Cove at the San Joaquin River
SJ-60	Hwy 4 & San Joaquin River P.S.
SJ-61	Eighth Street and the San Joaquin River
WS-171	Weber Slough at Hwy 99 East Frontage Rd.

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**Initial Sediment Tests Conducted**

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Sediment Organic Carbon

Sediment Grain Size

*If sediment is toxic, sediment will be sampled for the constituents below:*

---

**Organophosphate Pesticides**

---

Chlorpyrifos

---

**Pyrethroid Pesticides**

---

Bifenthrin

Cyfluthrin-1

Cyfluthrin-2

Cyfluthrin-3

Cyfluthrin-4

Cypermethrin-1

Cypermethrin-2

Cypermethrin-3

Cypermethrin-4

Deltamethrin

Esfenvalerate/Fenvalerate-1

Esfenvalerate/Fenvalerate-2

Lambda-cyhalothrin-1

Lambda-cyhalothrin-2

Permethrin-1

Permethrin-2

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# Detention Basin Monitoring Work Plan

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## 1. PERMITTEES' REQUIREMENTS FOR DETENTION BASIN MONITORING

The current National Pollutant Discharge Elimination System (NPDES) area-wide Municipal Separate Storm Sewer Systems (MS4) permit issued in 2007, Order No. R5-2007-0173, Monitoring and Reporting Program, Provision III.A, requires the City of Stockton and the County of San Joaquin (Permittees) to submit a Detention Basin Monitoring Work Plan (Work Plan). The provision states:

The Permittees shall update and submit the Detention Basin Monitoring Work Plan, as part of the SWMP, to reflect additional monitoring of the following constituents: pyrethroids, total mercury, and methylmercury in water; pyrethroids and total mercury in sediment. The Work Plan is designed to perform influent, effluent, and sediment chemistry/toxicity monitoring of one detention basin serving multiple land uses. Constituents that shall continue to be sampled include: total suspended solids (TSS), bacteria, turbidity, total dissolved solids (TDS) and organophosphate pesticides (chlorpyrifos and diazinon). Monitoring shall be designed to evaluate the effectiveness of the detention basins in removing pollutants of concern and determining whether basins stimulate methylmercury production. The Permittees may propose a joint study with other Central Valley MS4 Permittees if they can demonstrate that data collected in other jurisdictions is applicable to detention basins in the Permittees' jurisdictions.

The same Monitoring and Reporting Program, section II G further discusses sediment toxicity monitoring which should include:

The Permittees shall conduct short-term sediment toxicity testing, which shall include (1) the analysis of sediment samples from one post first flush storm event<sup>1</sup>, and one dry weather monitoring event; and (2) analysis of at least the following freshwater sediment test species: Amphipod [*Hyalella azteca* (10-day survival and growth test)]; and (3) analysis of sediment organic carbon and grain size. The testing shall be conducted in accordance with U.S. EPA's method (U.S. EPA 20007). Sample sites for sediment toxicity testing shall be conducted on urban receiving water sites.

If toxicity is detected in a sediment sample, follow up actions shall be implemented and shall include sediment chemistry for chlorpyrifos and pyrethroids – including bifenthrin, cyfluthrin, deltamethrin, esfenvalerate, lambda cyhalothrin, permethrin, tralomethrin. Further, if toxicity is detected at a given monitoring station, the Permittees will continue conducting toxicity testing and sediment chemistry for chlorpyrifos and pyrethroids until the nature and cause(s) of the toxicity are defined.

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<sup>1</sup> Post first flush timeframe is within two weeks of the qualifying storm event.

While sampling at receiving water sites is discussed in the Sediment Toxicity Work Plan (**Appendix H-8**), sampling of detention basins is discussed in this Detention Basin Monitoring Plan in order to group all sampling that occurs in La Morada Basin.

## **2. SACRAMENTO AND MODESTO PERMIT REQUIREMENTS**

As indicated in the Permittees' 2007-2012 NPDES permit, detention basin monitoring studies may be coordinated with Modesto and/or Sacramento Permittees. To identify potential opportunities, a summary of the Sacramento and Modesto permits is provided below.

### **County of Sacramento Permit**

The administrative draft of the Sacramento-area NPDES MS4 permit (dated February 2008) shows that the requirements for the Permittees and Sacramento overlap well. Sacramento is required to sample for all of the constituents for which the Permittees are required to sample in water. As well as the permittees, Sacramento is required to take sediment chemistry and toxicity samples. The permit also notes the opportunity for collaboration in discussion of a revised Work Plan for detention basin monitoring:

- 1) The revised Work Plan is required to be designed to perform influent, effluent, and sediment chemistry/toxicity monitoring of at least detention basins that represent conditions within the Sacramento urban watershed.
- 2) Samples shall be collected annual during three storm events and one dry season event.
- 2) The Permittees may propose a joint study with other Central Valley MS4 Permittees if they can demonstrate that data collected in other jurisdictions is applicable to detention basins in the Permittees' jurisdictions.

### **City of Modesto Permit**

The Modesto tentative NPDES MS4 permit (dated April 2008) requires more extensive detention basin monitoring than the Permittees' and Sacramento's permits, but still includes language allowing Modesto to partner with other Permittees. Modesto's permit has the following requirements

1) The Discharger shall monitor a minimum of two basins in year two and four of this permit term for the following constituents at each basin:

- |  |                                      |
|--|--------------------------------------|
| • Arsenic  | • Barium                             |
| • Total Mercury  | • Selenium                           |
| • Methylmercury  | • Chromium                           |
| • Bacteria   | • Zinc                               |
| • Total Recoverable Petroleum Hydrocarbons (TRPH)        | • Total Petroleum Hydrocarbons (TPH) |
| • Nickel   | • Lead                               |
| • Copper   | • Turbidity                          |
| • Silver   | • Total Dissolved Solids (TDS)       |
| • Organophosphate Pesticides (diazinon and chlorpyrifos) | • Total Suspended Solids (TSS)       |

2) The basins shall represent storm water runoff from representative watersheds for residential and industrial/commercial urban areas. The Discharger may propose a joint study with other Central Valley MS4 Dischargers if they can demonstrate that data collected in other jurisdictions is applicable to detention basins in the Discharger's jurisdiction.

The Modesto permit also calls for sediment chemistry and toxicity monitoring with analysis for total mercury as does the Permittees' permit.

Both Modesto and Sacramento are required to specify a schedule for monitoring in Work Plans submitted to the Board. Once the permit requirements for Modesto and Sacramento are finalized, there will be an opportunity for Modesto's, Sacramento's, and the Permittees' Work Plans to be adapted so that collaboration is possible.

### **3. SCOPE OF WORK PLAN**

This Work Plan describes Permittees' detention basin monitoring to be conducted under Order No. R5-2007-0173. The primary objectives of the Work Plan are to:

- Evaluate the effectiveness of pollutant removal by the detention basins with water quality design
- Determine whether detention basins stimulate methylmercury production

One detention basin will be monitored during the second and fourth year of the permit. Influent and effluent will be monitored during two storm events in each year for a total of four storm events during the permit term. The first storm event samples each year will be within two weeks of an early-season storm. The second storm event will be later in the season. Sediment samples will be taken during a dry event in the second and fourth year of the permit term as well for a total of two dry event samples during the permit term. Sediment toxicity samples will be taken during one event within two weeks of an early-season storm and one dry weather event. To establish a



meaningful set of data with which to identify trends, La Morada Detention Basin, which was sampled in the previous permit term, has been selected for sampling. Teaming with Modesto and/or Sacramento would potentially change the site of sampling, but at this point, La Morada Basin is being proposed. The monitoring program is more fully discussed in the following sections.

#### **4. PROJECT ORGANIZATION AND RESPONSIBILITIES**

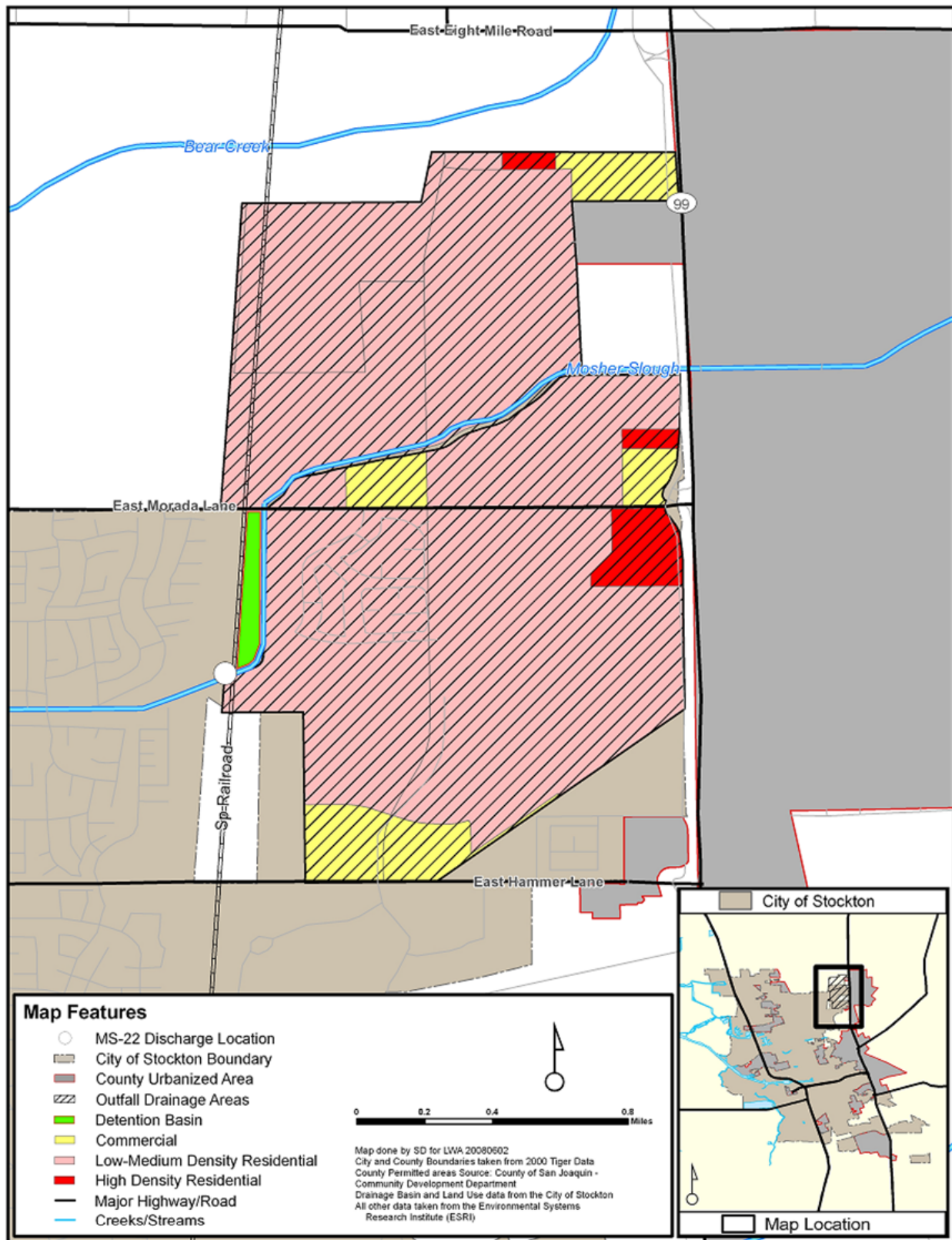
The detention basin monitoring will be conducted by Condor Earth Technologies, Inc (Condor). Condor staff will collect samples and will contract California certified laboratory services.

#### **5. MONITORING LOCATIONS AND PROCEDURES**

Monitoring for La Morada Basin commenced in 2003. La Morada Basin was then called simply Basin 2 and before that just the San Joaquin Area Flood Control Agency (SJAFC) Basin. The basin is located at the southeast corner of the intersection of the Union Pacific Railroad and Morada Lane. A map of the basin and its drainageshed is shown in **Figure 1**. La Morada Basin's drainageshed is approximately 760 acres and is predominantly residential in land use<sup>2</sup>.

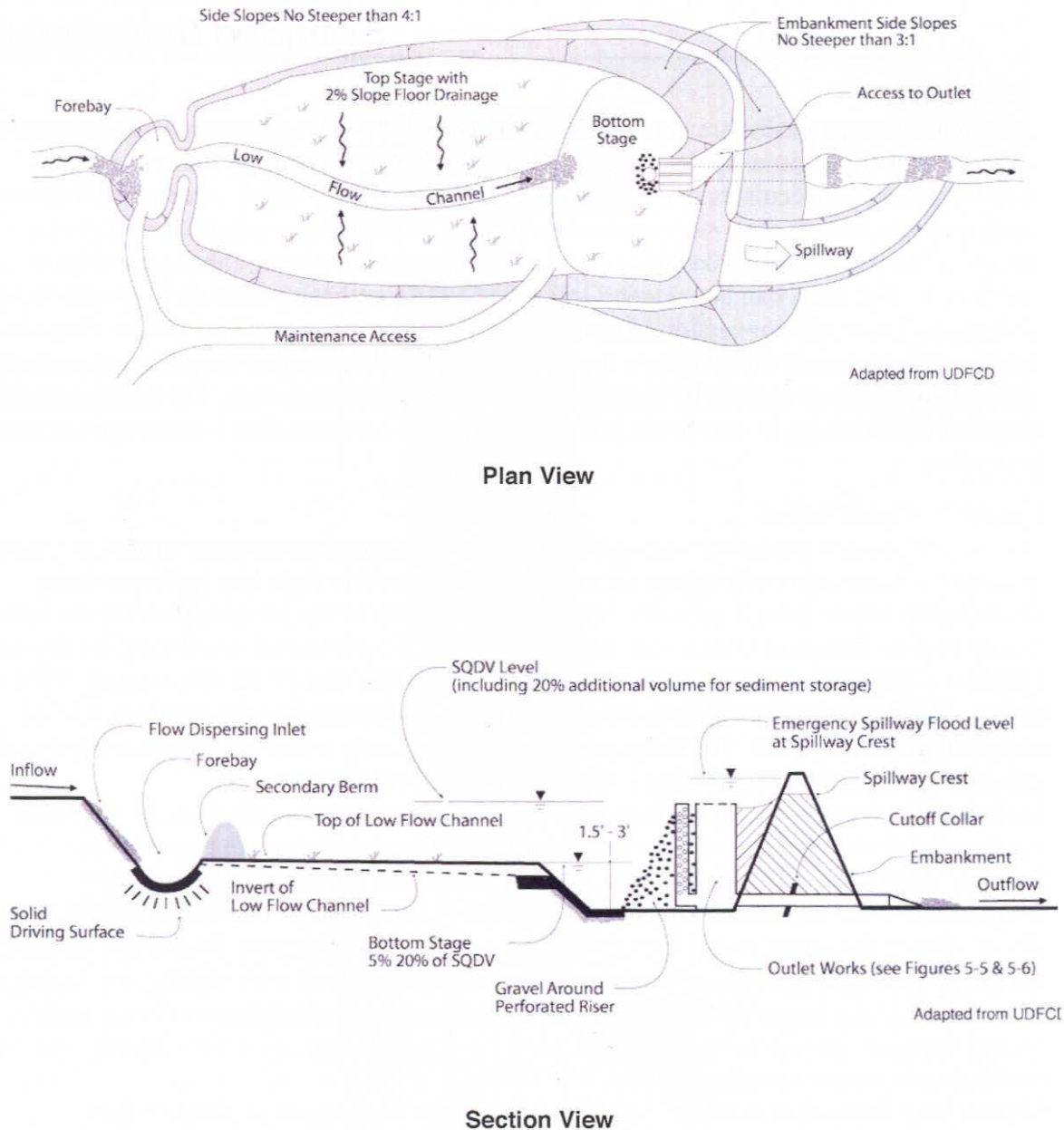
---

<sup>2</sup> While the NPDES permit identifies the need to monitor a detention basin with a mixed land use drainageshed, this basin was selected since it is designed as an extended detention basin, which is more representative of current basin design for water quality treatment than the older basins within the City, which were designed for flood control purposes.



**Figure 1. La Morada Basin Detention Basin and the Land Uses within its Drainageshed**

La Morada Basin is designed according to the Stockton Urbanized Area's Storm Water Quality Control Criteria Plan (SWQCCP) guidelines. A conceptual layout of SWQCCP extended



detention basin design is shown in **Figure 2**. La Morada Basin receives inflow from three

**Figure 2. Conceptual Layout of Extended Detention Basin Meeting SWQCCP Guidelines**

separate storm drain systems. Therefore, influent samples will be collected from three separate manholes that discharge to the basin. The effluent samples will be collected from a wet well that

receives effluent directly from the basin. Access to the basin requires a key to unlock the gate and the wet well.

Discrete grab samples will be collected from the influent and effluent stations in the basin during wet weather events. Sediment samples for the constituents dictated in the permit (see 1. Permit Requirements for Detention Basin Monitoring) will be collected from the basin after the rainy season during dry weather. Sediment samples will be collected as grab samples, from the lower end of the basin where the greatest amount of stormwater collects. Three surface samples (to a depth of 6 inches) are collected and composited by the laboratory as one sample for analysis.

## **6. 2002-2007 PERMIT TERM MONITORING**

During the previous permit term, three detention basins were monitored: Auto Center Basin, La Morada Basin, and Duck Creek Basin. The basins received discharges from commercial, residential, and industrial land uses, respectively. Stormwater samples were analyzed for pesticides and bacteria in addition to standard field measurements. Sediment samples were also analyzed for pesticides. The following conclusions were drawn from the monitoring conducted during 2003-2004 and 2005-2006:

- Chlorpyrifos and Diazinon were the pollutants that exhibited the most removal. In all but one event, if pesticides were detected in the influent, effluent concentrations of chlorpyrifos and diazinon were decreased.
- Organophosphate pesticides were not detected in the majority of sediment samples. However, during those events when pesticides were detected in influent, effluent concentrations usually decreased.
- Bacterial concentrations were ubiquitously high in all storm water grab samples and, while some events in La Morada Basin appeared to show marked reductions, monitoring at the Auto Center and Duck Creek basins was inconclusive.
- Total dissolved solids (TDS) concentrations were either roughly the same in influent and effluent or concentrations increased slightly from influent to effluent
- Total suspended solids (TSS) and turbidity concentrations decreased from influent to effluent in the majority of samples, but during one event at the Duck Creek basin, their concentrations increased significantly. Graphs of the complete 2003-2004 and 2005-2006 monitoring data can be found in **Appendix A** of this Work Plan. La Morada Basin exhibited the best constituent removal, which is likely because it was designed as an extended detention basin to improve water quality following SWQCCP guidelines. In comparison, the other basins were designed for flood control purposes. This is the primary reason why La Morada Basin was suggested for monitoring during the 2007-2012 permit term. Monitoring La Morada Basin will also allow a more meaningful analysis of trends because the basin was sampled during the 2002-2007 permit term.

## **7. 2007-2012 PERMIT TERM MONITORING**

During the 2007-2012 permit term, pyrethroids and mercury will be added to the list of influent and effluent constituents analyzed for the detention basin monitoring program. The following sections discuss the complete constituent analysis for influent and effluent stormwater monitoring as well as sediment monitoring and sediment toxicity monitoring.

## Stormwater Monitoring

A grab sample from each detention basin influent and effluent station shall be analyzed for each of the constituents listed in **Table 1**. **Table 1** also includes sample collection and analysis method direction.

**Table 1. Detention Basin Monitoring Stormwater Sample Requirements**

Constituent	Bottle	Volume (mL)	Preservative	Holding Time	Target Reporting Limit	EPA Method
Conventionals						
Conductivity	NA	NA	None	ASAP	1 μmhos/cm	Field
Dissolved Oxygen	NA	NA	None	ASAP	Sensitivity to 5 mg/L	Field
pH	NA	50	None	ASAP	0.0-14.0	Field
Temperature	NA	NA	None	ASAP	°C	Field
TDS	Sterilized poly	100	4°C	7 days	2 mg/L	EPA 160.1
TSS		100	4°C	7 days	2 mg/L	EPA 160.2
Turbidity		100	4°C	48 hrs	0.1 NTU	EPA 180.1
Bacteria						
E. coli	Sterilized poly	100	4°C, Na <sub>2</sub> S <sub>2</sub> O <sub>2</sub>	24 hrs	<20 MPN/100mL	SM 9223B
Fecal coliform		100		6 hrs	<20 MPN/100mL	SM 9221E
Total coliform		100		6 hrs	<20 MPN/100mL	SM 9221B
Pesticides						
Chlorpyrifos	Borosilicate glass	1000	4°C	7 days*	0.01 μg/L	EPA 614/8141
Diazinon		100	4°C	7 days*	0.05 μg/L	
Pyrethroids	Amber glass	1000	4°C	3 days	5 ng/L	EPA 8270MOD
Mercury Program						
Total Mercury	Glass, Dbl bagged	500	HCl	48 hrs/ 90 days ***	0.05 ng/L	EPA 1631
Methylmercury		500	4°C + HCl or H <sub>2</sub> SO <sub>4</sub> **		0.5 ng/L	EPA 1630

\* 7 days from sample collection to extraction, 40 days from extraction to analysis

\*\* Preserve with HCl if less than 10 ppth salinity OR preserve with H<sub>2</sub>SO<sub>4</sub> if greater than 10 ppth salinity

\*\*\* 48 hrs to preserve, 90 days once preserved

## **Sediment Chemistry Monitoring**

Sediment chemistry samples will be collected from the lower end of the basin (above residual standing water) where the greatest amount of storm water collects and outside of any concrete lined channels. All surface vegetation will be removed from the sampling sites prior to sample collection. Three surface soil samples (from the ground surface to six inches below ground surface) will then be collected by loosening the soil with a clean stainless steel shovel and/or soil auger. A clean stainless steel scoop will be used to place loose soil into the appropriate laboratory supplied container. The soil samples from each basin will be composited (3:1) by the laboratory and the individual composites analyzed. Sediment chemistry monitoring protocols for specific constituent analyses is provided in **Table 3**. Pyrethroid isomers are typically reported as totals instead of the individual isomers except where individual isomers may be obtained.

**Table 3. Detention Basin Monitoring Sediment Sample Requirements**

Constituent	Container	Volume (mL)	Preservative	Holding Time	Target Reporting Limit	EPA Method
pH	CWM <sup>1</sup>	125	Ice to 4°C	ASAP	0.0 – 14.0	EPA 150.1
Chlorpyrifos	CWM <sup>1</sup>	250	Ice to 4°C	7 days <sup>2</sup>	10 ng/g	EPA 8141
Diazinon	CWM <sup>1</sup>	250	Ice to 4°C	7 days <sup>2</sup>	50 ng/g	EPA 8141
Total mercury	CWM <sup>1</sup>	250	none	28	20 ng/g	EPA 7471
<b>Pyrethroids</b>						
Bifenthrin	CWM <sup>1</sup>	250	Ice to 4°C	14	1 ng/g	EPA 8270
Cyfluthrin-1, -2, -3, -4	CWM <sup>1</sup>	250	Ice to 4°C	14	3 ng/g	EPA 8270
Cypermethrin-1, -2, -3, -4	CWM <sup>1</sup>	250	Ice to 4°C	14	3 ng/g	EPA 8270
Deltamethrin	CWM <sup>1</sup>	250	Ice to 4°C	14	2 ng/g	EPA 8270
Esfenvalerate/ Fenvalerate-1	CWM <sup>1</sup>	250	Ice to 4°C	14	2ng/g	EPA 8270
Esfenvalerate/ Fenvalerate-2	CWM <sup>1</sup>	250	Ice to 4°C	14	1 ng/g	EPA 8270
Lambda-cyhalothrin-1	CWM <sup>1</sup>	250	Ice to 4°C	14	1 ng/g	EPA 8270
Lambda-cyhalothrin-2	CWM <sup>1</sup>	250	Ice to 4°C	14	4 ng/g	EPA 8270
Permethrin-1	CWM <sup>1</sup>	250	Ice to 4°C	14	4 ng/g	EPA 8270
Permethrin-2	CWM <sup>1</sup>	250	Ice to 4°C	14	1 ng/g	EPA 8270
Tralomatin <sup>4</sup>	CWM <sup>1</sup>	250	Ice to 4°C	14	1 ng/g	EPA 8270

1. CWM = clear wide-mouth glass jar with Teflon-lined lid

2. 7 days from sample collection to extraction, 40 days from extraction to analysis

3. Screw caps should be lined with PTFE

4. If laboratory is capable of analyzing for Tralomethrin

## Sediment Toxicity Monitoring

Sediment Toxicity Monitoring will be coordinated with other detention basin monitoring as much as possible. Sediment toxicity samples will be gathered in the same manner as described for sediment chemistry samples. Once the sediment samples for sediment chemistry monitoring are composited, monitoring will include analysis of Total Organic Carbon (TOC) and grain size. A ten day survival and growth test for *Hyalella azteca* will also be performed using EPA 2000 methods. If toxicity is detected in a sediment sample, follow up chlorpyrifos and pyrethroids analysis will be conducted using the same target reporting limits as shown in **Table 3**. If sediment chemistry and sediment toxicity samples are collected within the same period, the

sediment chemistry results may be used to analyze chlorpyrifos and pyrethroids. In either case, sediment TIE will continue until the nature and source of toxicity has been determined.

## **8. FUTURE ACTIONS**

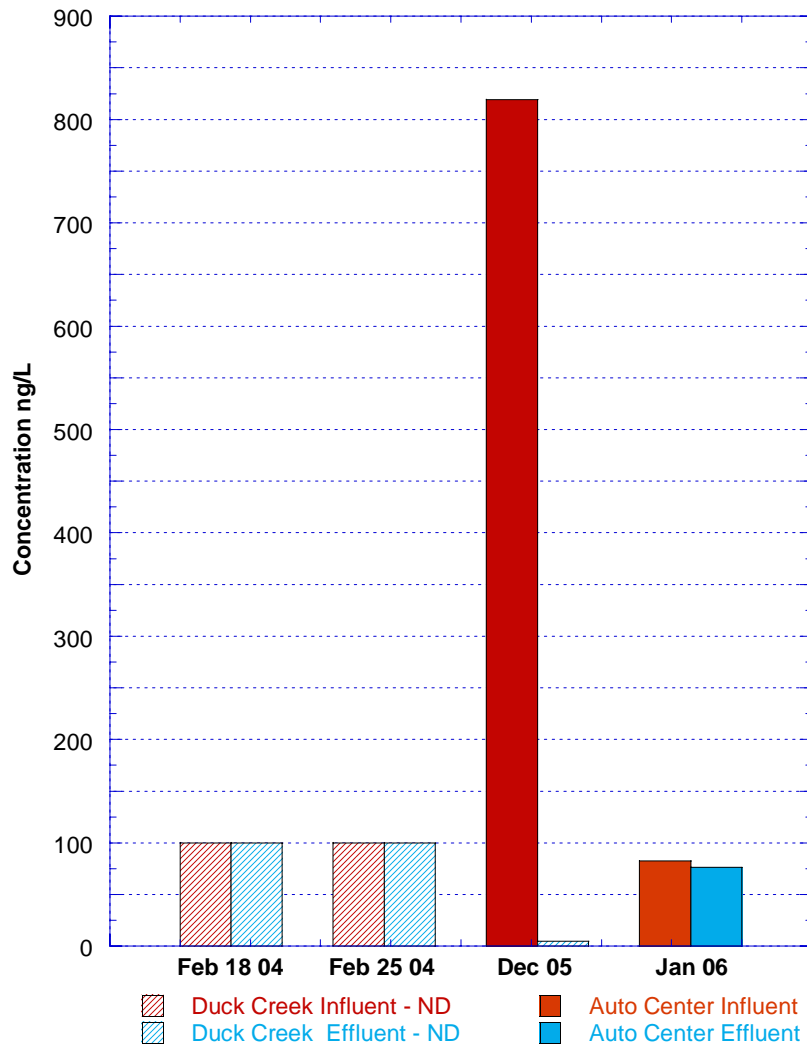
Once Modesto and Sacramento have final permits, the possibility of teaming will be explored. The 2007-2012 permit states that the detention basin sampled should drain from an area with mixed land uses. This provides some flexibility to share monitoring with other permittees. Each permit requires that the sampled detention basin have a drainageshed which is representative of conditions in the rest of the permitted area, so a comparison of land use is the first step in determining the practicality of teaming. If the Permittees were to team with Sacramento, the constituents to be monitored would not need to be adjusted. If the Permittees teamed with Modesto, the Permittees would have to decide how costs would be determined for constituent requirements that do not overlap (e.g. Modesto is not required to sample for pyrethroids).

Once the extent of cooperation with other municipalities is determined, the Permittees will complete a Detention Basin Sampling and Analysis Plan detailing monitoring protocol at the location(s) chosen to be monitored. The following is an implementation schedule for completing the Detention Basin Sampling and Analysis Plan and executing the monitoring defined within:

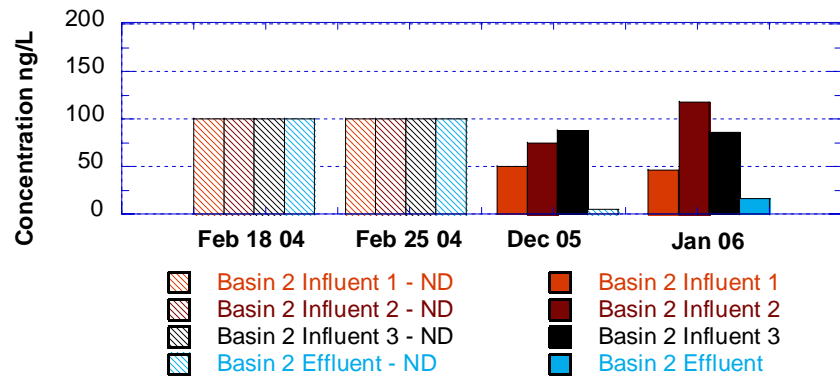
- Initiate conversation with other permittees beginning in June 2008
- Develop Detention Basin Sampling and Analysis Plan by September 2008
- Begin monitoring in fourth quarter of 2008



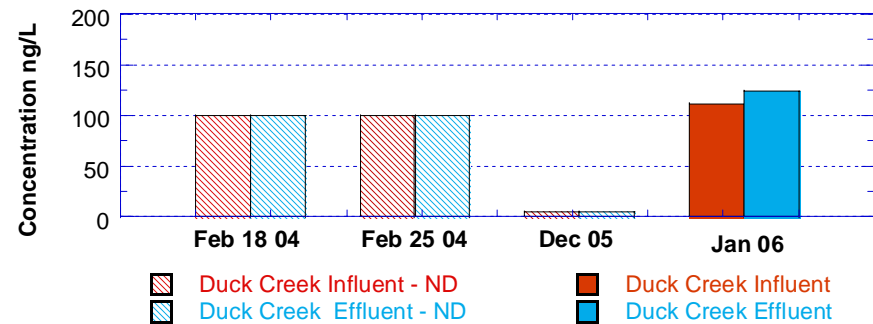
## **APPENDIX A: 2002-2007 PERMIT TERM DETENTION BASIN MONITORING ANALYSIS**



**Figure 1. Auto Center Detention Basin Chlorpyrifos Concentrations**

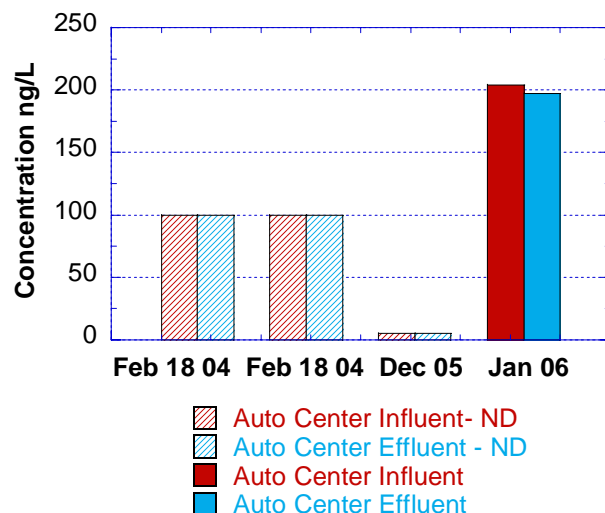


**Figure 2. Basin 2 Detention Basin Chlorpyrifos Concentrations**

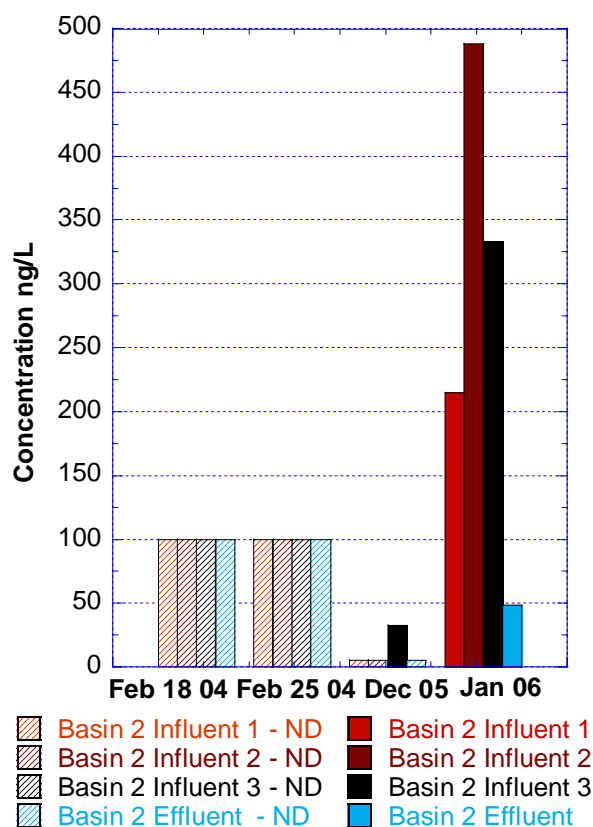


**Figure 3. Duck Creek Detention Basin Chlorpyrifos Concentrations**

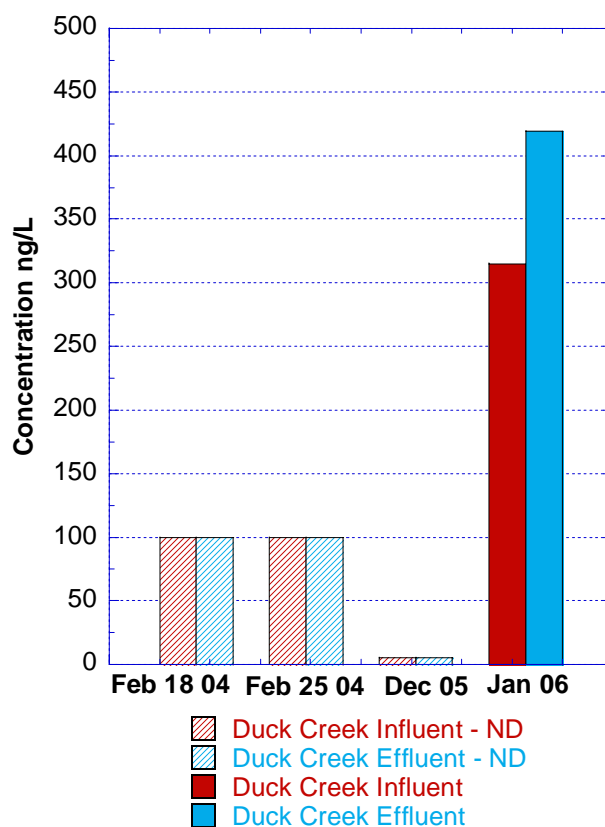
*ND in graphs stands for non-detect values which are less than or equal to the give value ">" stands for concentrations that are greater than the given value.*



**Figure 4. Auto Center Detention Basin Diazinon Concentrations**



**Figure 5. Detention Basin Diazinon Concentrations**



**Figure 6. Duck Creek Detection Basin Diazinon Concentrations**

*ND in graphs stands for non-detect values which are less than or equal to the give value ">" stands for concentrations that are greater than the given value.*

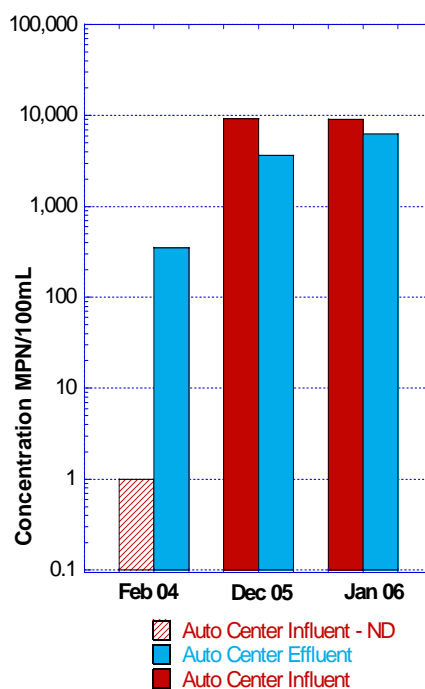


Figure 7. Auto Center Detention Basin *e. coli* Concentration

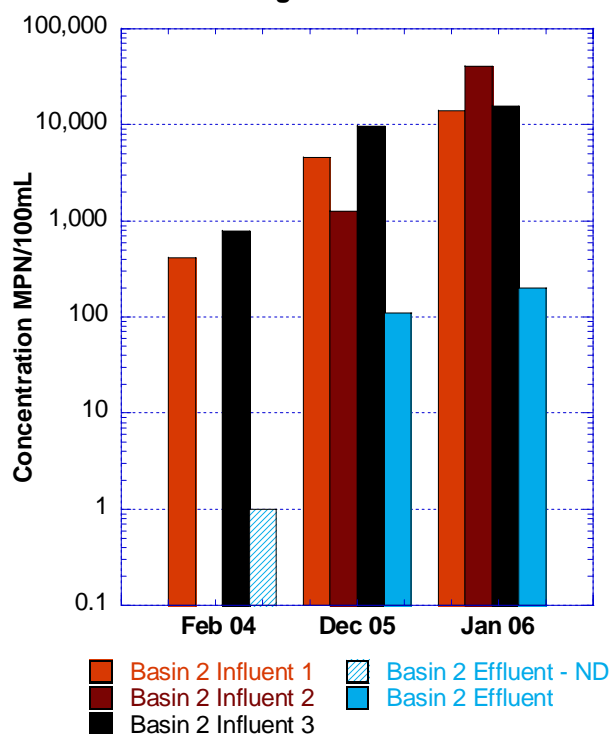


Figure 8. Basin 2 Detention Basin *e. coli* Concentrations

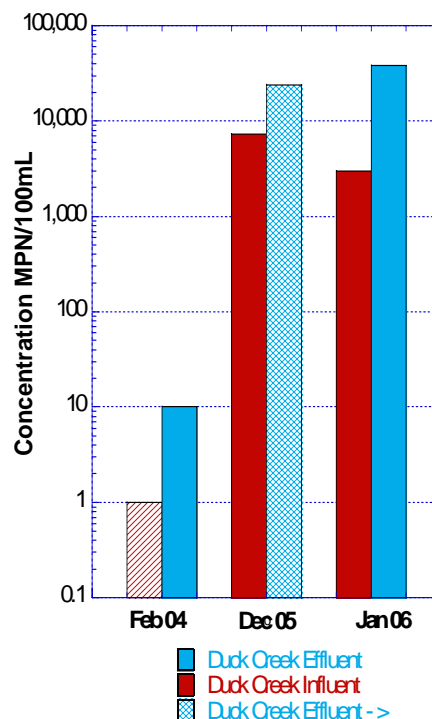
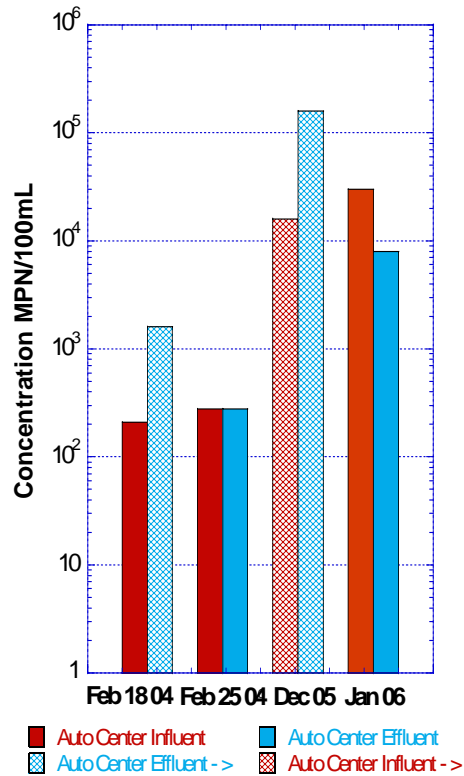
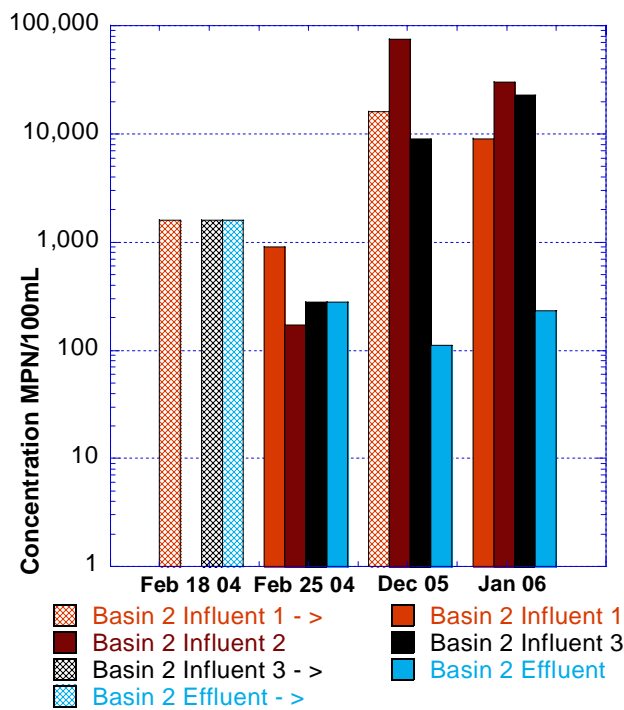


Figure 9. Duck Creek Detention Basin *e. coli* Concentrations

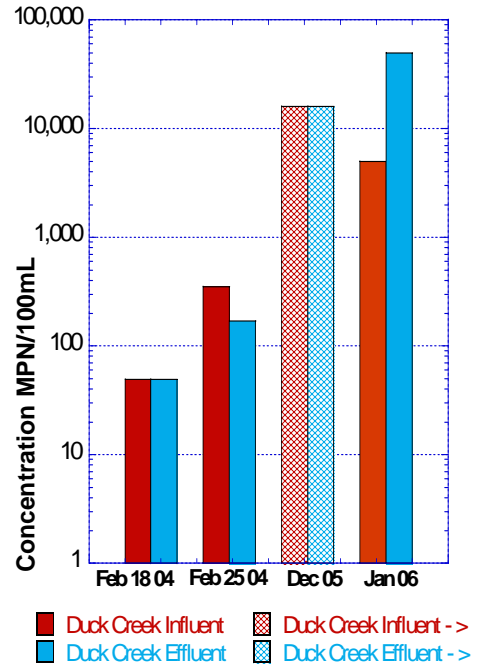
ND in graphs stands for non-detect values which are less than or equal to the give value ">" stands for concentrations that are greater than the given value.



**Figure 10. Auto Center Detention Basin Fecal Coliform Concentrations**



**Figure 11. Basin 2 Detention Basin Fecal Coliform Concentration**



**Figure 12. Duck Creek Detention Basin Fecal Coliform Concentration**

*ND in graphs stands for non-detect values which are less than or equal to the give value ">" stands for concentrations that are greater than the given value.*

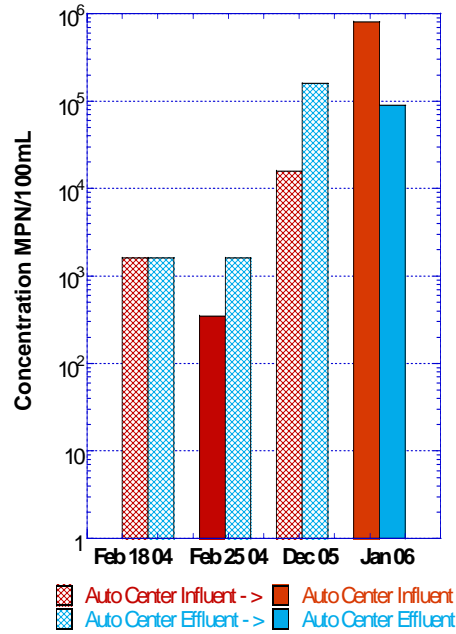


Figure 13 Auto Center Detention Basin Total Coliform Concentration

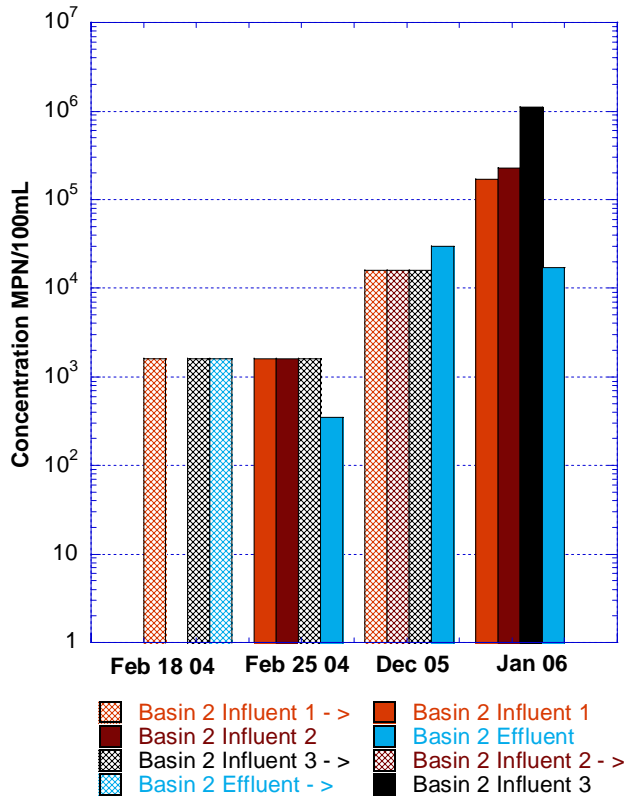


Figure 14. Basin 2 Detention Basin Total Coliform Concentrations

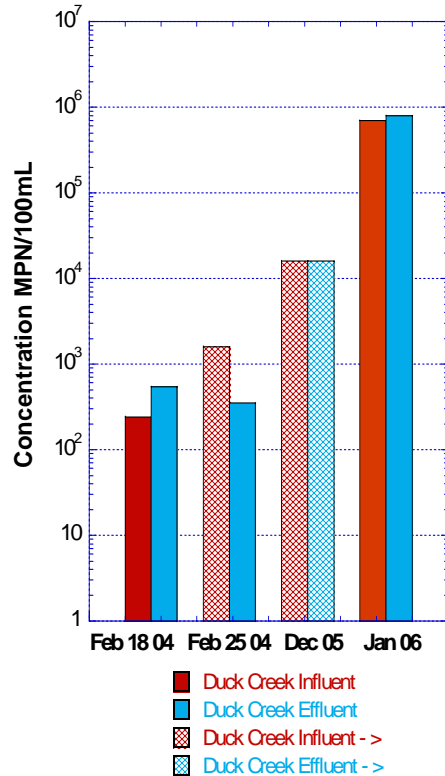


Figure 15. Duck Creek Detention Basin Total Coliform Concentration

ND in graphs stands for non-detect values which are less than or equal to the give value ">" stands for concentrations that are greater than the given value.

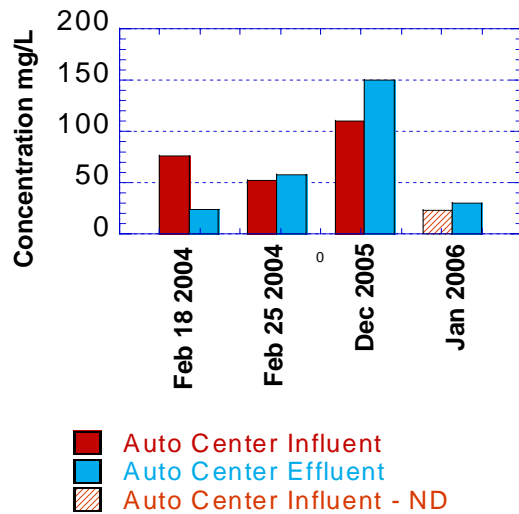
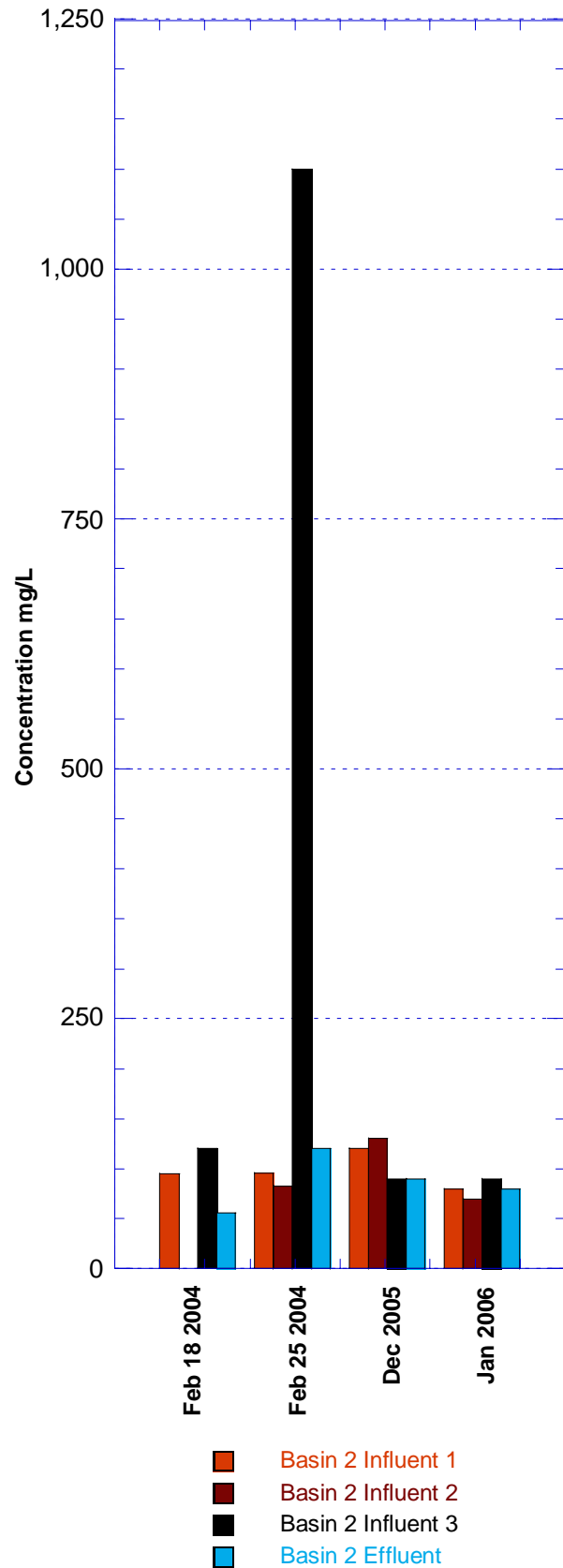
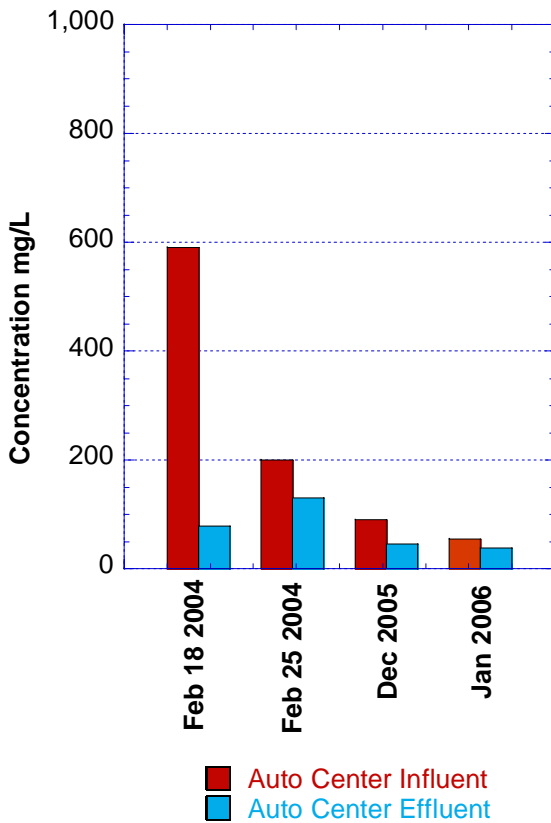


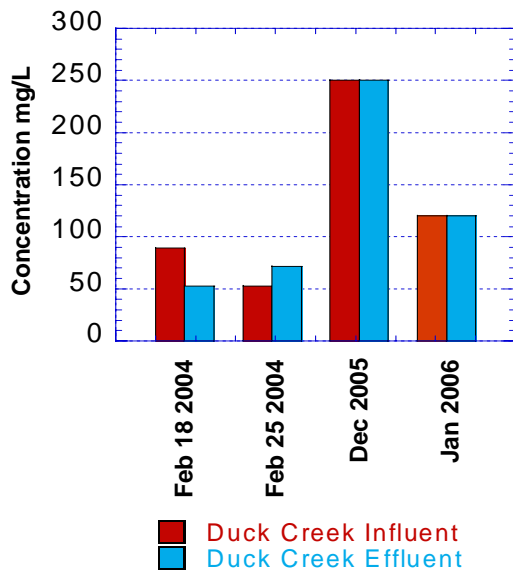
Figure 16. Auto Center Detention Basin Total Dissolved Solids Concentration

Figure 17. Basin 2 Detention Basin Total Dissolved Solids Concentration (AT RIGHT)

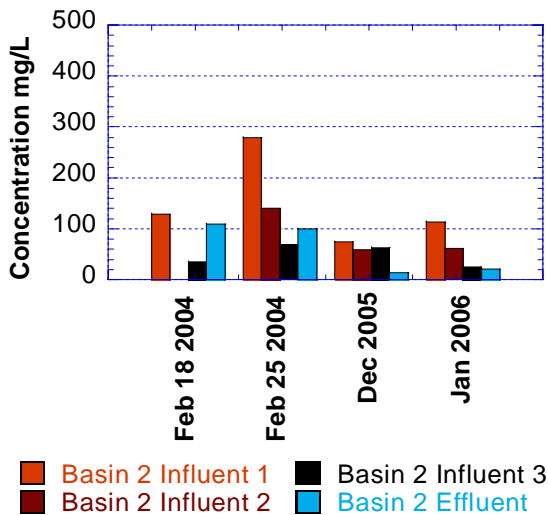
Figure 18. Duck Creek Detention Basin Total Dissolved Solids Concentration (BELOW)



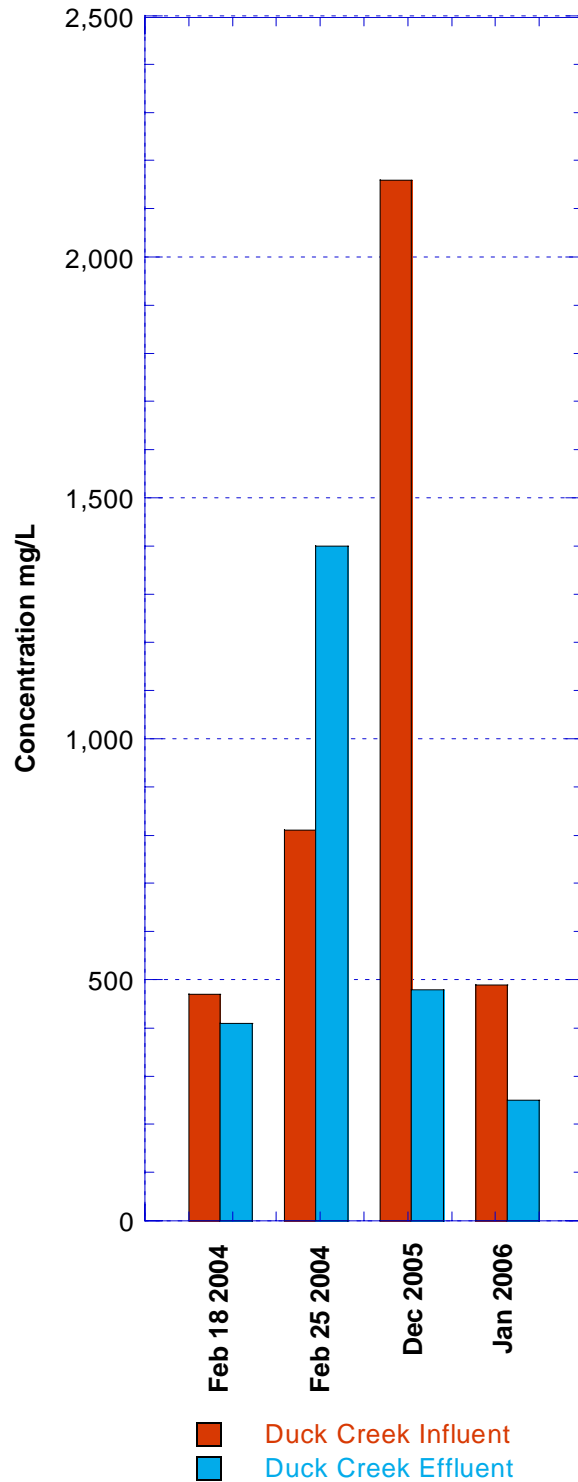
ND in graphs stands for non-detect values which are less than or equal to the give value ">" stands for concentrations that are greater than the given value.



**Figure 19. Auto Center Detention Basin Suspended Solids Concentration**



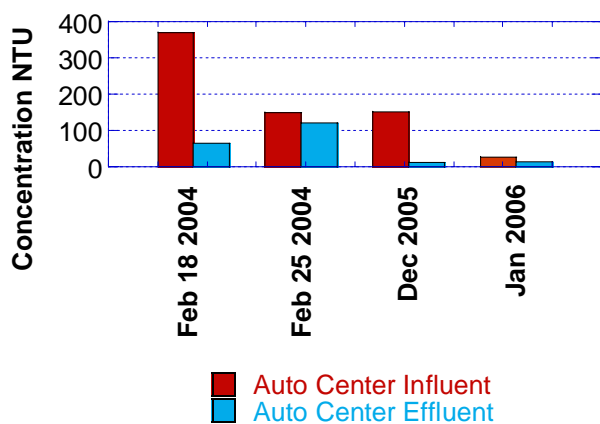
**Figure 20. Basin 2 Detention Basin Total Suspended Solids Concentration**



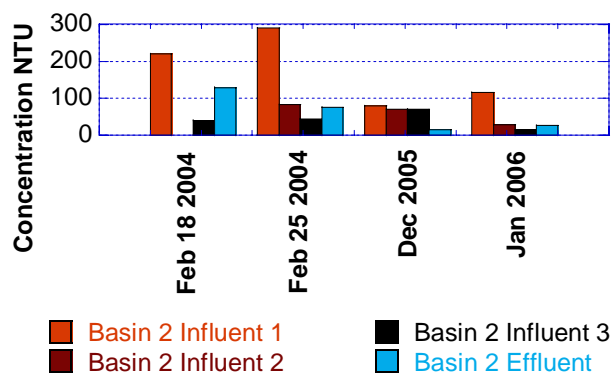
**Figure 21. Duck Creek Detention Basin Total Suspended Solids Concentration**

*ND in graphs stands for non-detect values which are less than or equal to the give value ">" stands for concentrations that are greater than the given value.*

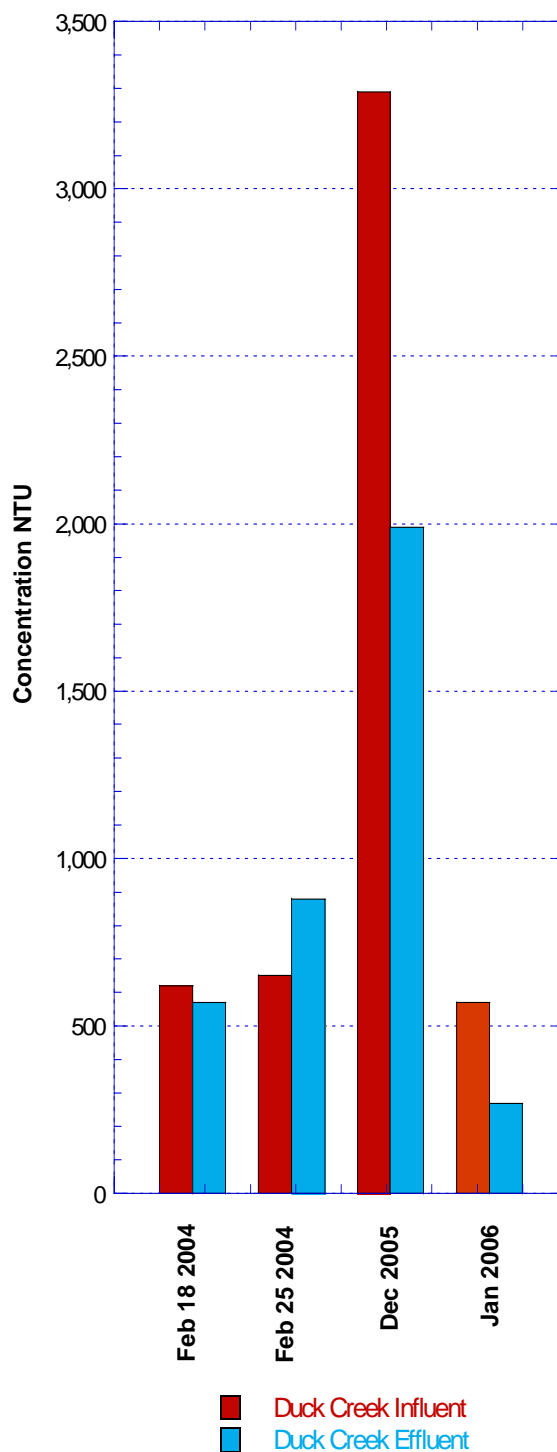




**Figure 22. Auto Center Detention Basin Turbidity Concentration**



**Figure 23. Basin 2 Detention Basin Turbidity Concentrations**



**Figure 24. Duck Creek Detention Basin Turbidity Concentrations**

*ND in graphs stands for non-detect values which are less than or equal to the give value ">" stands for concentrations that are greater than the given value.*

# LEGION PARK BMP REVISED STUDY PLAN

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The current National Pollutant Discharge Elimination System (NPDES) area-wide Municipal Separate Storm Sewer Systems (MS4) permit issued in 2007, Order No. R5-2007-0173, Monitoring and Reporting Program, Provision III.B, requires permittees to conduct Best Management Practice (BMP) effectiveness studies. Specifically, Provision III.B requires permittees to:

“...conduct or participate with Modesto and Sacramento area Permittees in two studies (e.g., low impact development) to evaluate the effectiveness of source or treatment control BMPs. The Permittees may choose to conduct one BMP study each or may choose to contribute to studies by one of the Permittees. The objective of this study shall include the following:

- 1) Monitor the reduction of pollutants of concern in storm water including, but not limited to, pathogen indicators, nutrients, heavy metals, and pesticides from a minimum of one BMP that has been properly installed within the year preceding monitoring. Monitoring shall be continued until the effectiveness of the BMP can be determined;
- 2) Evaluate the requirements for and installation and maintenance cost of each BMP; and
- 3) Develop recommendations for appropriate BMPs for the reduction of pollutants of concern in storm water in the Stockton Urbanized Area.”

One of the two BMP effectiveness studies required by the NPDES area-wide MS4 permit may be met through the continued evaluation of the Legion Park BMP. The second BMP effectiveness study is addressed in a separate document, BMP Effectiveness Study Plan Memorandum dated May 1, 2008. The purpose of this document is to layout the information necessary to continue monitoring of the Legion Park BMP. The memorandum is organized as follows:

- 1) Site and BMP Description
- 2) Past Monitoring Efforts
- 3) Monitoring Efforts for the Current NPDES MS4 Permit
- 4) Reporting and Assessing Effectiveness
- 5) Next Steps
- 6) References

## **1) SITE AND BMP DESCRIPTION**

In response to 2002-2007 NPDES MS4 Permit Monitoring and Reporting Requirements and the Smith Canal Dissolved Oxygen Work Plan, the City installed a media filter stormwater treatment (MFST) system at the Legion Park Pump Station (LPPS) in late 2005. The LPPS includes five pumps that discharge effluent from the station’s wet well into Yosemite Lake. The LPPS also includes a low-flow pump that discharges dry weather flow, light precipitation runoff and early portions of larger storm events. The MFST System is connected to and is designed to provide continuous treatment of discharges from the low-flow pump.

The MFST System is a structural stormwater treatment control measure consisting of 156 perlite filled cartridges designed to reduce the loading of pollutants, particularly those associated with solids, in discharges of urban runoff from the LPPS to the Yosemite Lake/Smith Canal receiving water system.

## **2) PAST MONITORING EFFORTS**

In 2006, the City began a monitoring program to evaluate the effectiveness of the MFST System at removing pollutants, including metals, pesticides, bacteria, and nutrients. Results at this time have indicated an export of metals, nitrate, phosphate and total coliform. An export of pollutants indicates that the filter may not be functioning correctly and may be clogged. As a result, the City is working with the manufacturer of the MFST System to replace the media cartridges and ensure proper maintenance is conducted to prevent future clogging. This maintenance activity will take place before any additional monitoring is conducted.

## **3) MONITORING EFFORTS FOR THE CURRENT NPDES MS4 PERMIT**

Once the media cartridges have been replaced, the City should proceed with monitoring efforts. Due to the malfunction of the old media cartridges, past monitoring data should be reviewed carefully and possibly not used to assess the effectiveness of the filter.

### Monitoring Schedule

Composite-based sampling will be conducted at the MFST System's influent and effluent boxes. The low flow pump should be turned on immediately prior to sampling and allowed to run for approximately three to five minutes. Grab samples will be collected at equal time intervals of approximately two minutes over the course of each discharge event. The laboratory will composite the collected grab samples in order to assess event mean concentrations (EMCs) of influent versus effluent. During the 2008/2009 wet season and possibly into the 2009 dry season, sampling will be collected during the early flush of two storm events and five dry weather sampling events. Wet weather sampling will only be conducted for storms forecasted to produce 0.25 inches or more rainfall. Dry weather sampling will only be conducted after five consecutive days with no measurable rainfall.

Incoming storms will be tracked and evaluated as candidates for storm water monitoring. Prior to each sampling event (wet or dry weather), the appropriate analytical laboratory will be contacted to order pre-cleaned, labeled and preserved sample containers (including quality control samples) and coordinate sample transportation details. In addition, the Stockton Municipal Utilities Department (MUD) and/or OMI Thames Water, Stockton, Inc. (OMI/Thames) will be notified in advance of a sampling event in order for a representative to be available to activate/de-activate the low flow pump to ensure that the MFS is in operation during sample collection.

### Target Pollutants and Field Parameters for Monitoring

The NPDES MS4 permit requires BMP effectiveness studies to monitor the reduction of pollutants of concern in storm water including, but not limited to, pathogen indicators, nutrients, heavy metals, and pesticides. These requirements along with City of Stockton/ County of San Joaquin's target pollutants will be monitored and are outlined in Table 1.

Additional information on monitoring procedures (e.g., equipment and health and safety) can be found in the Legion Park Pump Station Best Management Practice Effectiveness Study Monitoring and Reporting Plan (Condor Earth Technologies, 2006). This plan should be updated to reflect the 2008 Stormwater Management Plan (SWMP).

**Table 1. Analytes, Methods, Reporting Limits and Holding Times**

Analyte	EPA Method*	Units	Target Reporting Limit	Holding Time
<b>Field<sup>1</sup></b>				
Dissolved Oxygen (DO)	Field	mg/L	0.1 mg/L	Field
Oxidation Reduction Potential (ORP)	Field	mV	---	Field
pH	Field	Std. pH Units	0 – 14.0	Field
Specific Conductance (EC)	Field	µmhos/cm	1 µmhos/cm	Field
Temperature	Field	°C	0.1°C	Field
Turbidity	Field	NTU	0.1 NTU	Field
<b>Nutrients</b>				
Nitrate	300.0	mg/L	0.1 mg/L	48 days
Nitrite	300.0	mg/L	0.1 mg/L	48 days
Kjeldahl Nitrogen (TKN)	351.1	mg/L	0.1 mg/L	28 days
Total Phosphorous	4500-P,E	mg/L	0.05 mg/L	28 days
Phosphate	300.0	mg/L	0.5 mg/L	48 hours
<b>Bacteria</b>				
Total and Fecal Coliform	SM9221B	MPN/100 ml	2 – 1,600,000	6 hours
<i>E. coli</i>	SM9223B	MPN/100 ml	2 – 1,600,000	6 hours
<b>General</b>				
Total Suspended Solids (TSS)	2540D	mg/L	2 mg/L	7 days
Total Dissolved Solids (TDS)	Field /2540C,E	mg/L	2 mg/L	7 days
Biological Oxygen Demand (BOD)	5210B	mg/L	5 mg/L	48 hours
Hardness	Calculated	mg/L	2.0 mg/L	6 months
Oil & Grease	1664	mg/L	3 mg/L	28 days
<b>Metals</b>				
Total Aluminum	200.7	mg/L	0.1 mg/L	6 months
Total Calcium	200.7	mg/L	1.0 mg/L	6 months
Total Cadmium	200.7	mg/L	0.00025 mg/L	6 months
Total Chromium	200.7	mg/L	0.0005 mg/L	6 months
Total Copper	200.7	mg/L	0.001 mg/L	2 hours <sup>2</sup>
Total Iron	200.7	mg/L	0.05 mg/L	6 months
Total Manganese	200.7	mg/L	1.0 mg/L	6 months
Total Nickel	200.7	mg/L	1.0 mg/L	6 months
Total Lead	200.7	mg/L	0.0002 mg/L	2 hours <sup>2</sup>
Total Zinc	200.7	mg/L	1.0 mg/L	6 months <sup>3</sup>
Methylmercury	1630	ng/L	0.05 ng/L	48 hours <sup>3</sup>
<b>Pesticides</b>				
Organochlorine Pesticides	625m	µg/L	0.01 µg/L	7 days <sup>4</sup>
Organophosphate Pesticides	625m	µg/L	0.01 µg/L	7 days <sup>4</sup>
Pyrethroids	8270MOD	ng/L	5 ng/L	3 days

1: Field parameters will be collected using an YSI 556 and Hach 2100P meters.

2: 2 hour hold time to preserve sample. After preservation, the holding time is 6 months.

3: 48 hour hold time to preserve sample. After preservation, the holding time is 90 days.

4: Maximum holding time prior to extraction. Extracted sample may be held up to 40 days before analysis.

#### 4) REPORTING AND ASSESSING EFFECTIVENESS

Monitoring data will be reviewed and summarized for inclusion in the City's annual stormwater reports. Effectiveness of the MFST System may be assessed and reported by focusing on the following:

- Is there a statistically significant reduction between influent and effluent concentrations (e.g., is the reduction in reported means real?)?
- Is the performance of the MFST System consistent with that of other media filter BMPs?

Table 2 provides typical median average influent and effluent concentrations of other media filter BMPs for select analytes. As noted above, these concentrations may be used to assess the performance of the MFST System. Percent removal may be reported but will not be used in the final evaluation of MFST System's performance. Percent removal will not be used because it is a function of influent quality and high influent pollutant concentrations can result in reporting of higher pollutant removals than those with cleaner influent. Using of percent removal may be more reflective of how "dirty" the influent water is rather than how well the BMP is actually performing.

**Table 2. Typical Median Average Influent and Effluent Concentrations of Media Filters**

(Source: Clary, et al., 2008 and Geosyntec and Wright Water Engineers, 2007)

Analyte	Median of Average Influent Concentration	Median of Average Effluent Concentration
Total Cadmium (µg/L)	0.25	0.19
Total Chromium (µg/L)	2.18	1.48
Total Copper (µg/L)	14.57	7.63
Total Lead (µg/L)	11.29	2.62
Total Zinc (µg/L)	92.34	32.23
Nitrate (mg/L)	0.41	0.66
Kjeldahl Nitrogen (TKN) (mg/L)	1.52	1.16
Total Phosphorous (mg/L)	0.20	0.11
Total Suspended Solids (TSS) (mg/L)	43.27	10.85
Fecal Coliform (#/100mL)	583	200

#### 5) Next Steps

Next steps for implementing the Legion Park BMP Revised Study Plan include:

- Replacing clogged media cartridges by July 2008.
- Updating monitoring plan to reflect 2008 SWMP by August 2008.
- Resuming monitoring by October 2008 (beginning of wet season).
- Reporting and assess effectiveness of the system annually.

## **6) REFERENCES**

Clary, J., J. Jones, B. Urbonas, M. Quigley, E. Strecker, and T. Wagner. 2008. Can Stormwater BMPs Remove Bacteria? New Findings from the International Stormwater BMP Database. *Stormwater Magazine* 9(3): 60-67.

Condor Earth Technologies. 2006. Legion Park Pump Station Media Filter Effectiveness Study Monitoring and Reporting Plan. Prepared for City of Stockton.

Geosyntec Consultants and Wright Water Engineers. 2007. Overview of Performance by BMP Category and Common Pollutant Type. International Stormwater Best Management Practices Database [1999-2007].

# BMP EFFECTIVENESS STUDY PLAN

---

The current National Pollutant Discharge Elimination System (NPDES) area-wide Municipal Separate Storm Sewer Systems (MS4) permit issued in 2007, Order No. R5-2007-0173, Monitoring and Reporting Program, Provision III.B, requires permittees to conduct Best Management Practice (BMP) effectiveness studies.

Provision III.B specifically requires the permittees to:

“...conduct or participate with Modesto and Sacramento area Permittees in two studies (e.g., low impact development) to evaluate the effectiveness of source or treatment control BMPs. The Permittees may choose to conduct one BMP study each or may choose to contribute to studies by one of the Permittees. The objective of this study shall include the following:

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- 2) Evaluate the requirements for and installation and maintenance cost of each BMP; and
- 3) Develop recommendations for appropriate BMPs for the reduction of pollutants of concern in storm water in the Stockton Urbanized Area.”

One of the two BMP effectiveness studies required by the NPDES area-wide MS4 permit may be met through continued evaluation of the Legion Park BMP (see Appendix H-6 of the April 2009 Stormwater Management Plan). Permittees have identified the Morelli Park Swale A as a viable option to meet the BMP Effectiveness Study requirements.

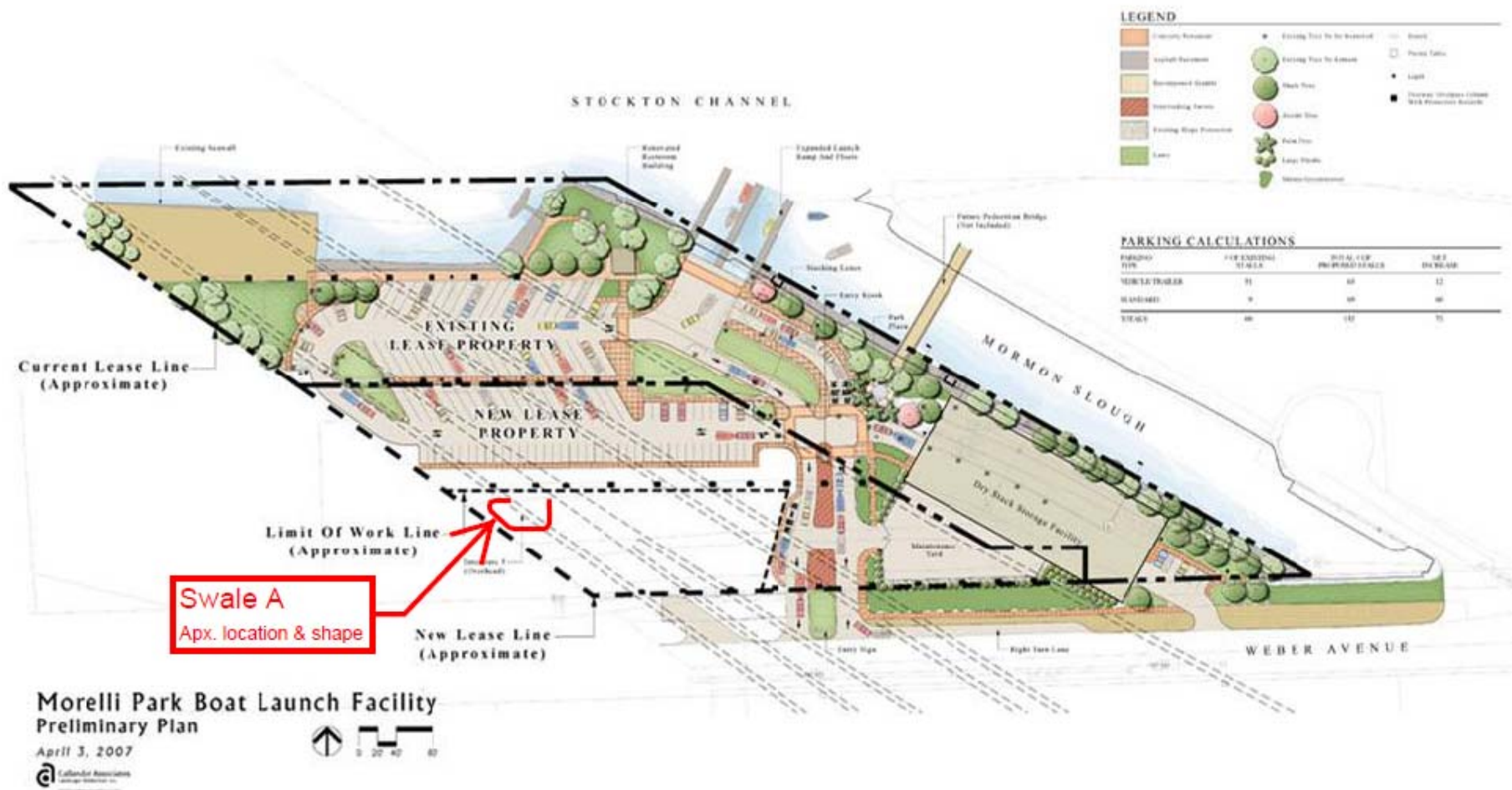
This document serves as the Study Plan for the Effectiveness Study of the Morelli Park Swale A. The document is organized around the following sections:

- 1) Monitoring Locations and Approach
- 2) Sampling Plan
- 3) Technical Report
- 4) Schedule
- 5) References

## **MONITORING LOCATIONS AND APPROACH**

Morelli Park Boat Launching Facility is a recent downtown Stockton redevelopment effort of the City's and includes a parking lot, boat ramps, access road, sidewalks and restroom facilities (Figure 1). Stormwater management is provided onsite by three grassy swales (Figure 2). Permittees will evaluate one of the swales, Swale A, for pollutant removal effectiveness and volume reduction (Figure 3).

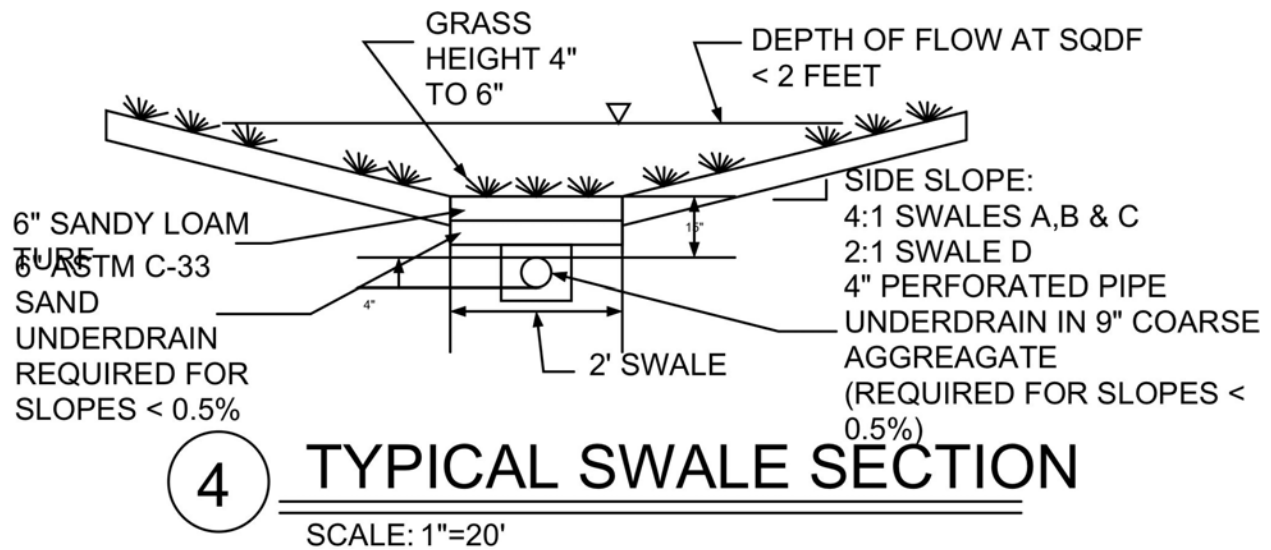
Morelli Park Swale A will be monitored within Permit years 3 - 5. Influent and effluent will be monitored each year for a total of ten storm events during the permit term. In addition, the ability of Swale A to reduce runoff volume will be monitored as this has an impact on the overall pollutant load.



**Figure 1. Approximate location and shape of Swale A at Morelli Park**

(Source: City of Stockton Morelli Park Project Website: <http://www.stocktongov.com/Redevelopment/MorelliParkProject.cfm>)





**Figure 2. Typical Swale Cross Section at Morelli Park** (Source: Morelli Park Drainage Plan)



**Figure 3. Morelli Park Swale A**

## Stormwater Monitoring

The BMP will be monitored for the constituents outlined in **Table 1**.

**Table 1. List of Constituents to Monitor**

Constituent	City of Stockton/ County of San Joaquin Pollutants of Concern
<b>Conventional</b>	
Oil and Grease	✓
pH	*
<b>Nutrients<sup>1</sup></b>	
Nitrate	✓
Nitrite	✓
Kjeldahl Nitrogen (TKN)	✓
Total Phosphorus	✓
Phosphate	✓
<b>Bacteria</b>	
Fecal coliform	✓
E. coli	✓
<b>General</b>	
Total Suspended Solids	*
<b>Metals</b>	
Aluminum, Total	✓
Aluminum, Dissolved	*
Copper, Dissolved	*
Copper, Total	✓
Iron, Total	✓
Iron, Dissolved	*
Lead, Dissolved	*
Lead, Total	✓
Mercury	*
Methylmercury	*
<b>Pesticides</b>	
Pyrethroids	✓ <sup>2</sup>

1: Nutrients are not included in Permittees' Pollutants of Concern, however they were added to this list since nutrients are called out within BMP Effectiveness MRP requirements

2: Pyrethroids are not included in City of Stockton/County of San Joaquin's Pollutants of Concern, however they were added to this list since pesticides are called out within the current permit's BMP Effectiveness MRP requirements

\*Recommended that this constituent be added to the monitor list even though it is not currently called out on any existing list.

## Measuring BMP Effectiveness

BMP monitoring will be conducted at influent and effluent stations. Effectiveness of Swale A will be based on the following variables:

- Runoff volume reduction
- Volume of runoff treated (versus bypassed or conveyed)
- Statistical difference in effluent quality compared to influent quality
- Distribution of effluent quality achieved

The Effluent Probability Method will be used to determine pollutant removal effectiveness. The Effluent Probability Method determines whether the influent and effluent mean EMCs are statistically different from one another and then examine either a cumulative distribution function of influent and effluent quality.

The entire BMP should be taken into account when measuring effectiveness. Overflow and bypassing of BMPs affect the long-term performance of the stormwater control measure. In order to accurately assess the efficiency of the BMP system, the bypass flow should be taken into consideration. If necessary, a third flow monitor may be installed to measure by-passed flow directly (ASCE, 2002).

## **SAMPLING PLAN**

A sampling and analysis plan for compliance monitoring will be developed and submitted in year 2 of the permit term. The plan will include specification of the following:

- Sampling Stations
- Sampling Protocols
- Event Preparation
- Personal Safety
- Quality Assurance/Quality Control
- Data Analysis and Reporting

## **TECHNICAL REPORT**

A technical report will be submitted at the conclusion of the study describing the results of the water quality monitoring, BMP effectiveness and runoff reduction. The report will document installation and maintenance costs and make recommendations regarding future use and applicability of the BMP within the Stockton Permittee area.

## **SCHEDULE**

A schedule is provided in Table 2.

**Table 2. Schedule for Pilot Watershed New Development BMP Effectiveness Evaluation**

<b>Task</b>	<b>Timeframe</b>
Develop a Sampling and Analysis Plan for Swale A	Year 2
Monitor Effectiveness	Years 3 – 5
Develop summary Technical Report	Year 5

## **REFERENCES**

American Society of Civil Engineers. 2002. Urban Stormwater BMP Performance Monitoring. Prepared for the US EPA. Available online: [www.bmpdatabase.org](http://www.bmpdatabase.org).

## **SEDIMENT TOXICITY WORK PLAN**

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**Stockton, CA 95206-1191**

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**1810 E. Hazelton Avenue**  
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- Figure 2: Stormwater Discharge Locations within the Greater Stockton Urbanized Area, Stockton, California
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# SEDIMENT TOXICITY WORK PLAN

## 1.0 INTRODUCTION

Preparation of this work plan is directed by the California Regional Water Quality Control Board, Central Valley Region (Regional Water Board) National Pollutant Discharge Elimination System (NPDES) Permit No. CAS083470, Order R5-2007-0173 (Permit), approved December 6, 2007. The City of Stockton (City) and the County of San Joaquin (County) (collectively, Permittees) are required to submit a sediment toxicity work plan (Sediment Work Plan) and to commence sediment quality characterization sampling for sediment toxicity in order to characterize sediment/water quality conditions, determine the significance of the increase in urban pyrethroid usage, and assess the impact of the best management practices (BMPs) implemented as part of the Permittees Stormwater Management Plan (SWMP).

Ambient sediment water quality monitoring by the Surface Water Ambient Monitoring Program (SWAMP-Sacramento Basin) identified a high incidence of sediment toxicity in several urban creeks that drain the suburbs of Roseville, California (Weston et al., 2005)<sup>1</sup>. Another study by the Sacramento River Watershed Program (SRWP) observed sediment toxicity in almost every Sacramento area urban creek that was tested (Amweg et al., 2006)<sup>2</sup>. The sediment toxicity observed in the above mentioned studies was localized to within tens to hundreds of meters downstream of stormwater outfalls draining residential areas.

Aquatic organisms are exposed to sediment pollutants through transport across biological membranes either from dissolved contaminants in sediment pore water or ingestion of contaminants adhered to sediment particles (U.S. EPA, 2000b)<sup>3</sup>. The chemical partitioning characteristics of the contaminant and the nature of the sediment affects whether the contaminant is dissolved in sediment pore water or attached to sediment particles. The speciation of pollutants, especially metals, in the sediment and the way in which they behave in an aquatic environment may affect the degree of toxicity observed. Factors that affect bioavailability of contaminants in sediment include (U.S. EPA, 2000b):

Organic matter content	Grain size
Hydrogen ion activity (pH)	Aerobic state and sulfides concentration
Microbiological activity	Receptor
Sediment composition and mineralogy	Degree of bioturbation or physical mixing.

Organic matter in sediments is often associated with fine particles and, in general, the smaller the grain size the greater the potential for high concentrations of pollutants. Organic matter is a food source for sediment ingesters; consequently, sediments that contain smaller, organic particles are more likely to contain pollutants that are bioavailable to sediment ingesters through consumption.

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<sup>1</sup> Weston, D.P., R.W. Holmes, J. You, and M.J. Lydy. 2005. Aquatic toxicity due to residential use of pyrethroid insecticides. *Environ. Sci. & Technol.* 39: 9778-9784.

<sup>2</sup> Amweg, E.L., D.P. Weston, J. You, and M.J. Lydy. 2006. Pyrethroid insecticides and sediment toxicity in urban creeks from California and Tennessee. *Environ. Sci. & Technol.* Published on web 1/31/2006.

<sup>3</sup> United States Environmental Protection Agency (U.S. EPA). 2000b. Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment Status and Needs. EPA-823-R-00-001.

## 2.0 OVERVIEW

Stockton is located within California's Central Valley approximately 83 miles east of San Francisco and 45 miles south of Sacramento (Figure 1, Attachment A). Stockton encompasses approximately 60 square miles with an average elevation of 15 feet; the western portion of the city lies within the boundary of the Sacramento-San Joaquin Delta.

Stockton area waterways<sup>4</sup> drain westerly to the San Joaquin River (SJR), which flows northward along the western portion of the Stockton Urbanized Area<sup>5</sup> (SUA). Tidal variation generally ranges from 0 feet mean sea level (msl) to approximately four feet above msl. Besides direct groundwater inputs and tidal exchange, all inputs to Smith Canal, Five-Mile Slough, and the urbanized portion of Mormon Slough are from the SUA's stormwater system. In addition to urban runoff, Bear Creek, Mosher Slough, the Calaveras River, and Walker Slough/Duck Creek receive inflow from upstream agricultural runoff and agricultural return (tail water). In general, the urbanized portion of the Calaveras River receives upstream flow predominantly from the Stockton Diversion Canal (Figure 1, Attachment A). In most areas of the SUA, dry weather flow and stormwater runoff discharge by gravity to pump stations where the flows are released to sloughs and rivers. The quality and quantity of these discharges vary considerably and are affected by hydrology, geology, land use, season, and sequence and duration of precipitation events.

Due to the proximity of the County's urbanized areas to the City and the physical interconnection with the City's storm drain system, portions of the County are designated as Phase I in accordance with 40 Code of Federal Regulations (CFR) 122.26 (b)(4)(iii). The Permittees own and operate the municipal separate storm drain system (MS4) which collects stormwater and surface water runoff within the SUA. The City has identified approximately 400 miles of storm drain lines. The City and County have identified 158 and 47 outfalls, respectively, within their jurisdictions that discharge stormwater and surface runoff generated from various land uses (Figure 2, Attachment A).

## 2.1 PESTICIDE IMPAIRED WATERBODIES

Based on water quality sampling results, five waterways within the SUA have been classified as pesticide-impaired waterbodies under the Federal Clean Water Act Section 303(d) [303(d)]: Mosher Slough, Five-Mile Slough, the Calaveras River, Smith Canal, and the Stockton Deep Water Ship Channel (DWSC) (Table 1, on the following page, and Figure 3, Attachment A). In addition, the Regional Water Board Toxic Hot Spots Clean-Up Plan (California Water Code Section 13394) has identified hot spots<sup>6</sup> related to organophosphate pesticides, diazinon and chlorpyrifos, in Mosher Slough, Five Mile Slough, the Calaveras River, and Mormon Slough.

In 2000, the United States Environmental Protection Agency (U.S. EPA) announced agreements with manufacturers to phase out most urban uses of diazinon and chlorpyrifos. In addition, the U.S. EPA developed agreements outlining effective dates for diazinon and chlorpyrifos containing products. Non-agricultural uses of chlorpyrifos allowed to continue included residential use of containerized baits and indoor/certain outdoor areas where children would not be exposed.

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<sup>4</sup> The major drainage watersheds in the SUA are Bear Creek, Mosher Slough, Five Mile Slough, Fourteen Mile Slough, the Calaveras River, Smith Canal, Stockton Deep Water Ship Channel/Stockton Shipping Channel, Mormon Slough, Walker Slough/Duck Creek, and Littlejohns Creek.

<sup>5</sup> The SUA includes the City and Phase I portions of County of San Joaquin.

<sup>6</sup> Regional Water Board NPDES Permit No. CAS083470, Order R5-2007-0173, Finding 70.



Although, results of the Permittees' 2004-2006 Pesticide Plan<sup>7</sup> monitoring program suggested that diazinon and chlorpyrifos are no longer SUA stormwater pollutants of concern (POCs), the Regional Water Board directed that continued monitoring<sup>8</sup> is needed to determine the significance of the Permittees' contribution to diazinon and chlorpyrifos concentrations in 303(d)-listed waters and the toxic hot spots. The Permittees are currently conducting detention basin and pesticide monitoring programs in compliance with the Permit and the Regional Water Board 13267 Letter<sup>9</sup>; the data from these monitoring programs will be incorporated in the Sediment Work Plan analyses and reporting.

**Table 1: Pesticide Impaired Waterways within the SUA**

Waterbody	Reach	Estimated Size Affected	Potential Toxicity Source
Mosher Slough	Downstream of Interstate 5	1.3 Miles	Chlorpyrifos Diazinon
Five-Mile Slough	Alexandria Place to Fourteen Mile Slough	1.6 Miles	Chlorpyrifos Diazinon
Calaveras River	Lower	5.8 Miles	Diazinon
Smith Canal	Entirety	2.3 Miles	OP Pesticides
Delta Waterways	Stockton DWSC	1,603 Acres	Chlorpyrifos DDT Diazinon Dioxin/Furans Group A Pesticides PCBs Unknown Toxicity

Note: DWSC = Stockton Deep Water Ship Channel  
PCBs = Polychlorinated Biphenyls

DDT = Dichlorodiphenyltrichloroethane  
OP Pesticides = Organophosphate Pesticides

The phase-out on the sale of diazinon and chlorpyrifos for most residential and commercial uses resulted in an increase in the use of pyrethroid pesticides. Pyrethroid pesticides are persistent, hydrophobic, and rapidly sorb to sediments in aquatic environments. As per Finding 81 of the Permit, the Regional Water Board determined that monitoring of sediment quality (sediment toxicity testing) and water column toxicity of urban runoff/discharges is needed to characterize sediment/water quality conditions, determine the significance of the increase in urban pyrethroid usage, and assess management practice effectiveness.

<sup>7</sup> City of Stockton and County of San Joaquin Pesticide Plan, dated April 1, 2004.

<sup>8</sup> Regional Water Board NPDES Permit No. CAS083470, Order R5-2007-0173, Finding 73(g).

<sup>9</sup> Requirement for Technical Report Pursuant to California Water Code Section 13267, dated November 14, 2007. The 13267 Letter directs pesticide monitoring consistent with the Permittees' Pesticide Plan dated April 1, 2004 (revisions September 22, 2004).

### 3.0 SEDIMENT WORK PLAN OBJECTIVE

The purpose of the Sediment Work Plan is to characterize sediment toxicity in areas subject to urban discharge and, based on the results, identify BMPs for controlling sources of sediment toxicity. Consistent with the requirements of Permit Provision D(26)(a-i) and Monitoring and Reporting Program (MRP), Provision II(G), this Sediment Work Plan is a component of the Permittees' SWMP and will address the following:

- Conducting characterization monitoring of sediment quality within the SUA waterways, including detention basins<sup>10</sup>, which receive stormwater discharges.
- Selection of sample sites based on the following criteria: (1) select sediment depositional areas downstream and within close proximity (within 25-100 meters) of representative stormwater outfalls; (2) assess a variety of land uses including residential, suburban residential, commercial, industrial, and mixed; and 3) capture a range of ages of residential and suburban neighborhood drainage areas (less than 10 years old, 10 to 25 years old, or older than 25 years old).
- Sampling of sediment consistent with SWAMP Quality Assurance Management Plan (QAMP) protocols.
- Analyses of sediment samples from one post first flush storm<sup>11</sup> event and one dry weather monitoring event.
  - Use of United States Environmental Protection Agency (U.S. EPA) standardized ten-day sediment toxicity testing method (U.S. EPA, 2000)<sup>12</sup> for freshwaters using *Hyalella azteca*.
  - Analyses will include sediment total organic carbon (TOC) and grain size with the sediment toxicity testing data summary.
- Follow-up testing if characterization of sediment quality has identified toxicity at a given station including sediment Toxicity Identification Evaluation (TIE) approaches and chemical analyses of the sediments, including chlorpyrifos and pyrethroid pesticide analyses, will be conducted.
  - Pyrethroid analyses to include bifenthrin, cyfluthrin, deltamethrin, esfenvalerate / fenvalerate, lambda cyhalothrin, permethrin, and tralomethrin.
  - Toxicity testing and sediment chemistry for chlorpyrifos and pyrethroids will continue until the nature and cause(s) of the toxicity are defined.
- Identification, development, implementation, and assessment of BMPs to address controllable discharges of sediment-bound contaminants that may be linked to sediment toxicity to the maximum extent practicable (MEP)<sup>13</sup>
- Development and adoption of policies, procedures, and/or ordinances to implement the Sediment Work Plan (contained in SWMP protocol; Section 4).
- Development of a time schedule for implementation and assessment.

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<sup>10</sup> Detention basin sediment toxicity monitoring is addressed in the updated *Detention Basin Work Plan*, dated April 2009

<sup>11</sup> Post first flush timeframe is within two weeks of the qualifying storm event.

<sup>12</sup> U.S. EPA 2000. Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates. EPA 600/R-99/064. Office of Research and Development. Washington, DC.

<sup>13</sup> The definition for MEP is provided in Attachment C – Definitions of the Permit (Order No. R5-2007-0173).

#### 4.0 PROPOSED SEDIMENT WORK PLAN MONITORING LOCATIONS

Sediment toxicity monitoring locations will be located within SUA waterways, including one detention basin, which receive stormwater discharges. Sediment toxicity monitoring locations are based on the site selection requirements summarized in the previous section. Sediment toxicity monitoring locations are also based on studies<sup>14</sup> conducted by the Regional Water Board and Delta Keeper from 1994 to 2001 which found toxicity in Mosher Slough, Five-Mile Slough, the Calaveras River, Smith Canal, and Duck Creek.

Sediment toxicity monitoring will be coordinated to the greatest extent possible with the existing Detention Basin Monitoring Program<sup>15</sup> and applicable Regional Water Board 13267 Letter<sup>16</sup> Special Studies. Proposed sediment characterization monitoring locations consist of receiving water locations on the following SUA waterways: Mosher Slough, Five-Mile Slough, the Lower Calaveras River, Smith Canal, Mormon Slough, and Walker Slough/Duck Creek (Table 2, below), and will include the La Morada Detention Basin which receives urban discharge from a relatively young (generally less than five years) largely residential land use area. Sediment toxicity monitoring locations located within the SUA are provided in Table 2, below, and shown in Figure 4, Attachment A).

**Table 2: Proposed SUA Sediment Toxicity Monitoring Locations**

Waterbody	Monitoring Location*	Receiving Water Site ID	Land Use	Approximate Development Age
Mosher Slough	Mariner's Bridge	MS-14R	Residential/Commercial	10 – 25 years
Mosher Slough	La Morada Basin	MS-5R	Residential	< 10 years
NA	La Morada Detention Basin <sup>17</sup>	NA	Residential	< 10 years
Five-Mile Slough	Swenson Park Golf Course	5M-27R	Residential/Recreational	≥ 25 years
Calaveras River	Brookside Road	CR-39R	Residential/Recreational	< 10 years
Calaveras River	West Lane Bridge	CR-46R	Mixed Use	≤ 5 to ≥ 25 years
Smith Canal	Yosemite Lake	SC-5R	Residential/Commercial	≥ 25 years
Mormon Slough	Commerce Street	MR-2R	Mixed Use	≥ 25 years
Duck Creek / Walker Slough	Manthey Road Bridge	WK-64R	Mixed Use	≥ 25 years

\*Nearest cross street or urban feature

NA = Not Applicable

Mixed Use = Residential/Commercial/Industrial Uses

<sup>14</sup> Review of the City of Stockton Urban Stormwater Runoff, Aquatic Life Toxicity Studies Conducted by the CVRWQCB, DeltaKeeper, and the University of California, Davis, Aquatic Toxicology Laboratory, between 1994 and 2000. G. Fred Lee, PhD, DEE and Anne Jones-Lee, PhD.

<sup>15</sup> The updated *Detention Basin Monitoring Work Plan*, revised June 2008, is a component of the Permittees' current SWMP, dated June 2008.

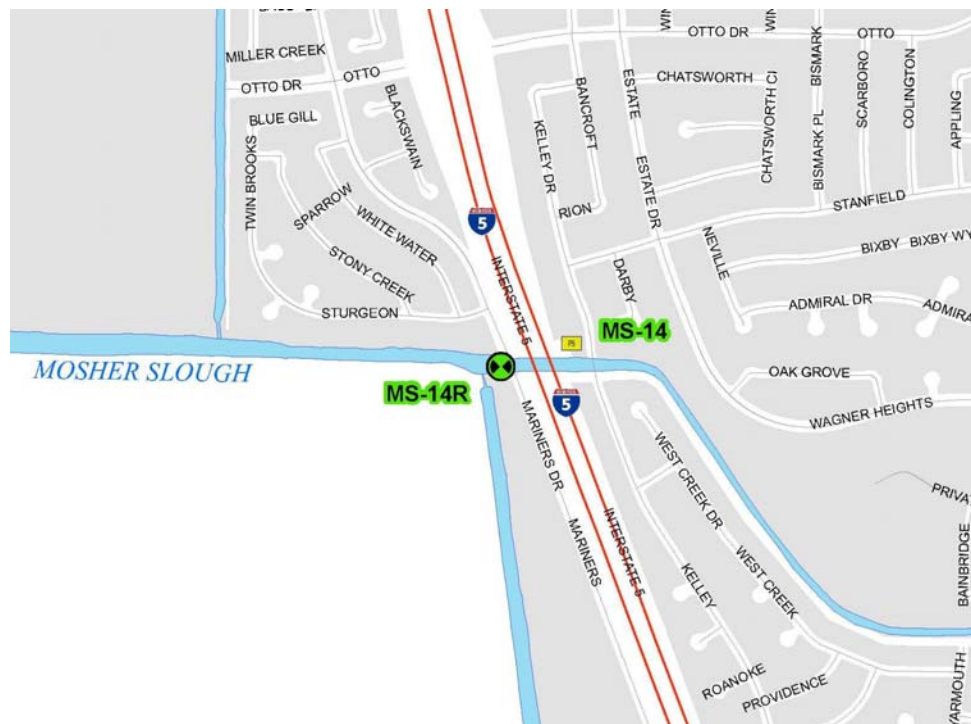
<sup>16</sup> *Requirement for Technical Report Pursuant to California Water Code Section 13267*, dated November 14, 2007.

<sup>17</sup> Detention basin sediment toxicity monitoring will be addressed in the Detention Basin Work Plan, updated April 2009.

#### 4.1 MOSHER SLOUGH

Mosher Slough is one of Stockton's least-improved waterways and is located in the northern portion of the SUA. A 1.3 mile section of Mosher Slough downstream of I-5 is 303(d)-listed for diazinon and chlorpyrifos and is entirely downstream of the SUA. Mosher Slough (Mosher Creek) flows southwest from the Sierra Nevada foothills to the SJR; but within the SUA, the waterway is oriented roughly east/west. South Bear Creek flows southwest into the western portion of the slough. Prior to entering the City limits, the slough receives limited inflow from agricultural runoff and tail waters. A small water control structure diverts water from the Calaveras River downstream of the Calaveras Headworks (built in 1933 and located approximately 20 miles east of Stockton) to the slough for irrigation purposes. Mosher Slough flows naturally only when it receives input from surface runoff. In general, Mosher Slough is a very shallow waterway which increases in depth west of the SUA to its confluence with Bear Creek to the north. At high tide, the water level immediately west of I-5 is approximately four to five feet above mean sea level (msl). Land use within the urbanized portion of the Mosher Slough watershed is dominantly residential with a small percentage being commercial and public lands.

Two receiving water sediment toxicity monitoring locations will be sited on Mosher Slough and are shown in Figure 4, Attachment A. The downstream sediment sampling location will be located as close as possible to the waterway's confluence with the SJR and will be downstream of essentially all urban discharges. The downstream sediment sampling location (MS-14R) will be sited west of Mariner's Bridge (Inset 1, below, and Photo 1, on the following page) and represents the eastern extent of the 1.3 mile portion of Mosher Slough 303(d)-listed for pesticide impairment. The MS-14R monitoring location receives discharge from a large catchment area (approximately 530 acres) via the Kelly Drive Pump Station (MS-14). The MS-14 pump station discharges an urbanized watershed, approximately 10 to 25 years old, consisting predominantly of mixed residential/commercial land uses.



**Inset 1: Mosher Slough Sediment Toxicity Downstream Monitoring Location (MS-14R)**

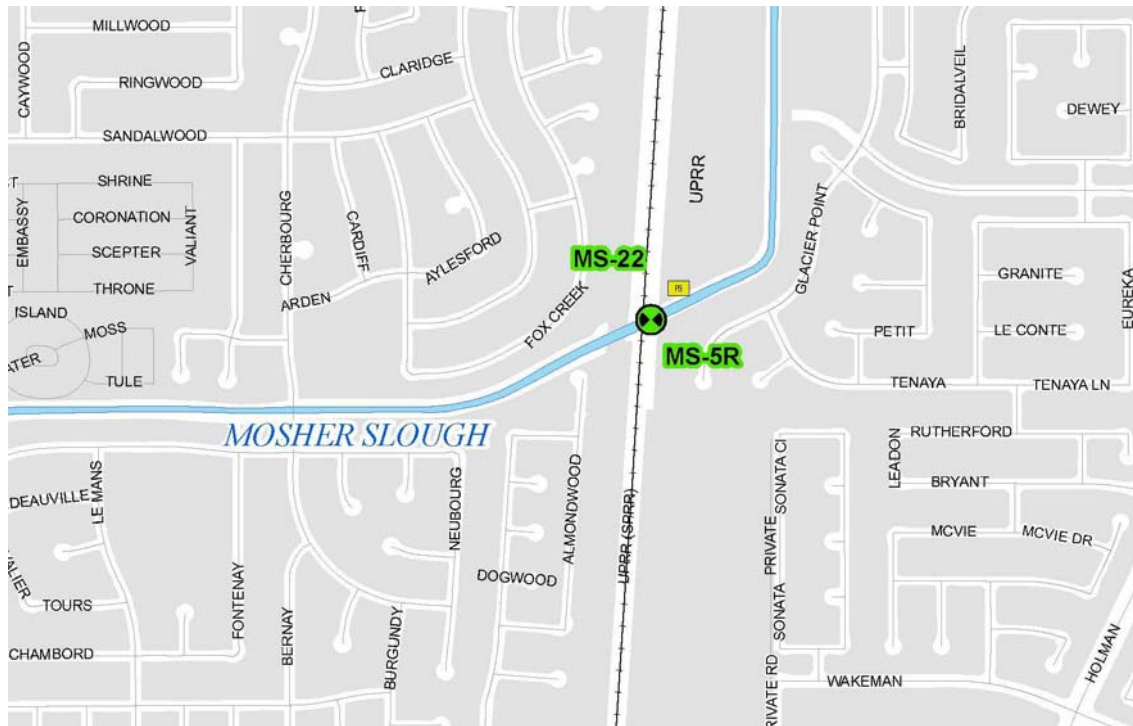


**Photo 1: Mosher Slough (MS-14R) Downstream Monitoring Location (May 12, 2008)**

View is from Mariner's Bridge looking west (downstream) of the SUA. This area represents the upstream extent of Mosher Slough's 303(d)-listed segment for pesticide impairment.

An upstream sediment sampling location (MS-5R) is located as close as possible to the eastern boundary of the SUA. MS-5R (Inset 2, on the following page) is located west of the La Morada Detention Basin pump station (MS-22) discharge outfall (Photo 2, on the following page). The MS-22 pump station discharges a large catchment area (approximately 761 acres) representing a younger residential area less than ten years old.





**Inset 2: Mosher Slough Sediment Toxicity Upstream Monitoring Location (MS-5R)**



**Photo 2: Mosher Slough (MS-5R) Upstream Monitoring Location (May 12, 2008)**

View is from the north bank of the slough looking to the southwest. This site is directly downstream of the La Morada Detention Basin MS-22 discharge outfall and east of the Union Pacific Railroad tracks.

## 4.2 CALAVERAS RIVER

The Calaveras River watershed<sup>18</sup> is a tributary to the SJR Delta System flowing southwest from the Sierra Nevada foothills through Calaveras, Stanislaus, and San Joaquin Counties. The Calaveras River Basin drains a total of 470 square miles located in the northwestern region of Calaveras County, the westernmost portion of San Joaquin County, and a small, southwestern portion of Stanislaus County.

The construction of New Hogan Dam and Reservoir, located approximately 38 miles upstream from the confluence with the SJR at an approximate elevation of 700 feet, substantially altered flows in the river. Water is used for irrigation and municipal purposes with the water right permit held by the United States Bureau of Reclamation (USBR). In 1970, Stockton East Water District (SEWD) and the Calaveras County Water District contracted with USBR for the project's entire water supply. In 1978, SEWD began to divert water at Bellota Weir to SEWD's municipal water treatment plant, further altering water flow patterns in the river system. The Stockton Diversion Canal was built in 1910 to carry flows from Mormon Slough around the east side of Stockton and back to the Calaveras River.

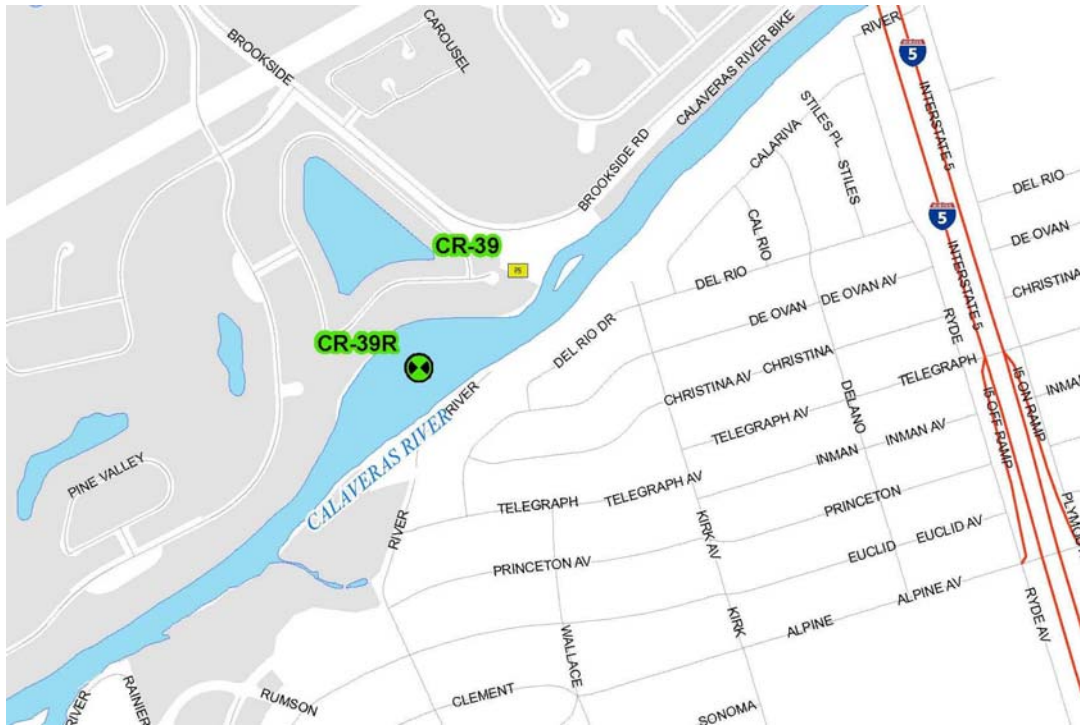
Flow is not released downstream of Bellota in Mormon Slough or downstream of the Calaveras Headworks in the "old" Calaveras River channel except when flood releases are made from New Hogan Dam or when storm runoff flows into the river and channels. In general, the "old" Calaveras channel downstream of the Calaveras Headworks receives only storm runoff between November and March. During the April to October irrigation season, the Calaveras River receives input to supply irrigation needs.

Within the SUA, land use along the Calaveras River is predominantly residential and commercial, but also includes industrial uses. The entire urbanized length of the Calaveras River (approximately 5.8 miles from the SJR confluence to the Stockton Diversion Canal) is 303(d)-listed for pesticides (Figure 3, Attachment A).

One upstream and one downstream receiving water sediment sampling monitoring locations are proposed along the urbanized portion of the Calaveras River (Figure 4, Attachment A). The downstream sediment sampling location will be located as close as possible to the waterway's confluence with the SJR and downstream of essentially all urban discharges within the Permittees' jurisdiction (Inset 3, on the following page). Sediment sampling location (CR-39R) will be located approximately 1.2 miles upstream (east) of the SJR/Calaveras River confluence (Photo 3, on the following page) and approximately 300 feet downstream (west) of the Brookside Pump Station (CR-39). The CR-39 pump station discharges a predominantly residential development of approximately 297 acres and represents a relatively young (less than ten years), upscale residential and golf course/country club urban area.

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<sup>18</sup> Department of Water Resources, *Calaveras River Fish Migration Barriers Assessment Report*, September 2007



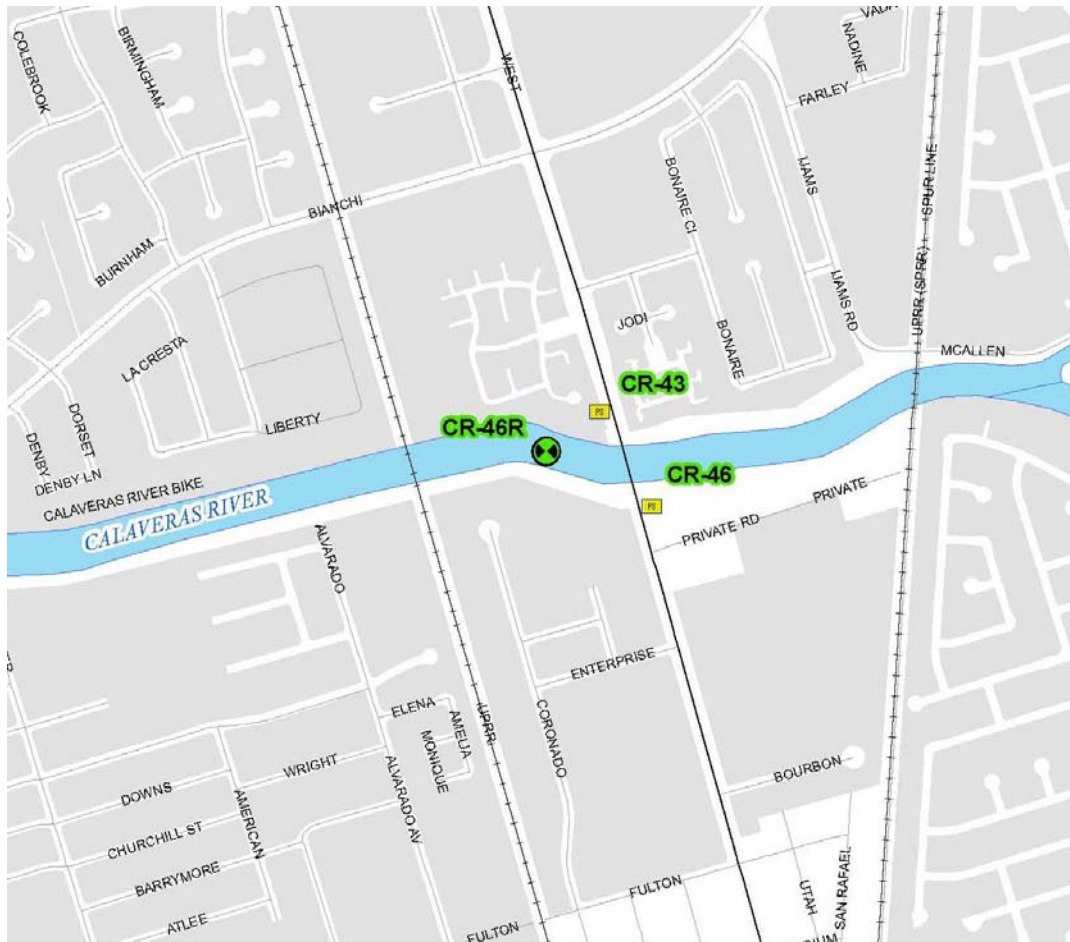
**Inset 3: Calaveras River Sediment Toxicity Downstream Monitoring Location (CR-39R)**



**Photo 3: Calaveras River/ Brookside (CR-39) Discharge Outfall (April 22, 2008)**  
View is looking south from the Lower Calaveras River north levee (west of I-5) approximately 1.2 miles east of the confluence with the SJR.



Within the SUA, an upstream sediment sample will be located as close as possible to the waterway's confluence with the "old" Calaveras River channel and the Stockton Diversion Canal. The CR-46R sampling location (Inset 4, below, and Photo 4, on the following page) is sited downstream of the CR-43 and CR-46 West Lane Pump Stations. These two West Lane pump stations discharge a mixed use area located between two Union Pacific Railroad lines whose development ranges in age from approximately five to older than 25 years.



**Inset 4: Calaveras River Sediment Toxicity Upstream Monitoring Location (CR-46R)**



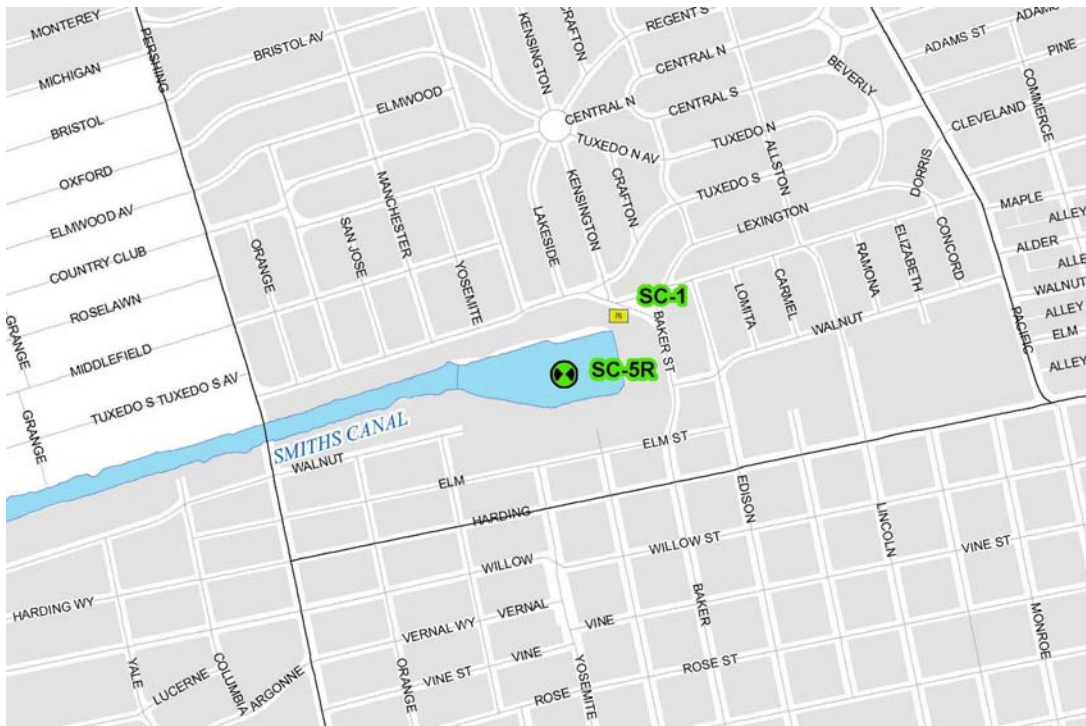
**Photo 4: Calaveras River (CR-46R) at West Lane (April 1, 2008)**  
The view is from the east side of the West Lane Bridge looking east (upstream).

#### **4.3 SMITH CANAL**

In a staff report dated April 2, 2002, the Regional Water Board recommended the addition of Smith Canal to California's Clean Water Act Section 303(d) list due to impairment by low DO, organophosphate pesticides, and pathogens. Smith Canal is a tidally influenced, shallow, east/west-constructed, freshwater slough that extends approximately 2.6 miles east from its confluence with the SJR to its upstream terminus at Yosemite Lake in central Stockton, California. The canal averages approximately 105 feet in width with an average depth of four to six feet (with an approximately ten foot maximum depth at the mouth) and an approximate ebb to flood stage difference of up to approximately four feet.

Besides direct groundwater inputs and tidal exchange, all inputs to Smith Canal are from stormwater runoff draining from an urbanized watershed that encompasses approximately 3,306 acres. Approximately 62% of the Smith Canal watershed (approximately 1,866 acres) drains to the Legion Park Pump Station (LPPS) SC-1 discharge outfall located in the northeast corner of Yosemite Lake.

Stormwater discharge is predominantly from residential and commercial property with a small percentage of public land use, with all land uses generally greater than 25 years old. One receiving water sediment sampling monitoring location will be situated in the approximate center of Yosemite Lake (SC-5R) located at the eastern terminus of Smith Canal approximately 2.3 miles upstream of the confluence with the SJR (Inset 5 and Photo 5, on the following page).



**Inset 5: Smith Canal/Yosemite Lake Sediment Toxicity Monitoring Location (SC-5R)**



**Photo 5: Smith Canal (SC-5R) Yosemite Lake Monitoring Location (March 26, 2008)**  
Yosemite Lake is the upstream terminus of Smith Canal. At low tide, the lake at SC-5R is approximately 3.5 feet deep.

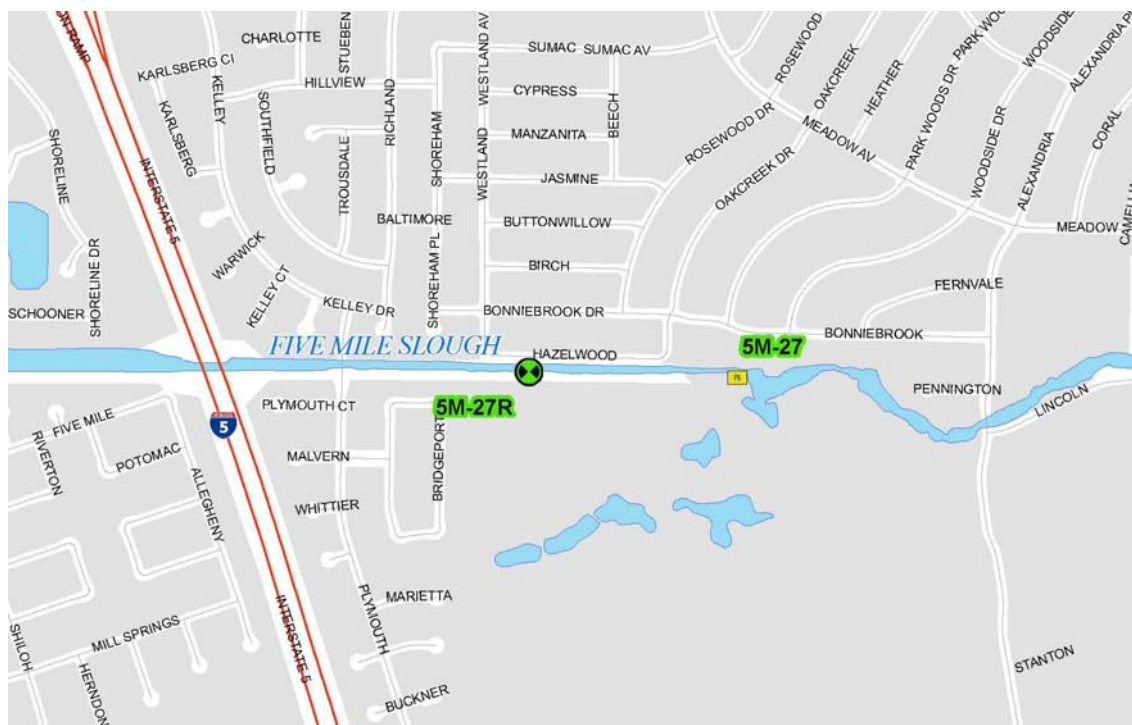


#### 4.4 FIVE-MILE SLOUGH

Five-Mile Slough is a tidally influenced, urban waterway beginning at Rivara Road and Pacific Avenue. The waterway meanders westward through residential areas, including the City's Swenson Park Golf Course, and unincorporated areas to Fourteen-Mile Slough where a weir controls the tidal flow from Fourteen-Mile Slough into Five-Mile Slough. During the summer, flow is reduced by diversion of irrigation water from Five-Mile Slough to the park and golf course. Besides direct groundwater inputs and tidal exchange, all other inputs to Five-Mile Slough are from stormwater runoff

The width of Five-Mile Slough varies from around three feet at Rivara Road and Pacific Avenue to up to 45 feet (Friends of Five-Mile Creek website)<sup>19</sup>. The mean depth of the channel at the confluence of Five-Mile Slough and Fourteen-Mile Slough west of Interstate 5 (I-5) is estimated to be approximately ten feet. East of I-5, the slough is very shallow; water depth generally does not exceed four feet in the deepest portion of the waterway. During the dry season (April to November), about one quarter of the easternmost channel is dry.

One receiving water sediment sampling monitoring location will be sited on Five-Mile Slough near the western extent of the City's Swenson Park Golf Course (5M-27R; Inset 6, below, and Photo 6, on the following page). The proposed sediment sampling location will be located downstream of the 5M-27 pump station which receives discharge from a large catchment area (approximately 670 acres) from a predominantly upscale residential area, including the golf course and park. Development in this area of Five-Mile Slough is approximately 25 years old.



**Inset 6: Five-Mile Slough Sediment Toxicity Monitoring Location (5M-27R)**

<sup>19</sup> <http://www.friendsoffivemilecreek.com/CreekDescription.html>



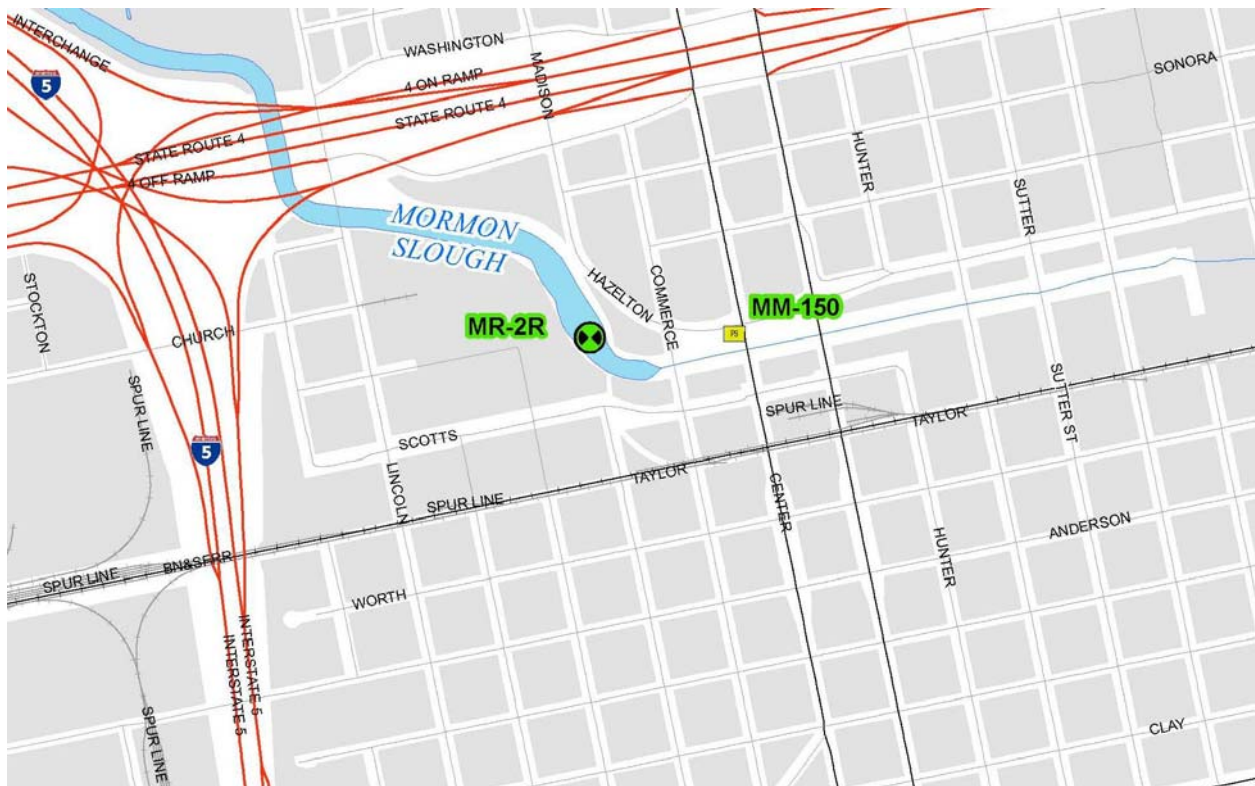
**Photo 6: Five-Mile Slough (5M-27R) Swenson Park Monitoring Location (May 13, 2008)**  
View is from the Swenson Park Golf Course on the south side of Five-Mile Slough looking east.

#### **4.5 MORMON SLOUGH**

Mormon Slough originally extended from its confluence with the Stockton DWSC to the Calaveras River at the Bellota Weir. The Stockton Diversion Canal was built in 1910 to carry flows from Mormon Slough around the east side of the City and back to the Calaveras River. In 1969 the USACE modified Mormon Slough from its confluence with the Stockton Diversion Canal upstream to Bellota Weir to convey additional flood flows. Flow is not released downstream of Bellota in Mormon Slough except when flood releases are made from New Hogan Dam or when storm runoff flows into the river and channels. Consequently, stretches of Mormon Slough and the Stockton Diversion Canal remain dry for days, weeks, or months at a time during winter and early spring. During the April to October irrigation season, Mormon Slough upstream of the SUA receives input to supply irrigation needs.

West of the Stockton Diversion Canal, Mormon Slough no longer receives flow from upstream sources. Portions of the slough from approximately South Golden Gate Avenue to the Stockton Diversion Canal have been converted to orchards. Upstream of the urbanized area, Mormon Slough receives dominantly residential and agricultural runoff from unincorporated areas; within the SUA, the slough receives stormwater discharge from residential, commercial, and industrial properties. East of the Lincoln Street Bridge the waterway is extremely shallow.

Mormon Slough from the Weber Avenue overcrossing to Commerce Street is predominantly a steep-sided, concrete constructed channel which is inaccessible to foot or boat traffic. East of Commerce Street to Wilson Way, the slough has been modified from an open channel to an enclosed culvert. One receiving water sediment sampling monitoring location (MR-2R) is proposed west of Commerce Street adjacent to the enclosed culvert (Inset 7 and Photo 7, on the following page). The proposed sampling location is located approximately 500 feet downstream of the MM-150 lift station which receives discharge from the largest watershed to Mormon Slough (approximately 955 acres) from an older (greater than 25 years old) mixed use (residential, commercial, and industrial) area.



**Inset 7: Mormon Slough Sediment Toxicity Monitoring Location (MR-2R)**



**Photo 7: Mormon Slough (MR-2R) Commerce Street Monitoring Location (March 6, 2006)**  
View is looking west/southwest (downstream) from the point where Mormon Slough is channeled underground, immediately west of Commerce Street.



#### 4.6 DUCK CREEK/WALKER SLOUGH

The Duck Creek watershed is a tributary to the SJR Delta System flowing southwest from the Sierra Nevada foothills through Stanislaus and San Joaquin Counties. Duck Creek's headwaters are in Stanislaus County from which it meanders westerly approximately 33 miles before ending approximately three miles south/southwest of downtown Stockton. East of the SUA, Duck Creek flows through predominantly open space and agricultural lands. Within the SUA, the Duck Creek watershed consists of relatively recent (less than five years old) industrial and older residential (greater than 25 years old) developments east of El Dorado Street. Duck Creek also receives irrigation water flows from upstream of the SUA.

Between El Dorado Street and I-5, Duck Creek drains into Walker Slough which continues approximately 700 feet west to its confluence with French Camp Slough, which is formed by the convergence of Littlejohns Creek and Lone Tree Creek. From the convergent point of Walker Slough and French Camp Slough, the merged waterways extend approximately 600 feet westward to their confluence with the SJR. Although tidally influenced, the Duck Creek/Walker Slough waterway east of El Dorado Street is generally relatively shallow.

Two receiving water sediment sampling locations were selected on the Duck Creek/Walker Slough waterway generally consistent with baseline receiving water sampling locations. The downstream sediment sampling location will be located on Walker Slough approximately 1.5 miles east (upstream) of the confluence with the SJR. Sediment sampling location WK-64R (Inset 8, below, and Photo 8, on the following page) is located immediately west of I-5 and downstream of the Turnpike and Walker Slough Pump Station which discharges a large catchment area (approximately 1,490 acres) servicing a predominantly older mixed land use (commercial, industrial, and residential) area.



**Inset 8: Duck Creek/Walker Slough Sediment Toxicity Monitoring Location (WK-64R)**



**Photo 8: Walker Slough (WK-64R) Manthey Road Bridge Monitoring Location (May 13, 2008)**

View is looking west (downstream) from the Manthey Road Bridge located immediately west of Interstate 5. Water level was approximately three to four feet deep.

## 5.0 SEDIMENT MONITORING WORK PLAN

This section describes Sediment Work Plan sampling procedures and proposed monitoring parameters. Sediment samples from proposed sampling locations (discussed in Section 4 and depicted in Figure 4, Attachment A). In general, sediment toxicity monitoring will be conducted in wadeable streams: deeper water locations are anticipated at the Lower Calaveras River (CR-3R), Yosemite Lake (SC-5R), and Manthey Road Bridge (WK-64R). Sediment sampling will be conducted consistent with SWAMP QAMP protocols. All sediment samples will be analyzed using the U.S. EPA standardized ten-day sediment toxicity testing method (U.S. EPA, 2000)<sup>20</sup> for freshwaters using *Hyalella azteca* and will report sediment TOC and grain size with each sediment toxicity testing data summary. If toxicity is determined to be statistically significant and greater than or equal to 50% increase in *Hyalella azteca* mortality is observed, follow-up testing including sediment TIE approaches (described in Section 5.2.1) and chemical analyses for chlorpyrifos and pyrethroid pesticides will be conducted until the nature and cause(s) of the toxicity are determined. Pyrethroid constituents will include: Bifenthrin, Cyfluthrin, Cypermethrin, Deltamethrin, Esfenvalerate/ Fenvalerate, Lambda-cyhalothrin, and Permethrin.

### 5.1 SAMPLING FREQUENCY

The Sediment Work Plan will include annual sample collection from one post first flush storm event (within two weeks of the qualifying storm event) and one dry weather monitoring event. A qualifying storm event is characterized as a rain event forecasted with at least a 75% probability to produce at least 0.25 inches of precipitation. The post first flush storm event will be preceded by a continuous three (3) day period with no measurable precipitation (defined as less than 0.10 inch of precipitation during the

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<sup>20</sup> U.S. EPA 2000. Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates. EPA 600/R-99/064. Office of Research and Development. Washington, DC.



previous 72 hours). Sediment Plan dry weather events may be conducted throughout the permit year (July 1 through June 30) and will be coordinated with *Detention Basin Monitoring Work Plan* and *Low Dissolved Oxygen Monitoring and Assessment Work Plan* monitoring events to the maximum extent possible. Dry weather monitoring events will be preceded by at least seven (7) days of no measurable rainfall. A day with a storm event too small to generate runoff (typically 0.10 inches of rainfall or less) shall be considered a dry weather day.

Where active flow (receiving water) or standing water (detention basin) is observed, the following field parameters will be collected from the water column at mid-depth at each location: date, time, weather, water temperature, specific conductivity (EC), pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), and total dissolved solids (TDS). Field parameters will be collected using a calibrated YSI 556 MPS (or equivalent). Turbidity will be measured using a Hach 2100P (or equivalent) turbidity meter. Prior to each sampling event, all field equipment will be calibrated according to manufacturer's standards and recommendations. Calibration methods and records are kept with each meter. Field observations will be recorded during each event.

## 5.2 SEDIMENT SAMPLING PROCEDURES

A single composite sample<sup>21</sup> of unconsolidated fine-grain sediment from wadeable and non-wadeable waters will be obtained from each of the sediment sampling locations shown in Figure 4, Attachment A. Sediment sampling sites will be located using a hand-held global positioning system (GPS) unit to provide site consistency between sampling events. Since pyrethroids are found primarily in the organic carbon fraction of sediments, sample locations will be selected on the basis of availability of soft, fine-grained sediments, excluding the more commonly available areas with coarse-grained sediments or rock substrates. Downstream (deeper water) sediment sampling events will be scheduled to coincide with low tide. Prior to sample collection, the water depth at each receiving water location will be measured to the nearest 0.01-foot with a weighted tape measure.

For wadeable waters, sediment samples will be collected utilizing a stainless-steel, hand-operated push sampler or stainless steel scoop (for waters less than two feet deep). Field personnel will move and stand on the downstream side of the sample site in order to create the least disturbance to the sampling site as possible due to wading or disturbance of the sediment from currents induced by wading. Samples will be collected by skimming the upper one to three centimeters (cm) (to a maximum of six inches) of surface sediment. In general, sediment samples will be collected from mid-channel locations from the deepest portion of each waterway. However, dependent upon availability of soft substrate, samples will be collected either from a single mid-channel location or from an area of approximately 5 square meters (m<sup>2</sup>) from the streambed.

For non-wadeable waters, sampling will utilize a boat-mounted, stainless-steel, hand-operated push sampler. At each designated monitoring site, the boat will be tied off or anchored to prevent drifting. If deploying an anchor is necessary, care will be taken to limit artificial increase of the turbidity in the area. When using a boat, all engines will be turned off and the samples collected upstream from the engines or any other machinery that may release exhaust fume/oils into the sample. In order to collect enough sediment for all necessary analyses, sediment cores will be collected in a consecutive fashion within a 5 m<sup>2</sup> area from the surface (top 0 - six inches) at each sampling location. The upper three centimeters of surface sediment from a sufficient number of cores will serve to make-up the composite sample for analysis. Sampling will be conducted with standard care to minimize disturbance of the sediment during collection. Samples will be composited in the field, although a sample may be collected from a single

---

<sup>21</sup> Sediment sample volumes to be collected will be based on laboratory analytical requirements

location based on the availability of soft substrate. All sediment samples will be homogenized by hand mixing, then stored in the dark at approximately 4° Celsius (C) prior to delivery to the laboratory for analyses.

Sediment samples collected using a stainless steel scoop or push sampler will be transferred directly into pre-cleaned, laboratory-supplied clear, wide-mouth (CWM) glass jars and sealed with Teflon-lined lids. Each container will be labeled for sample identification, stored and transported in coolers chilled to approximately 4° Celsius with ice, and delivered under chain-of custody to a State-certified laboratory for sample preparation and laboratory analyses in time to allow analysis of constituents with the shortest holding times. Sample locations and the numbers of sample containers collected will be listed on the Sediment Monitoring Chain-of-Custody forms.

All field analytical and sampling equipment will be decontaminated with a solution of laboratory-grade, non-phosphate detergent and deionized water, and rinsed with deionized water prior to use at individual sample locations. All rinsates will be properly disposed of.

### 5.2.1 Laboratory Analyses

Analyses and preparations will be conducted consistent with State, EPA, and USACE method protocols. Initial laboratory analyses and analytical methods are listed in Table 3, below.

**Table 3: Sediment Work Plan Initial Analytical Constituents and Limits**

ANALYTICAL CONSTITUENTS	TARGET REPORTING LIMIT / MLs <sup>1</sup>
<b>SEDIMENT MONITORING PARAMETERS</b>	<b>mg/kg</b>
Total Organic Carbon	1
Grain Size	-
<b>HYALELLA AZTECA (U.S. EPA 2000)</b>	<b>10 day survival and growth test</b>

<sup>1</sup> Order No. R5-2007-0173, City of Stockton and County of San Joaquin Municipal Separate Storm Sewer System.

Units: mg/kg = milligrams per kilogram (parts per million)  
- = not applicable

Quality assurance/quality control (QA/QC) grab samples consisting of laboratory duplicates or laboratory blanks will be collected from various monitoring locations during the monitoring program. For laboratory duplicate analyses, an additional sample volume must be collected, per laboratory requirements, for each analysis.

Toxicity testing for the amphipod *Hyalella azteca* is based on the procedures outlined in “Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates” (US EPA, 2000). As previously stated in Section 5.0, if at a given monitoring station, toxicity is determined to be statistically significant and greater than or equal to 50% increase in *Hyalella azteca* mortality is observed, follow-up testing including “targeted” sediment Phase I TIE approaches and chemical analyses for chlorpyrifos and pyrethroid pesticides (as listed in Table 4, on the following page) will be implemented and will continue until the nature and cause(s) of the toxicity are defined. The Phase I TIE for ambient waters will be targeted to include methods that assist in the identification of organics (e.g. pesticides) and metals. Should the “targeted” Phase I TIE not resolve the cause of the toxicity, then a full Phase I TIE will be implemented. If 100% mortality is detected in a receiving water sample within 24 hours of test initiation, a dilution series testing is conducted (0.5x steps ranging from the undiluted sample to 6.25% of the sample) to determine the magnitude of toxicity.

**Table 4: Sediment Work Plan Follow-Up Analytical Constituents and Limits**

ANALYTICAL CONSTITUENTS	TARGET REPORTING LIMIT / MLs <sup>1</sup>
<b>ORGANOPHOSPHATE PESTICIDES</b>	<b>µg/kg</b>
Chlorpyrifos	0.01
<b>PYRETHROID PESTICIDES IN SEDIMENT <sup>2</sup></b>	<b>(ng/g)</b>
Bifenthrin	1
Cyfluthrin-1, -2, -3, -4	3
Cypermethrin-1, -2, -3, -4	3
Deltamethrin	2
Esfenvalerate/Fenvalerate-1	2
Esfenvalerate/Fenvalerate-2	1
Lambda-cyhalothrin-1	1
Lambda-cyhalothrin-2	4
Permethrin-1	4
Permethrin-2	1
Tralomethrin <sup>3</sup>	1
<b>TOXICITY INDEX EVALUATION (TIE)</b>	<b>10 day survival and growth test</b>

<sup>1</sup> Order No. R5-2007-0173, City of Stockton and County of San Joaquin Municipal Separate Storm Sewer System.

<sup>2</sup> Pyrethroid isomers are typically reported as totals instead of the individual isomers except where individual isomers may be obtained.

<sup>3</sup> If the laboratory is capable of analyzing for Tralomethrin.

Units: µg/kg = micrograms per kilogram (parts per billion)  
ng/g = nanograms per gram (parts per billion)

### 5.2.2 Health and Safety Procedures

All personnel who participate in fieldwork during the Sediment Work Plan monitoring program will attend a safety indoctrination. Copies of a program specific Health and Safety Plan (HASP) shall be available to all field crews and will be located in each on-site field vehicle.

- Field crews will consist of at least two persons wearing clean, powder-free nitrile gloves and appropriate personal protective equipment (life vest, safety glasses, reflective vests, hard hats, steel toes, etc.) for the specific monitoring/sampling location.
- “Clean sampling” techniques are required to minimize the potential for cross-contamination of the samples. To minimize the potential of sample contamination and personnel exposure, crew members will change gloves whenever something not known to be clean has been touched and/or between sampling locations.
- No smoking, eating, or drinking will be allowed during sample collection. Field personnel should refrain from touching their face while sampling until thoroughly washing their hands. Liquids should be kept in, and consumed at, the field vehicle. Field crew members should wash their hand with antibacterial soap (located in the field vehicle) prior to consuming any food or drinks.
- A drowning hazard exists at the shoreline, along streams, and at waterbodies. If fieldwork is required in water greater than three feet deep or without any protective structure (such as a guard rail) to prevent falling into the waterway, appropriate safety equipment (personal floatation

device) will be worn. Adequate swimming ability will be required of all field crew members conducting receiving water monitoring.

- All electronic equipment will be kept as dry as possible.
- Heat stress will be a hazard during hot weather and will be intensified when personnel are in protective clothing (if necessary). To prevent heat stress, personnel will be required to take breaks as needed, and consume adequate quantities of liquid.

## **6.0 REPORTING**

The Permittees will provide Sediment Work Plan monitoring program updates in the forthcoming Annual Reports. The SWMP will also be updated to reflect any changes to reduce the pollutants causing toxicity or increase pollutant monitoring. A comprehensive final report for the Sediment Work Plan will be submitted to the Regional Water Board in the Annual 2012 Report due September 1, 2012. The final report will include:

- A summary of the project;
- Map of sampling locations;
- Description of activities performed; methods used;
- Project results and conclusions; and,
- BMP assessment, selection, and implementation program.

## 7.0 PROPOSED SCHEDULE

The Sediment Work Plan proposes a staggered schedule for the sediment toxicity monitoring program to commence during the 2008/2009 wet season as shown in Table 5, below. Short-term sediment toxicity testing will consist of annual sediment sample collection from one post first flush storm event (within two weeks of the qualifying storm event) and one dry weather monitoring event through the Permit term. Dry weather sediment toxicity monitoring will be conducted concomitantly with the Permittees' *Low Dissolved Oxygen Monitoring and Assessment Work Plan* and the *Pathogen Plan* monitoring programs to the greatest extent possible. Detention basin sediment toxicity monitoring will be addressed in the *Detention Basin Work Plan*, updated June 2008.

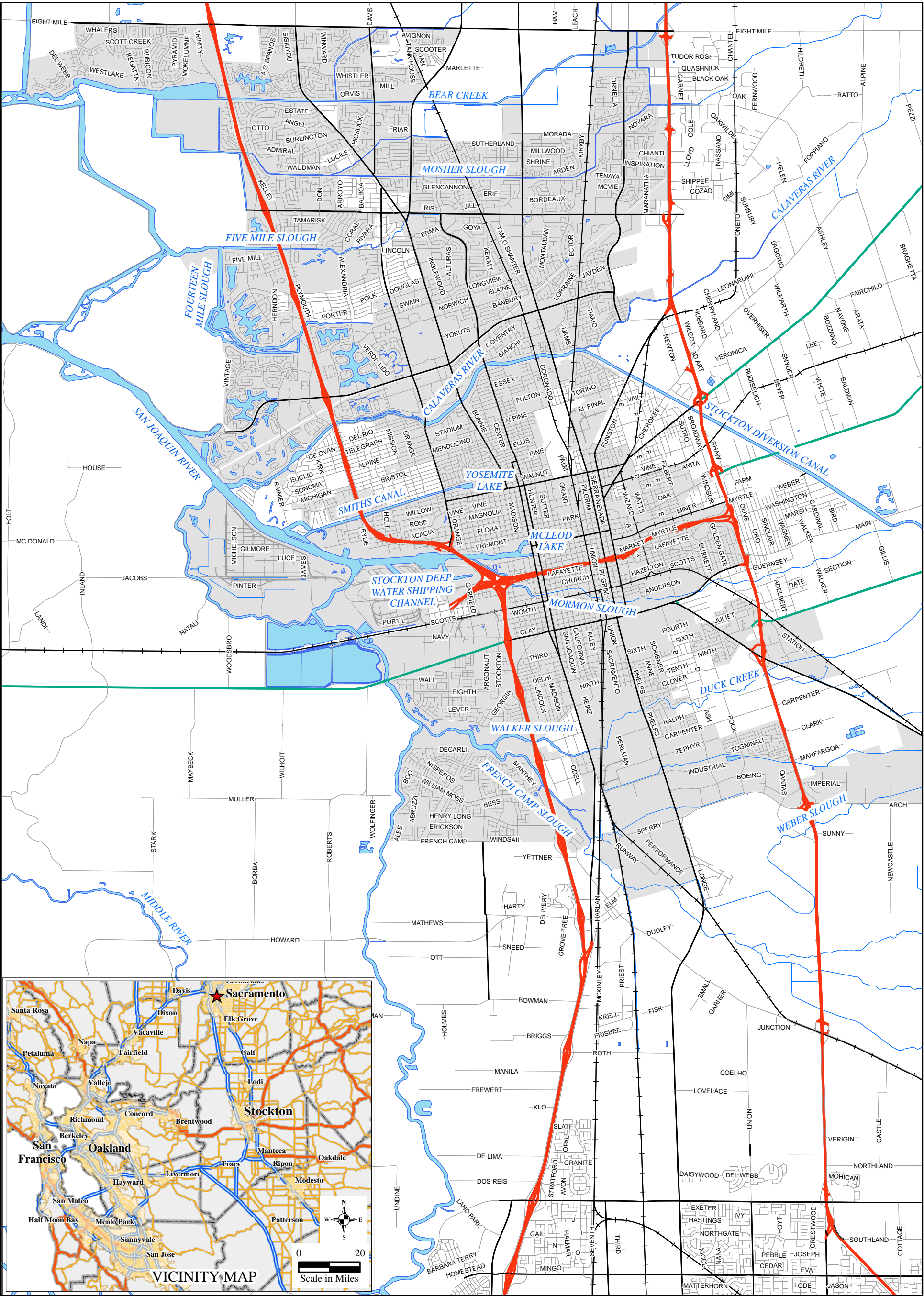
**Table 5: Proposed Sediment Work Plan Monitoring Schedule**

Permit Field Year →	2007/2008	2008/2009		2009/2010		2010/2011		2011/2012		
		Start	End	Start	End	Start	End	Start	End	
		7/01/08	6/30/09	7/01/09	6/30/10	7/01/10	6/30/11	7/01/11	6/30/12	
	Season →	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	
<b>Work Plan Submittal</b>										
Sediment Toxicity Work Plan	6/06/08									
<b>Waterbodies</b>										
Mosher Slough (MS-14R)		X	X							
Mosher Slough (MS-5R)		X	X							
La Morada Detention Basin		X	X							
Calaveras River (CR-39R)				X	X					
Calaveras River (CR-46R)				X	X					
Smith Canal (SC-5R)						X	X			
Five-Mile Slough (5M-27R)						X	X			
Mormon Slough (MR-2R)								X	X	
Duck Creek/Walker Slough (WK-64R)								X	X	
<b>Final Report Submittal</b>										
Sediment Toxicity Work Plan Final Report										12/01/12

Notes: X = one sampling event at each proposed sediment toxicity sampling location

## **ATTACHMENT A**





**LEGEND**

Approximate Boundary of Stockton Urbanized Area (2007)

Water Bodies

Map compiled at scale indicated and in color. Projection: Lambert Conformal Conic  
NAD 1983 California State Plane Coordinate System, Zone III.  
All zoning, street, and water body data created by County of San Joaquin and  
City of Stockton GIS Departments (data current as of 8/07).

SEDIMENT PLAN  
SAN JOAQUIN WATERWAYS WITHIN THE  
GREATER STOCKTON  
URBANIZED AREA  
STOCKTON, CALIFORNIA

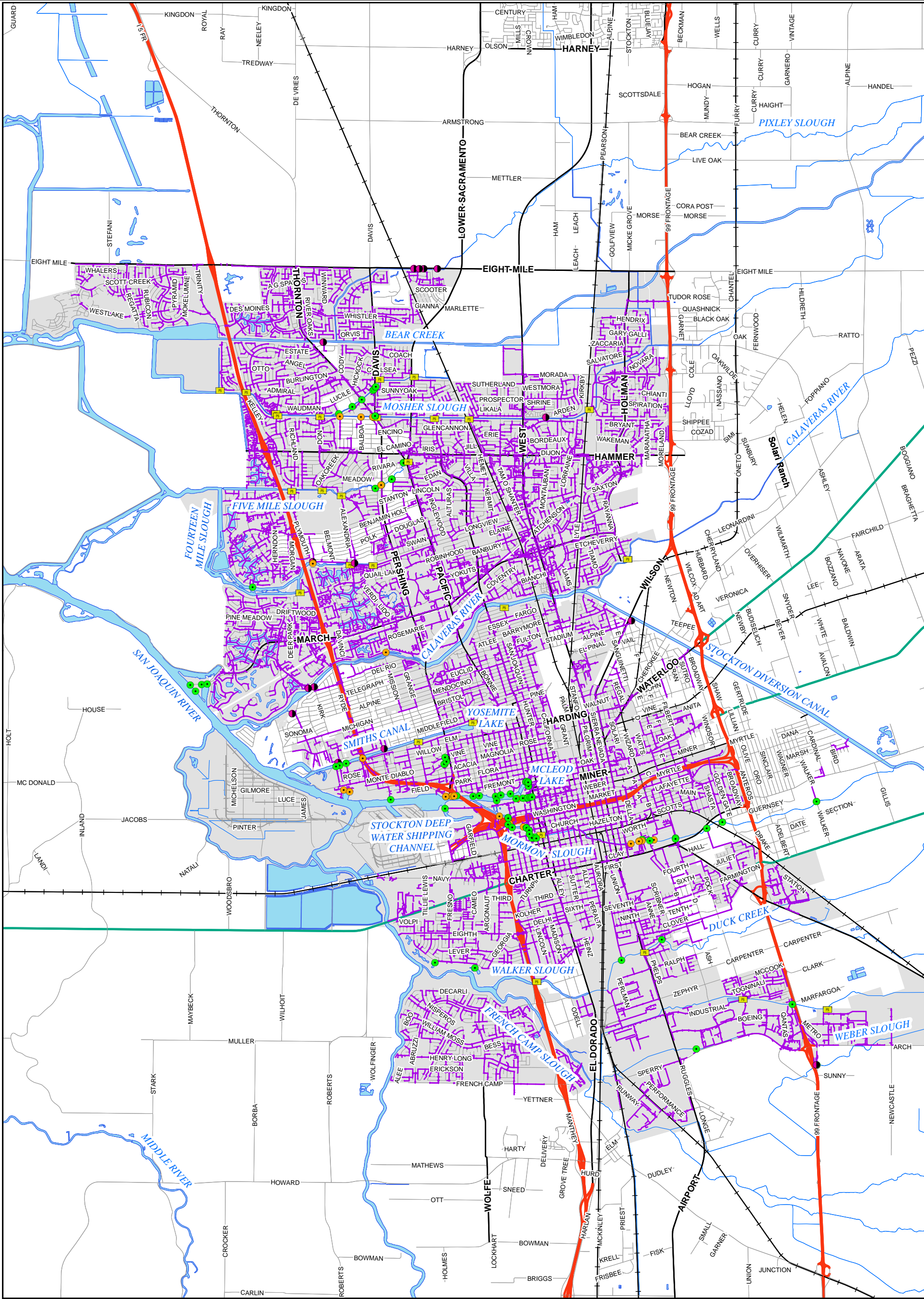
00.6251.252.5

Scale in Miles

FIGURE  
1

5418\_F1.MXD





Gravity Outfall, City

Pump & Lift Station, County/Other

Gravity Outfall, Other

Pump Station

Stormwater line

Approximate Boundary of Stockton Urbanized Area (2007)

Water Bodies

Map compiled at scale indicated and in color. Projection: Lambert Conformal Conic NAD 1983 California State Plane Coordinate System, Zone III. All zoning, street, and water body data created by County of San Joaquin and City of Stockton GIS Departments (data current as of 8/07).

STORMWATER DISCHARGE LOCATIONS  
WITHIN THE GREATER STOCKTON  
URBANIZED AREA  
STOCKTON, CALIFORNIA

00.6251.252.5

Scale in Miles

W

E

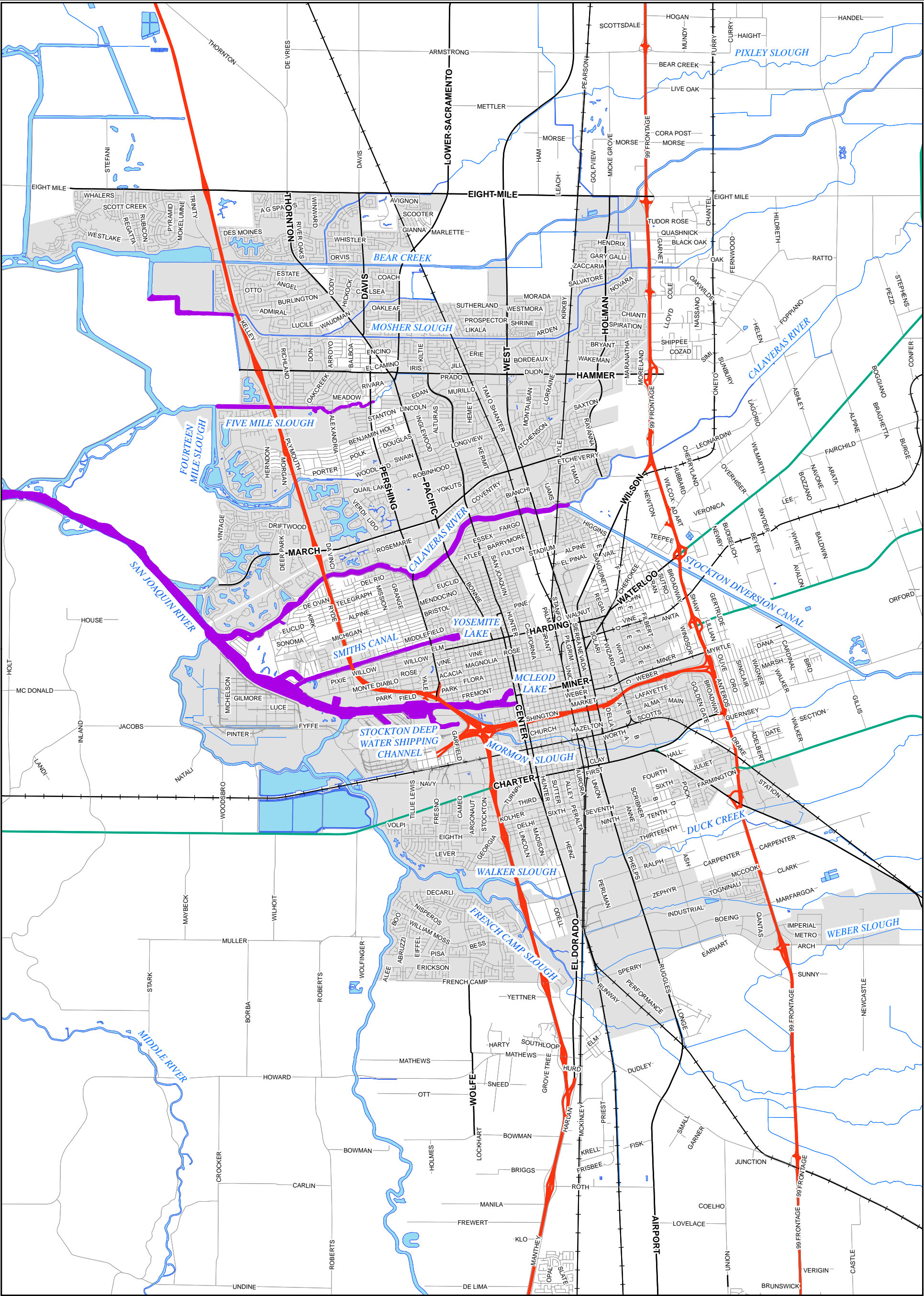
S

N


FIGURE  
2

5418\_F2.MXD







### LEGEND



Waterway Segments  
303(d)-Listed for  
Pesticides



Water Bodies



Approximate Boundary of  
Stockton Urbanized Area (2007)

IMPAIRED PORTIONS OF STOCKTON WATERWAYS  
303(d) - LISTED FOR PESTICIDES  
WITHIN THE GREATER STOCKTON URBANIZED AREA  
STOCKTON, CALIFORNIA

00.6251.252.5

Scale in Miles




FIGURE  
3

5418\_F3.MXD

Map compiled at scale indicated and in color. Projection: Lambert Conformal Conic NAD 1983 California State Plane Coordinate System, Zone III. All zoning, street, and water body data created by County of San Joaquin and City of Stockton GIS Departments (data current as of 8/07).

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City of Stockton  
County of San Joaquin

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Pesticide Plan Update – Revised  
April 2009

*prepared by*

LARRY WALKER ASSOCIATES



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## **1.0 BACKGROUND**

The City of Stockton (City) and County of San Joaquin (County) (collectively Permittees) previously identified organophosphate pesticides (and in particular diazinon and chlorpyrifos) as problematic pollutants that impact local waterbodies. In order to address the organophosphate (OP) pesticide impairment of urban streams, and as specified in Provision D.18.a.v. of their 2002-2007 municipal stormwater National Pollutant Discharge Elimination Systems (NPDES) Permit (Order No. R5-2002-0181), the Permittees developed a Pesticide Plan that addressed the use of diazinon and chlorpyrifos by the City/County and others. The Pesticide Plan was provided to the public, interested parties, and the Regional Water Board for review, and after addressing submitted comments, finalized with an addendum letter to Regional Water Board on September 22, 2004.

According to requirements in the 2002 Permit, the following elements were incorporated into the Plan:

- Public education and outreach programs
- Coordination with Household Hazardous Waste collection agencies
- Landscaping alternatives
- Assessment of the relative contribution of urban stormwater runoff to diazinon and chlorpyrifos levels in waterbodies of concern within the City's jurisdiction
- A diazinon and chlorpyrifos mitigation program should City stormwater be a significant contributor

The City and County have implemented the Pesticide Plan since 2004. The Pesticide Plan results were summarized in detail in the 2005-2006 Annual Report.

In December 2007, the Permittees received a new municipal stormwater permit (Order No. R5-2007-0173) (permit term 2007-2012) which included a requirement for the continued implementation of the Pesticide Plan, specified in Provision D.28.a. The focus of the plan is public outreach and integrated pest management (IPM), to protect water quality and promote safe, and minimal, pesticide use. The Permit also requires the Permittees to continue to monitor diazinon, chlorpyrifos and pyrethroids. This document is an update to the 2004 Pesticide Plan to reflect past efforts and identify future efforts in conformance with the 2007 NPDES Permit. The updated Pesticide Plan incorporates progress and results made since the 2004 Pesticide Plan has been in place, identifies the Permittees' efforts for IPM and municipal operations, enhancements to the public education and outreach program, as well as modifications in the monitoring approach to satisfy monitoring requirements.

### **1.1 Organophosphate Pesticides**

Organophosphate pesticides (including diazinon and chlorpyrifos) act by compromising the nervous systems of exposed organisms. They are broad-spectrum pesticides, used to kill a wide variety of insect pests, including ants, fleas, cockroaches, aphids, spiders, and wasps. However, they can also be highly toxic to birds, honeybees, other beneficial insects, and mammals. Following their widespread use in the 1990s, diazinon and chlorpyrifos became major urban

pollution problems. They are among the most commonly found pesticides in air, rain, and fog, with the highest concentrations near major cities.

In June 2000, the U.S. Environmental Protection Agency (EPA) announced an agreement with pesticide manufacturers to remove most products containing chlorpyrifos (Dursban) from retail sale and phase out most residential and selected professional uses by the end of 2001. Under terms of an agreement with pesticide manufacturers released in December 2000, residential outdoor and indoor uses and sales were to be phased out by the end of 2004. Additionally, most urban uses of diazinon were phased out by the EPA on December 31, 2005.

## 1.2 Pesticide TMDL in Delta Urban Waterways

Water samples collected starting from the mid-1990s from streams, sumps, and sloughs in Stockton during storm runoff events indicated that Stockton urban waterways contained concentrations of chlorpyrifos and diazinon in excess of California Department of Fish and Game recommended values, and caused toxicity to invertebrates. In 2002, the Regional Water Board identified urban creeks in the Stockton areas as being impaired for diazinon and chlorpyrifos, and placed them on the 2002 303 (d) list<sup>1</sup>. The historic pesticide impairment of Sacramento-San Joaquin Delta (Delta) waterways led to the development of a Sacramento-San Joaquin Delta (SSJD) Diazinon and Chlorpyrifos Total Maximum Daily Load (TMDL). The Basin Plan Amendment for the Control of Diazinon and Chlorpyrifos Runoff into the Sacramento-San Joaquin Delta (Amendment) was adopted by the Central Valley Water Board on June 23, 2006<sup>2</sup>.

The TMDL recognized that the USEPA phase-out of urban diazinon and chlorpyrifos uses was expected to significantly reduce the concentrations of those pesticides in urban runoff. Since the City and County already had a Pesticide Plan that had been developed and implemented, the Regional Water Board identified that the Basin Plan Amendment would not likely require the Permittees to implement additional management measures or treatment technology to control diazinon or chlorpyrifos, nor increase the monitoring of those pesticides. The water quality targets for chlorpyrifos and diazinon presented in the Sacramento-San Joaquin Delta Diazinon and Chlorpyrifos TMDL are as follows:

Pesticide	Acute (1-hour average) Maximum Concentration <sup>1</sup>	Chronic (4-day average) Maximum Concentration <sup>1</sup>
Chlorpyrifos	0.025 µg/L	0.015 µg/L
Diazinon	0.16 µg/L	0.10 µg/L

<sup>1</sup> Not to be exceeded more than once in a three year period.

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<sup>1</sup> SWRCB. 2003. Final 2002 Clean Water Act Section 303(d) List of Water Quality Limited Segments (Region 5). State Water Resources Control Board (SWRCB). Sacramento, California. Available at: <http://www.waterboards.ca.gov/tmdl/docs/2002reg5303dlist.pdf>.

<sup>2</sup> SWRCB. 2006. Delta Diazinon and Chlorpyrifos TMDL-Final Basin Plan Amendment Staff Report, June 2006. State Water Resources Control Board (SWRCB). Sacramento, California. Available at: [http://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/delta\\_op\\_pesticide/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_op_pesticide/index.shtml)

In order to ensure that pesticide impairment of Stockton urban waterways is diminishing as expected, the 2007 NPDES Permit requires the City and County to update and continue to implement the Pesticide Plan.



## 2.0 PESTICIDE PLAN 2004-2007

The 2004-2007 Pesticide Plan efforts involved public education, promoting IPM and monitoring urban waterbodies to identify trends in pesticide concentrations. The specific goals included:

- Promotion of IPM through identification of less toxic pesticide alternatives,
- Tracking pesticide applications and uses,
- Conducting public outreach to educate pesticide users on proper handling and disposal, as well as landscaping alternatives,
- Monitoring impaired Stockton urban waterbodies to identify trends in pesticide concentrations.

The IPM program, public outreach, and monitoring efforts conducted under the Pesticide Plan from 2004-2007 are summarized below.

### 2.1 Integrated Pest Management

The Permittees have developed and implemented an IPM program that promotes the use of less toxic or non-toxic approaches to pest management. The Permittees have made many efforts to promote IPM for municipal activities, including the use of IPM at City parks. City and County acres utilizing IPM are summarized in Table 1.

**Table 1. City and County acres managed under the IPM Program<sup>3</sup>**

Year	Number of Acres Under the IPM Program			
	Parks	Golf Courses	Total City acres	County acres
<b>2004-2005</b>	573	390	963	2,000
<b>2005-2006</b>	614	390	1,004	2,171

The specific alternatives to pesticides that were employed by City and County pest control crews as components of the IPM program are listed below:

<u>Weeds</u>	<u>Diseases</u>	<u>Insects</u>
• Hand weeding/hoeing	• Irrigation	• Plant selection
• Mulch for suppression	• Plant selection	• Pruning
• Adjust mowing height	• Pruning	• Physical removal
• Improve drainage	• Fertilization	• Landscape design
	• Landscape design	

<sup>3</sup> City of Stockton and County of San Joaquin National Pollutant Discharge Elimination System Municipal Stormwater Program 2005-2006 Annual Report.

## 2.2 Public Education and Outreach

The Pesticide Plan relies heavily on education and outreach efforts that promote less toxic pest control methods and use of IPM. The City participates in the University of California (UC) Statewide Integrated Pest Management Program with Orchard Supply Hardware (OSH) to encourage the use of less toxic products and proper disposal of pesticides. Known as the “Our Water Our World” (OWOW) program, the program is now supported in all 82 California OSH stores. The City’s focus is specifically at the sole Stockton store. The program provides over 20 different fact sheets on less-toxic pest management strategies to retail outlets that sell pesticides; holds community outreach events in stores to promote less toxic methods and products; and trains store personnel in IPM principles. The OWOW program is also part of the outreach efforts at community events.

The public education and outreach program distributed a number of educational materials for various target audiences and activities. The City distributed approximately one thousand pieces per year at OSH. Materials are summarized in Table 2.

**Table 2. Education and outreach materials distributed**

Name of Material	Target audience
<b>Brochures</b>	
County Household Hazardous Waste Consolidation Facility	General public
Parks and Recreation Turf Management Tips & Techniques	Urban pest control professionals, Municipal parks, golf courses and recreation managers
Residential Pest Control Landscape Management Tips & Techniques	Residential gardeners
<b>Fact Sheets</b>	
Our Water Our World IPM Fact Sheets	General public
U.C. California-Davis 14 IPM and Website Cards	General public

### 2.2.1 Public Education and Outreach Effectiveness Assessment

Because the Pesticide Plan relies heavily on public outreach and education, public surveys are used to evaluate the program effectiveness. Questions to assess the awareness and impact of the pesticide education program were incorporated into head-of-household surveys conducted in 2005 and 2007. Survey data was compared with data collected from the baseline survey, established in 2003. The survey results from 2005 and 2007 suggest that Pesticide Plan has been successful in educating the general public about the impacts of pesticide use and the importance of proper disposal. When compared to baseline survey results:

- A greater percentage of respondents knew to take the leftover pesticides or weed killers to the HHW Facility or a collection event (2007: 29%; 2005: 29%; 2003: 23%)<sup>4</sup>;

<sup>4</sup> City of Stockton and County of San Joaquin National Pollutant Discharge Elimination System Municipal Stormwater Program 2005-2006 Annual Report.

- Fewer respondents reported that they disposed of remaining pesticide products in the trash (2007: 12%; 2005: 10%; 2003: 21%); and
- Similar numbers of respondents reported that garden care products can contribute to storm drain pollution (2007: 7%; 2005: 12%; 2003: 6%).

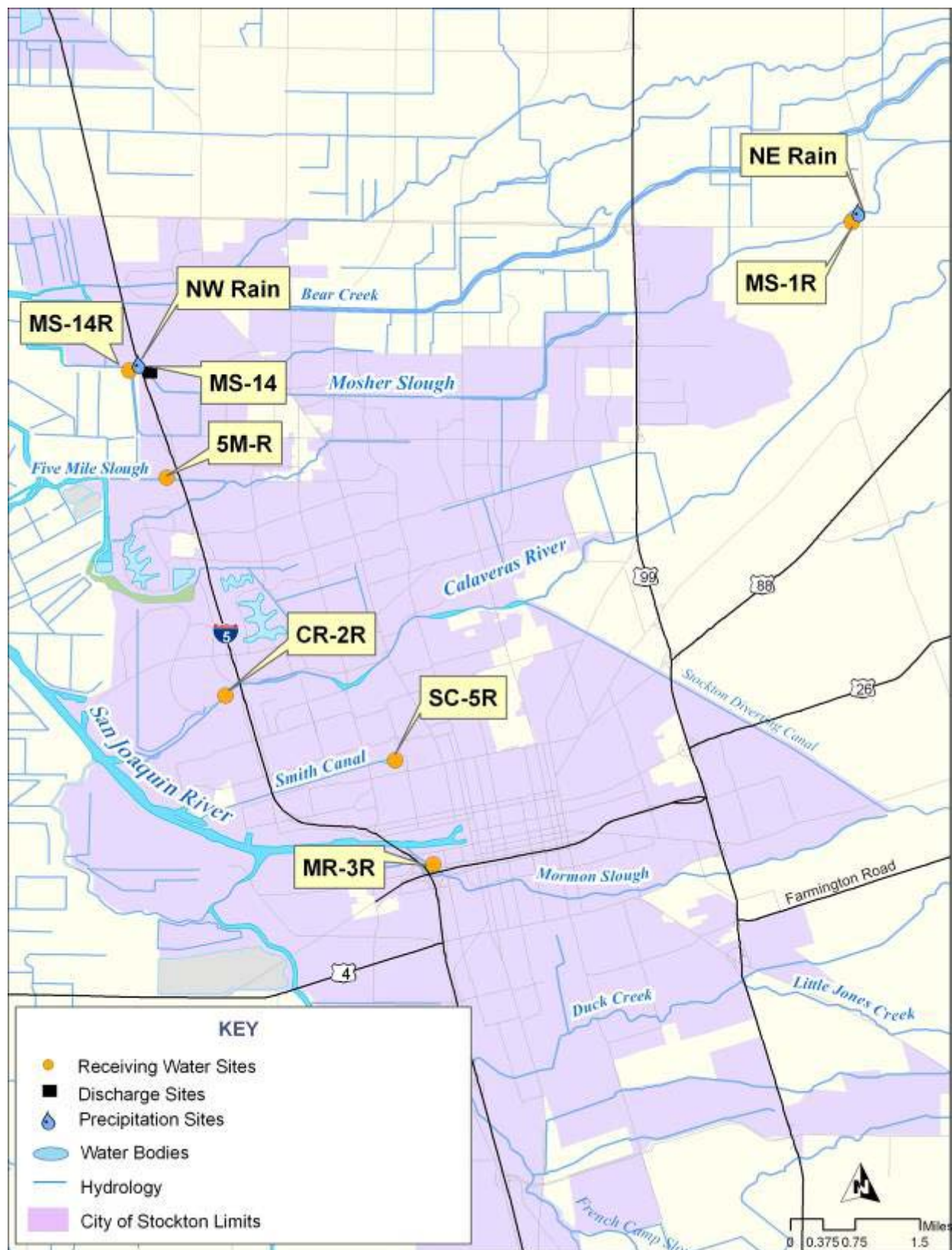
Insight gained from the survey will be incorporated into outreach and education efforts to improve community awareness of proper pesticide use and disposal. Specifically, outreach efforts should focus on informing the public that garden care products can contribute to storm drain pollution. Section 3.1 of this document outlines the Permittees enhancements to the Public Education and Outreach program to improve pesticide knowledge in the community.

## **2.3 Monitoring**

The Permittees conducted an assessment of the relative contribution of OP pesticides (diazinon and chlorpyrifos) to waters within its jurisdiction that are identified as a toxic hot spot (per § 13394 of Porter-Cologne) or are on the Clean Water Act (CWA) 303(d) list for pesticide impairment. The 2002 NPDES Permit required the Permittees to: (1) identify trends in the levels of diazinon and chlorpyrifos in all CWA 303(d) listed waters within the Permittees' jurisdiction; and, (2) examine the concentration of diazinon and chlorpyrifos in rainwater at sites within and outside of the Stockton Urbanized Area. Based on these requirements, and comments received during the public comment period, a targeted monitoring program for diazinon, chlorpyrifos, and pyrethroids was developed. The Permittees added pyrethroids to the analyte list because pyrethroids are replacing OP pesticides as the pesticide most used by urban and agricultural users.

### **2.3.1 Location of Pesticide Plan Monitoring Sites**

The Pesticide Plan identified a monitoring program that targeted rainwater within and outside of the Stockton area (labeled "NE Rain" and "NW Rain"), and local San Joaquin River tributary receiving waters that were classified as impaired due to elevated levels of pesticides (Figure 1). The receiving water sites were located in Mosher Slough (MS), Five-Mile Slough (5M), Calaveras River (CR), Smith Canal (SC), and Mormon Slough (MR).



**Figure 1. 2004 Pesticide Plan Monitoring Locations**

### **2.3.2 Timing of Pesticide Monitoring**

The timing of the monitoring was coordinated with annual cycles in pesticide application by agricultural and urban users. Application of pesticides, particularly to orchards, often revolves around the dormant season. Though spraying periods are variable based on weather conditions and crop type, the following periods are the approximate “spray seasons”:

- Pre-dormant spray season: October – December
- Dormant spray season: December – March
- Post-dormant spray season: March – June
- Dry Season: June – October

The timing of the monitoring with respect to growing seasons is shown in Table 3. Spraying pesticides during the dormant season reduces wintering populations of pests during vulnerable periods of their lifecycles, while reducing exposure of non-target organisms, such as natural enemies. Dormant sprays can also serve as an effective preventative measure to reduce or eliminate the need for multiple insecticide applications for target pests over the course the growing season. It should be noted, however, that using pesticides during the dormant season, which is the rainiest time of the year, has led to many of the water quality impacts associated with the enrichment of OP pesticides in runoff from agricultural and urban areas. Therefore, an important goal of Pesticide Plan monitoring was to characterize the differences in water quality during different spray seasons.

### **2.3.3 Frequency of Pesticide Monitoring**

All monitoring locations, including precipitation sites (NE Rain and NW Rain), were monitored for OP pesticides and pyrethroids during:

- One storm event during the dormant spray application season (1/14/06); and
- One storm event after the dormant spray application season (3/19/05); and
- One event during the dry season (6/15/05) (except for precipitation sites).

In addition, three sites – 2 receiving water and 1 discharge– along Mosher Slough were monitored during additional events, for a total of:

- Two storm events during the dormant spray application season (1/14/06 and 1/30/06);
- Two storm events after the dormant spray application season (3/19/05 and 4/28/05) ; and
- Two events during the dry season (6/15/05 and 8/30/05).

Also, benthic sediment samples from the downstream Mosher Slough receiving water site (MS-14R) were analyzed for pyrethroids during:

- One event before the dormant spray application season (12/1/05);
- One storm event during the dormant spray application season (1/14/06); and

Benthic sediments were analyzed for pyrethroids because, unlike diazinon and chlorpyrifos, pyrethroids are hydrophobic and therefore tend to bind to sediments as opposed to remaining in the water column.

The frequency of the monitoring is also shown in Table 3.

Much of the pesticide loading to Mosher Slough may be due to upstream inputs by agricultural land uses. Monitoring was conducted more frequently in Mosher Slough in order to better define OP pesticide concentration trends, and to quantify relative upstream/downstream differences and thereby characterize the impacts of upstream (and out-of-City) agricultural inputs. Monitoring was conducted at a pump station (MS-14) and two in-stream locations in Mosher Slough; one upstream of the City (MS-1R) and one downstream of urban influence (MS-14R). In addition, both rainwater stations were located along Mosher Slough, one site within the City limits (NW Rain) and one site outside of the City limits (NE Rain). Finally, as noted above, Mosher Slough (MS-14R) was the site used for testing of benthic sediment for pyrethroids.

It should also be noted that, as discussed in the 2004/05 Annual Report, monitoring events were also conducted during dormant spray storm events on 12/7/04, 1/7/05, and 1/26/05. However, the laboratory achieved poor reporting limits (RL) of 2.0 µg/L and OP pesticides were non-detect. The laboratory that analyzed water column pyrethroids achieved satisfactory RLs.

**Table 3. Timing and Frequency of Pesticide Plan Monitoring Events**

Waterbody	Site Type and Name	2004/2005 Monitoring Year						2005/2006 Monitoring Year			
		Dormant Spray Season Storm (12/7/04) <sup>1</sup>	Dormant Spray Season Storm (1/7/05) <sup>1</sup>	Dormant Spray Season Storm (1/26/05) <sup>1</sup>	Post Dormant Spray Season Storm (3/19/05)	Post Dormant Spray Season Storm (4/28/05)	Dry Season (6/14/05)	Dry Season (8/30/05)	Pre Dormant Spray Season (12/1/05)*	Dormant Spray Season Storm (1/14/06) <sup>*</sup>	Dormant Spray Season Storm (1/30/06)
Mosher Slough - urban discharge	Pump Station: MS-14	√	√	---	√	√	√	√	√	<b>X , O</b>	<b>X , √</b>
Mosher Slough - upstream	Receiving Water: MS-1R	√	√	---	√	√	√	√	√	√	√
Mosher Slough - down stream	Receiving Water: MS-14R	√	√	---	√	√	√	√	---	√	√
Five Mile Slough	Receiving Water: 5M-1R	√	---	---	√	---	√	---	---	√	---
Mormon Slough	Receiving Water: MR-3R	√	---	---	√	---	√	---	---	√	---
Calaveras River	Receiving Water: CR-2R	√	---	---	√	---	√	---	---	√	---
Smith Canal	Receiving Water: SC-5R	√	---	---	√	---	√	---	---	√	---
Rainwater Within City Limits	Rainwater collection site: NW Rain	√	---	√	√	---	---	---	√	---	---
Rainwater Outside City Limits	Rainwater collection site: NE Rain	√	---	√	√	---	---	---	<b>O , √</b>	---	---

1 = For samples collected on this date the laboratory reported very high reporting limits for diazinon and chlorpyrifos, which guaranteed that they would be non-detect.

Pyrethroids were analyzed with satisfactory reporting limits and were also non-detect.

√ = Sample collected – diazinon and chlorpyrifos were below DFG WQOs and pyrethroids were non-detect, unless otherwise indicated

X = Sample collected – diazinon was above WQO of 0.160 µg/L but pyrethroids were non-detect

O = Sample collected – chlorpyrifos was above WQOs of 0.025 µg/L but pyrethroids were non-detect

--- = No sample collected on this date

\* = On this date, benthic sediment was collected from MS-14R and analyzed for pyrethroids, which were non-detect.

### 2.3.4 Pesticide Plan Monitoring Results

During monitoring efforts, a total of approximately 50 samples – 31 water samples during 2004/05, and 17 water and 2 sediment samples during 2005/06 – were collected and analyzed for diazinon, chlorpyrifos, and pyrethroids, as shown in Table 5, Table 6, and Table 7, respectively. In cases of non-detection, results are reported as “less than” the RL. While analytical RLs for diazinon and chlorpyrifos were relatively high during the December 2004 and January 2005 events (a total of 12 samples), all samples collected after these dates (36 samples) were analyzed by CRG Marine Laboratories of Torrance, CA with ultra-low method detection limits (MDL = 0.005 micrograms per liter ( $\mu\text{g/L}$ )). It is common for other labs to only be able to achieve RLs that are twice as high (MDL = 0.01  $\mu\text{g/L}$ ). Also, note that samples from all events, even those in 2004/05, were analyzed by Caltest Laboratory in Napa, CA using ultra-low detection limits for pyrethroids (see Table 7 for pyrethroids detection limits). Using ultra-low detection limits maximized the ability of the Program to detect and quantify pesticide concentrations, and characterize spatial and temporal trends.

Overall, the frequency of pesticide detections was low, and Water Quality Objectives (WQO) for diazinon, chlorpyrifos, and pyrethroids were regularly achieved in the Stockton Area waterways that were monitored. This was especially the case for chlorpyrifos and pyrethroids, which were detected in only 14% and 0% of samples, respectively. The frequency of detection and the rate of WQO exceedances are shown in Table 4. The WQOs for diazinon and chlorpyrifos were considered to be the Department of Fish and Game (DFG) revised criteria of 0.16  $\mu\text{g/L}$  and 0.025  $\mu\text{g/L}$ , respectively, which are also the targets of the SSJD Diazinon and Chlorpyrifos TMDL. While in the case of diazinon, detection rates were much higher, 15 of 36 samples (41%), WQO exceedances were observed in only 6% of the collected samples. It should be noted that buildup of diazinon and chlorpyrifos in benthic sediments, and impacts on benthic organisms were not analyzed. However, pyrethroids, which were analyzed in two sediment samples from Mosher Slough at MS-14, were not detected in sediment.

**Table 4. Frequency of Detections and WQO Exceedances during the Pesticide Plan**

Pesticide	Number of Samples <sup>1</sup>	Number of Detections	Detection Rate	Number of Samples above the WQO <sup>2</sup>	WQO Exceedance Rate
Diazinon	36	15	41%	2	6%
Chlorpyrifos	36	5	14%	2 <sup>3</sup>	6%
Pyrethroids	50 <sup>4</sup>	0	0%	0	0%

1 = Only samples analyzed with ultra-low method detection limits are considered in this table.

2 = WQOs for diazinon and chlorpyrifos are 0.16  $\mu\text{g/L}$  and 0.025  $\mu\text{g/L}$ , respectively.

3 = One of these WQO exceedances occurred in rainwater that was collected outside of the Stockton Urbanized Area.

4 = This includes 2 benthic sediment samples collected from MS-14R at Mosher Slough



### *Trends Observed during Pesticide Plan Monitoring*

To display the diazinon and chlorpyrifos data collected during the Pesticide Plan, and elucidate spatial and temporal variations in pesticide concentrations, a geographic information systems (GIS) tool was utilized. Due to the fact that pesticides were detected relatively infrequently, it is difficult to develop comprehensive conceptual models regarding the transport of pesticides in the Stockton area. In fact, no pyrethroids were detected in any of 50 samples, even though ultra-low detection limits were used. Nonetheless, a few general trends were observed, as discussed in the sections below.

#### *Diazinon*

While diazinon was determined to be a stormwater Pollutant of Concern (POC) in 2003/04, data collected from 2004-2006 suggest that WQOs are regularly attained in Stockton waterways. There were only two exceptions for diazinon, and both WQO exceedances occurred in urban runoff collected at the Mosher Slough pump station (MS-14) during the dormant spray season (January 2006). It is also worth noting that during each storm event during the dormant spray season (January 2006) and the post-dormant spray season (March/April 2005), diazinon concentrations increased in Mosher Slough from the upstream site MS-1R to the downstream site MS-14R. However, zero receiving water WQO exceedances were observed during the entire study. Observed concentrations of diazinon at Five Mile Slough and Smith Canal were also highest during the dormant spray season. At the same time, diazinon was detected (concentration = 0.0253 µg/L) in precipitation collected outside of the urban area during the post-dormant spray season (March 2005). Therefore, it is possible that agricultural spray drift from outside of the City enriches rainwater before it even falls to the ground. However, the detection in rainwater occurred before the phase-out by USEPA was complete, and it is unknown if diazinon is still present in rainwater. Regardless, there were zero receiving water WQO exceedances observed during the Pesticide Plan, and thus diazinon impacts by stormwater may have been greatly reduced by the phase-out by USEPA, which was completed in December 2005. As described in the SSJC Diazinon and Chlorpyrifos TMDL, due to the completed phase-out, as time goes on it is expected that diazinon concentrations in Stockton area waterways will be reduced even further.

#### *Chlorpyrifos*

Chlorpyrifos was detected even less frequently than diazinon. In fact, chlorpyrifos was only detected in 5 of 36 samples, even with ultra low detection limits, and for those samples in which chlorpyrifos was detected, only two were observed above the water quality objective. The first occurrence was in the sample collected from the Mosher Slough (MS-14) pump station during the dormant spray season in January 2006. The second occurrence was during the pre-dormant spray season in December 2005, when chlorpyrifos was detected in rainwater outside of the City at concentrations above the WQO. Therefore, as with diazinon, it is possible that agricultural spray drift from outside of the City enriches rainwater, and in the case of chlorpyrifos, monitoring suggests that in some cases rainwater may have already been enriched above the WQO before it even falls to the ground. However, like the detection of diazinon in rainwater, the detection of chlorpyrifos in rainwater occurred before the phase-out by USEPA was complete, and it is unknown if chlorpyrifos is still present in rainwater. Overall, chlorpyrifos was detected very infrequently, zero receiving water WQO exceedances were observed, and thus (like

diazinon) its impacts by stormwater may have already been greatly reduced by the phase-out by USEPA.

### *Pyrethroids*

Pyrethroids, the most likely replacement for recently phased-out OP pesticides (diazinon and chlorpyrifos), were analyzed during the Pesticide Plan in response to comments received during the public comment period. Very sensitive reporting limits were used for all pyrethroids analyses, yet no pyrethroids were detected in any of the 48 water and 2 sediment samples collected during the Pesticide Plan. Therefore, it appears that pyrethroids are not generally present in Stockton-area discharge or receiving waters. However, it is acknowledged that over the past few years it has become relatively well-known that pyrethroids are normally tightly-bound by sediments (and thus not present in the water column), and only a few sediment samples were collected during the Pesticide Plan.

**Table 5. Diazinon Concentrations Observed during Pesticide Plan Monitoring (µg/L)**

Waterbody	Site Type and Name	2004/2005 Monitoring Year						2005/2006 Monitoring Year			
		Dormant Spray Season Storm (12/7/04) <sup>1</sup>	Dormant Spray Season Storm (1/7/05) <sup>1</sup>	Dormant Spray Season Storm (1/26/05) <sup>1</sup>	Post Dormant Spray Season Storm (3/19/05)	Post Dormant Spray Season Storm (4/28/05)	Dry Season (6/14/05)	Dry Season (8/30/05)	Pre Dormant Spray Season (12/1/05)	Dormant Spray Season Storm (1/14/06)	Dormant Spray Season Storm (1/30/06)
Mosher Slough - urban discharge	Pump Station: MS-14	<2.0 <sup>+</sup>	<2.0 <sup>+</sup>	----	<b>0.046</b>	<b>0.030</b>	<0.005	<0.005	<0.005	<b>*0.178*</b>	<b>*0.374*</b>
Mosher Slough – upstream	Receiving Water: MS-1R	<2.0 <sup>+</sup>	<2.0 <sup>+</sup>	----	<0.005	<0.005	<0.005	<0.005	----	<b>0.044</b>	<b>0.0571</b>
Mosher Slough - down stream	Receiving Water: MS-14R	<2.0 <sup>+</sup>	<2.0 <sup>+</sup>	----	<b>0.0196</b>	<b>0.0275</b>	<0.005	<0.005	<0.005	<b>0.090</b>	<b>0.138</b>
Five Mile Slough	Receiving Water: 5M-1R	<2.0 <sup>+</sup>	----	----	<b>0.0129</b>	----	<0.005	----	----	<b>0.303</b>	----
Mormon Slough	Receiving Water: MR-3R	<2.0 <sup>+</sup>	----	----	<0.005	----	<0.005	----	----	<0.005	----
Calaveras River	Receiving Water: CR-2R	<2.0 <sup>+</sup>	----	----	<0.005	----	<0.005	----	----	<0.005	----
Smith Canal	Receiving Water: SC-5R	<2.0 <sup>+</sup>	----	----	<b>0.0333</b>	----	<0.005	----	----	<b>0.113</b>	----
Rainwater Within City Limits	Rainwater collection site: NW Rain	----	----	<2.0 <sup>+</sup>	<0.005	----	----	----	<0.005	----	----
Rainwater Outside City Limits	Rainwater collection site: NE Rain	----	----	<2.0 <sup>+</sup>	<b>0.0253</b>	----	----	----	<0.005	----	----

1 = For samples collected on this date the laboratory reported very high reporting limits for diazinon and chlorpyrifos, which guaranteed that they would be non-detect..

Pyrethroids were analyzed with satisfactory reporting limits and were also non-detect.

--- = No sample collected on this date

+ = This reporting limit was below data quality objectives, and therefore additional samples were collected during the following dormant spray season.

**\*RED\*** = Concentration above WQO of 0.160 µg/L

**Table 6. Chlorpyrifos Concentrations Observed during Pesticide Plan Monitoring (µg/L)**

Waterbody	Site Type and Name	2004/2005 Monitoring Year						2005/2006 Monitoring Year			
		Dormant Spray Season Storm (12/7/04) <sup>1</sup>	Dormant Spray Season Storm (1/7/05) <sup>1</sup>	Dormant Spray Season Storm (1/26/05) <sup>1</sup>	Post Dormant Spray Season Storm (3/19/05)	Post Dormant Spray Season Storm (4/28/05)	Dry Season (6/14/05)	Dry Season (8/30/05)	Pre Dormant Spray Season (12/1/05)	Dormant Spray Season Storm (1/14/06)	Dormant Spray Season Storm (1/30/06)
Mosher Slough - urban discharge	Pump Station: MS-14	<2.0 <sup>+</sup>	<2.0 <sup>+</sup>	----	<0.005	<0.005	<0.005	<0.005	<0.005	<b>*0.0849*</b>	<b>0.0178</b>
Mosher Slough - upstream	Receiving Water: MS-1R	<2.0 <sup>+</sup>	<2.0 <sup>+</sup>	----	<0.005	<0.005	<0.005	<0.005	----	<0.005	<0.005
Mosher Slough - down stream	Receiving Water: MS-14R	<2.0 <sup>+</sup>	<2.0 <sup>+</sup>	----	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<b>0.0161</b>
Five Mile Slough	Receiving Water: 5M-1R	<2.0 <sup>+</sup>	----	----	<b>0.0174</b>	----	<0.005	----	----	<0.005	----
Mormon Slough	Receiving Water: MR-3R	<2.0 <sup>+</sup>	----	----	<0.005	----	<0.005	----	----	<0.005	----
Calaveras River	Receiving Water: CR-2R	<2.0 <sup>+</sup>	----	----	<0.005	----	<0.005	----	----	<0.005	----
Smith Canal	Receiving Water: SC-5R	<2.0 <sup>+</sup>	----	----	<0.005	----	<0.005	----	----	<0.005	----
Rainwater Within City Limits	Rainwater collection site: NW Rain	----	----	<2.0 <sup>+</sup>	<0.005	----	----	----	<0.005	----	----
Rainwater Outside City Limits	Rainwater collection site: NE Rain	----	----	<2.0 <sup>+</sup>	<0.005	----	----	----	0.0615	----	----

1 = For samples collected on this date the laboratory reported very high reporting limits for diazinon and chlorpyrifos, which guaranteed that they would be non-detect..

Pyrethroids were analyzed with satisfactory reporting limits and were also non-detect.

--- = No sample collected on this date

+ = This reporting limit was below data quality objectives, and therefore additional samples were collected during the following dormant spray season.

**\*RED\*** = Concentration above WQO of 0.160 µg/L

**Table 7. Pyrethroid Concentrations Observed during Pesticide Plan Monitoring**

Waterbody	Site Type and Name	2004/2005 Monitoring Year					2005/2006 Monitoring Year				
		Dormant Spray Season Storm (12/7/04)	Dormant Spray Season Storm (1/7/05)	Dormant Spray Season Storm (1/26/05)	Post Dormant Spray Season Storm (3/19/05)	Post Dormant Spray Season Storm (4/28/05)	Dry Season (6/14/05)	Dry Season (8/30/05)	Pre Dormant Spray Season (12/1/05) *	Dormant Spray Season Storm (1/14/06)*	Dormant Spray Season Storm (1/30/06)
Mosher Slough - urban discharge	Pump Station: MS-14	ND	ND	---	ND	ND	ND	ND	ND	ND	ND
Mosher Slough - upstream	Receiving Water: MS-1R	ND	ND	---	ND	ND	ND	ND	---	ND	ND
Mosher Slough - down stream	Receiving Water: MS-14R	ND	ND	---	ND	ND	ND	ND	ND	ND	ND
Five Mile Slough	Receiving Water: 5M-1R	ND	---	---	ND	---	ND	---	---	ND	---
Mormon Slough	Receiving Water: MR-3R	ND	---	---	ND	---	ND	---	---	ND	---
Calaveras River	Receiving Water: CR-2R	ND	---	---	ND	---	ND	---	---	ND	---
Smith Canal	Receiving Water: SC-5R	ND	---	---	ND	---	ND	---	---	ND	---
Rainwater Within City Limits	Rainwater collection site: NW Rain	---	---	---	---	---	---	---	---	---	---
Rainwater Outside City Limits	Rainwater collection site: NE Rain	---	---	---	---	---	---	---	---	---	---

\* = On this date, benthic sediment was collected from MS-14R and analyzed for pyrethroids, all of which were non-detect.

--- = No sample collected on this date

**RED** = Concentration above WQO of 0.025 µg/L

ND = Sample was non-detect for all pyrethroids; for most samples the reporting limits were (µg/L):

Bifenthrin	< 0.0050	Fenvalerate	< 0.0050
Cyfluthrin	< 0.0080	Fluvalinate	< 0.0050
Cyhalothrin	< 0.0080	Permethrin	< 0.0050
Cypermethrin	< 0.0050	Resmethrin	< 0.0060
Danitol	< 0.024	Tralomethrin	< 0.0080

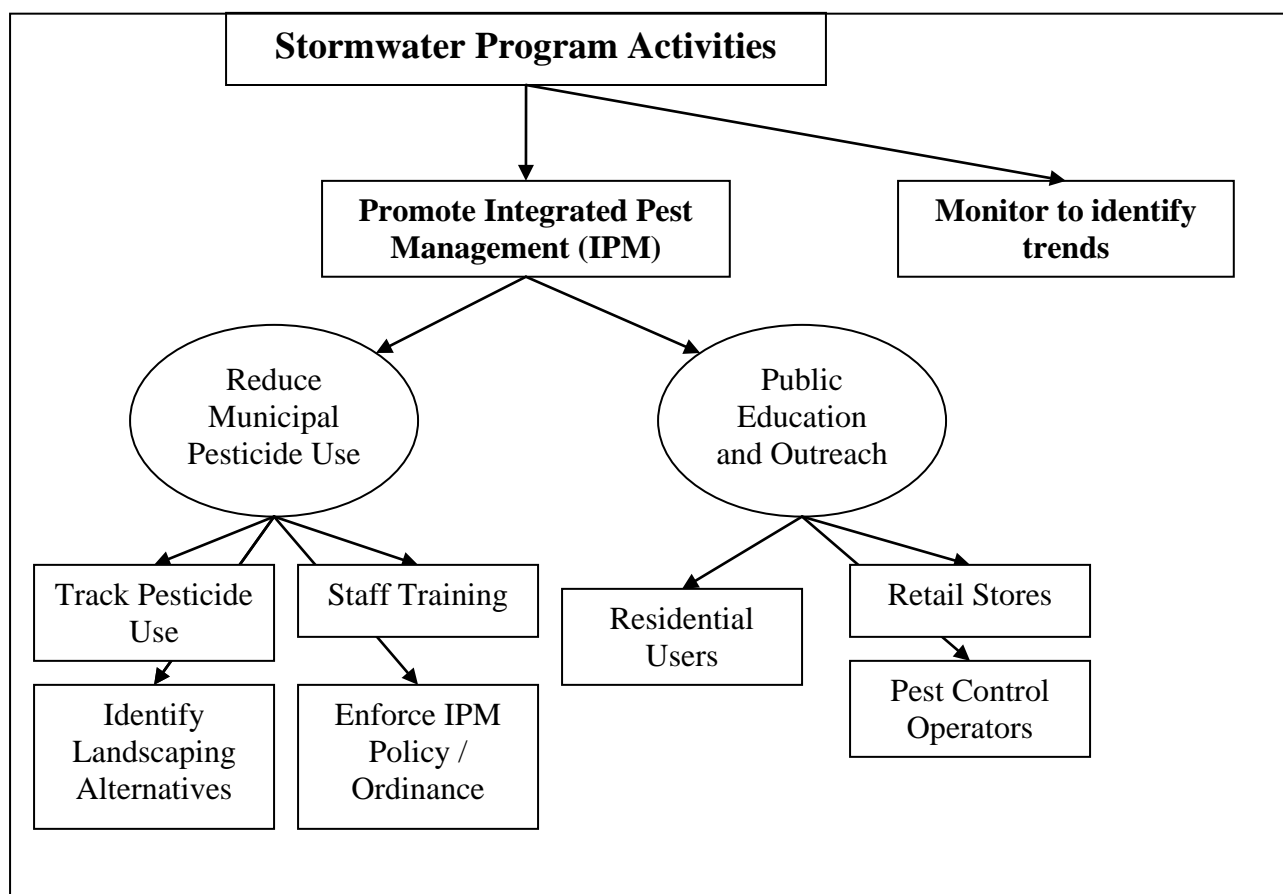
### **3.0 PESTICIDE PLAN 2007-2012**

The Pesticide Plan will continue the public outreach and promotion of IPM that was implemented during the 2004-2007 Plan, and will extend its monitoring efforts to track OP pesticide concentrations. As the OP pesticides diazinon and chlorpyrifos are phased out, a new generation of chemicals (e.g., pyrethroids) will replace them as the most commonly used pesticides. As such, the most important component of the Pesticide Plan may be the promotion of IPM, which is applicable to all types of pesticides.

The overall goal of the Pesticide Plan is to protect water quality by implementing IPM, and the associated Best Management Practices (BMPs) to minimize or eliminate pesticides in stormwater runoff. The Pesticide Plan proposes to accomplish this goal (and address permit requirements) with both water quality monitoring and the implementation of IPM in public and municipal activities. The Pesticide Plan includes the following components:

- Public education and outreach
- IPM and municipal operations
- Effectiveness assessment
- Water quality monitoring

The Pesticide Plan approach is summarized in Figure 2.



**Figure 2. Diagram of the Pesticide Plan Approach**

### **3.1 Public Education and Outreach**

The Permittees will continue to coordinate with the County Agriculture Commission and Extension Service, environmental organizations, and interested stakeholders to provide targeted information to the public about safe pesticide use and disposal, as well as less toxic pest control alternatives. Education and outreach programs that have been conducted as components of the Pesticide Plan thus far will continue to be implemented. Key outreach forums/mechanisms include:

#### **3.1.1 “Our Water Our World” Program Outreach**

The OWOW program began in 1997 by Central Contra Costa Sanitary District in cooperation with the Bay Area Regional Water Quality Control Board and grant support from the California Department of Pesticide Regulation and the National Foundation for Integrated Pest Management Education (USEPA funding). The pilot project was implemented in various nurseries and other retail outlets in Contra Costa County, the city of Palo Alto and Marin County in 1998. Since then, the program has expanded to include additional California communities and participation by OSH stores throughout California. The program provides over 20 different fact sheets on less-toxic pest management strategies to retail outlets that sell pesticides; holds

community outreach events in stores to promote less toxic methods and products; and trains store personnel in IPM principles.

The Permittees have supported the OWOW Program through Orchard Supply Hardware. During the 2007-2012 Permit term, the Permittees will involve other local garden-supply retailers in the OWOW program. The City and County will report the number of new retailers which adopt IPM promotion programs in its Annual Reports.

### **3.1.2 Annual Public Outreach Messages**

Prior to the wet season, the City and County will promote IPM and proper pesticide handling through the following mechanisms, which are already in practice:

- Inclusion of brochures promoting IPM in City and County publications
- Public service announcements on radio and television
- Newspaper articles

These outreach mechanisms will be employed annually. The Permittees will conduct a survey of the regional sales of residential and commercial pesticides which are available for the public on a bi-annual basis (i.e. once every two years). This survey will allow the Permittees to identify potential pesticide use and impacts before they occur.

### **3.1.3 City-Sponsored Workshops**

The City will hold annual public workshops in the summer in order to promote safer pest control. These workshops will follow a similar format to the OWOW Program classes, but will be more widely advertised and will target the general public. Municipal staff and/or consultants will provide training on safer pesticide use, less-toxic pesticide alternatives, and the use of native plants to minimize the need for pesticides and reduce water use.

Additional, more in-depth training workshops will target pest control operators and municipal staff who deal with landscape management (detailed in section 3.2.2).

The Green Gardener Program, an effort of the City and County of Santa Barbara and Ecology Action of Santa Cruz, incorporates a comprehensive curriculum to promote improved sustainability of urban landscapes. The Green Gardener Program<sup>5</sup> will be integrated into the program as an additional resource for the workshop curriculum and educational materials.

## **3.2 Municipal Operations**

The Permittees will review, and if appropriate, modify their pesticide, herbicide, and fertilizer application protocols at park sites, landscaped medians, and golf courses. The internal inventory on pesticide use will be expanded, and the Permittees will continue to track pesticide use by the Department of Parks and Recreation. In order to standardize IPM implementation, the City will review and update its specific IPM protocols in the 2009-2010 Permit year, which will be used public agencies and/or contractors hired by the public agencies to control pests. These IPM policies will include the components outlined below.

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<sup>5</sup> <http://www.californiagreensolutions.com/cgi-bin/gt/tpl.h,content=113>



### **3.2.1 IPM Components**

The IPM approach focuses on the long-term prevention and elimination of pests through a combination of tactics. The components of the IPM program are:

- Develop and implement IPM protocols, including proper handling, application, and disposal of pesticides;
- Train municipal staff and pest control operators;
- Develop landscape alternative standards; and
- Develop contract language for outside landscape contractors to use IPM.

### **3.2.2 Implementation Steps**

The Permittees will review and update its policies which promote IPM in municipal use. The City and County will ensure that staff involved in pest management and landscape maintenance is trained in proper pest control by holding annual training, and that pesticide operator license requirements are followed. The Permittees will track the numbers of employees trained each year and the city acreage operated under IPM, and present them yearly in the Annual Reports.

### **3.3 Effectiveness Assessment**

Municipal pesticide use and acreage operated under IPM will be tracked yearly to assess the effectiveness of the municipal component of the Pesticide Plan. The municipal pesticide usage will be reported in Annual Reports. The Education and Outreach component will be assessed by reporting the following:

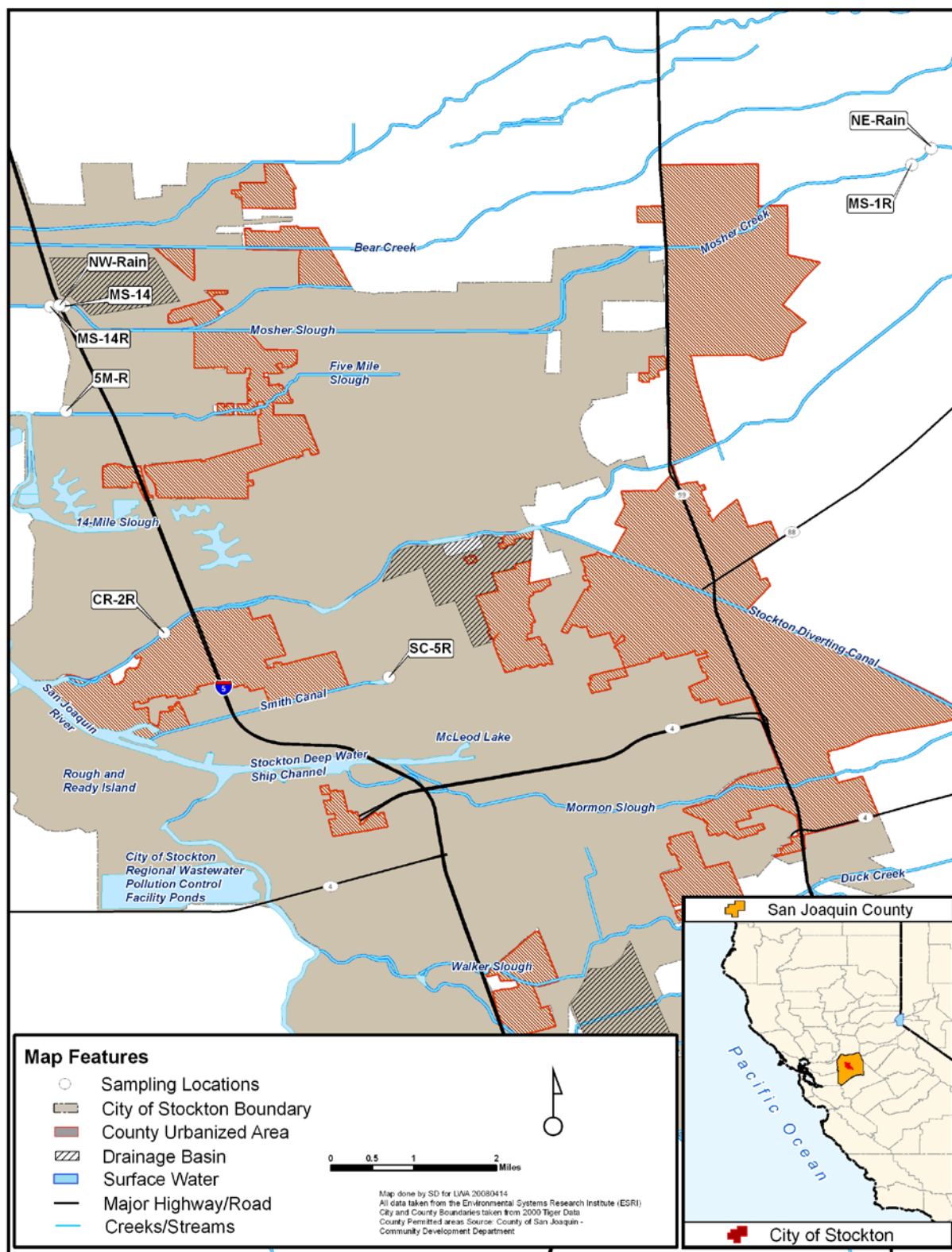
- Number of retail stores supporting OWOW or similar programs,
- Distribution of outreach messages, including numbers of brochures, television commercials, and newspaper articles, with an estimation of the number of people who were reached,
- Number of public workshops, with comments collected from attendees, and
- Number of pest control operators and municipal employees who participated in training workshops.

### **3.4 Monitoring**

Consistent with the 2004 Pesticide Plan, the Pesticide Plan monitoring will continue for Calaveras River, Mosher Slough, Five-Mile Slough, and Smith Canal. Monitoring is no longer required for Mormon Slough. Monitoring locations are shown in Figure 3. Monitoring will be conducted for chlorpyrifos and diazinon in all waterbodies, and for pyrethroids in urban runoff/discharges, during the following time periods:

- 1 Storm event during the dormant spray season: December – March
- 1 Storm event following the dormant spray season: March – June
- Once during the dry Season: June – October

Monitoring requirements allow the Permittees to discontinue monitoring if the Regional Water Board is satisfied that water quality objectives are met. The monitoring effort will be reconsidered two years into the Permit (2009-2010).



**Figure 3. Pesticide Plan Monitoring Locations for 2007-2012.**

MS=Mosher Slough, 5M=Five-Mile Slough, SC=Smith Canal; R=Receiving Water


### 3.5 Implementation Schedule

Plan Component	Type of Component <sup>1</sup>	Implementation Schedule <sup>2</sup>																			
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Pesticide monitoring	C													X							
Public education and outreach																					
OWOW Program outreach	N																				X
Annual public outreach messages	E					X				X				X				X			
Pest control workshops	N				X	X			X	X			X	X			X	X			X
Conduct survey of pesticides available for the public	N																	X			
Municipal Operations																					
Review pesticide application protocols	C								X												
Implement IPM protocols	C																				X
Train municipal employees	E								X				X				X				X
Review and implement landscaping standards	C																				X
Enforce IPM standards for contracted landscapers	C																				X
Effectiveness assessment																					
Track municipal pesticide use and IPM	C																				X
Track OWOW participation	C																				X
Track outreach material distribution and workshop attendance	E																				X
Track PCO and municipal employee training	E																				X

Notes: 1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

X = Plan element will be completed during this quarter.

 = Plan element will be completed during this timeframe as specified

A P R I L 1 5 , 2 0 0 9

City of Stockton  
County of San Joaquin

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Pathogen Plan Update – Revised  
April 2009

*prepared by*

LARRY WALKER ASSOCIATES



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## 1.0 BACKGROUND

Six urban waterbodies in the Stockton Urbanized Area (SUA) are listed as impaired on the Clean Water Act (CWA) §303(d) list due to high levels of fecal indicator bacteria. Although fecal indicator bacteria do not generally cause illness themselves, they are widely measured as representative surrogates for pathogenic microorganisms.

In order to address bacteria impairment, the City of Stockton and County of San Joaquin (Permittees) developed the Pathogen Plan in accordance with Provision D.18.b of their 2002 municipal stormwater National Pollutant Discharge Elimination Systems (NPDES) Permit (Order No. R5-2002-0181), which required them to develop and implement a plan to identify, monitor and mitigate bacteria sources. The Pathogen Plan was provided to the public, interested parties, and the Central Valley Regional Water Quality Control Board (Regional Water Board) for review. After submitted comments were addressed by the Permittees, a revised Pathogen Plan was provided to the Regional Water Board on August 18, 2004. The focus of the Pathogen Plan is on the following tributaries to the San Joaquin River (SJR) which are classified as impaired due to high levels of fecal indicator bacteria:

- Mormon Slough
- Smith Canal
- Mosher Slough
- Five-Mile Slough
- Walker Slough
- Lower Calaveras River

The Permittees have implemented the Pathogen Plan since 2004. Preliminary Pathogen Plan results were summarized in detail in the 2005-2006 Annual Report, and in the 2007 Report of Waste Discharge.

In December 2007, the Permittees received a new municipal stormwater NPDES Permit (Order No. R5-2007-0173), which included a requirement for the continued implementation of the Pathogen Plan. This document is an update to the 2004 Pathogen Plan, to reflect progress to date, and to evaluate the Pathogen Plan approach for future Plan phases.

### 1.1 Pathogen Total Maximum Daily Load

In 2002, the Regional Water Board designated six waterbodies within the SUA as impaired by pathogen indicator bacteria. As a result of this designation, the Regional Water Board developed the Stockton Urban Waterways Pathogen Total Maximum Daily Load (TMDL) for pathogen indicator bacteria in Five-Mile Slough, Lower Calaveras River, Mormon Slough, Mosher Slough, Smith Canal and Walker Slough<sup>1</sup>. The Regional Water Board released a Public Review Draft Staff Report in December 2007, and Resolution No. R5-2008-0030, approving the TMDL was adopted on March 14, 2008. Implementation of the TMDL is incorporated through the City of Stockton's municipal stormwater NPDES Permit and associated Pathogen Plan. The

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<sup>1</sup> SWRCB, 2008. Total Maximum Daily Loads of Pathogens in Stockton Urban Waterbodies, San Joaquin County. State Water Resources Control Board (SWRCB). Sacramento, California.



Pathogen TMDL establishes the following water quality targets for indicator bacteria, shown in Table 1:

**Table 1. Water Quality Targets for Indicator Bacteria**

Indicator organism	Waterbody Usage Designation	Water Quality Target	Criteria Source
Fecal coliform	REC-1	<ul style="list-style-type: none"> <li>Geometric Mean not to exceed 200 MPN/100 ml for any 30-day period</li> <li>Geometric mean of 90% of samples must be below 400 MPN/100 ml</li> </ul>	Basin Plan Objective
<i>E. coli</i>	REC-1	<ul style="list-style-type: none"> <li>Geometric Mean not to exceed 126 MPN/100 ml for any 30-day period</li> <li>Any single sample not to exceed 235 MPN/100 ml</li> </ul>	Basin Plan Objective, USEPA Ambient Water Quality Criteria <sup>2</sup>

## 2.0 PATHOGEN PLAN SUMMARY

The Pathogen Plan addresses indicator bacteria impairment in urban waterbodies in the Stockton area. To assist with source assessment and to address some of the issues associated with using traditional indicator bacteria, one of the major goals of the Pathogen Plan is to apply novel techniques that quantify source-specific bacteria to obtain information regarding specific sources (e.g., human or non-human) of fecal contamination to the impaired waterbodies.

### 2.1 Pathogen Plan Objectives

The overall goals of the Pathogen Plan are to monitor, identify, and mitigate, the controllable sources of indicator bacteria to the impaired Stockton urban waterbodies. The specific components of the Pathogen Plan are:

- Develop a monitoring program to assess the contribution of pathogens from both natural and anthropogenic sources;
- Identify areas and/or activities which contribute high pathogen concentrations in stormwater;
- Identify, develop and implement best management practices (BMPs) to address controllable discharges;
- Identify and develop policies, procedures and/or ordinances to implement the above objectives; and
- Develop recommendations and/or performance standards for assessing effectiveness.

<sup>2</sup> USEPA. 1986. Ambient Water Quality Criteria for Bacteria – 1986.

## 2.2 Approach

The Pathogen Plan was designed to accomplish the Permit objectives and address its overall goal of monitoring, identifying, and mitigating bacteria impairment through the components described below. The Plan reflects a three-phased approach (summarized as a flow-chart in Figure 1), with each phase encompassing the following sequential components:

- Characterization Monitoring
- Source Identification Monitoring
- BMP Implementation
- Effectiveness Monitoring

The approach is applied to two waterbodies per phase. The initial schedule is shown below in Table 2.

**Table 2. 2004 Pathogen Plan Implementation Schedule.**

Implementation Phase	Waterbody	Start Date	End Date
Phase I	Smith Canal	July 1, 2004	June 30, 2007
	Mormon Slough		
Phase II	Mosher Slough	July 1, 2007	June 30, 2010
	5 Mile Slough		
Phase III	Lower Calaveras River	July 1, 2010	June 30, 2013
	Walker Slough		

### 2.2.1 Characterization Monitoring

Traditional indicator bacteria (fecal coliform and *E. coli*) are monitored for one year to determine trends in bacteria loading, and identify any “hot spots” where concentrations of indicator bacteria are particularly high. Specific sites that consistently exceed water quality objectives for indicator bacteria are candidates for source identification monitoring.

### 2.2.2 Source Identification (ID) Monitoring

Specific sites identified during characterization monitoring are subjected to additional monitoring to determine sources contributing fecal contamination. In addition to monitoring traditional indicator bacteria (fecal coliform and *E. coli*), microbial source tracking (MST) analytical techniques are employed. The MST method targets species-specific deoxyribonucleic acid (DNA) sequences in *Bacteroidales-Prevotella* (*Bacteroidales*), which are anaerobic bacteria that are highly abundant in the intestines of warm-blooded animals. Their anaerobic nature is desirable because their environmental persistence is thought to be much less than aerobic microbes (e.g., fecal coliform) which can survive for years, and perhaps even re-grow in the environment. Researchers at the University of California, Davis, have developed the quantitative polymerase chain reaction (qPCR) methods to allow quantification of unique DNA sequences from specific hosts. Methods are currently available to detect bacteria from all animals (Universal), humans, dogs, and cows or horses (cow/horse). During source ID monitoring, large volumes of water are collected and concentrated by filtration in order to detect human-specific viruses (entero- and adenoviruses). These viruses are known to be epidemiologically-relevant

indicators of water that has been impacted by human waste<sup>3</sup>. Direct quantification of viruses (instead of bacteria only) will provide important information about health risks.

### **2.2.3 BMP Implementation**

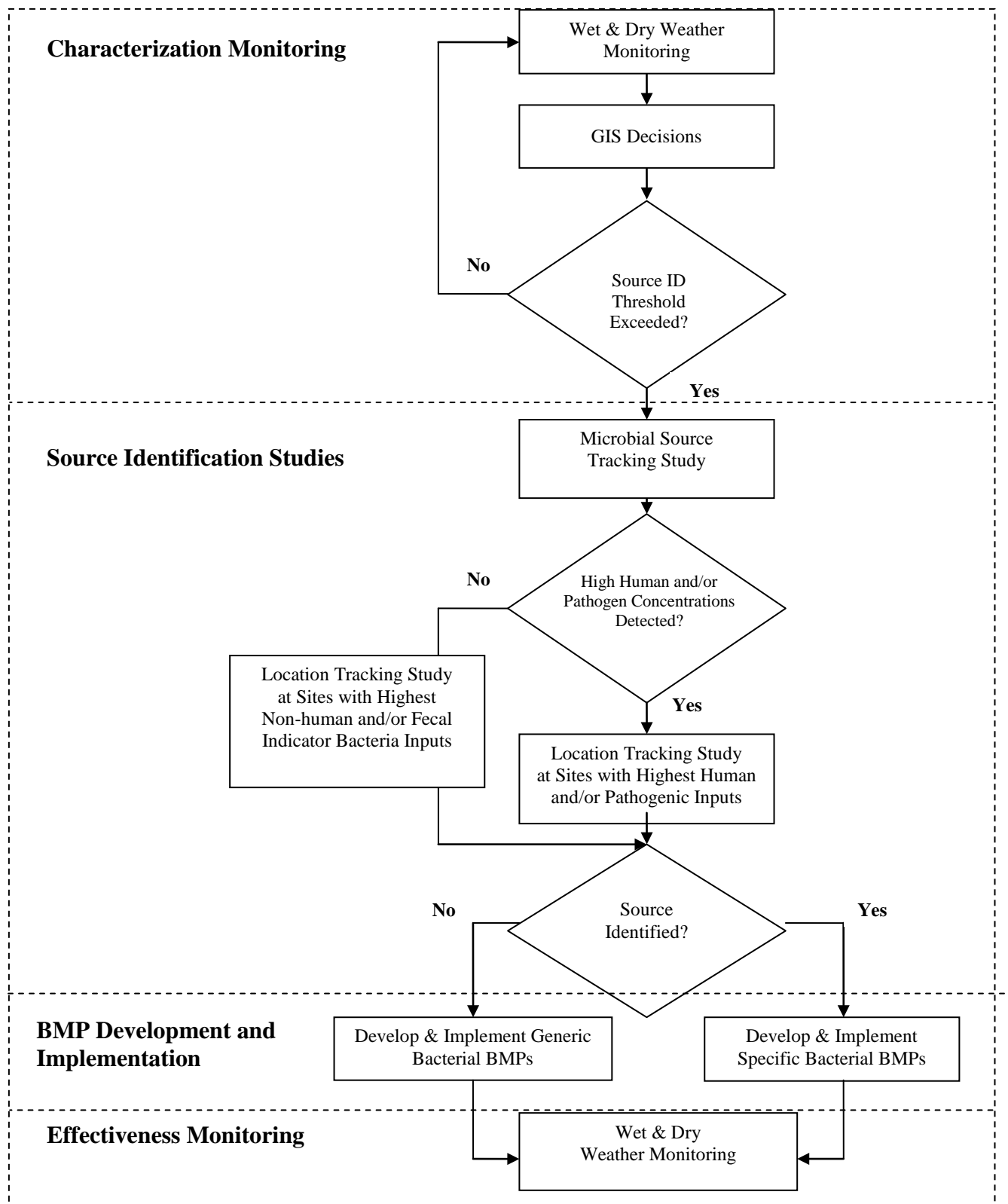
The ultimate goal of the Pathogen Plan is to mitigate bacterial impairment by gaining specific information about sources of fecal bacterial contamination, and implementing BMPs which focus on specific sources. Targeted BMPs are selected based on the dominant controllable sources of fecal contamination determined from source ID monitoring.

### **2.2.4 Effectiveness Monitoring**

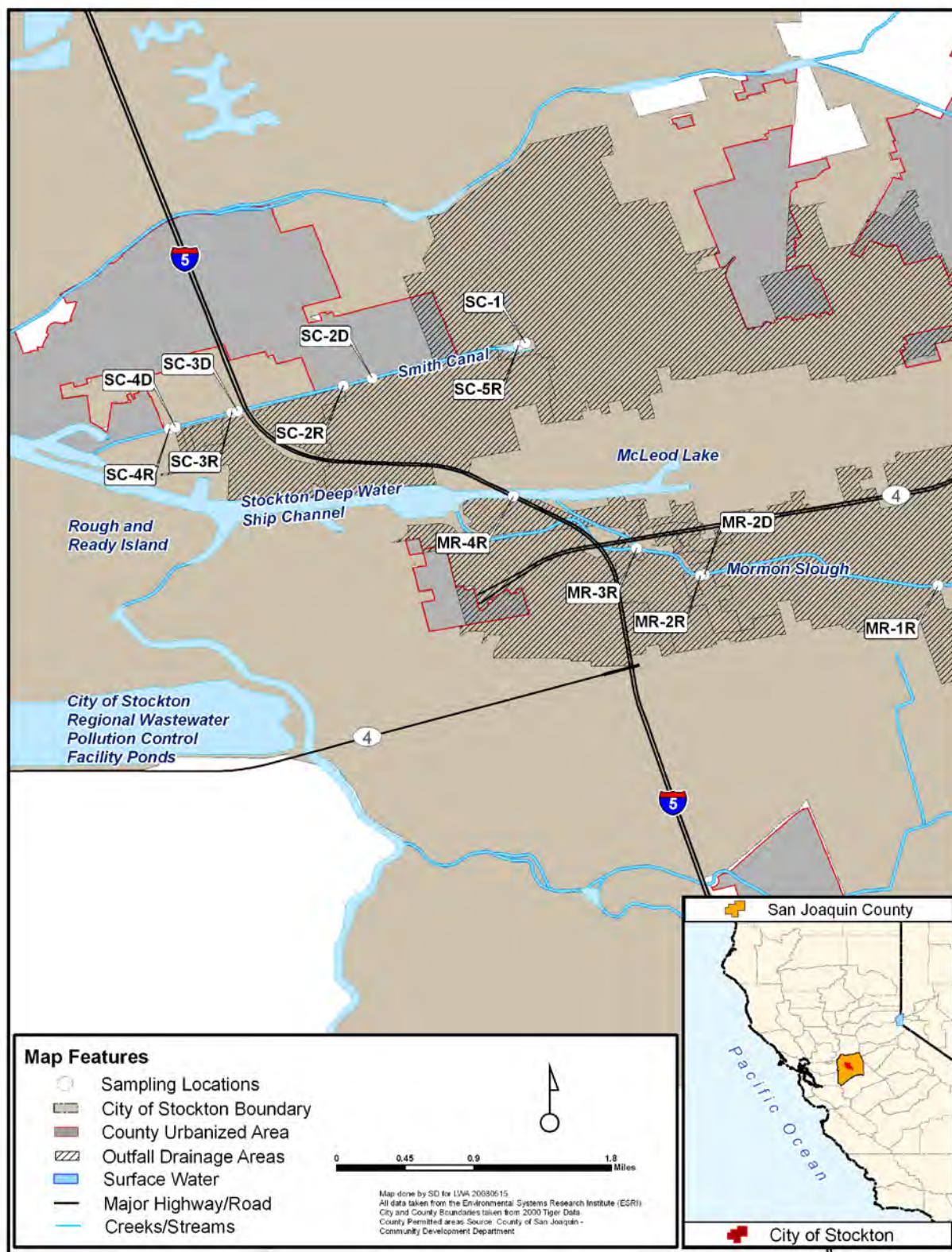
After BMPs have been implemented for a sufficient time period, the effectiveness of control programs is assessed. Assessment includes monitoring fecal indicator bacteria levels to determine if BMPs impacted the impairment of the waterbodies.

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<sup>3</sup> E.D. Schroeder, W.M. Stallard, D.E. Thompson, F.J. Loge, M.A. Deshussess, H.H.J Cox, May 2002. *A Report Prepared for the Division of Environmental Analysis California Department of Transportation Interagency Agreement*. No. 43A0073.



**Figure 1. Phase I Pathogen Plan Monitoring Approach**



**Figure 2. Phase I Monitoring Locations**

## 2.3 Phase I Results

Phase I of the Pathogen Plan has been implemented since 2004. The locations monitored during Phase I are shown in Figure 2. To date, characterization monitoring has been completed, source identification monitoring is near completion, and BMP implementation is ongoing. The results are summarized below.

### 2.3.1 Characterization Monitoring

Characterization monitoring for Phase I waterbodies, Smith Canal and Mormon Slough, was conducted from December 2004 until December 2005.

Smith Canal characterization monitoring took place at four receiving water and four discharge locations. In the Mormon Slough watershed, four receiving water sites and one discharge site were monitored. For most sites, seven wet weather monitoring events and 14 dry weather events were conducted. The results are shown separately for dry weather and wet weather events for each waterbody in Figures 3 to 6.

Overall, when compared to single sample WQOs (400 MPN/100mL for fecal coliform and 235 MPN/100mL for *E. coli*), the frequency of exceedances was relatively high, especially during wet weather:

#### *Dry Weather*

- During dry weather, 91 of 143 total samples (64%) of collected samples were above single sample WQOs
- For Smith Canal, 49 of 83 (59%) were above single sample WQOs
- For Mormon Slough, 42 of 60 (70%) of samples were above single sample WQOs.
- Every dry weather sample collected at the following sites was above WQOs:
  - SC-1
  - MR-1R

#### *Wet Weather*

- During wet weather, 76 of 90 total samples (84%) of collected samples were above single sample WQOs
- For Smith Canal, 48 of 54 (89%) were above single sample WQOs
- For Mormon Slough, 28 of 36 (78%) of samples were above single sample WQOs.
- Every wet weather sample collected at the following sites was above WQOs:

○ SC-5R	○ SC-2D
○ SC-2R	○ SC-3D
○ SC-4R	○ MR-1R
○ SC-1	○ MR-2R

To highlight the spatial and temporal patterns of fecal indicator bacteria concentrations in the Smith Canal and Mormon Slough watersheds, indicator data collected during 2004-2005 characterization monitoring were entered into a GIS decision-support tool. The GIS-tool allows the indicator data to be easily compared among sites and types of monitoring events (dry and wet weather). The GIS-tool was used to display the dry and wet weather indicator data collected from Smith Canal. The results are presented in the Figures 3 to 6.

The receiving water indicator data exhibit a pattern where geometric mean concentrations increase as distance from the SJR increased. The concentrations toward the terminal end of the Smith Canal and Mormon Slough are consistently higher than relevant WQO's. At the sites near the SJR, however, indicator concentrations in receiving waters are lower; geometric mean concentrations of fecal coliform at the downstream (near the SJR) sites SC-4R and MR-4R were below the fecal coliform WQO of 200 MPN/100mL during both dry and wet weather. Similarly, *E. coli* geometric mean concentrations were below the WQO of 126 MPN/100 mL for the downstream receiving water sites SC- 3R, SC-4R, and MR-4R during dry weather only.

The patterns in Smith Canal suggest that bacteria sources to the stormwater system are ubiquitous. The statistics for each discharge station are relatively similar, and the geometric mean concentrations observed at all discharge sites were above the relevant WQOs. In Mormon Slough, due to accessibility and insufficient flow issues, only one discharge site was consistently monitored during characterization monitoring, so it is unknown how indicator concentrations varied between discharge sites. However, as noted above, MR-2D fecal coliform concentrations were relatively low and in compliance with geometric mean WQOs, although *E. coli* concentrations at the same site were above geometric mean WQOs. Moreover, based on current knowledge, there are no known stormwater outfalls that flow during dry weather upstream of MR-1R, which exhibited some of the highest bacteria concentrations observed during the characterization study. Together these observations suggest that sources other than stormwater, including homeless encampments, which are common along Mormon Slough, may be the most important. At the same time, however, in the Smith Canal watershed, there are very few (if any) homeless encampments, so different sources of bacteria may be dominant in each watershed. The goal of the source ID monitoring, discussed in the next section, is to differentiate among these different types of sources.



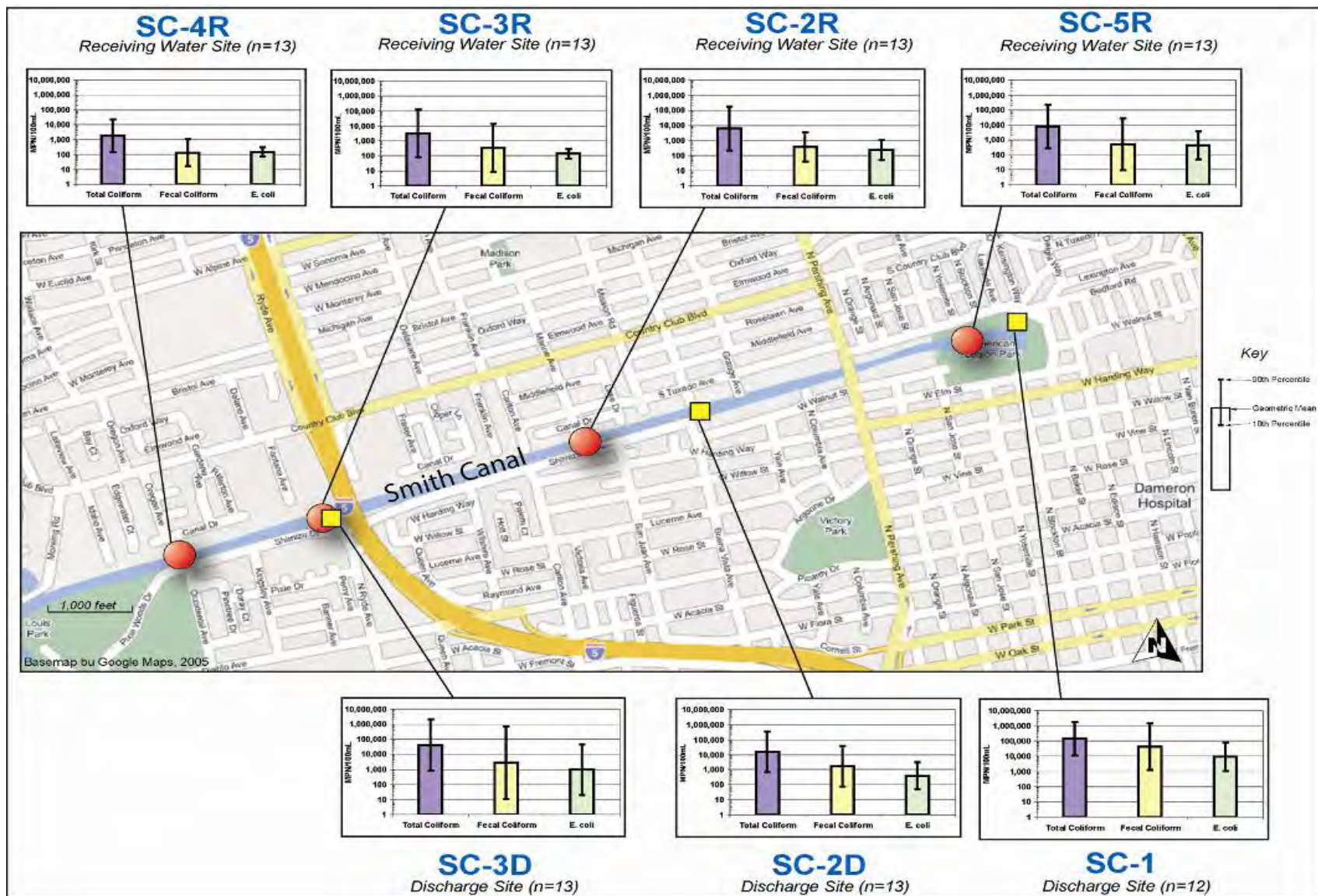
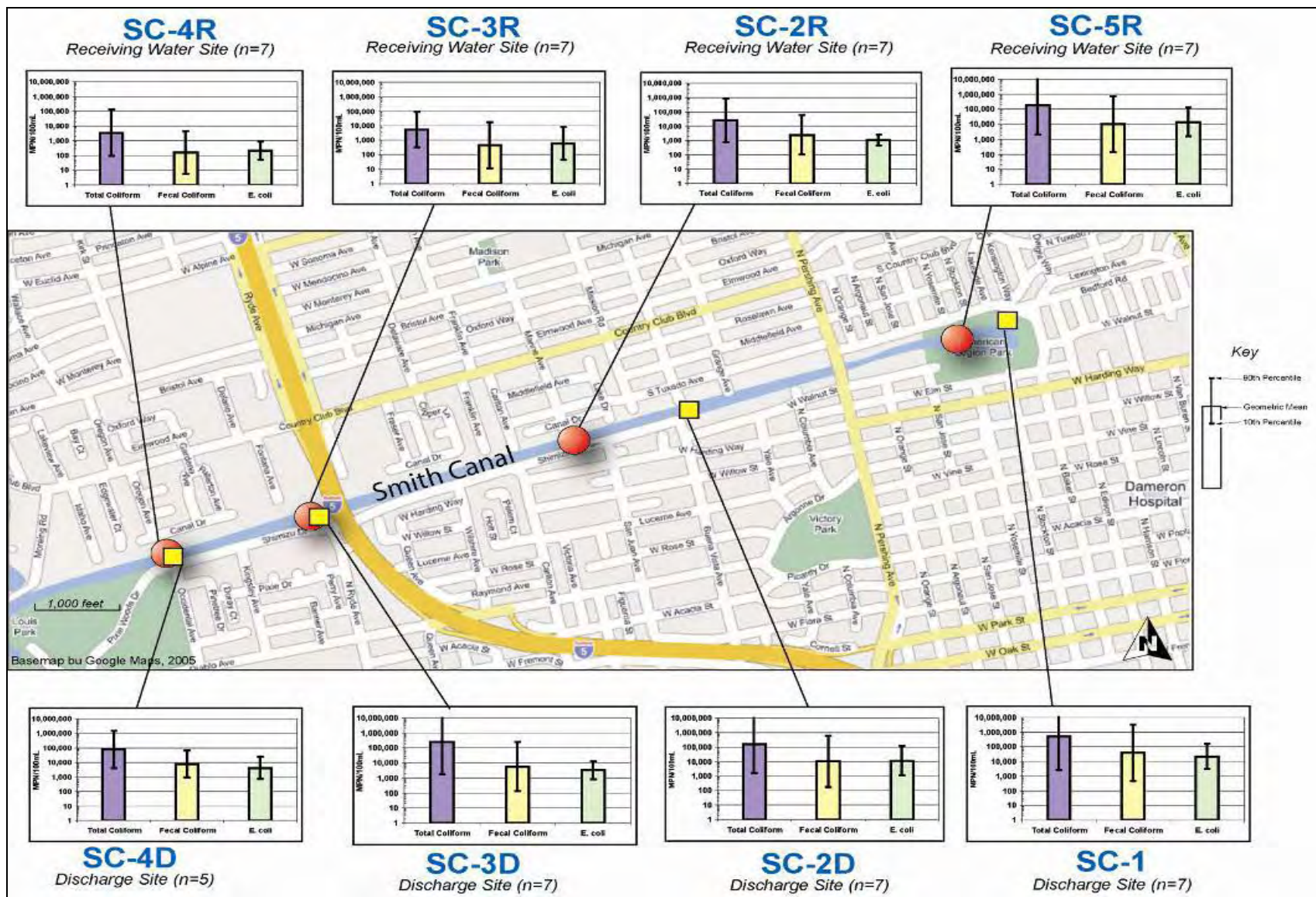


Figure 3. Dry Weather Indicator Bacteria Concentrations Observed during Phase I Characterization Monitoring for Smith Canal





**Figure 4. Wet Weather Indicator Bacteria Concentrations Observed during Phase I Characterization Monitoring for Smith Canal**





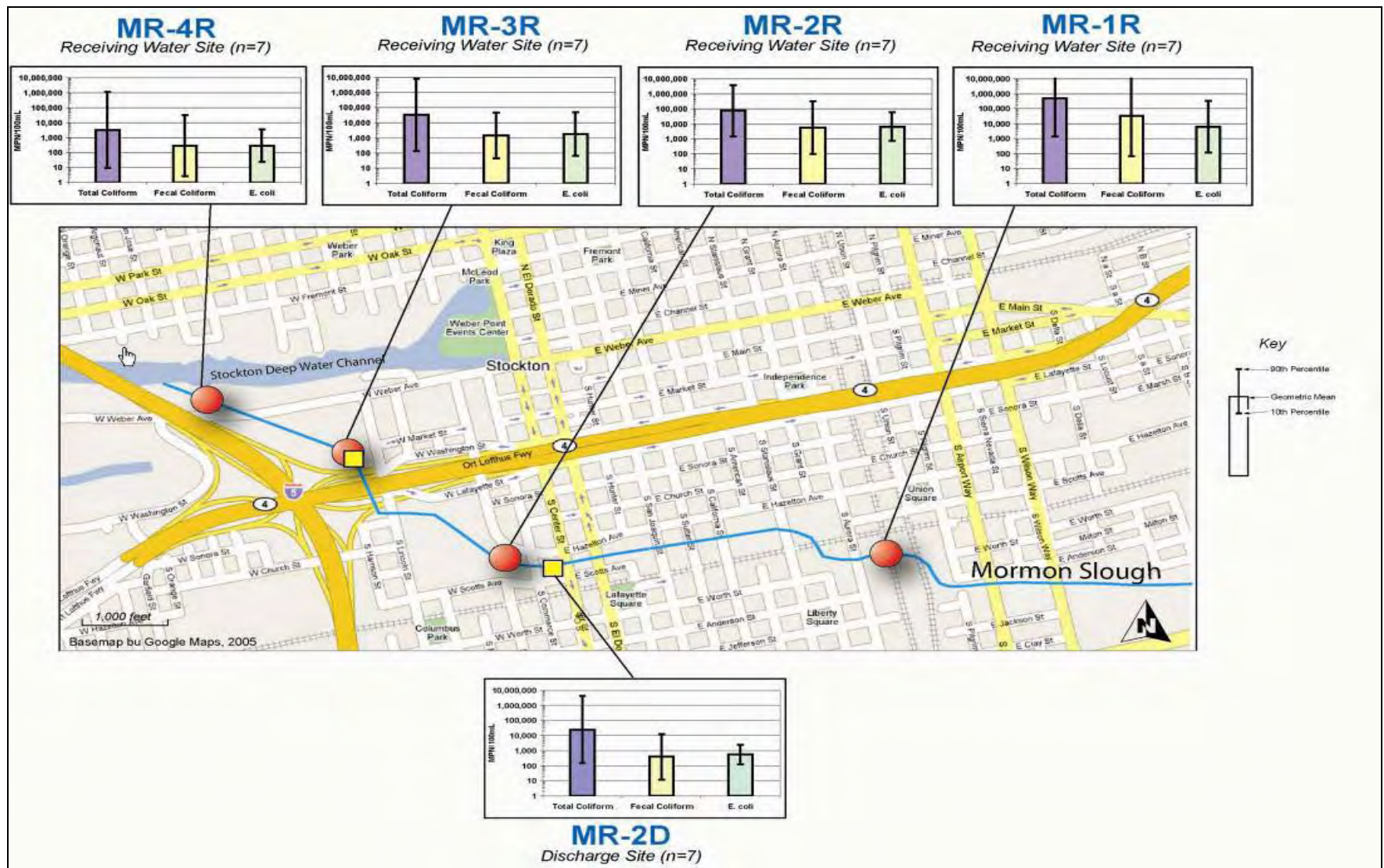


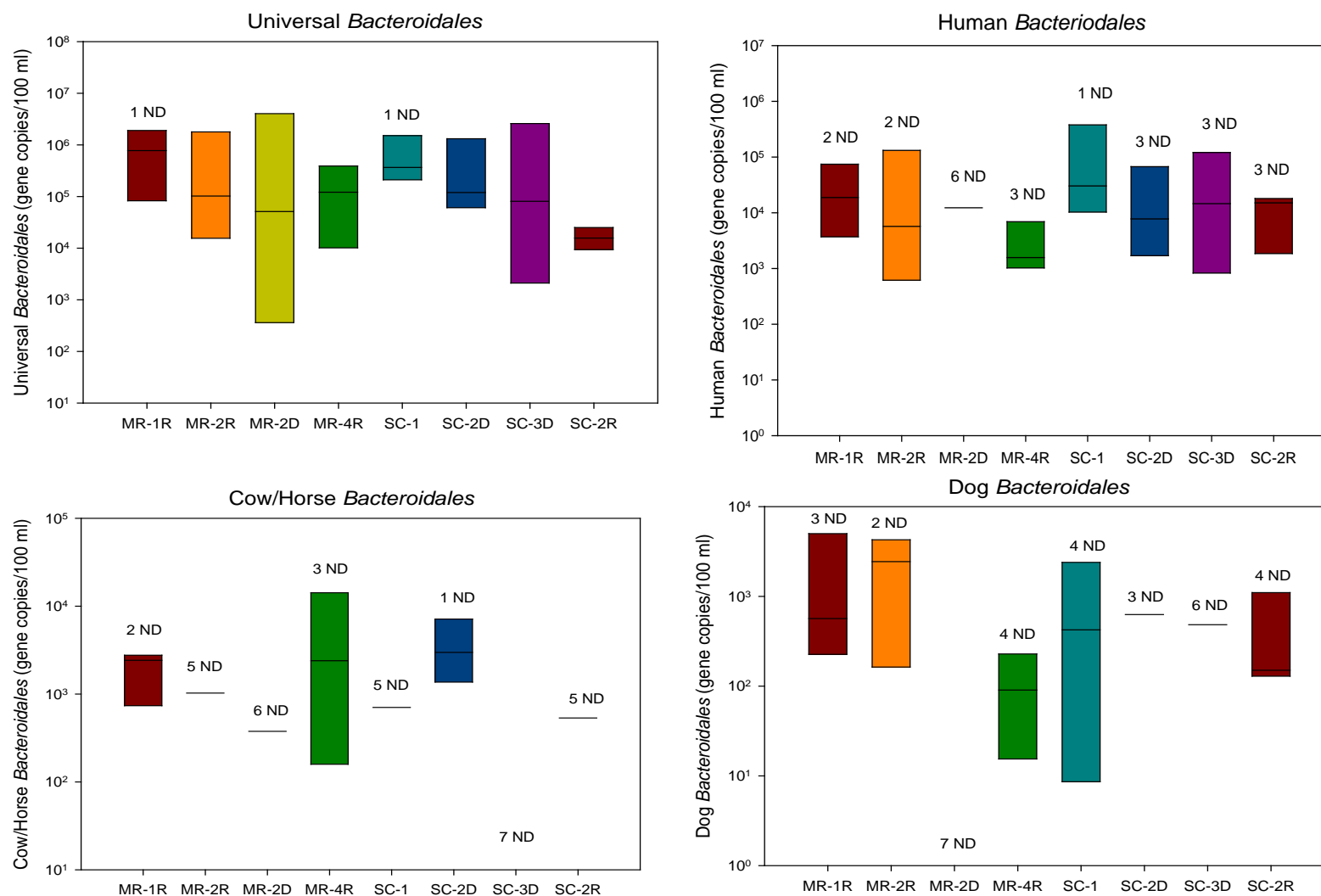
Figure 6. Wet Weather Indicator Bacteria Concentrations Observed during Phase I Characterization Monitoring at Mormon Slough

### 2.3.2 Source Identification Monitoring

After Phase I characterization monitoring was completed, sites were selected for Source ID studies, and MST monitoring began in January 2006. The site locations selected for Phase I Source ID monitoring were based on both accessibility and patterns observed during characterization monitoring. The source ID monitoring events conducted to date are shown in Table 3. The results of Source ID monitoring, grouped by individual site, are shown in Figure 7.

**Table 3. Source identification monitoring events conducted to date under Phase I.**

Water Body	Site Name	Site Type	Source Identification Monitoring Events					
			Wet Season	Wet Season	Wet Season	Dry Season	Dry Season	Wet Season
			Dry Weather (1/25/06)	Wet Weather (3/6/06)	Wet Weather (4/12/06)	Dry Weather (5/10/06)	Dry Weather (6/7/06)	Dry Weather (1/30/07)
Smith Canal	SC-1	Urban Discharge	✓	✓	✓	✓	✓	✓
	SC-2D		✓	✓	✓	✓	✓	✓
	SC-3D		✓	✓	✓	✓	✓	✓
	SC-2R	Receiving Water	✓	✓	✓	✓	✓	✓
Mormon Slough	MR-2D	Urban Discharge	✓	✓	✓	✓	✓	✓
	MR-1R	Receiving Water	✓	✓	✓	✓	---	✓
	MR-2R		✓	✓	✓	✓	✓	✓
	MR-4R		✓	✓	✓	✓	✓	✓



**Figure 7. Microbial Source Tracking results at all Phase I sampling events for each species-specific *Bacteroidales* marker.** The center-line in each plot indicates the median, the top boundary of each box marks the 75<sup>th</sup> percentile, and the bottom boundary of each box marks the 25<sup>th</sup> percentile. The number of samples with *Bacteroidales* markers below the detection limit is indicated by the number of non-detects (ND).

### *Universal Bacteroidales*

Universal *Bacteroidales*, which are representative of inputs by all warm-blooded animals, were detected in nearly every sample. This is typical of studies in other watersheds.

### *Human Bacteroidales*

Human *Bacteroidales* are generally present in mixed-sources of human contamination. A small proportion of fecal samples from “individual humans” may be non-detect, but the human marker is nearly always detected in mixed sources like wastewater influent. Samples from SC-1 (Legion Park pump station) were generally highest of all sites, and human *Bacteroidales* were detected in every sample. An important part of the BMP implementation component of the Pathogen Plan will be to collect information regarding sanitary sewer overflows (SSOs).

### *Cow/Horse Bacteroidales*

Cow/horse *Bacteroidales* are generally present in fecal samples from both cows and horses. It is surprising that cow/horse *Bacteroidales* were regularly detected at SC-2D. An effort will be made to determine possible sources of cows or horse fecal input within the Smith Canal watershed.

### *Dog Bacteroidales*

Dog *Bacteroidales* are generally present in mixed fecal samples from dogs. Some individual fecal samples from dogs will be non-detect, and there is slight overlap with human sequences. In Mormon Slough, dog sequences were detected in every sample from MR-2R, but there were no detections at the Mormon Slough discharge site MR-2D. The most interesting pattern with respect to dog *Bacteroidales* was the relative level of concentrations/detection during the wet weather events; 7 of 9 detected samples in Smith Canal were during wet weather, while 22 out of 23 non-detected samples in Smith Canal occurred during dry weather events, suggesting that dogs may be an important source of bacteria during storm events.

### *All Bacteroidales markers*

It should be noted that calculated ratios of host-specific: universal *Bacteroidales* (e.g., the ratio of the measured human concentration to the measured universal concentration in a sample) can provide important information regarding the relative impact of sources of space and time. It is important to note that the ratios should not be compared across different hosts. For example, ratios of human:universal are useful for determining the relative impact of human sources at different times and locations. But the value of the human:universal ratio is meaningless when compared to the value of a dog:universal ratio.

### *Human Viruses*

Human virus concentrations (enterovirus and adenovirus) are measured with each collected sample. Virus detections further confirm the presence of human, or high-risk, fecal sources. Since viruses are generally present in such low numbers, 100 liter samples are collected during the MST studies, and subsequently filtered to concentrate samples. Quantification of viruses requires time-consuming assays based on cell culturing and counting of a surrogate bacteriophage (a virus that infects bacteria), which is used to calculate recovery after filtering.

Virus assays for four types of adenovirus and for enterovirus have been performed for Phase I samples. Adenovirus 40/41 was detected in the Mormon Slough receiving water sites MR-1R on two occasions; MR-2R and MR-4R each on one occasion; and in a sample from Smith Canal discharge site SC-3D for one sampling event. Adenovirus 40 and adenovirus 41 (detected together using the adenovirus 40/41 assay) are both enteric viral pathogens, which commonly cause diarrhea in infants and children. No adenovirus A, B, or C, or enterovirus, were detected in any samples. Detection of viruses indicates the risk associated with fecal contamination in a waterbody.

### **2.3.3 BMP Implementation**

#### *Pet Waste Disposal*

To date, the Permittees have undertaken many BMP, public education, and outreach efforts while the Pathogen Plan monitoring and source assessment activities have been in progress. In 2004-2005, in cooperation with the City of Stockton's Parks and Recreation Department, pet waste disposal stations were installed in the new parks at Fong, Nelson, Long, Equinoa, Garrigan and Baxter. In 2005-2006, six pet waste disposal stations were also installed at the City's new park in Weston Ranch, which opened in June 2006. There are now pet waste disposal stations in 14 of the City's 61 parks. The City's Stormwater Program intends to continue its partnership with the Parks and Recreation Department to install pet waste stations in new City parks as they are developed. The City also plans to install Pet Waste Signs at approximately 50 existing parks. Additionally, the County of San Joaquin in conjunction with the City of Stockton is planning to install pet waste stations at several marinas within San Joaquin County, pursuant to the Keep the Delta Clean Grant. Even though the marinas are not located in the Phase I area, the placement of the pet waste stations and accompanying Keep the Delta Clean campaign will spread the Phase I message of reducing non point source pollution in rivers, streams, and other Delta waterbodies. The location and number of pet waste stations to be installed as part of the Keep the Delta Clean campaign are:

- Tiki Lagoon Resort and Marina – 4 pet waste stations
- H & H Marina Resort – 3 pet waste stations
- Tower Park Marina – 3 pet waste stations
- Tracy Oasis Marina – 4 pet waste stations
- King Island Resort – 3 pet waste stations
- Turner Cut Resort – 4 pet waste stations
- Paradise Point Marina – 3 pet waste stations
- Wimpy's Marina – 2 pet waste stations

Once installed, these pet waste stations will be managed by the SUA marinas for a 20-year period.

Additional pet waste disposal outreach was accomplished through mailings. In 2004-2005, the bilingual (English/Spanish) "Water Is Vital to Life" mailer was sent to all zip codes in the SUA.

The distribution reached an estimated 115,000 residences to ensure that all Phase I City areas would receive the mailer. The mailer featured various ways to reduce deleterious impacts on local water quality, including the proper cleanup and disposal of domestic pet waste. A similar mailing was conducted in 2006-2007 for utility customers, distributed to approximately half of the estimated residents.

Finally, during 2004-2005 inspections, six commercial kennels within the City were inspected. In addition to the inspection, each facility received a copy of the business-specific fact sheet for kennels. The second and final round of inspections of commercial businesses, including commercial kennels, was conducted in 2006-2007.

### **3.0 MODIFICATIONS TO THE PATHOGEN PLAN APPROACH**

At this point in Pathogen Plan implementation, it is appropriate to evaluate the current approach and determine if modifications would improve its effectiveness. Because the approach is novel and science-based, it is expected that periodic modifications will be necessary to reflect advances in microbial source tracking technology.

The following modifications to the original Pathogen Plan approach are proposed:

- Revised schedule to reflect increased time for BMP implementation,
- Revised monitoring approach, with overlapping characterization and source ID monitoring,
- Modified source ID approach using a new *Bacteroidales* assay that detects live cells,
- Enhanced BMP implementation.

#### **3.1 Revised schedule**

The August 2004 version of the Plan included a schedule based on monitoring (characterization, source identification, and BMP effectiveness), but provided limited time for the Permittees to evaluate and implement BMPs. For example, BMP effectiveness monitoring was scheduled to begin immediately after the source identification studies. In review of the Plan, it has become apparent that such a schedule is not reasonable, as it does not provide sufficient time for the Permittees to begin implementation of BMPs and effectively address bacteria impacts.

To increase the likelihood of effective control of bacteria sources, the City and County requested a revision to the originally proposed Pathogen Plan schedule in a letter to the Regional Water Board in November 2006. The proposed revision extends the time period for each phase by five additional years, including three-year periods for the City and County to evaluate and begin implementation of BMPs (Table 4). Based on experiences during Phase I, the revised schedule also provides additional time for source identification monitoring. To allow for efficient characterization of SUA waterbody impairments (and to prevent delays), the revised Pathogen Plan schedule allows for overlap among the three phases. For example, once source identification monitoring is completed for Phase I waterbodies, BMP evaluation/implementation for Phase I will begin along with characterization monitoring for Phase II.



**Table 4. Revised Pathogen Plan Implementation Schedule**

Implementation Phase	Waterbodies	Start Date	End Date <sup>1</sup>
Phase I	Smith Canal	July 1, 2004	June 30, 2012
	Mormon Slough		
Phase II	Mosher Slough	July 1, 2007	June 30, 2015
	Five Mile Slough		
Phase III	Lower Calaveras River	July 1, 2010	June 30, 2018
	Walker Slough		

<sup>1</sup> Schedule will be reconsidered based on results of BMP implementation and effectiveness assessment

The revised implementation schedule depicting the timing of the components within each monitoring phase is presented in Table 5.

**Table 5. Monitoring Implementation Schedule<sup>1</sup>**

Phase I Component	2004	2005	2006	2007	2008	2009	2010	2011
Characterization Monitoring	■	■						
Source ID Monitoring		■	■	■	■	■		
Preliminary BMP Implementation				■	■	■	■	
Effectiveness Monitoring							■	■

Phase II Component	2007	2008	2009	2010	2011	2012	2013	2014
Characterization Monitoring		■	■					
Source ID Monitoring			■	■	■	■		
Preliminary BMP Implementation				■	■	■	■	
Effectiveness Monitoring							■	■

Phase III Component	2010	2011	2012	2013	2014	2015	2016	2017
Characterization Monitoring	■	■						
Source ID Monitoring		■	■	■	■			
Preliminary BMP Implementation				■	■	■	■	
Effectiveness Monitoring							■	■

<sup>1</sup> Schedule will be reconsidered based on results of BMP implementation and effectiveness assessment

### 3.2 Microbial Source Tracking Methods

The use of *Bacteroidales* genetic markers for MST is a new, rapidly evolving science. Therefore, it is necessary to periodically re-evaluate the MST methods employed by the Pathogen Plan.

### 3.2.1 New *Bacteroidales* Approach

Since MST was implemented in Phase I, there have been new advances in the methods available. One critical advance is an analytical method that allows *Bacteroidales* genetic markers from *viable, intact* cells to be distinguished from *extracellular DNA*.

Current MST assays do not directly discriminate between viable and non-viable cells since DNA of both live and dead cells, as well as extracellular DNA, can be amplified. Yet, it is paramount for a meaningful interpretation of source tracking data to distinguish between recent and older contamination events. Although *Bacteroidales* cannot survive for prolonged periods in the aerobic environment, their DNA can persist in the environment after cells have died. It is known that DNA of selected pathogens can persist after cell death for up to 3 weeks.

Researchers at UC Davis recently developed an assay to detect sequences only from live cells, based on application of a compound that penetrates dead cell membranes and inhibits polymerase chain reaction (PCR) amplification. Recent data from UC Davis suggested that the assay for viable *Bacteroidales* cells detects fecal contamination that occurred within the previous 28 hours, whereas assays for all *Bacteroidales* could detect extracellular DNA that persists in the environment for as long as 177 hours<sup>4</sup>. Therefore, the detection of viable *Bacteroidales* would provide more useful information for MST.

Both methods provide information about the source of fecal contamination, but will give different information about the concentration of genetic markers present in a waterbody.

- All *Bacteroidales* markers – the MST approach employed to date – quantify genetic material derived from *Bacteroidales* present in the waterbody. This genetic material can come from inside of cells, or from free DNA released by dead cells. Free DNA can persist in the environment for prolonged time periods under certain conditions.
- Live *Bacteroidales* markers quantify genetic material from intact cells, indicating that the fecal pollution is recent. This provides more information about the risk of illness from fecal pollution.

Because the point of conducting source ID monitoring is both to identify sources of fecal contamination (which can be determined with either *Bacteroidales* assay) and to provide an indication of health risk by measuring actual fecal bacteria, it seems prudent to incorporate the detection of viable *Bacteroidales* into the MST approach.

For consistency between Phase I and subsequent phases, the Phase I approach of detecting all *Bacteroidales* markers will be implemented at all source ID sites, and viable markers will be monitored along with all markers at selected sites. One or two sites per waterbody will be selected for analysis of both all and viable *Bacteroidales*.

### 3.2.2 Selective Virus Sampling

During Phase I, samples for virus detection were collected during all source ID monitoring events and locations. Virus detection relies on a large sample volume (100 liter (L)), which requires extensive and costly filtration steps. Because the focus of the Pathogen Plan source ID

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<sup>4</sup> Unpublished results from Wuertz, S. and Bae, S. University of California, Davis. 2008.

monitoring is on *Bacteroidales* marker quantification, and not virus detection, it would make sense to focus resources on *Bacteroidales* detection. Viruses should still be quantified at select sites in all monitored waterbodies, downstream of stormwater discharge, in order to assess pathogen impairment and health risk in the Stockton waterbodies. For each monitored waterbody, one or two receiving sites will be selected for virus detection.

### **3.3 Enhanced BMP Implementation**

Targeted BMPs, based on results from source ID monitoring will be identified and begin implementation in late 2008. A schedule for BMP implementation is given in Table 6. The BMP implementation schedule includes ongoing BMPs, carried over from the 2004 Pathogen Plan, as well as the targeted BMPs which are outlined below. Source-specific BMPs will address:

#### ***Human Fecal Contamination in Smith Canal and Mormon Slough***

- Discharge from station SC-1 contributes a consistent level of human-derived fecal bacteria. The City will investigate whether sanitary sewer overflows occur in the area or illicit discharges occur in the storm drain system.
- Houseboats are present on Smith Canal, which could be a source of human fecal bacteria if waste is not properly disposed of. Permittees will provide outreach materials to houseboats that promote proper disposal of waste.
- Sites MR-2R and MR-1R have high concentrations of human *Bacteroidales* markers. Mormon Slough has a substantial homeless population, along with a high concentration of litter and debris. The Permittees will develop and implement a strategy to periodically clear debris in the Mormon Slough, and address sources of human-derived fecal matter.

#### ***Dog Fecal Contamination***

Dog fecal contamination in Smith Canal and Mormon Slough will be addressed by providing additional public outreach messages through educational materials (e.g., fact sheets) that address proper disposal of pet waste, and signage at City parks. The City will work with the City of Stockton Animal Control and Pet Licensing to provide outreach and literature on the proper disposal of pet waste to pet owners and adoption agencies.

#### ***Cow/Horse Fecal Contamination***

Smith Canal SC-2D, Mormon Slough MR-1R, and MR-4R discharge sites have a consistent presence of cow/horse markers. Possible sources of cow or horse fecal input to the stormwater drain system will be investigated.

Overall, the BMP implementation efforts conducted during the Pathogen Plan are considered preliminary, and the effectiveness monitoring is simply intended to evaluate whether BMP implementation has possibly improved bacteriological water quality. The success of BMP implementation is made difficult due to the complexity in dealing with bacteria sources, the ubiquity of bacterial inputs, and the high variability of stormwater quality.

**Table 6. BMP Implementation Schedule**

Pathogen Plan BMP	Type of Component <sup>1</sup>	Implementation Schedule <sup>2</sup>																			
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Human-specific BMPs																					
Investigate SSO and Illicit Connections in Smith Canal drainage area	N											X	X								
Provide outreach material to houseboats on Smith Canal on proper disposal of waste	N									X	X										
Investigate clearing of debris from Mormon Slough	N														X						
Dog-specific BMPs																					
Install pet waste stations in new City parks, and marinas (under the Keep the Delta Clean grant)	C																				
Ensure that educational materials address proper disposal of pet waste	C									X				X				X			
Develop outreach materials specifically targeted at pet owners regarding the proper disposal of pet waste	N													X							
Install Pet Waste Signs at approximately 50 existing parks	N																				
Livestock-specific (horse/cow) BMPs																					
Identify possible sources of horse/cow fecal contamination to Smith Canal and Mormon Slough	N														X						

Notes: 1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

3. P = Primary Responsibility; S = Secondary Responsibility

X = Performance Standard will be completed during this quarter

■ = Performance standard will be completed during this timeframe as specified.

MUD = Municipal Utilities Department

## 4.0 PATHOGEN PLAN PHASE II MONITORING

Phase II of the Pathogen Plan began implementation in 2007. During the 2007-2012 Permit term, characterization monitoring and source identification monitoring will be conducted for the Phase II waterbodies, Mosher Slough and Five-Mile Slough. Drainage basin land usage for sampling locations on Mosher Slough Five-Mile Slough is shown in Table 7.

### ***Mosher Slough***

Mosher Slough is located primarily in the residential north side of Stockton and is impaired from the confluence with the DWSC to 3.5-miles upstream of Interstate 5. Land use in the drainage area is dominantly urbanized residential. Commercial land use, industrial land use, and mixed urban land use make up the remainder of land uses in the Mosher Slough drainage area.

### ***Five-Mile Slough***

Five-Mile Slough is an indirect tributary to the Deep Water Ship Channel, flowing into Fourteen-Mile Slough. Five-Mile Slough is a dead-end slough, extending through urban Stockton from its confluence with Fourteen-Mile Slough and ending near Pacific Avenue. The land uses within the drainage area include residential (44.4%), commercial (11.2%), mixed urban (22.3%), and open space (22.1%).

**Table 7. Land Usage for Phase II Discharge Site Drainage Basins**

Discharge Site	Drainage Basin	Drainage Basin Acres	Land Use	Land Use % of Basin Acreage
MS1-D	La Morada and Mosher Slough P.S.	761	Low-Medium Residential	85%
			High Density Residential	4%
			Commercial	10%
MS2-D	Cherbourg and Mosher Slough P.S.	1186	Low-Medium Residential	73%
			Commercial	19%
			Industrial	7%
MS3-D	Cayuga and Mosher Slough P.S.	739	Low-Medium Residential	69%
			High Density Residential	5%
			Administrative Professional	2%
			Commercial	17%
			Performance Industrial	5%
MS4-D	Don and Mosher Slough P.S.	389	Low-Medium Residential	90%
			High Density Residential	3%
			Commercial	6%
MS14-D	Kelly and Mosher	530	Low-Medium Residential	99%

	Slough P.S.			
FM-1D	Alexandria and Five Mile Slough P.S.	671	Low-Medium Residential	67%
			High Density Residential	1%
			Commercial	1%
			Parks and Recreation	30%
FM-2D	Plymouth Road and Five Mile Slough P.S.	186	Low-Medium Residential	84%
			High Density Residential	2%
			Commercial	13%
FM-3D	Lighthouse and Five Mile Slough P.S.	185	Low-Medium Residential	70%
			High Density Residential	7%
			Administrative Professional	6%
			Commercial	12%

#### 4.1 Characterization Monitoring

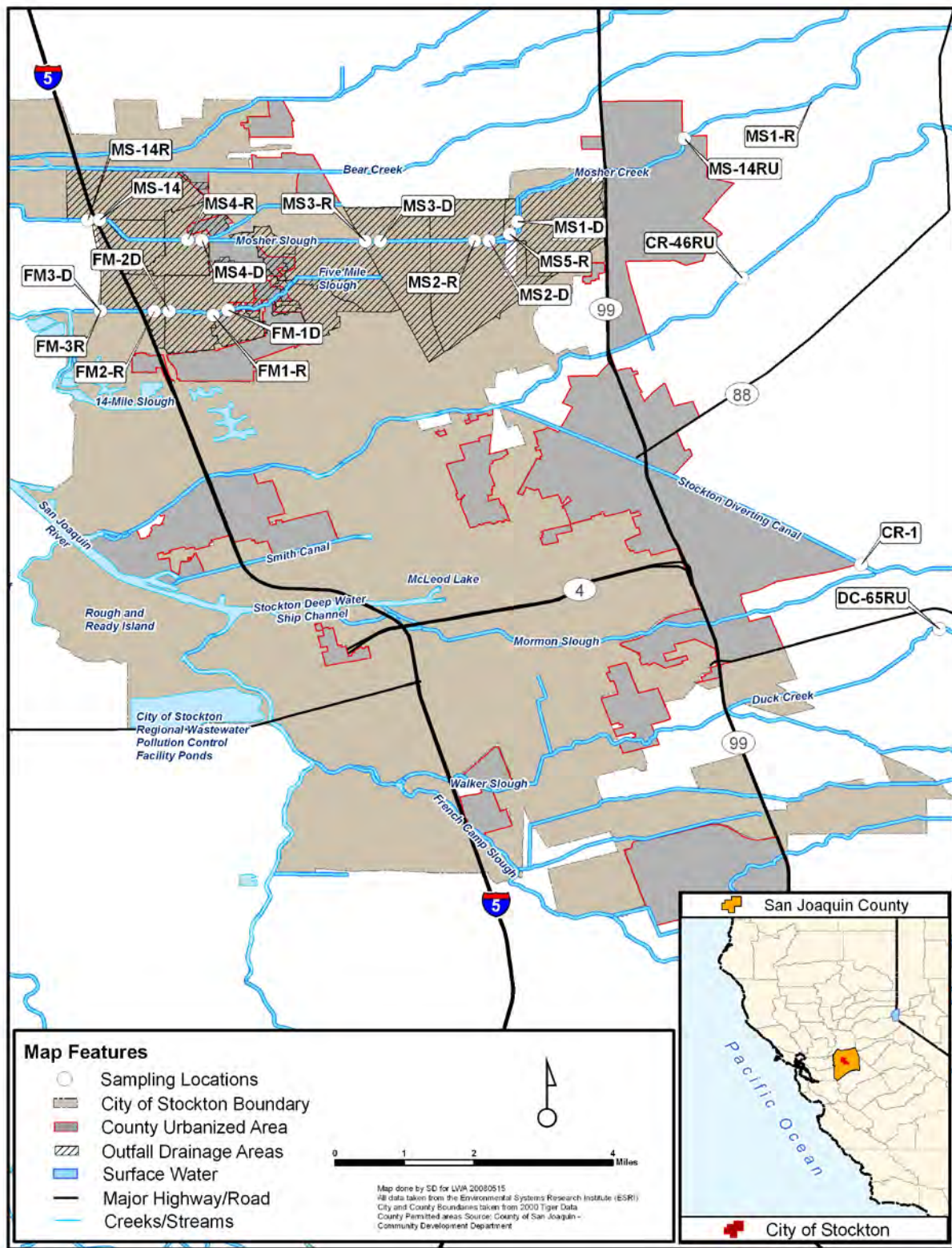
Characterization monitoring is underway for Phase II, and is being conducted as described in the 2004 Pathogen Plan. Phase II characterization monitoring locations are presented in Figure 8, and described in Table 8.

Wet weather monitoring is conducted during 5 storms, including first flush when possible. Sites are also monitored twice monthly during dry weather.

**Table 8. Phase II Monitoring Sites**

Waterbody and Monitoring Location	Bacteria Monitoring Sites	
	Discharge Site ID	Receiving Water Site ID
<b>Mosher Slough</b>		
Morada Basin	MS1-D	MS5-R
Cherbourg Way	MS2-D	MS2-R
Hudson Dr., by Railroad tracks	MS3-D	MS3-R
Don Ave.	MS4-D	MS4-R
Kelly Drive P.S. and Mariners Drive by Interstate 5	MS-14 (D)	MS14-R
<b>Five-Mile Slough</b>		
Swenson Park, at Alexandria Pl.	FM-1D	FM-1R
Plymouth Rd.	FM-2D	FM-2R
Lighthouse Dr.	FM-3D	FM-3R
<b>Upstream locations</b>		
Mosher Slough at Quashnick (immediately upstream of urban area)		MS-14RU
Mosher Slough alternate upstream receiving location, at 8-mile Road bridge		MS-1R

Calaveras River at Solari Ranch Road (old Calaveras River channel)		CR-46RU
Calaveras River at South Main Street (Stockton Diverting Channel)		CR-1R
Duck Creek by Railroad Tracks (near Stagecoach Road)		DC-65RU



**Figure 8. Phase II Monitoring Locations.**



## 4.2 Source Identification Monitoring

Source identification monitoring locations will be selected based on results of characterization monitoring. Monitoring will focus on eight locations with particularly high and/or consistent concentrations of fecal indicator bacteria. As discussed previously, the source ID approach for Phase II will incorporate the detection species-specific sequences from live *Bacteroidales* cells along with the Phase I approach of monitoring all *Bacteroidales* cells. Selected sites and sampling events are monitored for both viable *Bacteroidales* and all *Bacteroidales* DNA. To be consistent when comparing results between Phase I and Phase II, the Phase I approach of monitoring all *Bacteroidales* will continue to be implemented at all sampling locations. An example source ID monitoring approach for Phase II is shown in Table 7; monitoring combinations of virus (V), all *Bacteroidales* (AB), or viable *Bacteroidales* (VB) are given for example only, as the monitoring approach will depend on resources available during each sampling event for the intensive filtration required for virus sampling. Fecal indicator bacteria are also be monitored during all source ID monitoring events at all source ID locations.

**Table 9. Modified Source Identification Monitoring Approach**

Sample Site	Sampling Frequency								
	Wet Season Dry Weather Winter/Spring 2009	Wet Season Storm Event Winter/Spring 2009	Wet Season Storm Event Spring 2009/Fall 2009	Wet Season Dry Weather Spring 2009	Dry Season Dry Weather Summer 2009	Wet Season Storm Event Winter 2009/2010	Wet Season Storm Event Winter 2009/2010	Wet Season Storm Event Spring 2010/Fall 2010	Wet Season Storm Event Fall/Winter 2010
MS-2D	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB
MS-3D	AB, VB	AB	AB	AB	AB	AB, VB	AB	AB	AB
MS-4D	AB, VB	AB	AB	AB	AB	AB, VB	AB	AB	AB
MS-14	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB
MS-14RU	AB, VB	AB	AB	AB	AB	AB, VB	AB	AB	AB
FM-1D	AB, VB	AB	AB	AB	AB	AB, VB	AB	AB	AB
FM-2R	AB, VB	AB	AB	AB	AB	AB, VB	AB	AB	AB
FM-2D	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB	V, VB, AB

V=Virus

AB=All *Bacteroidales*

VB=Viable *Bacteroidales*

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City of Stockton  
County of San Joaquin

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Mercury Plan – Revised April  
2009

*prepared by*

LARRY WALKER ASSOCIATES



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## **1.0 INTRODUCTION**

The Sacramento-San Joaquin Delta Estuary (the Delta) is on the Clean Water Act Section 303(d) List of Impaired Water Bodies because of elevated levels of methylmercury in fish. To address mercury impairment in the Delta, Provision 28.d of the City of Stockton (City) and County of San Joaquin (County) (Permittees) Municipal Stormwater National Pollutant Discharge Elimination Systems (NPDES) Permit (Order No. R5-2007-0173) requires the Permittees to develop and implement a mercury plan that identifies the Permittees' strategy to reduce methylmercury exposure to human and wildlife in the Delta and to prevent the creation or maintenance of toxic hot spots.

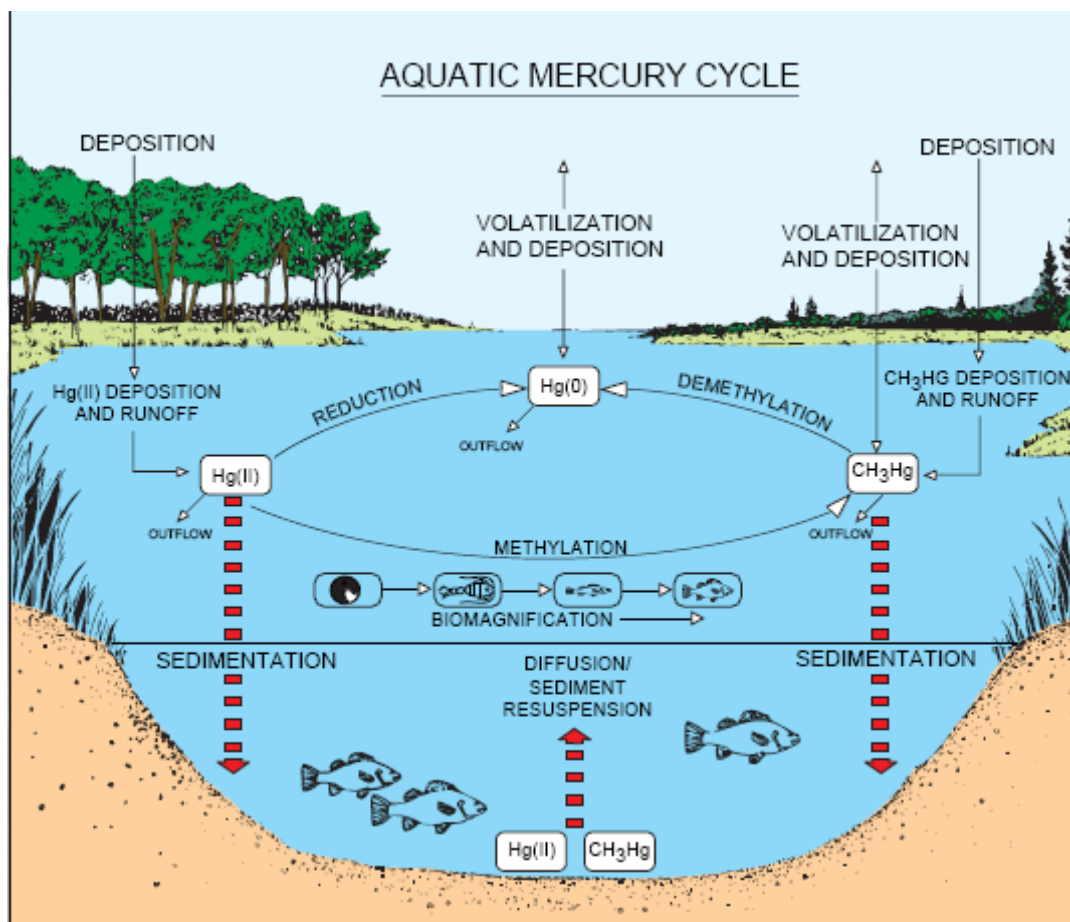
This document outlines the Permittees' mercury pollution prevention strategy. The mercury pollution prevention program (Mercury Plan) presented here provides background information on mercury pollution in Delta waters, describes related mercury reduction efforts, identifies possible sources of mercury to urban runoff, and provides strategies to address the controllable sources of mercury pollution.

### **1.1 Mercury in the Environment**

Mercury is primarily a concern because of the highly toxic and bioaccumulative nature of methylmercury. The environmental processes that affect the transformation of mercury between its ionic and methylated forms are discussed below.

#### **1.1.1 Mercury Cycle**

In the environment, mercury naturally cycles among its elemental, ionic, and methylated forms (Figure 1). Once mercury is released in the environment, local environmental conditions determine its transformations. Bacteria that process sulfate in the environment can take up mercury in its inorganic form, and through metabolic processes convert it to methylmercury. Factors such as dissolved oxygen, pH, nutrient, sulfide and sulfate concentrations affect methylation rates (USEPA, 1997). Concentrations of methylmercury increase in the food web, from primary producers to higher trophic level fish to wildlife and humans, thereby causing a greater risk to consumers at the highest trophic level. Methylmercury is a neurotoxin that affects the brain and central nervous system, with long term exposure leading to loss of physical coordination and mental deficiencies. Developing fetuses and young children are most susceptible to its toxic effects.



**Figure 1. The Aquatic Mercury Cycle<sup>1</sup>**

In the past decade, studies have focused on the bioaccumulative effects of mercury concentration in fish in Delta waterways. A 1998 study examined fish tissue concentrations of mercury in the Delta region, identifying elevated tissue mercury concentrations in sport fish along with regional variation in mercury concentrations -- with higher concentrations in tributaries (including the Feather, Sacramento, American, and San Joaquin Rivers) and lower concentrations in the Central Delta (Davis et al., 2000). A recently published study systematically evaluated mercury concentrations in Delta sport fish, to determine baseline levels of mercury in fish and evaluate spatial patterns of mercury accumulation (Davis et al., 2008). The report underscored the complexity of mercury dynamics in the Delta, reporting variations in methylmercury levels among fish species, along with correlations between fish tissue and water column methylmercury but no relationship between fish tissue and sediment methylmercury.

<sup>1</sup> From: Mercury Pollution: Integration and Synthesis. Copyright Lewis Publishers, an imprint of CRC Press., as shown in <http://wi.water.usgs.gov/pubs/FS-216-95/mercury.pg3.pdf>

### **1.1.2 Sources of Mercury**

Mercury enters the environment through natural sources, such as the natural breakdown of minerals in rocks and soils, as well as human activities such as mining, burning fossil fuels, and consumer product use. Mercury from these sources enters waterways through atmospheric deposition and direct contamination of water entering waterways.

#### ***Atmospheric Deposition***

Vapor released from mercury sources is transported in the atmosphere and deposited on land and water, either directly or through precipitation. The U.S. EPA estimates that combustion of mercury-containing material accounts for 86% of atmospheric mercury emissions in the U.S., with coal-fired electric utility boilers, municipal waste combustion, and coal and oil-fired commercial/industrial boilers being the primary contributors (USEPA, 2001). Atmospheric deposition is the primary source of mercury in most locations, and can contaminate even pristine watersheds (Fitzgerald et al., 1998). A study by the San Francisco Estuary Institute (SFEI) found total mercury in ambient air samples in the San Francisco Bay Area ranged from 1.5 to 4.2 nanograms per cubic meter (ng/m<sup>3</sup>), with an average concentration of 2.1 ng/m<sup>3</sup>, which is twice the global background concentration (SFEI, 2001). They concluded that direct atmospheric deposition contributed 27 kilograms (kg) of total mercury to the San Francisco Bay Estuary, with direct wet deposition contributing 18% of the total atmospheric deposition.

#### ***Sediment-Associated Mercury***

In areas where gold and mercury have been mined extensively, watersheds contain elevated mercury levels. Sediment-associated elemental mercury from historic mining activity is likely the most prevalent mercury source within the Central Valley (Domagalski, 2001).

#### ***Mercury-Containing Products***

Mercury has useful properties which have been applied in many products and applications historically, and is still widely used (Table 1). Thermometers, barometers and other scientific instruments can contain mercury. Its electrical conductivity has been utilized in silent, position-dependent switches. Mercury vapor is used in streetlights, fluorescent light bulbs, computer equipment and advertising signs. Its ability to easily form amalgams with other metals such as gold, silver, zinc and cadmium led to use of mercury in dental fillings and dry cell batteries. Mercury can form compounds with other elements, to create cleaning chemicals, disinfectants, and paints. Improper disposal of these chemicals can contribute mercury directly to wastewater, stormwater, and the atmosphere.

**Table 1. Common mercury-containing products for consumer and commercial uses**

Product Type	Mercury-containing Products
<b>Consumer Products</b>	
Home items	Airflow/thermostat controls, antique instruments (barometers, mirrors, organs), appliances, button cell batteries, clothes irons, light switches, latex paint, tilt switches, fluorescent light bulbs
Medical Pharmaceutical Products	Thimerasol (preservative in vaccines, antibiotics), contact lens solution, dental amalgam, thermometers, ear and eye drops, skin cream
Automotive parts	Switches in pre-2003 cars – light switches, heated car rear windows, acceleration sensors, school bus braking systems; switches in new cars' navigation screens and HID headlights
<b>Commercial Products</b>	
Medical Products	Antibiotics, batteries, alarms, blood pressure cuffs, hearing aids, pacemakers, scales, ultrasound, tubes, vaccines
Electrical Products	Tilt switches, security systems, pressure controls, silent light switches, temperature control, thermometers, laptop computers, computer monitors
Manufacturing Products	Laboratory reagents (i.e., Mercury chloride, Mercury iodide, Mercury nitrate, Hitachi Chem Analyzer reagent, Golgi's, Takata's reagent)

## 1.2 Regulatory Background

The Delta is impaired due to elevated levels of methylmercury in fish and is on the Clean Water Act 303(d) list for mercury. The State Board has also designated the Delta as a toxic hot spot under the Bay Protection and Toxic Hot Spot Cleanup Program.

### 1.2.1 Permit Requirements

The Municipal Stormwater NPDES Permit (Order No. R5-2007-0173), Provision 28.d, requires the Permittees to develop a mercury pollution prevention plan, and identifies the following key components which must be addressed:

- Reduction of mercury from controllable sources in stormwater, including the identification of mercury-containing products used by the Permittees and a schedule for their timely control;
- Study feasibility and benefits to local stormwater quality of residential and commercial programs for diverting mercury-containing waste products (potentially including thermometers and gauges, batteries, fluorescent and other lamps, switches, relays, sensors, and thermostats) from the waste stream;
- Coordination with Central Valley Regional Water Quality Control Board (Regional Water Board) staff to assess the contribution of air pollution sources to mercury in stormwater;



- Public education, outreach and participation program designed to reach residential, commercial and industrial users or sources of mercury-containing products or emissions;
- Participation with other organizations to develop programs to reduce or eliminate sources of mercury within the Stockton Urbanized Area (SUA); and
- Development and adoption of policies, procedures and/or ordinances to implement the Mercury Plan.

### **1.2.2 Delta Mercury TMDL**

The Regional Water Board has proposed an amendment to the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins to address the regulation of methylmercury and total mercury in the Delta.

The draft Sacramento-San Joaquin Delta Estuary TMDL for Methylmercury (TMDL)<sup>2</sup> aims to reduce methylmercury concentrations in fish by implementing wasteload allocations for total and methylmercury. The proposed fish tissue objectives are as follows:

<b>Matrix</b>	<b>MeHg Objective</b>
Trophic level 3 fish tissue (150-500 mm length)	0.08 mg MeHg/kg
Trophic level 4 fish tissue (150-500 mm length)	0.24 mg MeHg/kg
Small fish (<50 mm length)	0.03 mg MeHg/kg

The draft TMDL specifies methylmercury wasteload allocations which apply to runoff from urban areas within Municipal Separate Storm Sewer System (MS4) service areas within the Delta and Yolo Bypass.

The Permittees expect to work with Regional Water Board staff to support the methylmercury and total mercury reduction efforts identified in the final approved Mercury TMDL.

### **1.2.3 Additional Legislative and Regulatory Efforts**

Additional legislative and regulatory efforts to reduce mercury loading to the Delta and San Francisco Bay and to control mercury-containing products include the following:

- Bay Protection and Toxic Cleanup Program and Consolidated Toxic Hot Spots Cleanup Plan, which identified mercury in the Delta as a toxic hot spot;
- Mercury control program for San Francisco Bay, which assigned mercury reductions to Central Valley outflows to the Bay to address the Bay's mercury impairment;
- California Mercury Reduction Act of 2001 (Senate Bill 633), which limits or prohibits the sale and/or use of several types of mercury-containing products in California;

<sup>2</sup> Wood, M., P. Morris, J. Cooke, S. Louie and D. Bosworth. 2008a. Amendments to The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Methylmercury and Total Mercury in the Sacramento-San Joaquin Delta Estuary. Central Valley Regional Water Quality Control Board, Draft Staff Report for Public Review. Sacramento. February. Available at:

[http://www.waterboards.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/delta\\_hg/staff\\_report\\_feb08/bpa\\_full\\_rpt.pdf](http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/staff_report_feb08/bpa_full_rpt.pdf)

- California Department of Toxic Substances Control's 2002 Universal Waste Rule (UWR), which established special management standards for three types of hazardous waste called "universal wastes" (batteries [except automotive lead acid type]; thermostats containing mercury, and lamps such as fluorescent tubes and mercury vapor lamps); and
- Energy Independence and Security Act of 2007, which requires the most common screw base incandescent household bulbs to be phased out in the United States over the next six years.

These legislative and regulatory efforts will be tracked by the Permittees to provide context and benefit their local mercury control program. In particular, the UWR and Mercury Reduction Act will serve as guidelines for promoting proper use and handling of mercury-containing products by the Permittees.

### 1.3 Current Conditions of Mercury in Delta Stormwater

Total mercury and methylmercury have been monitored in Stockton and Sacramento urban runoff and receiving waters. The results of those monitoring efforts are presented below.

#### 1.3.1 Mercury in Stockton Urban Runoff and Receiving Waters

Dissolved and total mercury were monitored in Stockton urban runoff and receiving water sites in the Calaveras River, Smith Canal, Duck Creek, and Mormon Slough from 2002-2006 (Table 2). The California Toxics Rule (CTR) specifies a criterion for total recoverable mercury for freshwater sources of drinking water. The CTR does not specify duration or frequency, but the Regional Water Board has previously employed a 30-day averaging period with an allowable exceedance frequency of once every three years. Mercury in urban runoff can be compared to CTR standards, but there may be too little urban runoff and receiving water concentration data to evaluate compliance with the CTR.

Total mercury in urban runoff was measured in exceedance of the 50 nanograms per liter (ng/l) CTR standard on three occasions (once in each waterbody except Mosher Slough). Total mercury in receiving water consistently exceeded the 50 ng/l standard in all waterbodies except Mosher Slough. In general, receiving water had approximately an order of magnitude higher concentrations of both total and dissolved mercury compared to urban runoff. However, far fewer receiving water samples were collected than urban runoff samples – only one to three samples were collected at each of the monitoring locations, so any comparisons to urban runoff concentrations could be biased by aberrantly high or low concentrations.

**Table 2. Mercury (total and dissolved) measured in Stockton urban runoff and receiving water, 2002-2006.**

Constituent	Location	Urban Runoff				Receiving Water			
		n	Mean	Min	Max	n	Mean	Min	Max
Total Mercury (ng/l)	All Sites	52	34	1.4	540	7	627	32	1,400
	Calaveras River CR-46	13	41	2.5	300	2	737	74	1,400
	Duck Creek DC-65	13	56	1.4	540	1	290		
	Mosher Slough	13	17	1.6	32	1	32		

	MS-14								
	Smith Canal at Legion Park SC-1	13	21	2.3	87	3	863	410	1200
Dissolved Mercury (ng/l)	All Sites	25	5.3	1.2	17	2	455	340	570
	Calaveras River CR-46	6	7.1	1.2	12	1	570		
	Duck Creek DC-65	6	3.6	1.6	7				
	Mosher Slough MS-14	7	4.3	2	8	1	340		
	Smith Canal at Legion Park SC-1	6	6.6	2.8	17				

### 1.3.2 Methylmercury in Stockton Urban Runoff

Urban runoff from four Stockton pump station outfalls sampled during the 2003/2004 wet season contained methylmercury levels ranging from 0.084 to 0.533 ng/l. Average values are presented in Table 3.

**Table 3. Average methylmercury concentrations in Stockton pump outfalls sampled during the 2003/2004 wet season.**

Pump Outfall	n samples	Average methylmercury concentration (ng/l) <sup>a</sup>
Calaveras River Pump Station CR-46	5	0.167
Duck Creek Pump Station DC-65	1	0.103
Mosher Slough Pump Station MS-14	4	0.125
Smith Canal Pump Station SC-57	4	0.263

a. Data Source: 2008 Draft Delta Mercury TMDL Staff Report

### 1.3.3 Total and Methylmercury in Sacramento Urban Runoff

The City of Sacramento has measured total mercury and methylmercury in its urban watersheds since 2002 (Table 4). The average total mercury concentrations measured at Strong Ranch Slough exceeded the water quality objective of 50 ng/l total mercury in stormwater. However, as discussed previously, the CTR might be difficult to assess for urban discharge

**Table 4. Mercury (total and methyl) measured in Sacramento urban runoff, 2002-2007<sup>3</sup>**

Parameter	Strong Ranch Slough (a)	Sump 111 (b)	Sump 104 (c)
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<sup>3</sup> SSQP. 2002/2003 – 2007/2008 Joint Program Annual Report. Prepared by: County of Sacramento and the Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, and Rancho Cordova.

	n det (d)	Mean (e)	Min det (f)	Max det (g)	n det (d)	Mean (e)	Min det (f)	Max det (g)	n det (d)	mean (e)	Min det (f)	Max det (g)
Dissolved Mercury (ng/L)	17	4.32	1.7	10.2	19	3.8	1.1	9	19	3	0.6	7
Total Mercury (n/L)	18	58.8	3.5	609	19	22.7	2.9	71	19	14.5	2	41
Methylmercury (ng/L)	18	0.48	0.07	2	18	0.3	0.09	0.9	18	0.2	0.05	0.6

(a) Strong Ranch Slough - drains a 5,162 acre mixed-use area of the County of Sacramento

(b) Sump 111 – drains an industrialized 420 acre area of the City of Sacramento

(c) Sump 104 - drains a 2,220 acre area of mixed residential/commercial land use in the City of Sacramento

(d) Number of samples in which analyte was detected

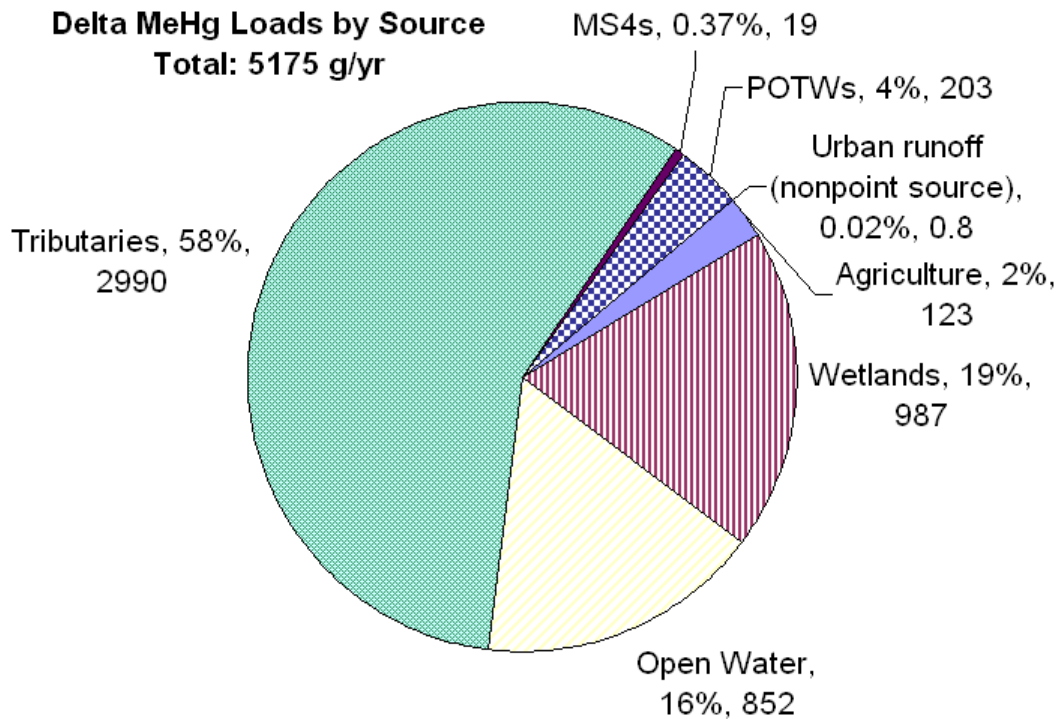
(e) Arithmetic mean value; "ID" indicates insufficient data detected to calculate value

(f) Minimum value reported; "ND" if no detected values

(g) Maximum value reported; "ND" if no detected values

### **1.3.4 Contribution of Stormwater to Methylmercury Load**

The draft Mercury TMDL presents the source contributions for methylmercury loads in the Sacramento-San Joaquin Delta Estuary. The various mercury source contributions are presented in Figure 2. Stormwater discharges within the Delta are estimated to contribute 0.37% of the total methylmercury load to the Delta. It should be noted that the majority of urban area managed by the Sacramento and Stockton MS4s is immediately outside the legal Delta boundary.



**Figure 2. Contributions by Source Categories to Methylmercury Loads in the Delta (presented in the February 2008 Delta Methylmercury and Total Mercury Basin Plan Amendment Draft Staff Report)**

## 1.4 Related Mercury Reduction Efforts

### 1.4.1 Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP)

The SCVURPPP developed a mercury pollution prevention plan per requirements in its 2001 NPDES permit. They developed guidelines on mercury containing products for use by the Santa Clara permit agencies; prepared a survey of mercury containing product use, handling, and disposal; developed a model policy on eliminating the use of mercury containing products by permittees; and conducted a public outreach media campaign, coordinating with household hazardous waste collection centers on proper disposal of mercury containing products. The efforts outlined in their mercury pollution prevention plan served as a model for the Sacramento Stormwater Management Program mercury plan.

### 1.4.2 Sacramento Stormwater Management Program (SSMP)

The SSMP was required in its 2002 NPDES permit to implement mercury pollution prevention strategies in the Sacramento area. The Sacramento Program has conducted monitoring for total mercury and methylmercury in Sacramento waterways since 2002. Additionally, they executed several mercury source reduction activities, including industrial inspections to promote safe handling and disposal of mercury containing devices, household hazardous waste collection

program support, and public outreach efforts. They also conducted a survey of municipal use of mercury containing products, and reported the results<sup>4</sup>. The survey results reported what mercury-containing products are used, how many products are disposed of, and whether the disposal methods are in conformance with the UWR. Information on UWR requirements was transmitted to all surveyed personnel. When the survey was initially conducted in 2004, many permittee departments were in conformance with the UWR, while some departments were unaware of UWR requirements, and altered their existing procedures to come into conformance. The primary value of survey results was to ensure that the largest quantities of breakable mercury-containing products are disposed of as universal waste rather than as solid waste, where breakage could contribute mercury to urban runoff. The Sacramento survey concluded that the largest volume of breakable mercury-containing products was fluorescent lamps, which were properly disposed of as universal/hazardous waste in almost all cases.

#### **1.4.3 Delta Mercury Tributaries Council (DMTC)**

The DTMC is a stakeholder group of representatives of various federal, state and county agencies, academic institutions, consulting firms and citizen stakeholders. It was formed in 1999, and meets quarterly to evaluate the status of knowledge of mercury within the Sacramento-San Joaquin and San Francisco Bay Area. Participants report regularly on mercury monitoring, dispersion, methylation, accumulation in biota and its potential effects on wildlife and humans; discuss projects intended to attain safe mercury levels in waterways; and make recommendations for regulatory agencies in support of those reduction efforts.

## **2.0 THE MERCURY PLAN**

The goal of the Delta-wide mercury reduction effort is to minimize methylmercury exposure to humans and wildlife in the Delta and to prevent the creation or maintenance of toxic hot spots. The Mercury Plan serves as a component of this reduction strategy, with the objective of reducing total and methylmercury conveyed to Delta waterways through stormwater from the SUA. Stormwater conveys mercury, by transporting mercury from atmospheric deposition and mercury resuspended from sediments. Stormwater can also contain mercury from improperly disposed chemicals and mercury-containing devices. The Mercury Plan focuses on addressing controllable sources of mercury to stormwater. The Mercury Plan aims to reduce mercury discharged to the Delta by reducing the input of mercury-containing waste to stormwater discharge, and reducing mercury conveyance through sediment erosion control.

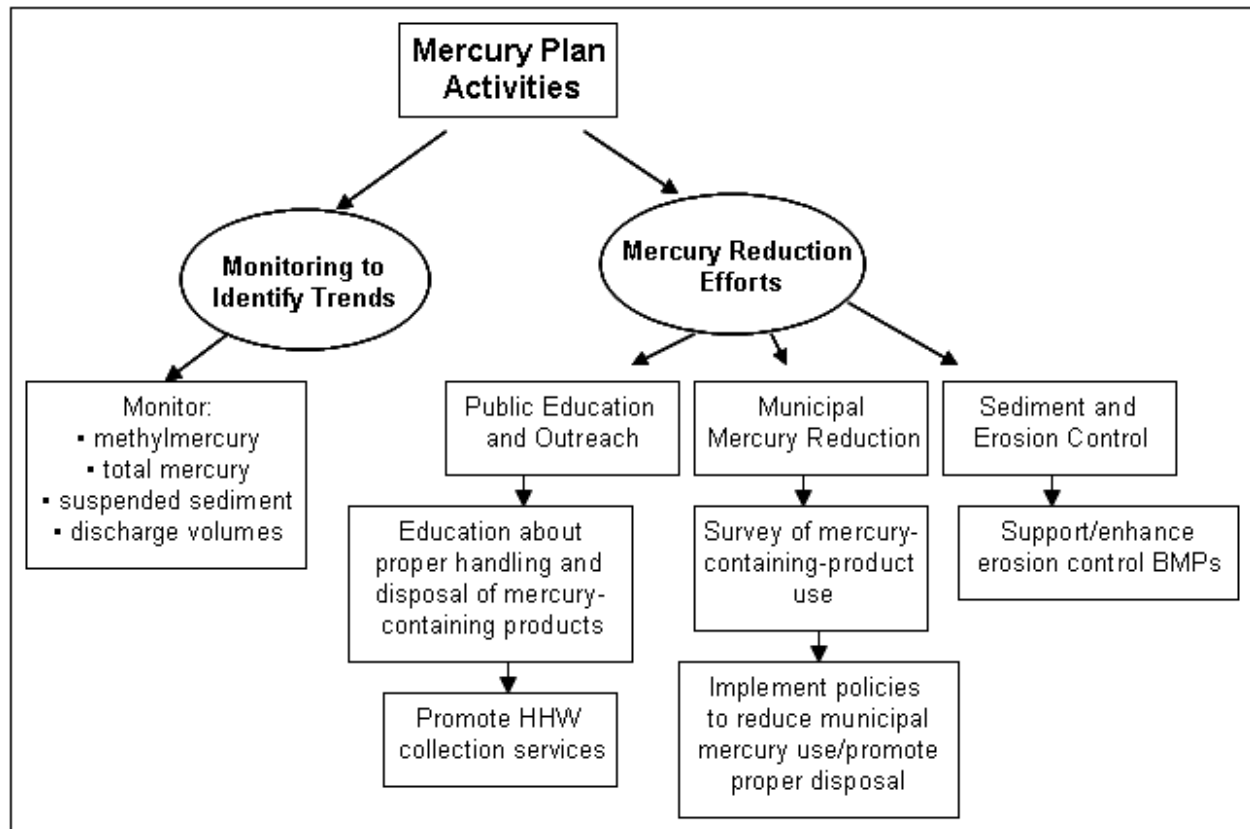
The Mercury Plan includes the following components:

- Public outreach to promote proper use and disposal of products containing mercury, including coordination with household hazardous waste facilities and commercial and industrial outreach;
- Assessment and reduction of municipal use of mercury-containing products;
- Support of sediment and erosion control efforts; and
- Characterization of total mercury and methylmercury in SUA waterbodies and stormwater discharges.

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<sup>4</sup> SSQP. 2005. Municipal Mercury Survey Technical Memorandum. Prepared by Archibald & Wallberg Consultants for the Sacramento Stormwater Quality Partnership. March 2005.

The Mercury Plan approach is summarized in Figure 3.



**Figure 3. The Mercury Plan Approach**

## 2.1 Public Outreach and Education

The goal of public outreach is to promote public awareness about mercury pollution prevention, as well as inform the public of the health risk of mercury contamination in fish and Office of Environmental Health Hazard Assessment (OEHHA) fish consumption advisories.

One major component will be to inform the public about common products that contain mercury and safe disposal options using various media. The public outreach effort will identify common products containing mercury. A focus on mercury education will be incorporated into the SUA stormwater outreach program. Existing programs which will incorporate messages about mercury include:

- Stormwater pollution prevention in the classroom
- Community presentations
- Earth Day Festival

The City maintains a Stormwater Program website which details their outreach efforts<sup>5</sup>. A link will be added to a webpage providing information about mercury. The page will contain information on common household products that contain mercury, alternatives to mercury-containing products, safe disposal of mercury-containing products (with a link to the household hazardous waste program), the health effects of methylmercury, and information on fish consumption advisories (with a link to the health advisories on the OEHHA website<sup>6</sup>).

### **2.1.1 Household Hazardous Waste Collection Programs**

The County operates a Household Hazardous Waste (HHW) Facility which accepts mercury-containing products. The facility is open to the public Thursday-Saturday. Their outreach brochure lists accepted products, including fluorescent bulbs, mercury thermometers, mercury thermostats and other devices containing mercury. Information about HHW collection is made available to the public through their website<sup>7</sup> and brochures. The Mercury Plan will support the HHW program to encourage proper disposal of products containing mercury.

The County also operates a free electronic waste (e-waste) collection event on the second Saturday of every month at the San Joaquin Delta College parking lot. The Mercury Plan will focus efforts to include this e-waste collection in outreach materials promoting proper disposal of mercury-containing products.

The Permittees will track the amount of mercury-containing products which are disposed of through these programs.

### **2.1.2 Commercial and Industrial Outreach**

The Permittees currently provide pollution prevention information for businesses in order to focus on minimizing pollutants in stormwater runoff. Information is disseminated through various media, including fact-sheets which detail best management practices (BMPs) specific to business type. Information specific to business type, listing products that contain mercury, along with proper handling and disposal procedures, is available and will be expanded to include:

- Lists of commonly used products that contain mercury, along with mercury-free alternative products;
- Information on proper handling of mercury-containing products;
- Disposal information for mercury-containing products; and
- Information on UWR participation in the Conditionally Exempt Small Quantity Generator (CESQG) program for generators of small quantities of hazardous waste (up to 220 lbs. or 27 gallons), and the Hazardous Waste Generator Program for generators of larger quantities of hazardous waste.

The diversion of mercury-containing waste products from the waste stream by participation of commercial and industrial businesses in UWR and CESQG programs will be tracked.

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<sup>5</sup> [http://www.stocktongov.com/MUD/General/stormwater/stormwater\\_outreach.cfm](http://www.stocktongov.com/MUD/General/stormwater/stormwater_outreach.cfm)

<sup>6</sup> <http://oehha.ca.gov/fish.html>

<sup>7</sup> <http://www.sjgov.org/solidwaste/pdf%20folder/HHW%20brochure.pdf>



The City also contracts inspections of commercial and industrial operations, with the purpose of helping local businesses become better aware of what can be done to reduce or eliminate stormwater pollutants. The City provides an evaluation checklist for types of BMPs addressed during the visit. The evaluations will be modified to include a discussion regarding mercury-containing products, along with proper handling and disposal procedures.

## **2.2 Municipal Operations**

### ***2.2.1 Identification and Control of Mercury-containing Products***

The Permittees are required to identify the extent of their use of mercury containing products. This will be accomplished through a mercury use survey, administered to municipal departments. The process of assessing municipal uses of mercury will include:

- Develop and administer a survey (based on Santa Clara Mercury Pollution Prevention Plan and Sacramento Stormwater Mercury Plan) to identify the types of mercury-containing products used by municipal departments. The survey results will be included in the Annual Report, and made available on the City's stormwater website.
- Identify products with a potential to enter stormwater runoff. Determine possible alternative products, or proper disposal procedures.

The Permittees will develop recommendations for City/County Departments regarding the management of mercury containing products.

### ***2.2.2 Storm Drain Maintenance***

The Permittees will continue to implement a Storm Drainage System Maintenance Control Measure, which prioritizes catch basins for cleaning based on the required level of maintenance, labels all catch basins with a storm drain message, and includes special event requirements to prevent debris accumulation in catch basins and storm drains.

### ***2.2.3 Collaboration with and Tracking of Regional Mercury Programs***

The Permittees will collaborate with and track regional programs related to mercury control. The Permittees will participate in the Delta Tributaries Mercury Council, and will track the progress of the CalFed Mercury Program. In addition, the Permittees will collaborate with Delta MS4s, in particular Sacramento and Modesto, to promote consistency and improve knowledge and effectiveness within their respective mercury control programs.

## **2.3 Sediment and Erosion Control**

Construction sites in the SUA employ BMPs to minimize the conveyance of pollutants through mobilized sediments. Erosion control measures are in place to avoid increased erosion and transport of contaminated soil into receiving waters via runoff. Specific erosion control measures include preservation of existing vegetation, rolled erosion control products such as blankets or mats, earth dikes, drainage swales, and limitations on construction activities during wet weather. Sediment control measures include, but are not limited to, sediment basins, sediment traps, fiber rolls, gravel bag berms, sandbag barriers, and storm drain inlet protection. Additional measures employed in the Stockton area are discussed below.

## **Construction Projects**

During construction projects, a number of activities may generate or mobilize pollutants. The Permittees implement the Construction Program Element (Program) to coordinate City/County programs and resources to effectively reduce pollutants in runoff from construction sites during all construction phases. The Program provides inspection to ensure proper BMP implementation. Specific practices which minimize sediment runoff from construction sites, and minimize the potential for erosion in the construction of new development, include:

- Preserve, and where possible, create or restore riparian corridors and buffer zones.
- Limit disturbances of natural water bodies and natural drainage systems.
- Use methods available to estimate increases in pollutant loads in runoff flows resulting from construction projects and projected future development. Require incorporation of structural and non-structural BMPs to mitigate the projected increases in pollutant loads.
- Identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion and sediment loss.
- Coordinate with local traffic management programs to reduce pollutants associated with vehicles and increased traffic resulting from construction and development.
- Implement source and structural controls as necessary to protect downstream receiving water quality from increased pollutant loads and flows from new development and significant redevelopment.

## **2.4 Methylmercury Characterization Monitoring**

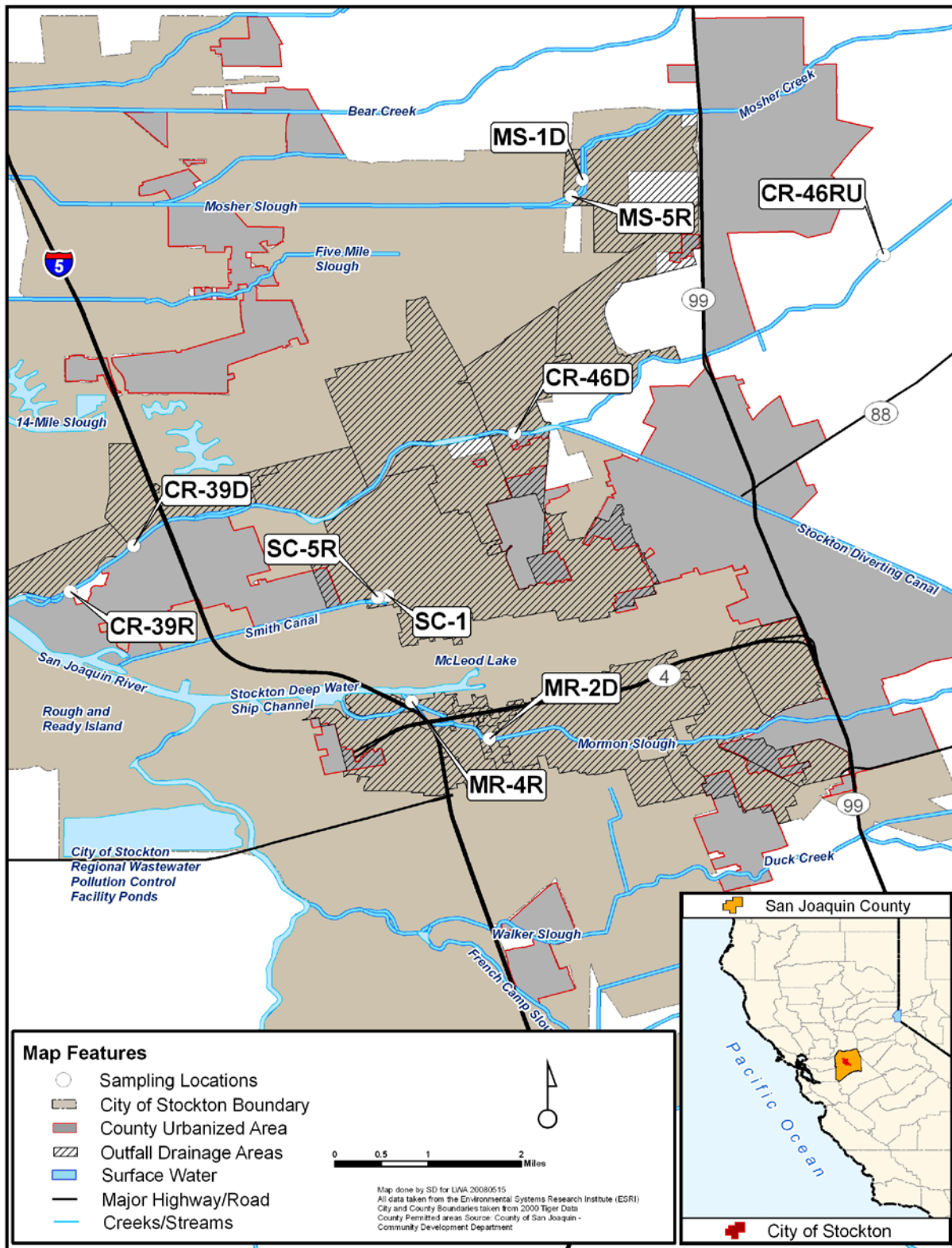
Order No. R5-2007-0173 requires monitoring to characterize the concentrations and loads of methylmercury entering the Delta from Stockton urban runoff. Receiving water, outfall discharges, and one detention basin will be monitored for total mercury and methylmercury. Additionally, suspended sediment concentrations<sup>8</sup> (SSC) will be measured in the water column. The discharged loads will be estimated at sampling locations.

Characterization monitoring will be conducted for three (3) years, capturing two dry weather events and three wet weather events (over a range of storm intensities) per year<sup>9</sup>. The monitoring locations are shown in Figure 4.

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<sup>8</sup> American Society for Testing and Materials Method D 3977-97, "Standard Test Method for Determining Sediment Concentration in Water Samples," will be used to determine suspended sediment concentrations.

<sup>9</sup> Characterization monitoring is described in more detail in the Mercury Monitoring Plan, which is a monitoring plan included as a separate document in support of the Mercury Plan.



**Figure 4. Proposed Monitoring Locations**

### **2.4.1 Monitoring Locations**

The SUA discharges to a series of freshwater rivers, sloughs, and man-made canals via numerous pump stations and gravity lines. Some of the gravity discharge lines are tidally influenced; the subsidiary waterways to the San Joaquin River generally experience a one to three foot tide. These relatively shallow, tidally influenced waterbodies generally flow west/southwest to the lower San Joaquin River and include Mosher Slough, Five-Mile Slough, the Calaveras River, Smith Canal, and Mormon Slough (Figure 4). The Mercury Plan is required to sample locations representative of conditions in the SUA.

The Permittees used the following criteria to select sites:

- Representative of land use and activities in the SUA;
- Accessible to monitoring;
- Spatially representative of waterbodies in the SUA; and
- Overlap with ongoing and/or proposed studies whenever possible.

The intention of site selections for the Mercury Plan is to coordinate when possible with existing data sources and programs, while maximizing the effectiveness of the individual programs. Proposed specific sampling sites are listed in Table 5 and discussed below.

#### ***Calaveras River***

The Calaveras River originates in the eastern Sierra Nevada Mountains, and receives upstream runoff primarily from open spaces, forest lands, pasture lands and agriculture. It receives high flows during late fall, winter, and early spring, while summer and early fall flows can be minimal. The Calaveras River drainage area is primarily residential with some open space. Sites were chosen along the Calaveras River to represent background mercury conditions prior to impact from the SUA; stormwater discharged from an older residential and commercial area; stormwater discharged from a newer, more upscale residential; and mercury conditions in downstream receiving water. The City of Stockton's stormwater baseline monitoring program has collected data for total mercury at discharge and receiving water stations on the Calaveras River at site CR-46, which will be compared with the Mercury Plan data to provide a longer-term perspective.

#### ***Smith Canal***

Smith Canal is a dead-end slough connecting the San Joaquin River with Yosemite Lake in downtown Stockton. It receives stormwater runoff only from urban downtown Stockton. Land uses in Smith Canal are dominantly residential (71.5%), with some commercial (18.3%), with industrial, mixed urban, and open space comprising the remaining 10.2%. The Legion Park station is the 2<sup>nd</sup> largest pump station in Stockton, and represents dominantly residential and commercial land uses. Discharge from the Legion Park pump station will be sampled, along with receiving water in Yosemite Lake.

#### ***Mosher Slough***

Mosher Slough is located primarily in the residential north side of Stockton. Land uses in the drainage area are primarily residential, with a smaller percentage of commercial and open space. The residential areas consist primarily of new development in the eastern portion of the SUA. A detention basin on Mosher Slough will be monitored for total mercury and methylmercury as a

component of the Permittees' Detention Basin Monitoring program. Results from detention basin monitoring will be compiled with results from other Mercury Plan sites, in order to compare mercury levels at other sampled locations in Stockton.

#### *Mormon Slough*

Lower Mormon Slough is a direct tributary to the Deep Water Ship Channel, and is located in the southern area of Stockton. Sampling locations on Mormon Slough were chosen to represent a predominantly older, more industrialized portion of Stockton. The land uses within the drainage area include residential (39.2%), commercial (31.2%), industrial (12.9%), mixed urban (12.1%) and open space (4.6%).

#### **2.4.2 Air Pollution Source Assessment**

The Permittees will coordinate with Regional Water Board staff to assess the contribution of air pollution sources to mercury in Stockton stormwater. This assessment will also include tracking air pollution studies that may provide information on air emissions and deposition as a source of mercury to the Stockton area.

In addition, total mercury concentrations in rainwater will be analyzed during scheduled rainwater sampling events (see Appendix I-1, Pesticide Plan sampling schedule).

**Table 5. Mercury Plan Monitoring Locations**

Waterbody	Monitoring Location	Monitoring Sites	
		Discharge Site ID	Receiving Water Site ID
Smith Canal	Legion Park pump station at Yosemite Lake	SC-1	SC-5R
Mosher Slough	Morada Basin	MS1-D	MS5-R
Calaveras River	Upstream receiving location at Solari Ranch Road		CR-46RU
	West Lane (South side of river)	CR-46D	
	Downstream discharge and receiving location, at Brookside	CR-39D	CR-39R
Mormon Slough	Weber Avenue Overpass		MR-4R
	Lift station wet well at Commerce Street	MR-2D	

## 2.5 Reporting

Implementation progress and monitoring results will be reported to the Regional Water Board annually in a Mercury Plan Progress Report submitted with the Permittees' Annual Report. In addition, a final baseline report will be submitted to the Regional Water Board by December 1, 2011.

## 2.6 Implementation Schedule

Mercury Plan Component	Type of Component <sup>1</sup>	Implementation Schedule <sup>2</sup>																			
		2007-2008				2008-2009				2009-2010				2010-2011				2011-2012			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Monitor methylmercury and total mercury	N																				
Public education and outreach																					
Modify City's website to include information re. mercury	N																				
Coordinate with HHW Program to publicize mercury-containing product information and disposal	E																				
Commercial and industrial outreach																					
Distribute fact sheet for businesses	N																				X
Business inspections (Industrial stormwater inspection program)	E																				X
Track commercial and industrial business' participation in UWR and CESQG programs	N												X								X
Municipal operations																					
Develop survey to identify use of mercury-containing products	N							X													
Administer survey	N																	X			
Develop recommendations for City Departments	N											X									
Implement recommendations	N																				
Track mercury-containing products disposed through the HHW and e-waste collection events	C							X					X				X				X
Estimate increases in mercury loads in runoff from construction and projected future development	N							X	X			X	X			X	X				X

Collaboration with Delta MS4s and tracking regional mercury programs	N							X		X		X		X		X		X	
Coordinate with Regional Water Board staff to assess air pollution sources to mercury in stormwater	N												X				X		
Erosion/Sediment Control																			
Implement Construction Program Element	C																		X
Reporting																			
Report annual monitoring results and implementation progress in Annual Report	N					X				X				X				X	
Develop annual urban runoff mercury load estimates	N																	X	
Characterization Baseline Report	N																X	X	

Notes:

1. C = Continue; E = Enhance; N = New

2. Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

X = Plan component will be completed during this quarter.

■ = Plan element will be completed during this timeframe as specified



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City of Stockton  
County of San Joaquin

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Mercury Monitoring Plan –  
Revised April 2009

*prepared by*

LARRY WALKER ASSOCIATES



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## **1.0 OBJECTIVE**

The primary objective of this Mercury Monitoring Plan is to determine the extent to which the Stockton urban area discharges contribute methylmercury and total mercury to the Delta. Based on the monitoring results, future efforts will identify methylmercury and total mercury sources, and evaluate best management practices (BMPs) to reduce the mercury in the Stockton Urbanized Area (SUA) discharges.

The goal of the Mercury Monitoring Plan is to conduct baseline monitoring to determine the methylmercury and total mercury concentrations and loads discharged to the Delta by the SUA.

## **2.0 SCOPE OF THE MONITORING PLAN**

To address mercury impairment in the Delta, Provision 28.d of the City of Stockton (City) and County of San Joaquin (County) (collectively, Permittees) Municipal Stormwater National Pollutant Discharge Elimination Systems (NPDES) Permit (Order No. R5-2007-0173) requires the Permittees to develop and implement a mercury plan that identifies the Permittees' strategy to reduce methylmercury exposure to humans and wildlife in the Delta and to prevent the creation or maintenance of toxic hot spots. This monitoring plan supports the Permittees Mercury Plan by characterizing the concentrations and loads of methylmercury entering the Delta from SUA discharges.

Receiving water and outfall discharges will be monitored for total mercury, methylmercury, and suspended sediment concentrations (SSC). Characterization monitoring will be conducted for three years, capturing two dry-weather events and three wet-weather events (over a range of storm intensities) per year.

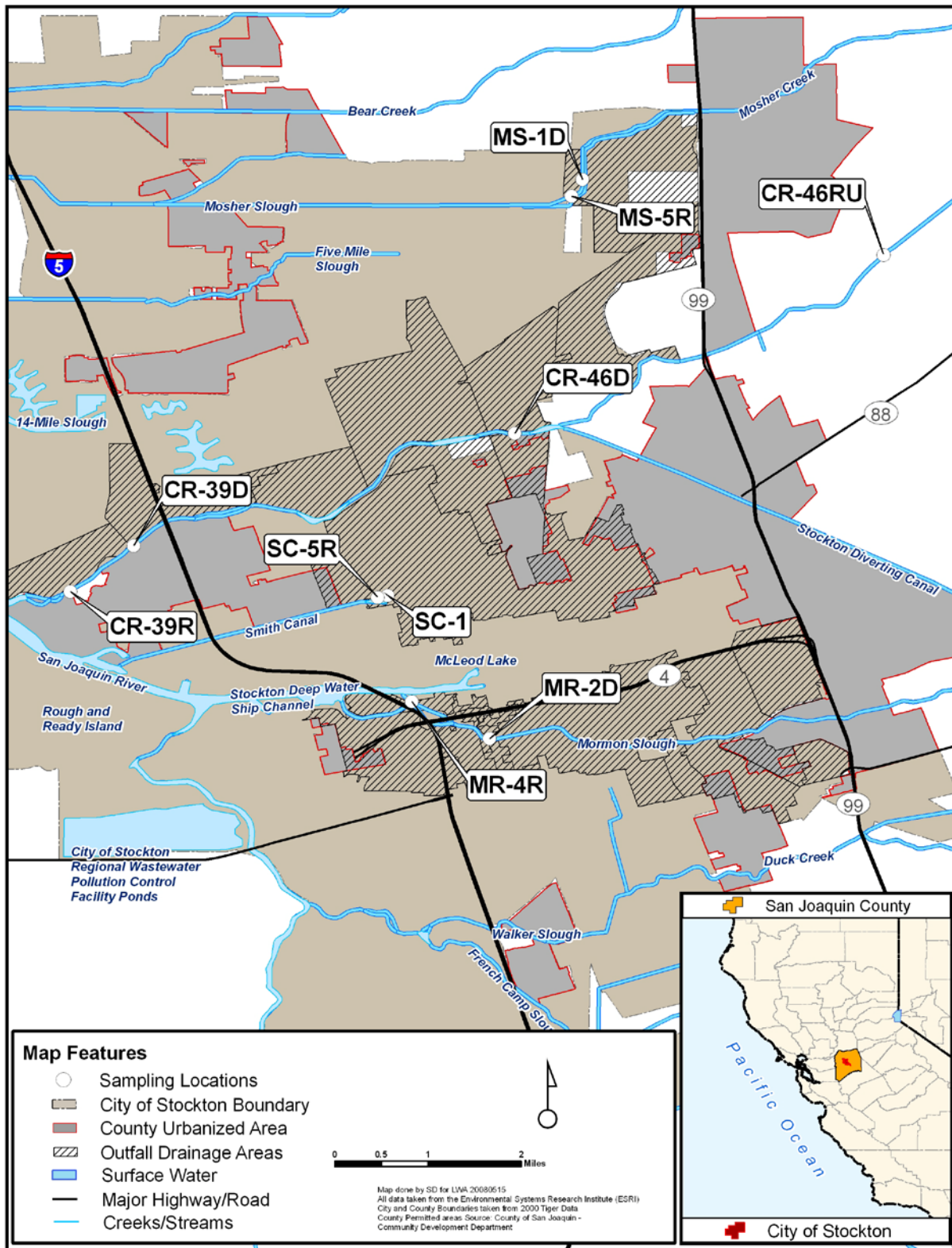
## **3.0 MONITORING LOCATIONS**

Mercury and methylmercury monitoring will be conducted at eight strategic locations, representative of conditions throughout the watersheds in the SUA. The SUA discharges to a series of freshwater rivers, sloughs, and constructed canals via numerous pump stations and gravity lines. Some of the gravity discharge lines are tidally influenced; the subsidiary waterways to the San Joaquin River generally experience a one to three foot tide. These relatively shallow, tidally influenced waterbodies generally flow west/southwest to the lower San Joaquin River and include Mosher Slough, Five-Mile Slough, the Calaveras River, Smith Canal, and Mormon Slough. Tidal effects at receiving water monitoring locations will be addressed by recording direction and rate of flow during each sampling event.

The Mercury Plan is required to sample locations representative of conditions in the SUA. The Permittees used the following criteria to select sites:

- Representative of land uses and activities in the SUA;
- Accessible to monitoring;
- Spatially representative of waterbodies in Stockton; and
- Overlap with ongoing and/or proposed studies whenever possible.

The intention is to coordinate, when possible, with existing data sources and monitoring programs. Proposed specific sampling locations on four waterbodies in the SUA are shown in Figure 1, described in Table 1 and discussed below.



**Figure 1. Proposed Mercury Plan Monitoring Locations**

**Table 1. Proposed Monitoring Site Locations**

Waterbody	Monitoring Location	Monitoring Sites	
		Discharge Site ID	Receiving Water Site ID
Smith Canal	Legion Park pump station in Yosemite Lake	SC-1	SC-5R
Mosher Slough <sup>a</sup>	Morada Basin	MS1-D	MS5-R
Calaveras River	Upstream receiving location at Solari Ranch Road		CR-46RU
	West Lane (South side of river)	CR-46D	
	Downstream discharge and receiving location at Brookside	CR-39D	CR-39R
Mormon Slough	Weber Avenue Overpass		MR-4R
	Lift station wet well at Commerce Street	MR-2D	

a. Morada Basin on Mosher Slough is sampled for the Detention Basin Monitoring Plan. Total and methylmercury concentrations reported for those sites will be included with the Mercury Monitoring Plan results.

### *Smith Canal*

Smith Canal is a dead-end slough connecting the San Joaquin River with Yosemite Lake in downtown Stockton. It receives stormwater runoff only from downtown Stockton. Land uses in the drainage areas of each monitored waterbody are shown in Table 2. Land uses in the Smith Canal drainage area are dominantly residential (71.5%), with some commercial (18.3%), with industrial, mixed urban, and open space comprising the remaining 10.2%. The Legion Park pump station is the 2<sup>nd</sup> largest pump station in Stockton, and represents dominantly residential and commercial land uses. Discharge from the Legion Park pump station will be sampled, along with receiving water in Yosemite Lake.

### *Mosher Slough*

Mosher Slough is located primarily in the residential north side of Stockton. Land uses in the drainage area are primarily residential and open space. Three residential areas consist primarily of new development. Commercial land use, industrial land use, and mixed urban land use make up the other a small percentage (<10%) of land uses in the Mosher Slough drainage area. A detention basin on Mosher Slough will be monitored for total mercury and methylmercury as a component of the Permittees' Detention Basin Monitoring program. Results from detention basin monitoring will be compiled with results from other Mercury Plan sites, in order to compare mercury levels at all sampled sites in Stockton.

### *Calaveras River*

The Calaveras River originates in the eastern Sierra Nevada Mountains, receiving upstream input primarily from open spaces, forest lands, pasture lands and agriculture. It receives high flows



during late fall, winter, and early spring, while summer and early fall flows can be minimal. The Calaveras River drainage area is largely open space and residential. Sites were chosen along the Calaveras River to represent background mercury conditions upstream of the SUA; stormwater discharged from an older residential and commercial area; stormwater discharged from a newer, more upscale residential; and mercury conditions in downstream receiving water. The Permittees' stormwater baseline monitoring program has collected data for total mercury at discharge and receiving water stations on the Calaveras River at site CR-46, which will be compared with the Mercury Plan data to provide a longer-term perspective.

### *Mormon Slough*

Lower Mormon Slough, located in the southern area of Stockton, is a direct tributary to the Deep Water Ship Channel. Sampling sites on Mormon Slough were chosen to represent a predominantly older more industrialized portion of Stockton. The land uses within the Mormon Slough drainage area include residential (~40%), commercial (~30%), industrial (~13%), mixed urban (~12%) and open space (~5%).

**Table 2. Summary of Land Uses within Drainage Areas for Monitored Waterbodies**

Waterbody	Urbanized Drainage Area (Acres)	Land Uses					Comments
		Residential %	Commercial %	Industrial %	Mixed Urban %	Open Space <sup>a</sup> %	
Smith Canal	36,342	71.5	18.3	2.1	7.0	1.2	No upstream contribution
Mosher Slough	51,524	21.1	3.2	0.5	2.6	72.6	Moderate upstream contribution
Calaveras River	48,210	37.5	9.9	0.7	8.3	43.6	Moderate upstream contribution
Mormon Slough	33,319	39.2	31.2	12.9	12.1	4.6	No upstream contribution

a. Can include cropland, pasture, herbaceous rangeland, orchards, groves, vineyards, nurseries, streams, and canals.

## **4.0 SAMPLED PARAMETERS**

Table 3 lists the specific parameters to be tested, analytical methods, reporting limits, and holding times. The analyses will be performed by a National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory for the relevant methods. Because the analytical method and laboratory selection are critical steps in any monitoring program, all analyses must meet data quality objectives. The analytical method may change during the study if a different method is found to yield better results (better quality assurance/quality control results (QA/QC) and/or a lower detection limit).

**Table 3. Constituents and Monitoring Methods**

Constituent	Analytical Method	Container	Preservative	Method Detection Limit	Reporting Limit	Hold Time
Methylmercury	EPA 1630M	500 ml, glass, double bagged	4°C + HCl or H <sub>2</sub> SO <sub>4</sub> *	0.02 ng/l	0.05 ng/l	48 hrs/ 90 days **
Total Mercury	EPA 1631M	500 ml, glass, double bagged	4°C +HCl	0.2 ng/l	0.5 ng/l	48 hrs/ 90 days **
Suspended Sediment Concentration	ASTM Method D 3977-97 <sup>1</sup>	125 ml, polycarbonate	None	3 mg/l	3 mg/l	7 days

\* Preserve with HCl if less than 10 ppt salinity OR preserve with H<sub>2</sub>SO<sub>4</sub> if greater than 10 ppt salinity

\*\* 48 hrs until preservation/90 days once preserved

Unfiltered samples will be collected and analyzed. In addition to total mercury and methylmercury, suspended sediment concentrations will be monitored at each sampling location. Discharge flows will be estimated at the sampling locations.

For measurements less than the method detection limit (MDL), regression on order statistics will be used to calculate values below the MDL for load calculations. In cases where there are non-detect values, the regression on order statistics (ROS) method<sup>2</sup> uses the non-detect values to calculate the order statistic value, but fits the curve only to the order statistics and concentrations of detected values. This statistical approach is considered superior to arbitrarily assuming one-half the detection limit because it distributes non-detect values below the detection limit according to the observed distribution.

## 5.0 REPORTING AND MERCURY LOAD ASSESSMENT

Monitoring results will be reported in the Permittees' Annual Reports. Load estimates for the urban runoff mercury contribution will be developed once sufficient data is collected, and included in the final baseline monitoring report. The final baseline monitoring report will be submitted to the Regional Water Board by December, 2011, which will include estimates of the total mercury and methylmercury concentrations and loads discharged to the Delta by the SUA.

Annual runoff volume will be estimated in order to calculate the annual loads of mercury and methylmercury. At the sampling locations, it is impractical to directly measure urban runoff flow since discharge points are not easily or safely accessible. Therefore, urban annual runoff volume will be estimated using the following methodology: Data on run-times for the pumps at

<sup>1</sup> "Standard Test Method for Determining Sediment Concentration in Water Samples" (American Society for Testing and Materials, 2000)

<sup>2</sup> Dennis R. Helsel (2005), Nondetects And Data Analysis: John Wiley and Sons, New York.

the discharge locations will gathered and, along with pump capacity, age of pump, and percentage of power that the pump operated (if pump operates on a variable frequency drive), will be used to estimate annual discharge volumes.

## 6.0 MONITORING SCHEDULE

Three wet-weather and two dry-weather monitoring events will be targeted per year for three monitoring years, according to the schedule shown in Table 4. Wet and dry-weather monitoring is described below. Monitoring events will be targeted during the quarters shown in Table 4; however, depending on weather conditions, up to two events may occur each quarter.

**Table 4. Quarterly Schedule for Targeting Wet-Weather and Dry-Weather Monitoring Events**

Monitoring Events	2008-2009				2009-2010				2010-2011				2011-2012			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Wet-weather Monitoring		X	X	X		X	X	X		X	X	X				
Dry-weather Monitoring		X		X	X	X		X	X	X		X	X	X		

Q1 = Jan-March; Q2 = April-June; Q3 = July-Sep; Q4 = Oct-Dec

X = Monitoring events are targeted during this quarter. Depending on weather conditions, zero, one or two events may occur during the quarter.

### 6.1 Wet-Weather Monitoring

Three wet-weather samples will be collected annually for three monitoring years during targeted storm events of variable intensity. In order to capture storms of varying intensity, one wet-weather event will be defined as a storm with at least a 75% probability of greater than 0.1 inch of precipitation. The additional two wet-weather events will be defined as a storm with at least a 75% probability of greater than 0.25 inches of precipitation. In order to be a qualifying event, a storm must show 75% probability of the appropriate rainfall amount at least 72 hours prior to occurring in order to have sampling crews and labs on alert. All wet-weather monitoring will consist of grab samples. Wet-weather monitoring will be coordinated, if possible, with other ongoing water quality monitoring programs. Specific wet-weather sampling criteria are:

- Attempts will be made to monitor three storms per year (if possible, including the “first flush,” after one or more months with no precipitation greater than 0.1 inch)
- Storms will be targeted throughout the rainy season, from fall to spring.
- If conditions permit, samples will be collected with a minimum of at least three weeks between storm events.
- Wet-weather monitoring will only take place after a dry period, defined as a continuous three day period with no measurable precipitation (defined here as less than 0.1 inch).

### 6.2 Dry-Weather Monitoring

Two dry-weather samples will be collected annually for three monitoring years. Dry-weather monitoring will be conducted during dry weather from spring to early fall and will be coordinated with other ongoing water quality sampling programs. The events will be scheduled

to allow for at least seven days without measurable precipitation prior to sampling (storm events which produce less than 0.10 inches of rain). All dry-weather monitoring will consist of grab samples.

## **7.0 MONITORING PROCEDURES**

This section describes the procedures for each sampling event, including the preparation, collection, and field procedures.

### **7.1 Sampling Event Preparation**

Sample event preparation includes preparing field equipment, placing bottle orders, and contacting necessary personnel regarding site access and personnel availability. The following steps will be completed prior to each sampling event:

1. Contact laboratories to order bottles and to coordinate sample delivery.
2. Confirm scheduled sampling date with field crew, and set-up sampling day itinerary including sample drop-off.
3. Prepare equipment.
4. Prepare sample labels.
5. Prepare the sampling event summary and field log sheet to indicate the type of field measurements, field observations and samples to be taken at each of the stations.
6. Calibrate field measurement equipment.

Table 5 provides a field equipment checklist of equipment to mobilize prior to each sampling event.

**Table 5. Field Equipment Checklist**

✓ Monitoring Plan (this document)	✓ Coolers w/ Ice
✓ Sample Bottles w/ Pre-Printed and Extra Labels	✓ Powder-Free Gloves
✓ Event Summary Sheets	✓ Pens
✓ Field Log Forms	✓ First Aid Kit
✓ Chain of Custody Forms	✓ Cellular Telephone
✓ Watch	✓ Gate Keys (if necessary)
✓ Camera	✓ Paper Towels or Rags in a Box
✓ Tape Measure	✓ Plastic Trash Bags
✓ Grab Sample Collection Devices	✓ Distilled/DI Wash Bottles
✓ Distilled/DI Water Blanks (provided by the laboratory)	✓ Grab Pole
✓ Sealable Plastic Bags	✓ Safety Equipment
✓ Flow meter	

### **7.1.1 Sampling Event Summary**

A sampling event summary sheet will be produced for the sampling crew prior to each sampling event. The summary will outline sampling requirements at each sampling station, including a list of samples to be collected and QA/QC requirements. This summary will help field crews prepare for and track sample collection during each event. An example event summary is shown in **Attachment 1**.

### **7.1.2 Sample Bottle Order and Preparation**

Sample bottle orders will be placed with the appropriate analytical laboratory at least two weeks prior to each sampling event. Bottles will be ordered for all samples, including quality control samples. The proper bottle volume, immediate processing and storage needs are presented in Table 3. The field crew will inventory sample bottles upon receipt from the laboratory to ensure that adequate bottles have been provided to meet analytical requirements for each sampling event.

### **7.1.3 Sample Bottle Labeling**

All samples will be pre-labeled before each sampling event to the extent practicable. Pre-labeling sample bottles simplifies field activities, leaving only sample collection time, sample

number, and the names of sampling personnel to be filled out in the field. Custom water-proof labels will be produced. Using this approach will allow the stations and analytical constituent information to be entered into the computer program in advance, and printed as needed prior to each sampling event.

Labels shall be placed on the appropriate bottles in a dry environment; attempting to apply labels to sample bottles after filling will cause problems, as labels usually do not adhere to wet bottles. The labels will be applied to the bottles or individual zip-lock bags. Field labels shall contain the following information:

- Program Name
- Station ID
- Event Number
- Date
- Time
- Sampling Personnel
- Sample ID (see next section for ID conventions)
- Analytical Requirements

## **7.2 Sample Collection**

This section describes the procedures involved in sample collection.

### **7.2.1 Clean Sample Handling**

“Clean sampling” techniques are required to collect and handle water samples in a way that results in neither contamination, loss, nor change in the chemical form of the analytes of interest. Samples are collected using protocols based on EPA Method 1669, as summarized below:

- Samples are collected only into pre-cleaned sample bottles.
- At least two persons, wearing clean, powder-free nitrile gloves at all times, are required on a sampling crew.
- One person (“dirty hands”) touches and opens only the outer bag of all double bagged items (such as sample bottles, tubing, strainers and lids), avoiding touching the inside of the bag.
- The other person (“clean hands”) reaches into the outer bag, opens the inner bag, and removes the clean item (sample bottle, tubing, lid, strainer, etc.).
- After a grab sample is collected, or when a clean item must be re-bagged, it is done in the opposite order from which it was removed.
- Clean, powder-free nitrile gloves are changed whenever something not known to be clean has been touched.
- For this program, clean techniques must be employed whenever handling the double-bagged aliquot bottles or mercury grab sample bottles.
- In order to reduce potential contamination, sample collection personnel will adhere to the following rules while collecting stormwater samples:
  - No smoking;
  - Never sample near a running vehicle. Do not park vehicles in immediate sample collection area (even non-running vehicles);

- Avoid allowing rainwater to drip from rain gear into sample bottles;
- Do not eat or drink during sample collection; and
- Do not breath, sneeze or cough in the direction of an open sample bottle.

### **7.2.2 Sample Collection**

All samples will be collected as grab samples. At most stations, grab samples will be collected at approximately mid-stream, mid-depth at the location of greatest flow (where feasible). For mid-depth, mid-channel receiving water grab samples, a horizontal lake (discrete depth) sampler will be used. For very shallow receiving waters, a dipping cup or long-handled sampling container will be used. A disposable (single-use) bailer will be used to sample from pump station wet wells. After collection, samples will then be transferred to sample bottles. This is the preferred method for grab sample collection; however, due to sampling station configurations and safety concerns, sampling station configuration may dictate grab sample collection technique. Grab samples will be collected and transferred into the appropriate bottles (containing the required preservations) as outlined in Table 3.

All grab samples will be collected using the following procedures.

1. Wear clean powder-free nitrile gloves when handling bottles and caps. Change gloves if soiled or if the potential for cross-contamination occurs from handling sampling materials or samples. Change gloves between sampling locations;
2. Pre-label sample containers as described in **Sample Bottle Labeling** and **Sample ID Conventions**;
3. Collect grab sample at mid-stream/mid-depth;
4. Rinse sample bottles three times with sample water, and then fill with sample. Preservative may be added at this time, or within 48-hours at the laboratory;
5. Place sample on ice;
6. Collect remaining samples including control samples, if needed, using the same protocols described above;
7. Fill out COC form, note sample collection on field form, and deliver to appropriate lab.

### **7.2.3 Health and Safety Procedures**

All personnel who participate in fieldwork will attend a safety introduction. Copies of a program specific Health and Safety Plan will be available to all field crews and will be located in each field vehicle.

Field crews will consist of at least two persons wearing clean, powder-free nitrile gloves and appropriate personal protective equipment (life vest, safety glasses, reflective vests, hard hats, steel toes, etc.) for the specific monitoring/sampling event.

A drowning hazard exists at the shoreline, along streams, and at water bodies. Adequate swimming ability will be required of all field crew members conducting receiving water monitoring. If fieldwork is required in water greater than three feet deep or without any protective structure (such as a guard rail) to prevent falling into the waterway, appropriate safety equipment (personal floatation device) will be worn.

To minimize the potential of sample contamination and personnel exposure, crew members will change gloves whenever something not known to be clean has been touched and/or between sampling locations.

Field personnel should refrain from touching their face while sampling until thoroughly washing their hands. Liquids should be kept in, and consumed at, the field vehicle. Field crew members should wash their hand with antibacterial soap (located in the field vehicle) prior to consuming any food or drinks.

All electronic equipment will be kept as dry as possible.

Heat stress will be a hazard during hot weather and will be intensified when personnel are in protective clothing (if necessary). To prevent heat stress, personnel will be required to take breaks as needed, and consume adequate quantities of liquid.

No field personnel will enter a manhole or storm pipe without first obtaining an approved confined-space entry permit.

In the event traffic control is necessary, traffic control must be set up before conducting any work where field personnel may be exposed to traffic. Standard traffic control measures include parking vehicles to shield personnel from traffic or using hazard lights or traffic safety cones to identify work areas.

### **7.3 Field Observations**

In addition to collection of the constituents listed in Table 3, field observations will be made at each sampling station. Observations will include color, odor, floating materials, presence of wildlife, as well as observations of contact and non-contact recreation. All comments on field observations will be recorded in the field log presented in **Attachment 2**.

### **7.4 Chain of Custody**

Chain-of-custody (COC) forms will be filled out for all samples submitted to each laboratory. Sample date, sample station, and analysis requested shall be noted on each COC. An example COC form is shown in **Attachment 3**.

### **7.5 Transport to Lab**

Samples will be stored in coolers with ice and delivered to the appropriate NELAP-certified analytical laboratories. Samples will be analyzed according to the methods listed in Table 3. In addition, Table 3 provides detection limits and holding times.

### **7.6 Field Protocols**

Field crews (2 persons per crew, minimum) will only be mobilized for sampling when weather conditions and flow conditions are considered to be safe. For after-hour sampling, 72 hour notification and identification of a qualifying storm are required. A sampling event should proceed in the following manner:

1. Before leaving the sampling crew base of operations, notify laboratory, confirm number and type of sample bottles as well as the complete equipment list.
2. Proceed to the first sampling station.
3. Fill-out the general information on the field log sheet.



4. Take field measurements and observations, and record on the field log sheet.
5. Take the samples indicated on the field log sheet in the manner described in this study plan. Take additional volume and blank samples for field-initiated QA/QC samples, if required. Place bottles in the coolers with ice. Double check against the log sheet that all appropriate bottles were filled.
6. Repeat the procedures in steps 3, 4, and 5 for each of the remaining sampling stations.
7. Complete the chain of custody forms using the field notes.
8. After collection is completed, deliver the samples to laboratory within sample holding time.

## 8.0 QUALITY ASSURANCE/QUALITY CONTROL

This section details the QA/QC measures that will be implemented.

### 8.1 Field Blank

The purpose of analyzing field blanks is to demonstrate that sampling procedures do not result in contamination of the environmental samples collected at the same time. Field blanks will be prepared and analyzed according to the schedule in Table 6. Blanks will consist of laboratory-prepared blank water (certified to be contaminant-free by the laboratory) processed through clean sampling equipment using the same procedures used for environmental samples.

Field blanks will be collected first, immediately prior to the collection of normal grab samples. The field crew will use the blank water provided and will fill each grab sample container according to standard procedures. Field blanks will be submitted “blind” to the laboratory using the station name pseudonym “FB”.

### 8.2 Field and Laboratory Duplicates

The purpose of analyzing laboratory duplicates is to demonstrate the precision of the sample preparation and analytical methods. Laboratory duplicates will consist of either replicate environmental samples or duplicate laboratory fortified method blanks. If the Relative Percent Difference (RPD) of field duplicate results is greater the required value of 25%, the analytical process is not being performed adequately for that analyte. In this case, the sample batch should be prepared and analyzed again, if possible. A pair of field duplicates is two samples taken at the same time, in the same manner, into two unique containers. If an RPD exceeds 25%, the associated data will be flagged as “not reproducible” for high variability.

Lab duplicates and field duplicates will be collected according to the schedule in Table 6. Field duplicates will be collected immediately following and in the same manner as the environmental grab samples. Field duplicates will be submitted “blind” to the laboratory using the station name pseudonym “FD”. The date and time of sampling should be noted on the log sheet.

**Table 6. QA/QC Sample Collection Schedule**

Site Name	Station ID	Event														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Smith Canal	SC-1	FB					FB					FB				
	SC-5R	FD					LD					FD				

Moshier Slough	MS1-D	LD		FD		LD
	MS5-R	FB		FB		FB
Calaveras River	CR-46RU		FB		FB	FB
	CR-46D		FD		LD	FD
	CR-39D		FB		FB	FB
	CR-39RU		LD		FD	LD
Mormon Slough	MR-4R			FD	LD	FD
	MR-2D			FB	FB	FB

FB = Field Blank

LD = Lab Duplicate

FD = Field Duplicate

### 8.3 Method Blanks

The purpose of analyzing method blanks is to demonstrate that sample preparation and analytical procedures do not result in sample contamination. Method blanks will be prepared and analyzed by the contract laboratory at a rate of at least one for each analytical batch. Method blanks will consist of laboratory-prepared blank water processed along with the batch of environmental samples. If the result for a single method blank is greater than the MDL, the source(s) of contamination should be identified and eliminated, and the sample batch should be prepared and analyzed again, if possible. If this is not possible, the data should be qualified accordingly. If method blank contamination is consistently reported, the laboratory will be expected to propose to the Program Manager a systematic approach for identifying and eliminating the source of contamination. The laboratory should also be prepared to sub-contract analysis for that method to another qualified laboratory until the contamination issue is resolved.

### 8.4 Matrix Spikes and Matrix Spike Duplicates

The purpose of analyzing matrix spikes and matrix spike duplicates is to demonstrate the performance of the sample preparation and analytical methods in a particular sample matrix. Each matrix spike and matrix spike duplicate will consist of an aliquot of laboratory-fortified environmental sample. Spike concentrations should be added at five to ten times the reporting limit for the analyte of interest.

If the matrix spike recovery of any analyte is outside the acceptable range, the results for that analyte have failed to meet acceptance criteria. The acceptable range for matrix spike recoveries is 70% to 130%, with an acceptable RPD of  $\leq 25\%$  for values greater than ten times the MDL. Concentration measurements with recoveries that do not fall within the acceptable range will be flagged low or high bias. If an RPD exceeds 25%, the associated data will be flagged as “not reproducible” for high variability. If recovery of laboratory control samples is acceptable, the analytical process is being performed adequately for that analyte, and the problem is attributable to the sample matrix. An attempt will be made to correct the problem (e.g., by dilution, concentration, etc.), and the samples and matrix spikes will be re-analyzed.

If the matrix spike duplicate RPD for any analyte is outside the acceptable range, the results for that analyte have failed to meet acceptance criteria. If the RPD for laboratory duplicates is acceptable, the analytical process is being performed adequately for that analyte, and the

problem is attributable to the sample matrix. An attempt will be made to correct the problem (e.g., by dilution, concentration, etc.), and the samples and matrix spikes will be re-analyzed.

## Sampling Event #1 – Date\_\_\_\_\_

### Event Summary Sheet

Sample Location	Requirements	Bottles	Lab*
SC1			
Discharge:	Methylmercury + Field Blank	4 X 500 ml, glass, double bagged	
	Total Mercury + Field Blank		
	Suspended Sediment Concentration + Field Blank	2 X 500 ml	
SC5R			
Receiving Water:	Methylmercury + Field Duplicate	4 X 500 ml, glass, double bagged	
	Total Mercury + Field Duplicate		
	Suspended Sediment Concentration + Field Duplicate	2 X 500 ml	
MS1D			
Discharge:	Methylmercury	2 X 500 ml, glass, double bagged	
	Total Mercury		
	Suspended Sediment Concentration	500 ml	
MS5R			
Receiving Water:	Methylmercury	2 X 500 ml, glass, double bagged	
	Total Mercury		
	Suspended Sediment Concentration	500 ml	
CR46-RU			
Upstream Receiving Water:	Methylmercury	2 X 500 ml, glass, double bagged	
	Total Mercury		
	Suspended Sediment Concentration	500 ml	
CR46D			
Discharge:	Methylmercury	2 X 500 ml, glass, double bagged	
	Total Mercury		
	Suspended Sediment Concentration	500 ml	
CR39D			
Discharge:	Methylmercury	2 X 500 ml, glass, double bagged	
	Total Mercury		
	Suspended Sediment Concentration	500 ml	
CR39R			
Receiving Water:	Methylmercury	2 X 500 ml, glass, double bagged	
	Total Mercury		

	Suspended Sediment Concentration	500 ml	
MR4R			
	Methylmercury	2 X 500 ml, glass, double bagged	
	Total Mercury		
	Suspended Sediment Concentration	500 ml	
MR2D			
	Methylmercury	2 X 500 ml, glass, double bagged	
	Total Mercury		
	Suspended Sediment Concentration	500 ml	

\* NELAP-certified analytical labs to be determined.

## DAILY FIELD REPORT

PROJECT #: \_\_\_\_\_ PERSONNEL: \_\_\_\_\_

PROJECT ID: Stockton Mercury DATE: \_\_\_\_\_

Site Location Description: \_\_\_\_\_

-

Site ID	Sample Time	Temp °C	pH	EC (μS)	DO (mg/L)	ORP (MV)	TDS (g/L)	Turbidity (NTU)
FM1-D								

**OBSERVATIONS:** Arrival Time: \_\_\_\_\_ Departure Time: \_\_\_\_\_ Receiving Water Flow Rate: \_\_\_\_\_ m/s Pumps

Active: Yes / No\_\_

Weather: \_\_\_\_\_

\_\_\_\_\_ Floating Material/Debris: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Extent of Visible Film (Oils, greases, waxes, etc.) on Water Surface / Stream Bottom: \_\_\_\_\_

\_\_\_\_\_ Surface Water Color/Odor: \_\_\_\_\_ Inspection Sample Color/Odor: \_\_\_\_\_

\_\_\_\_\_

Photograph # (if taken): \_\_\_\_\_  
\_\_\_\_\_

Recreation Uses Observed: \_\_\_\_\_  
\_\_\_\_\_

Aquatic Life Observed: \_\_\_\_\_  
\_\_\_\_\_

Other Notes (presence of algae, wildlife observations, pump run time, etc.): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

QA/QC (circle one): FD / LD / FB / NONE      C.O.C. Time: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
Field Personnel (signature)

Sample Results TAT: ☐ Rush ☐ Standard 10 Day *(recommended)*

---

---

---

NAME: \_\_\_\_\_

OFFICE: \_\_\_\_\_

[illegible]



**LOW DISSOLVED OXYGEN  
MONITORING AND ASSESSMENT WORK PLAN**

*Prepared for*  
**City of Stockton**  
**Department of Municipal Utilities**  
**2500 Navy Drive**  
**Stockton, CA 95206-1191**

**and**

**The County of San Joaquin**  
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**April 3, 2009**  
**Condor Project No. 5418**

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### **ATTACHMENT A**

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- Figure 2: Stormwater Discharge Locations within the Greater Stockton Urbanized Area, Stockton, California
- Figure 3: Impaired Portions of Stockton Waterways 303(d)-Listed for Low Dissolved Oxygen within the Greater Stockton Urbanized Area, Stockton, California
- Figure 4: Proposed Low DO Monitoring Locations within the Greater Stockton Urbanized Area, Stockton, California

### **ATTACHMENT B**

- Resource Reference List

# **LOW DISSOLVED OXYGEN MONITORING AND ASSESSMENT WORK PLAN**

## **1.0 INTRODUCTION**

Periodic depletions of DO levels below the Water Quality Control Plan (Basin Plan) water quality objective (WQO) have resulted in the designation of six waterways<sup>1</sup> within the Stockton Urbanized Area<sup>2</sup> (SUA) (Figure 1, Attachment A) as DO-impaired waterbodies under the Federal Clean Water Act Section 303(d) [303(d)]. As directed by the California Regional Water Quality Control Board, Central Valley Region (Regional Water Board) *Requirement for Technical Report Pursuant to California Water Code Section 13267* (13267 Letter), dated November 14, 2007, and referenced in the Regional Water Board's National Pollutant Discharge Elimination System (NPDES) Permit No. CAS083470, Order R5-2007-0173 (Permit), approved December 6, 2007, the City of Stockton (City) and the County of San Joaquin (County) (collectively, Permittees) are required to monitor and assess the DO impairment and toxic hot spots identified in the Stockton Area waterways. This Low Dissolved Oxygen (DO) Monitoring and Assessment Work Plan (Low DO Work Plan) is designed to assess the impacts from urban runoff on receiving water quality with respect to low DO.

## **2.0 OVERVIEW**

Stockton is located within California's Central Valley approximately 83 miles east of San Francisco and 45 miles south of Sacramento. Stockton encompasses approximately 60 square miles with an average elevation of 15 feet; the western portion of the city lies within the boundary of the Sacramento-San Joaquin Delta. The County contains an unincorporated urbanized area which surrounds the city. The Permittees own and operate the municipal storm drain system which collects stormwater and surface water runoff within the SUA. The City has identified approximately 400 miles of storm drain lines. The City and County have identified 158 and 47 outfalls, respectively, within their jurisdictions that discharge stormwater and surface runoff generated from various land uses (Figure 2, Attachment A).

Stockton area waterways drain westerly to the San Joaquin River (SJR), which flows northward along the western portion of the SUA. Tidal variation generally ranges from 0 feet mean sea level (msl) to approximately four feet above msl. Besides direct groundwater inputs and tidal exchange, all inputs to Smith Canal, Five-Mile Slough, and the urbanized portion of Mormon Slough<sup>3</sup> are from the City's urban stormwater system. In addition to urban runoff, the Calaveras River and Mosher Slough receive inflow from upstream agricultural runoff and tailwaters. In general, the urbanized portion of the Calaveras River receives upstream flow exclusively from the Stockton Diversion Canal (Figure 1, Attachment A). In most areas of the SUA, dry weather flow and stormwater runoff discharge by gravity to pump stations where the flows are released to slough and rivers. The quality and quantity of these discharges vary considerably and are affected by hydrology, geology, land use, season, and sequence and duration of precipitation events.

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<sup>1</sup> The Stockton Deep Water Ship Channel, Calaveras River, Five-Mile Slough, Mormon Slough, Mosher Slough, and Smith Canal have been designated as DO impaired waterways within the SUA. The San Joaquin River (SJR) is also listed as a DO impaired waterway, but is not included within the SUA.

<sup>2</sup> The SUA includes the City and portions of San Joaquin County.

<sup>3</sup> The upstream portion of Mormon Slough within the SUA receives minimal agricultural input due to construction of the Stockton Diversion Canal.

## 2.1 IMPAIRED WATERBODIES

Six waterways within the greater SUA have been 303(d)-listed as DO impaired waterbodies: the Calaveras River, the Stockton Deep Water Ship Channel (DWSC), Five-Mile Slough, Mormon Slough, Mosher Slough, and Smith Canal (Table 1, below, and Figure 3, Attachment A). The Basin Plan (CRWQCB-CVR-1998) contains a numeric objective which requires that DO levels in SJR waterbodies be maintained above 6.0 milligrams per liter (mg/L) between September 1 and November 30 and above 5.0 mg/L at all other times; this requirement is reiterated in the Permit (Provision C.1.a).

**Table 1: Low DO Impaired Waterways within the SUA**

Waterbody	Reach	Estimated Size Affected
Calaveras River	Lower	5.8 Miles
Delta Waterways	Stockton DWSC	1,603 Acres
Five-Mile Slough	Alexandria Place to Fourteen Mile Slough	1.6 Miles
Mormon Slough	Commerce Street to Stockton DWSC	0.93 Miles
Mosher Slough	Downstream of Interstate 5	1.3 Miles
Smith Canal	Entirety	2.3 Miles

Source: Regional Water Board 13267 Letter, November 14, 2007  
DWSC = Stockton Deep Water Ship Channel

## 3.0 CURRENT REGIONAL WATER BOARD DISSOLVED OXYGEN REQUIREMENTS FOR STOCKTON

Section 4 of the 13267 Letter and Provision D(28)(b)(i/ii) of the Permit directed the Permittees to develop and implement a low DO monitoring and assessment work plan. The Permittees are directed to identify areas and/or activities which contribute to low DO concentrations in the receiving water, such as unsewered areas within the SUA, natural vegetation, animal and bird waste, discharges of food wastes and other oxygen demanding substances, or direct discharges from existing collection systems due to sanitary sewer system overflow or blockage. A final report, due December 1, 2012, shall include identification of the Best Management Practices (BMPs) that will be implemented to address areas and/or activities as previously identified including assessment of BMPs and a time schedule for implementation.

### 3.1 LOW DO WORK PLAN OBJECTIVES

Pursuant to Regional Water Board directives, the Low DO Work Plan is a component of the Permittees' Stormwater Management Programs (SWMP) and discusses the following 13267 Letter and Permit requirements:

- Development of a two-year sampling and continuous monitoring program for the Calaveras River, Stockton DWSC near McLeod Lake (Stockton Channel), Five-Mile Slough, Mormon Slough, and Mosher Slough. Smith Canal requires a minimum one-year sampling and continuous monitoring program.
- Identification of monitoring sites consisting of: two urban runoff/discharge locations on each waterbody (one on Smith Canal into Yosemite Lake) and two receiving water monitoring locations on each waterbody (one on Smith Canal).

- Installation of continuous monitoring (+/- 15 minute intervals), *in-situ* water quality data recorders at each receiving water location for the following parameters, at a minimum: date, time, temperature, depth, DO, pH, turbidity, and electrical conductivity (EC).
- Collection and laboratory analyses<sup>4</sup> of monthly grab samples from both receiving water and urban discharge locations for nutrients and oxygen demanding substances. Flow quantity and velocity shall be monitored at the urban discharge locations. In addition, grab samples will be collected and analyzed during a minimum of two storm events per year.
- Collection of the following field parameters at each location (at a minimum) during each grab sampling event: date, time, weather, water temperature, DO, pH, EC, salinity, turbidity, and total dissolved solids (TDS).

#### **4.0 PREVIOUS REGIONAL WATER BOARD DISSOLVED OXYGEN REQUIREMENTS FOR STOCKTON**

As directed by their previous NPDES Permit, No. CAS083470, Order R5-2002-0181 (Previous Order) the Permittees implemented a Water Quality Based Program to target specific waterbodies and evaluate the spatial and temporal trends of identified pollutants of concern (POCs) impacting or potentially impacting local water quality, as well as appropriate POC control measures. During 2002-2007, these special programs included a Pathogen Plan; Pesticide Plan; DO Plan, Smith Canal Work Plan; and, Best Management Practices Effectiveness Study. Data from these special studies have been reported in the Permittees' Annual Reports.

With regards to low DO, Provision D(18)(c) and D(18)(d) of the Previous Order required the development of two separate work plans addressing DO impairment of waterbodies within the SUA. In August 2003, the *Smith Canal Drainage Area Analysis - Dissolved Oxygen Work Plan* (Smith Canal Plan) was submitted and subsequently approved by the Regional Water Board in a letter dated December 16, 2003. In March 2004, the *Dissolved Oxygen Plan (DO Plan)* was finalized with a revision letter to the Regional Water Board on September 27, 2004. A summary of the field and laboratory analytical data compiled during the 2004/2005 Smith Canal Plan and DO Plan monitoring programs was presented in the *Smith Canal Drainage Area Analysis and Dissolved Oxygen Work Plan Final Report (Smith Canal/DO Work Plan Final Report)*, dated October 2, 2006. Additional low DO reports and monitoring programs conducted by the Permittees are provided in the Resource Reference List, Attachment B.

During the 2007-2012 Permit term, Water Quality Based Program special studies include four work plans, three continued from the Previous Order (Pathogen Plan, Pesticide Plan, and Low DO Plan) and the Mercury Plan. The Low DO Work Plan builds on the previous work that has been completed and is designed to assess the impacts from urban runoff on receiving water quality with respect to low DO.

#### **4.1 SUMMARY OF THE 2005 TIDAL MIXING AND EXCHANGE STUDY**

The *Tidal Mixing and Exchange Study* (Circulation Study) completed in February 2005 (Jones & Stokes Associates and Litton, 2005) was designed to assess the tidal exchange and mixing between the SJR and Stockton's urban waterways and evaluate the effect of tidal exchange on pollutant transport, particularly during storm events. Smith Canal and the tidally influenced portion of the Calaveras River channel<sup>5</sup> were studied in this investigation. The Circulation Study indicated that, within the SUA, the upstream ends of Smith Canal and Calaveras River are more strongly influenced by stormwater discharges than tidal action.

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<sup>4</sup> List of laboratory analytes are provided in Section 8.3.2 of the Low DO Work Plan.

<sup>5</sup> The upstream end of the Calaveras River tidal channel is located three miles upstream of the mouth of the SJR.

Downstream sections of these waterbodies, particularly within one mile of the confluence with the SJR, are less influenced by stormwater inputs due to higher rates of exchange and dilution from the SJR. Due to very low flushing rates, stormwater discharges to Yosemite Lake have a significant residence time. The Circulation Study indicated that it would take 20 days for stormwater discharged at the upstream end of Smith Canal to be diluted to 50% by SJR tidal exchange alone. In addition, the percentage of SJR water that has mixed all the way to the upstream end at Yosemite Lake is less than 20% (Jones & Stokes Associates and Litton, 2005).

Very limited mixing of SJR water occurs at the upstream end of tidal exchange, approximately three miles upstream from the SJR confluence. However, the Circulation Study indicated that tidal effects did extend farther upstream to the Stockton Diversion Canal. The Circulation Study indicated that, at the end of 20 days, the fraction of SJR water that has mixed one mile upstream due to tidal exchange is about 70% and only about 10% has mixed three miles upstream in the Calaveras River channel.

Due to deeper channel geometry, tidal exchange with the SJR occurs at a slower rate in the Calaveras River than in Smith Canal. Based on Calaveras River dye observation studies, the report concluded that a significant improvement in water quality could be realized if flushing flows of higher quality waters could be engineered into the hydrology of Smith Canal. However, the feasibility of this strategy requires a more detailed investigation.

#### **4.2 SUMMARY OF THE SMITH CANAL/DO WORK PLAN FINAL REPORT**

*The Application of Stockton's Water Quality Model to Evaluate Stormwater Impact on Smith Canal*, dated February 23, 1999 (Chen and Tsai, 1999) indicated that, with respect to low DO, the terminal point of Smith Canal at Yosemite Lake was the most severely impacted by stormwater input, due to low flushing and minimal tidal exchange with the SJR. Laboratory analytical data collected during the Smith Canal Plan and DO Plan monitoring programs indicate that overall concentrations of oxygen demanding substances in urban runoff, while potentially a contributor, do not appear to cause an immediate DO impact in the receiving waters. Water samples collected from Mosher Slough and Smith Canal indicate that although concentrations of oxygen-demanding compounds in urban runoff were generally higher than receiving water concentrations, they were generally well below identified water quality objectives. Biostimulants and BOD concentrations were more pronounced during wet season storm events relative to dry season events and were marginally higher downstream of urban discharges in the dry season relative to upstream concentrations.

Previous studies indicated that the acute impact affecting low DO in Smith Canal, primarily at the beginning of the wet season, was the result of turbidity. While potentially a contributing factor, results of the Smith Canal Plan 2004/2005 *in-situ* monitoring program indicate that the primary source of the oxygen sags is not sediment transport from the storm drain system, but likely the result of oxygen demanding substances associated with resuspended, biologically-active (reduced) lake sediments. Sedimentation in Smith Canal has also provided a large reservoir of fine organic particles that are easily suspended during high kinetic energy events, including discharges from the storm drain system triggering resuspension of fine lake and canal sediments proximal to the discharge location(s).

Dissolved oxygen concentrations are dependent upon a variety of control factors; consequently, no single factor can be used to wholly explain the observed DO changes in Smith Canal throughout the year. For instance, resuspension of sediments is likely not responsible for the observed declines in DO concentrations during the dry season, and thus there may be two different mechanisms affecting DO during the wet and dry seasons. The extended periods of low DO below the water quality objective of 5.0



mg/L during the warm dry season months appear to be primarily a function of the canal's morphology, climatic and biological influences.

With respect to Mosher Slough, laboratory analytical results do not indicate that BOD and nutrient loading from urban discharge and upstream agricultural tailwaters significantly contribute to the DO depletion in the 303(d)-listed portion of the slough. In general, detected BOD and biostimulant concentrations in Mosher Slough did not exceed stated CALFED goals and maximum contaminant levels (MCLs). During the DO Plan monitoring program, water quality objectives were not exceeded in any of the field parameters collected the Mosher Slough monitoring locations. Overall, the results of the *DO Plan* monitoring do not support 303(d) listing from a DO perspective of the 1.3 mile section of Mosher Slough west of Interstate 5 (I-5).

## **5.0 PROPOSED 2007-2012 LOW DO WORK PLAN MONITORING PROGRAM**

With the exception of Smith Canal and Mormon Slough (to be discussed in greater detail in Sections 5.2.1 and 5.2.6, respectively), monitoring locations will consist of two urban runoff (discharge) and two receiving water locations on each waterbody (Figure 4, Attachment A). One discharge and one receiving water monitoring location for Smith Canal will be sited at Yosemite Lake. One discharge and one receiving water monitoring location for Mormon Slough will be sited near the confluence with the Stockton Channel.

As discussed in Section 5.1, the shallow and discontinuous nature of the Stockton's waterways preclude placement of receiving water monitoring locations upstream of the SUA. In general, discharge monitoring locations will represent a large catchment area (watershed) upstream of the receiving water locations; the upstream discharge monitoring sites located as close as possible to the eastern SUA boundary (Figure 4, Attachment A).

Due to security/liability and permitting concerns and multi-jurisdictional complications, *in-situ* monitoring equipment will not be installed at mid-channel, mid-depth in the downstream, deeper water receiving water locations (Mosher Slough, the Calaveras River, the Stockton DWSC near McLeod Lake (Stockton Channel), and Mormon Slough). Alternatively, the Permittees will seek to install *in-situ* monitoring equipment on established "permanent" structures (docks, pilings, etc.) away from high risk/high-traffic areas.

The following sections, Table 2, on the following page, and Figure 4 (Attachment A) describe the *in-situ* and urban discharge monitoring locations on the following SUA waterways: Smith Canal, Mosher Slough, the Lower Calaveras River, the Stockton Channel, Five-Mile Slough, and Mormon Slough. The low DO monitoring program must be adaptive. Consequently, the monitoring locations and procedures proposed may require modification to meet the both the requirements of the Permittees' Water Quality Based Program and hydrologic and security concerns.

**Table 2: Proposed SUA Low DO Work Plan In-Situ and Grab Sample Monitoring Locations**

Waterbody	Monitoring Location (nearest urban/ geographic feature)	Receiving Water <i>In-Situ</i> and Grab Sample Monitoring Location (Site ID)	Urban Discharge Monitoring Location (Site ID)
Smith Canal	Yosemite Lake	SC-5R (upstream)	
	Legion Park Pump Station		SC-1 (upstream)
Mosher Slough	Due South of Bear Creek Confluence	MS-6R (downstream)	
	Mariner's Bridge	MS-14R (upstream)	
	Kelly Drive Pump Station		MS-14 (downstream)
	La Morada Basin		MS-22 (upstream)
Calaveras River	SJR Confluence	CR-3R (downstream)	
	Pacific Avenue Bridge	CR-4R (upstream)	
	Brookside Pump Station		CR-39 (downstream)
	Bianchi Pump Station		CR-42 (upstream)
Stockton Channel	East of I-5 and Mormon Slough Confluence	DW-2R (downstream)	
	McLeod Lake	DW-1R (upstream)	
	Harrison Street		DW-115 (downstream)
	McLeod Lake		DW-123 (upstream)
Five-Mile Slough	Fourteen-Mile Slough	5M-25R (downstream)	
	Plymouth Road	5M-2R (upstream)	
	Lighthouse Drive Pump Station		5M-25 (downstream)
	Alexandria Place Pump Station		5M-28 (upstream)
Mormon Slough	Weber Avenue Bridge	MM-4R (downstream)	
	Commerce Street		MM-150 (downstream)

## **5.1 LIMITING FACTORS TO LOW DO MONITORING LOCATION SELECTION**

### **5.1.1 Waterway Geomorphology and Hydrology**

#### **Limitation: 13267 Letter Specified Downstream Monitoring Locations**

The 13267 Letter indicates that two discharge monitoring locations will be sited on each waterbody, with the exception of Smith Canal. One urban discharge monitoring site will represent a large downstream catchment area as close as possible to the confluence with the Stockton DWSC and be located just east of the downstream receiving water monitoring location.

#### **Mosher Slough**

##### **Discussion:**

The portion of Mosher Slough 303(d)-listed as impaired by low DO is entirely downstream of all urban discharge outfalls with the exception of MS-13; a small pump station outfall located approximately 1,600 feet west of I-5. The MS-13 outfall is not considered a representative urban discharge sampling location due to its overall size and location.

##### **Proposed Resolution:**

The downstream SUA discharge location that has been identified for Mosher Slough will represent a large catchment area as close as possible to the waterway's confluence with the SJR and upstream of the 303(d)-listed segment for low DO.

#### **Stockton Channel and Mormon Slough**

##### **Discussion:**

All urban discharge outfalls located along the Stockton Channel and Mormon Slough (Photos 1 and 2, respectively, on the following page) consist of tidally influenced gravity outfalls, with the exception of a lift station (MM-150) on Mormon Slough located at the Commerce Street Overpass (Figure 2, Attachment A).

##### **Proposed Resolution:**

With the exception of the Stockton Channel, urban runoff/discharge grab samples for laboratory analyses will be collected from the wet wells of pump stations that discharge directly to a receiving water and represent large catchment areas within the SUA. With respect to the Stockton Channel, urban runoff/discharge grab samples will be collected from exposed/accessible gravity outfalls, conditional upon the presence of discharge and absence of tidal impact. To the greatest extent possible, monthly grab sample events<sup>6</sup> will be scheduled so that tidal events will have a minimal impact (i.e. during low tide); however, grab samples will not be collected if the outfalls are tidally impacted or are not actively discharging during a regularly scheduled sampling event.

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<sup>6</sup> Monthly sampling events for the Low DO Work Plan will be conducted exclusively during daylight hours.



**Photo 1: DWSC Gravity Discharge Outfall (DW-116) (April 22, 2008)**

A low tide view of the DW-116 outfall located along the north shore of the Stockton Channel near the Stockton Arena. Note the waterline above the outfall indicating that the outfall is generally impacted by tidal fluctuations.



**Photo 2: Mormon Slough Gravity Discharge Outfall (MM-140) (April 22, 2008)**

The MM-140 outfall is located along the eastern wall of the Mormon Slough levee proximal to the Lincoln Avenue Overcrossing

### 5.1.2 Limitation: 13267 Letter Specified *In-Situ* Monitoring Locations

The 13267 Letter indicates that upstream discharge and receiving water locations will be representative of a large catchment area located as close as possible to the boundary of the SUA. The upstream receiving water location will be representative of what is entering the waterbody from upstream of the SUA or from upstream of the terminus of the waterbody should the terminus be within the urban area boundary.

#### Upstream Hydrology

##### Discussion:

During the dry and agricultural irrigation seasons, sections of the upstream portions of Mormon Slough, Mosher Slough, and the Calaveras River are virtually dry or are subject to intermittent irrigation water supply flows. East of the Stockton Diversion Canal, the urbanized portion of Mormon Slough no longer receives upstream flows; east of State Route 99 (approximately), portions of the slough have been converted to orchards (Photo 3, below).

Even during “normal” wet seasons, Mosher Slough (Photos 4 and 5, on the following page) and the Calaveras River (Photos 6 and 7, on the following pages) immediately upstream of the SUA can consist of isolated “puddles” to dry drainages for extended periods of time.

##### Proposed Resolution:

Upstream receiving water locations will be sited at the farthest upstream extent of each waterway that consistently has sufficient water column to support *in-situ* water quality monitoring. In the normally dry upstream reaches near the SUA boundary, field conditions will be noted and verified through photo documentation and water depth measurements collected (if applicable)



**Photo 3: Mormon Slough Orchard at Gillis Road (April 14, 2008).**

View is from the southbound lane of Gillis Road (east of State Route 99) looking east.





**Photo 4: Mosher Slough Immediately Upstream of the SUA (April 1, 2008).**  
View is from the creek bottom at the Mosher Slough railroad crossing (east of State Route 99) looking southwest. Note the isolated puddle in photo center.



**Photo 5: Mosher Slough Immediately Upstream of the SUA (April 1, 2008).**  
An isolated puddle located immediately northeast of Photo 4, above.



**Photo 6: The Calaveras River at Solari Ranch Road (April 1, 2008).**

Located in agricultural lands approximately 1.25 miles upstream of the SUA, the view is from the dry creek bottom looking southwest.



**Photo 7: The Calaveras River at Solari Ranch Road (April 1, 2008).**

The view is from the same vantage point as Photo 6, above, looking northeast. The structure in the background is believed to be a private agricultural weir for irrigation purposes.



## **Tidal Impact**

### Discussion:

Within the SUA, the zone of tidal exchange extends approximately three (3) miles from the confluence with the SJR; however, the zone of significant mixing with the SJR occurs within a more limited extent of approximately one mile. Along the Calaveras River, the effects of tidal fluctuations may extend east to the Stockton Diversion Canal (Jones and Stokes, February 2005).

During low and particularly during spring tides, and with the exception of the Stockton Channel and Smith Canal, the tidally influenced portions of the SUA waterways often resemble boggy mud flats or marshlands (Photo 8, below, and Photo 9, on the following page) to shallow streams (Photo 10 on the following page, and Photo 11, on the following pages). Upstream of the tidal zone, Stockton's waterways (Photos 12, 13, and 14, on the following pages) may seasonally resemble anywhere from a dry drainage channel, to isolated "puddles", to low volume, very shallow, intermittent streams.

### Proposed Resolution:

*In-situ* receiving water monitoring locations will be sited at locations with consistently sufficient depth (water column) during low, and particularly spring, tides for the data recorders to function continuously and securely.



**Photo 8: Low Tide at Moshier Slough, Mariner's Drive (April 22, 2008)**

View is from Mariner's Drive, immediately west of I-5) at the western extent of the SUA looking west. Mud flats are evident on the north side of the waterway; the deepest portion of the waterway is a meandering channel approximately two to three feet deep on the south side of the waterway.





**Photo 9: Low Tide at Mormon Slough, Lincoln Avenue (April 22, 2008)**

View is from Lincoln Avenue Bridge looking east. At the time of this photo, the deepest portion of the waterway, located to the right of the photo, was noted to be approximately six inches deep.



**Photo 10: Low Tide at Five-Mile Slough, Plymouth Avenue (April 22, 2008)**

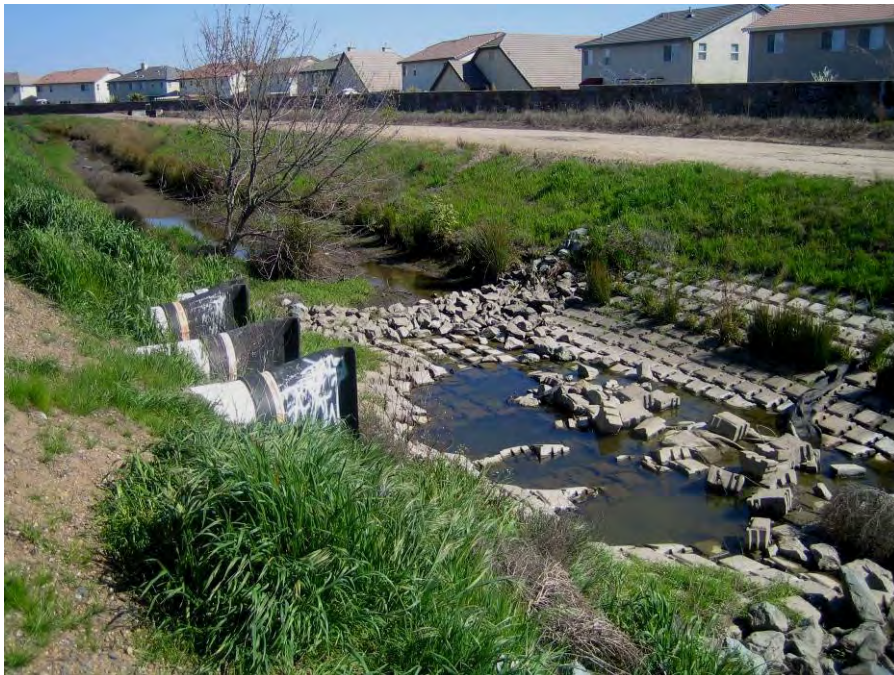
View is from Plymouth Avenue (just east of I-5) looking east. The deepest portion of the slough at this location, towards the center of the channel, was noted to be approximately two feet deep.





**Photo 11: Low Tide at Calaveras River, Pacific Avenue (April 22, 2008)**

View is from the north side of the river looking east. A rock “dam” is evident in the background under the northbound span of the Pacific Avenue Bridge. Isolated pools approximately four feet deep (in the foreground) were noted along the river west of the “dam”.



**Photo 12: Mosher Slough at the La Morada Basin (MS-5R) Outfall Location (March 3, 2008).**

View is from the north bank of the levee looking to the northeast. This location is immediately east of the Union Pacific Railroad tracks.





**Photo 13: Five Mile Slough at Alexandria Place (April 1, 2008).**

View is from the south canal bank in the northeast corner of Swenson Park looking north/northeast.



**Photo 14: Calaveras River at West Lane Bridge (April 14, 2008).**

View is from the West Lane Bridge looking east. At the time of this photo, the water depth is approximately six to eight inches deep at this location.

### 5.1.3 Security

#### Discussion:

In general, equipment and personnel security is a principal concern along all of the SUA waterways. Vandalism (Photo 15, below) is a primary concern especially at locations where access to the waterways is relatively unobstructed and where water levels potentially leave equipment visible during low water episodes. In addition, the entire urbanized length of Mormon Slough has a substantial transient population; west of Commerce Street to Wilson Way (Photo 16, on the following page), Mormon Slough is an underground culvert.

#### Resolution:

*In-situ* receiving water monitoring locations will be sited at locations with sufficient water column during low, and particularly spring, tides for the data recorders to function properly and surreptitiously. Receiving water locations will be sited away from known transient encampments. Security for both personnel and equipment will be of the utmost priority in selection of the *in-situ* receiving water locations; consequently, *in-situ* monitoring locations may need to be modified<sup>7</sup> during implementation of the Low DO Work Plan.



**Photo 15: “Tagging” (April 14, 2008)**

“Tagging” evident along Calaveras River immediately east of confluence with the Stockton Diversion Canal

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<sup>7</sup> Prior to any changes to monitoring site locations, the Permittees will seek written concurrence from the Regional Water Board Executive Officer.





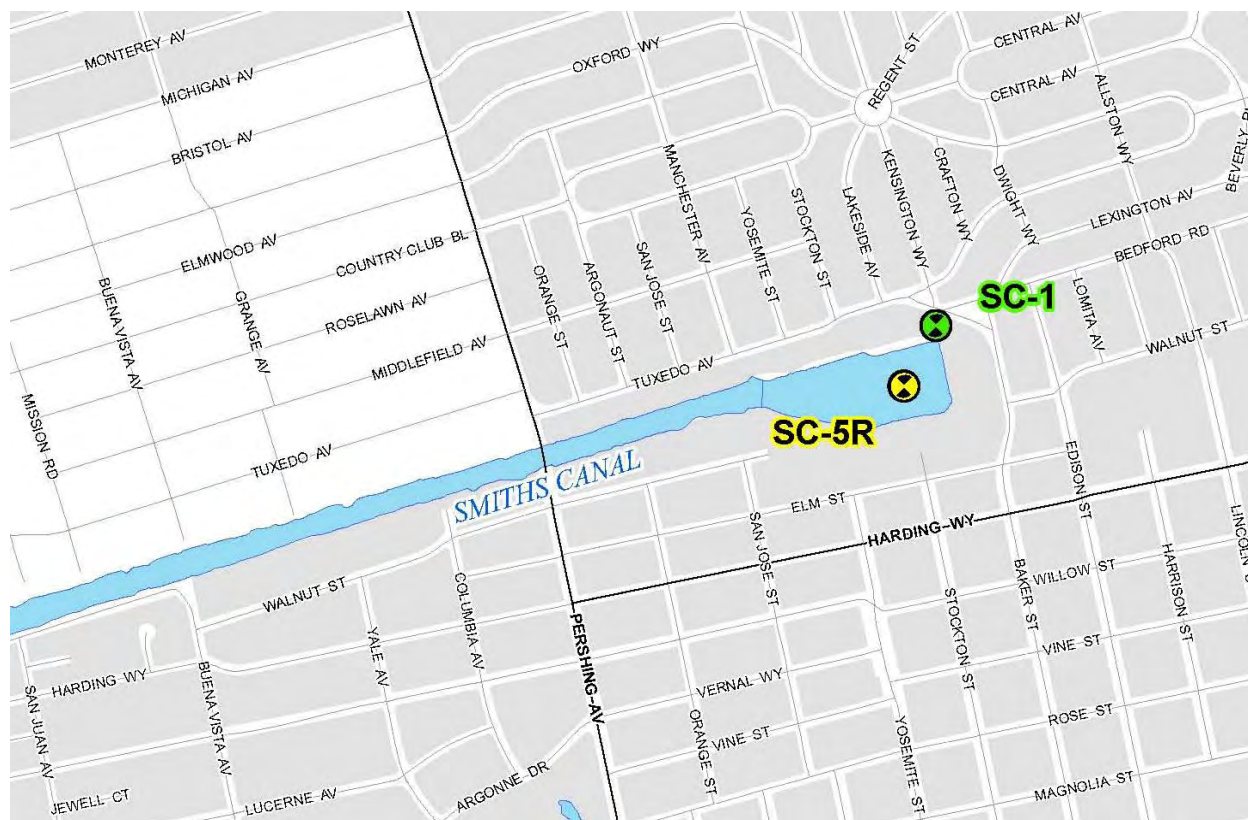
**Photo 16: Mormon Slough immediately east of Wilson Way, Stockton (October 21, 2004).**  
View is from the south canal bank looking north.

## **5.2 LOW DO MONITORING LOCATIONS**

### **5.2.1 Smith Canal**

In a staff report dated April 2, 2002, the Regional Water Board recommended the addition of Smith Canal to California's Clean Water Act Section 303(d) list due to impairment by low DO, organophosphate pesticides, and pathogens. Smith Canal is a tidally influenced, shallow, east/west-constructed, freshwater slough that extends approximately 2.6 miles east from its confluence with the SJR to its upstream terminus at Yosemite Lake in central Stockton, California. The canal averages approximately 105 feet in width with an average depth of four to six feet (with an approximately ten foot maximum depth at the SJR confluence) and an approximate ebb to flood stage difference of up to approximately four feet. Besides direct groundwater inputs and tidal exchange, all inputs to Smith Canal are from stormwater runoff draining from an urbanized watershed that encompasses approximately 3,306 acres.

The proposed low DO receiving water *in-situ* and urban discharge monitoring locations for Smith Canal are shown in Inset 1, on the following page, and Figure 4, Attachment A. Site specific details are provided in the following section.



**Inset 1: Proposed Smith Canal Low DO Work Plan Monitoring Locations**  
Receiving Water = SC-5R; Urban Discharge = SC-1

### **Proposed Smith Canal Low DO Work Plan Monitoring Locations**

One receiving water *in-situ*, multi-parameter, water quality monitoring station will be sited in the approximate center of Yosemite Lake (SC-5R) located at the eastern terminus of Smith Canal approximately 2.3 miles upstream of the confluence with the SJR (Photo 17, on the following page). At low tide, the lake at SC-5R is approximately 3.5 feet deep. In order to compensate for tidal influence and the overall shallow depth of Yosemite Lake, the in-situ water quality field equipment will be installed in a fixed position approximately 1.5 feet above the lake substrate.

Discharge grab samples for laboratory analyses will be collected monthly from the Legion Park Pump Station (LPPS; SC-1, Photo 18, on the following page) located in the northeast corner of Yosemite Lake. Approximately 62% of the Smith Canal watershed (approximately 1,866 acres) drains to the LPPS. Stormwater discharge is predominantly from residential and commercial property with a small percentage of public land use.





**Photo 17: Yosemite Lake receiving water in-situ monitoring location (SC-5R; March 26, 2008).**  
Yosemite Lake is the upstream terminus of Smith Canal.



**Photo 18: Legion Park Pump Station (LPPS; SC-1<sup>8</sup>; April 24, 2008)**

The station's composite sampler is shown in the left-hand foreground; the low flow summer pump is visible in the left-hand background. Wet well access is located in the back center of the photo.

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<sup>8</sup> The designated pump station District ID number for the Legion Park Pump Station corresponds to SC-57.

## 5.2.2 Mosher Slough<sup>9</sup>

Mosher Slough is one of Stockton's least-improved waterways and is located in the northern portion of the SUA. A 1.3 mile section of Mosher Slough downstream of I-5 is 303(d)-listed for organic enrichment/low DO impacts and is entirely downstream of the SUA. Mosher Slough (Mosher Creek) flows southwest from the Sierra Nevada foothills to the SJR; but within the urbanized area, the waterway is oriented roughly east/west. South Bear Creek flows southwest into the western portion of the slough. Land use within the urbanized portion of the Mosher Slough watershed is dominantly residential with a small percentage being commercial and public lands.

Prior to entering the Stockton city limits, the slough receives limited inflow from agricultural runoff and tailwaters. A small water control structure diverts water from the Calaveras River downstream of the Calaveras Headworks (built in 1933 and located approximately 20 miles east of Stockton) for irrigation purposes. Mosher Slough flows naturally only when it receives flow from surface runoff.

Two low DO receiving water *in-situ* and two urban discharge monitoring locations are proposed for Mosher Slough (Inset 2, below, and Figure 4, Attachment A). Site specific details are provided in the following pages.



**Inset 2: Proposed Mosher Slough Low DO Work Plan Monitoring Locations**

Receiving Water = MS-6R and MS-14R

Urban Discharge = MS-14 and MS-22

<sup>9</sup> In a letter dated December 23, 2008, the Regional Water Board Total Maximum Daily Load (TMDL) staff indicated that the selected Mosher Slough monitoring locations, as proposed in the originally submitted Low DO Work Plan, dated June 3, 2008, are suitable and consistent the requirements of the 13267 Order.



### **Proposed Mosher Slough Low DO Work Plan Monitoring Locations**

Two receiving water *in-situ*, multi-parameter, water quality monitoring stations in Mosher Slough were selected based on channel geomorphology, hydrology and security issues. The downstream *in-situ* receiving water monitoring location (MS-6R) will be sited south of the confluence of Mosher Slough and Bear Creek (Photo 19, below) approximately 1.3 miles west of I-5.



**Photo 19: Mosher Slough (MS-6R; March 25, 2008)**

View is from the south bank of Mosher Slough, approximately 1.3 miles downstream of I-5, looking north towards the confluence with Bear Creek.

Due to the geomorphology and hydrology of Mosher Slough, location of a receiving water site immediately upstream of the SUA is not feasible. Upstream of Kelly Drive (immediately east of I-5), Mosher Slough does not consistently contain sufficient water to install and support operation of an *in-situ* monitoring device. The “upstream” *in-situ* receiving water monitoring location (MS-14R) will be sited in the area of Mariner’s Bridge (Photo 20, on the following page). At low tide, the Mosher Slough at the Mariner’s Bridge (MS-14R) location is extremely shallow; the deepest portion of the waterway is represented by a meandering channel with a maximum, intermittent, depth of two to three feet deep. Consequently, the upstream Mosher Slough *in-situ* receiving water location may require limited modification<sup>10</sup> upon further field verification of location suitability and security concerns.

The selected downstream and “upstream” receiving water locations represent the extents of the 1.3 mile portion of Mosher Slough 303(d)-listed for DO impairment. While MS-14R is at the upstream end of the 303(d)-listed segment, it is downstream of essentially all urban discharges.

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<sup>10</sup> Prior to any substantial changes to the upstream Mosher Slough *in-situ* monitoring site location, the Permittees will seek written concurrence from the Regional Water Board Executive Officer.



**Photo 20: Mosher Slough (MS-14R; April 14, 2008)**

View is from Mariner's Bridge looking west (downstream) of the SUA. This point represents the upstream extent of Mosher Slough's 303(d)-listed segment for DO impairment.

Discharge grab samples for laboratory analyses will be collected monthly from the Kelly Drive Pump Station (MS-14) and La Morada Detention Basin Pump Station (MS-22). The MS-14 discharge sampling location (Photo 21, on the following page) represents a large catchment area (approximately 530 acres) as close as possible to the waterway's confluence with the SJR. The MS-22 sampling location (Photo 22, on the following page) represents a large catchment area (approximately 761 acres) located as close as possible to the eastern boundary of the SUA.



**Photo 21: Mosher Slough/Kelly Drive Pump Station (MS-14; April 24, 2008)**

View is from the north Mosher Slough levee looking northwest at the pump station. Grab samples will be collected from the wet well located in the back center of the photo.



**Photo 22: Mosher Slough/La Morada Pump Station (MS-22; May 2, 2008)**

View is looking north/northwest with the detention basin visible in the right background. The station's low flow pump is located on the right-hand side of the station; access to the wet well is located behind the pumps.

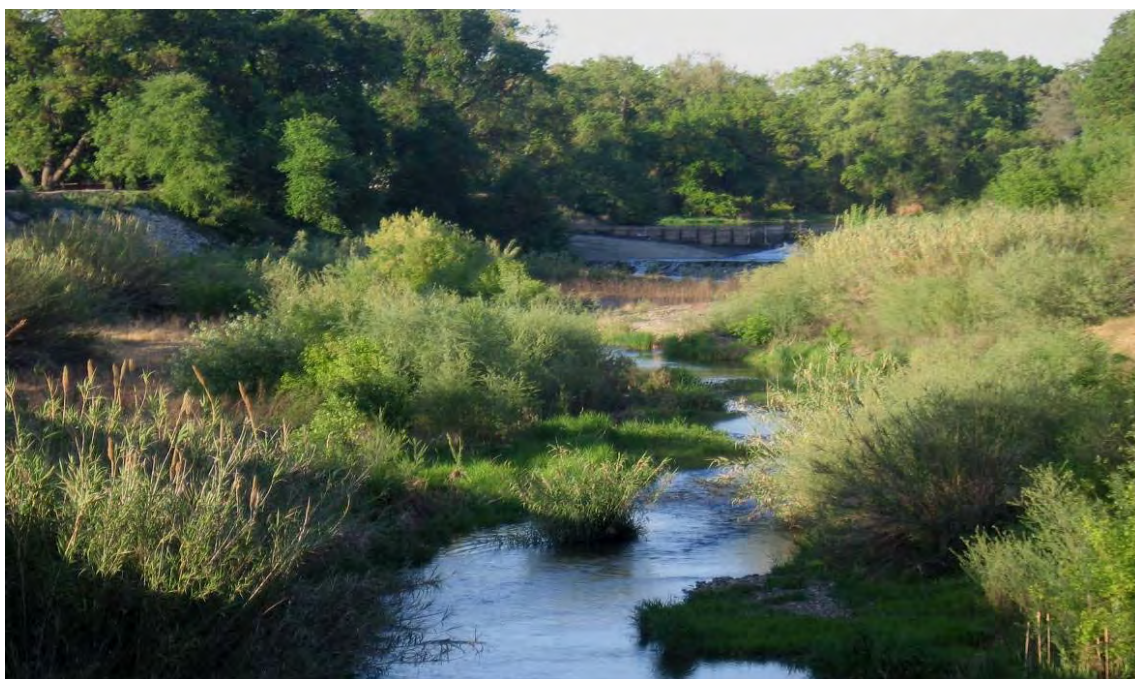


### 5.2.3 Lower Calaveras River<sup>11</sup>

The Calaveras River watershed is a tributary to the SJR Delta System flowing southwest from the Sierra Nevada foothills through Calaveras, Stanislaus, and San Joaquin Counties. The Calaveras River Basin drains a total of 470 square miles above the foothill line with its headwaters at approximately 4,365 feet elevation. The majority of the watershed lies in the northwestern region of Calaveras County; the westernmost portion of the watershed lies in San Joaquin County, and a small, southwestern area lies in Stanislaus County.

The most prominent manmade facility is New Hogan Dam and Reservoir located in Valley Springs, Calaveras County, which controls water flow on the lower Calaveras River. Completed in 1963, the dam is located at an elevation of approximately 700 feet approximately 38 miles upstream from the confluence with the SJR. The lower Calaveras River/Mormon Slough area below New Hogan Dam encompasses approximately 115,000 acres and receives up to 90,000 acre-feet of surface water supply from the lower Calaveras River.

New Hogan Dam substantially altered flows in the river; water is used for irrigation and municipal purposes with the water right permit held by the United States Bureau of Reclamation (USBR). In 1970, Stockton East Water District (SEWD) and the Calaveras County Water District contracted with USBR for the project's entire water supply. In 1978, SEWD began to divert water at Bellota Weir (Photo 23, below) to SEWD's municipal water treatment plant, further altering water flow patterns in the river system. Water is released to the SEWD water treatment plant during the non-irrigation season, generally during November to March.



**Photo 23: Calaveras River at Bellota Weir (April 17, 2008)**

Built in the late 1940s, the Bellota Weir is located approximately 15 miles east of Stockton along Highway 26. The weir is a dam with removable checks and flow control slide-gates at its face with the crest eight feet above the channel. At this point, the Calaveras River is diverted into two main channels, the Old Calaveras River to the north and Mormon Slough to the south.

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<sup>11</sup> Department of Water Resources, *Calaveras River Fish Migration Barriers Assessment Report*, September 2007

The Stockton Diversion Canal was built in 1910 to carry flows from Mormon Slough around the east side of Stockton and back to the Calaveras River. In 1969 the United States Army Corp of Engineers (USACE) modified Mormon Slough from its confluence with the Stockton Diversion Canal upstream to Bellota Weir to convey additional flood flows. The 1969 project enlarged and realigned the existing channel to increase its capacity to the New Hogan Lake operation design objective of 12,500 cfs (USACE 1983). Downstream of the Stockton Diversion Canal, the urbanized portion of the Calaveras River watershed is about 4,000 acres.

Flow is not released downstream of Bellota or the Calaveras Headworks in the Calaveras channel except when flood releases are made from New Hogan Dam or when storm runoff flows into the river and channels. The Calaveras channel downstream of the Calaveras Headworks receives only storm runoff between November and March. During the April to October irrigation season, both the Calaveras River channel and Stockton Diversion Canal receive input to supply irrigation needs.

Within the SUA, land use along the Calaveras River is predominantly residential and commercial, but also includes industrial uses. Although the entire urbanized length of the Calaveras River (approximately 5.8 miles from the SJR confluence to the Stockton Diversion Canal) is 303(d)-listed for low DO, the upstream segment from approximately Pacific Avenue to the Stockton Diversion Canal generally contains insufficient water column to support *in-situ* monitoring. Two low DO receiving water *in-situ* and two urban discharge monitoring locations are proposed for the lower Calaveras River (Inset 3, below, and Figure 4, Attachment A). Site specific details are provided in the following pages.



**Inset 3: Proposed Lower Calaveras River Low DO Work Plan Monitoring Locations**

Receiving Water = CR-3R and CR-4R

Urban Discharge = CR-39 and CR-42



### **Proposed Lower Calaveras River Low DO Work Plan Monitoring Locations<sup>12</sup>**

Two receiving water *in-situ*, multi-parameter, water quality monitoring stations in the lower Calaveras River were selected based on channel geomorphology, hydrology and security issues. The mean water depth of the Calaveras River from the SJR confluence to the Pershing Avenue Bridge is estimated to be approximately ten feet. The downstream *in-situ* receiving water monitoring location will be sited approximately 3,000 feet east of the SJR confluence with the Calaveras River (CR-3R; Photo 24, below).



**Photo 24: Lower Calaveras River (CR-3R; April 14, 2008)**

View is looking west from River Drive (north of the Stockton Golf and Country Club, west of I-5) approximately 0.5 miles east of the confluence with the SJR.

The upstream *in-situ* receiving water monitoring location (CR-4R) will be sited west of the Pacific Avenue Bridge (Photo 25, on the following page). Initial site reconnaissance indicated that at low tide, the Calaveras River west of the Pacific Avenue Bridge contains sufficient water, approximately four feet (locally), to install and support operation of the *in-situ* monitoring equipment. However, at this location, the river is located adjacent to the Calaveras River Bike Path and, especially during low tide, is readily accessible from either side of the channel (as evidenced by the amount of graffiti on the bridge supports). Consequently, the upstream Calaveras River *in-situ* receiving water location may require modification<sup>13</sup> upon further field verification of location suitability and security concerns.

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<sup>12</sup> During field tour conducted on December 12, 2008, the Regional Water Board TMDL staff indicated that the proposed Calaveras River monitoring stations (CR-3R, CR-4R, CR-39, and CR-42) are suitable and consistent with the requirements of the 13267 Letter.

<sup>13</sup> Prior to any substantial changes to the upstream Calaveras River *in-situ* monitoring site location, the Permittees will seek written concurrence from the Regional Water Board Executive Officer.



**Photo 25: Lower Calaveras River at Pacific Avenue, Stockton, CA (CR-4R; April 14, 2008)**  
View is from the Calaveras River Bike Path looking east at the Pacific Avenue Bridge. Water depth appeared to be approximately four (4) feet deep.

Discharge grab samples for laboratory analyses will be collected monthly from the Brookside Pump Station (CR-39) and Bianchi Pump Station (CR-42). The Brookside Pump Station (CR-39) discharge sampling location (Photo 26, on the following page) represents a large catchment area (approximately 297 acres) as close as possible to the river's confluence with the SJR and upstream of the CR-3R receiving water monitoring location. The Bianchi Pump Station (CR-42) discharge sampling location (Photo 27, on the following page, and Photo 28, on the following pages) represents a large catchment area located upstream of the CR-4R receiving water monitoring location, approximately 1.4 miles west of the Stockton Diversion Canal confluence. Approximately 844 acres (21%) discharged through the Bianchi Pump Station.



**Photo 26: Calaveras River/Brookside Pump Station (CR-39; April 22, 2008)**

View is looking southeast towards the north levee. Wet well of the pump station is in the foreground with the low flow pump visible on the right-hand side.



**Photo 27: Calaveras River/Bianchi Pump Station (CR-42; April 24, 2008)**

View is looking east from the parking lot. Approximately 21% of the stormwater runoff within the Calaveras River urban watershed is discharged via the Bianchi Pump Station





**Photo 28: Bianchi Pump Station (CR-42; April 24, 2008)**

Access to the pump station's wet well is provided via the stairway on the left-side of the photo. Two high-volume pumps and a low-flow summer pump are located to the right of the photo.

#### **5.2.4 Stockton Channel**

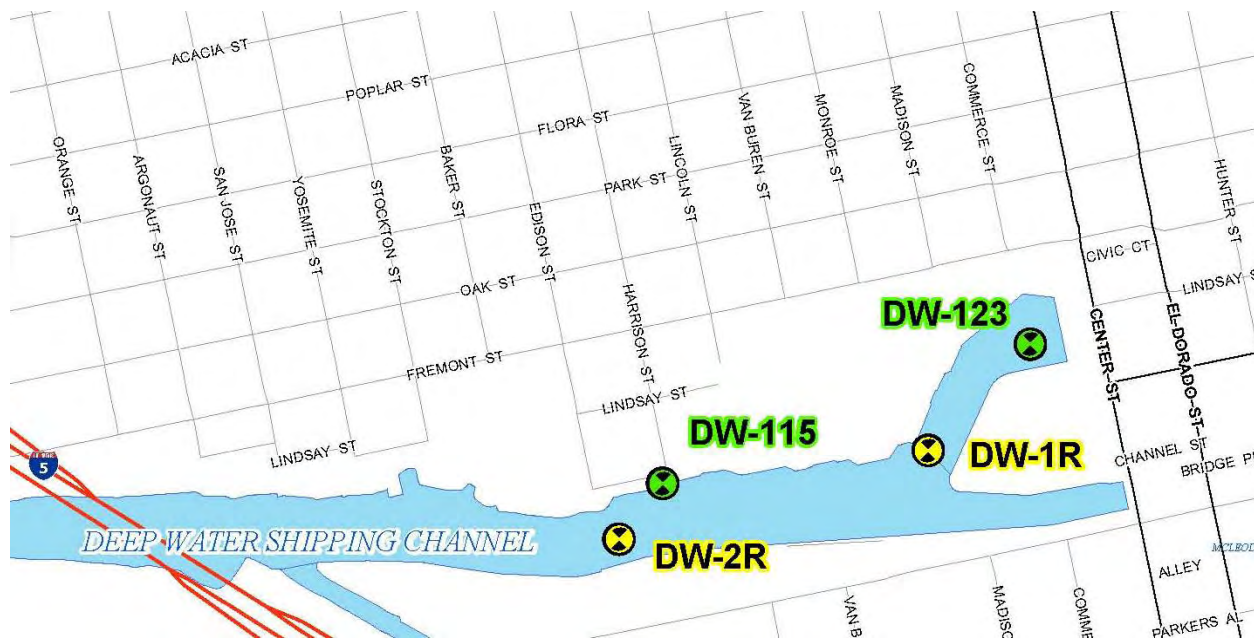
The Stockton DWSC is a USACE maintained portion of the SJR that serves as a commercial shipping lane between Pittsburgh, California, and the Port of Stockton (Port). The DWSC extends downstream from its terminus at the Port's East Complex for 37 miles to the City of Antioch, where the dredged ship channel leaves the main channel of the SJR and follows New York Slough to its mouth on the Sacramento River near Pittsburg. Within the SUA, a sizable turning basin allows the vessels to reverse their orientation before departing. The DWSC is approximately 500 feet wide with a mean depth of 30 feet. Upstream of the DWSC, the SJR is approximately 10 feet deep.

The Stockton Channel covers approximately 43 acres extending east of I-5 into downtown Stockton and McLeod Lake (Figure 1, Attachment A; Inset 4, on the following page) with an average depth ranging from approximately 18 feet (east) to ten feet (McLeod Lake). Watersheds discharging to the Stockton DWSC and Stockton Channel include older residential and commercial districts (downtown Stockton), industrial properties, and the Stockton Downtown Revitalization District.

In 1998, the Stockton DWSC was first identified as 303(d) impaired due to low levels of DO. Dissolved oxygen concentrations in the DWSC drop as low as 2 to 3 mg/L during warmer, low water flow periods in the SJR. Loading by upstream sources of BOD substances, channel geometry, and reduced flow reduces the assimilative capacity of the DWSC by increasing the residence time for loads of oxygen demanding substances and magnifying the effect of oxygen demanding reactions.

The USACE has operated a bubble jet system in the DWSC since the fall of 1993 generally from September 1 through November 30. The aeration system was designed to compensate for a 0.2 mg/l reduction in DO estimated to have resulted from USACE dredging of the DWSC. The aeration system jet, which is lowered to about a 20 foot depth, is designed to inject about 2,000 pounds per day of DO into the

SJR at the confluence with the DWSC, just downstream of the City's Regional Wastewater Control Facility (RWCF) discharge.



**Inset 4: Proposed Stockton DWSC Low DO Work Plan Monitoring Locations**

Receiving Water = RRI and DWSC-1R  
Urban Discharge = DW-115 and DW-123

The Stockton DWSC Demonstration DO project is a multiple-year assessment of the effectiveness of elevating DO concentrations in the channel. The objective of the study is to maintain DO levels above the minimum Basin Plan recommended levels. The project comprises a full-scale aeration system including two (2) 200 foot deep u-tube aeration tubes; two vertical turbine pumps capable of pumping over 11,000 gallons of water each; a liquid-to-gas oxygen supply system; and numerous ancillary equipment and control systems. The aeration system<sup>14</sup> has been sized to deliver approximately 10,000 pounds of oxygen per day into the DWSC. Four DO monitoring locations (Navigation Light NA40, NA42, NA43, and NA48) plus the Department of Water Resources (DWR) RRI station are used to monitor DO levels for the Stockton DWSC Demonstration DO project.

In 2006, the City installed a bubbler system in the Stockton Channel as part of the City's Stockton Channel Water Quality Improvement Project. Interspersed along the reach of the Stockton Channel from McLeod Lake to the I-5 overpass are eight (8) laterals which extend from the south shore of the Stockton Channel roughly 75% across the waterway along its bottom. The laterals are pipes with 1/16" diameter holes in them every three (3) feet that diffuse air into the water column. The system was designed to prevent thermal stratification and inhibit blue-green algae growth in the waterway. The bubbler system is operated continuously from April to October and intermittently for maintenance-only purposes from November to March.

<sup>14</sup> The aeration system is anticipated to only be operated when DWSC DO levels are below the Basin Plan DO WQOs (approximately 100 days per year)

Two low DO receiving water *in-situ* and two urban discharge monitoring locations are proposed for the Stockton DWSC (Inset 4, previous page, and Figure 4, Attachment A). Site specific details are provided in the following pages.

### **Proposed Stockton DWSC Low DO Work Plan Monitoring Locations**

Two receiving water *in-situ*, multi-parameter, water quality monitoring stations in the Stockton Channel were selected based on Regional Water Board TMDL staff direction<sup>15</sup>, channel hydrology, active engineering (City Downtown Redevelopment projects), and private property/jurisdictional considerations (Figure 4, Attachment A). Due to the amount of boat traffic anticipated in the Stockton Channel, the Low DO Work Plan proposes affixing the water quality monitoring device to existing structures. The City is currently in discussion with City Redevelopment Department regarding the methodology of affixing the equipment to the selected marina piles/docks (actively under construction).

The downstream Stockton Channel *in-situ* receiving water monitoring location (DW-2R) will be sited upstream of the Port of Stockton Turning Basin and east (upstream) and the confluence with Mormon Slough. The Stockton Channel/Mormon Slough confluence is located immediately east of the I-5 Bridge on the south shore. The in-situ monitoring equipment will be located as close to the center of the waterway as possible (Photo 29, below). The mean depth of the Stockton Channel in this location is estimated to be approximately 18 feet.



**Photo 29: Stockton Channel (DW-2R; March 24, 2009)**

View of the west portion of the Stockton Channel taken from south bank of Tuleburg Levee (Marina Project) looking west. The I-5 Bridge is seen the distance.

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<sup>15</sup> In a comment and request for additional information letter dated November 13, 2008 and during a field tour conducted on December 12, 2008, the Regional Water Board TMDL staff indicated that the proposed Stockton Channel DO monitoring stations should be located upstream of the Port of Stockton Turning Basin and the confluence of the SJR and the Stockton DWSC, or preferably upstream of the confluence with Mormon Slough confluence.



The upstream Stockton Channel *in-situ* receiving water monitoring location (DW-1R) will be sited immediately downstream (west) of McLeod Lake along the northern shore proximal to the Stockton Events Center (Photo 30, below). The mean depth of the Stockton Channel in this location is estimated to be approximately 8 feet.



**Photo 30: McLeod Lake and the Stockton Events Center, Stockton (DW-1R; March 26, 2009)**  
View is looking northeast from Tuleburg Levee on the south side of the Stockton Channel. McLeod Lake is in the right back corner of the photograph

All of the discharge outfalls along the Stockton DWSC and Stockton Channel are tidally influenced gravity outfalls. With one exception, all of the discharges to the Stockton DWSC from the Permittees' stormwater system are located east of the I-5 Bridge. Discharge grab samples for laboratory analyses will be collected monthly from DW-115, located upstream of the DW-2R *in-situ* receiving water monitoring location and discharge outfall DW-123, which represents the largest watershed into the Stockton Channel via McLeod Lake (Figure 4, Attachment A). Gravity outfall DW-115 represents a very small downtown residential and industrial watershed; DW-123 represents a watershed of approximately 1,120 acres. Access to all of the Stockton Channel outfalls is problematic (DW-115 at low tide; Photo 31, below). Monthly grab sample events will be scheduled to coincide with low tide; however, grab samples will not be collected if the outfalls are tidally impacted or are not actively discharging during a regularly scheduled sampling event.



**Photo 31: View of Stockton Channel DW-115 at Low Tide (March 26, 2009).**

## 5.2.5 Five-Mile Slough

Five-Mile Slough is a tidally influenced, urban waterway beginning at Rivara Road and Pacific Avenue. The waterway meanders westward through residential areas, including the City's Swenson Park Golf Course, and unincorporated areas to Fourteen-Mile Slough. A weir controls the tidal flow from Fourteen-Mile Slough into Five-Mile Slough. During the summer, flow is reduced by diversion of irrigation water from Five-Mile Slough to the park and golf course. Besides direct groundwater inputs and tidal exchange, all inputs to Five-Mile Slough are from stormwater runoff

The width of Five-Mile Slough varies from around three feet at Rivara Road and Pacific Avenue to up to 45 feet (Friends of Five-Mile Creek website) downstream at its confluence with Fourteen-Mile Slough. East of I-5, the slough is very shallow. During the dry season (April to November), about one quarter of the easternmost channel (east of I-5) is dry; water depth in the remaining three quarters does not exceed four feet at the center of the waterway.

Two low DO receiving water *in-situ* and two urban discharge monitoring locations are proposed for Five-Mile Slough (Inset 5, below, and Figure 4, Attachment A). Site specific details are provided in the following pages.



**Inset 5: Proposed Five-Mile Slough Low DO Work Plan Monitoring Locations**

Receiving Water = 5M-25R and 5M-2R

Urban Discharge = 5M-25 and 5M-28

### **Proposed Five-Mile Slough Low DO Work Plan Monitoring Locations**

Two receiving water *in-situ*, multi-parameter, water quality monitoring stations in Five-Mile Slough were selected based on channel geomorphology, hydrology and security issues. The downstream *in-situ* receiving water monitoring location will be sited immediately east of the confluence of Five-Mile Slough and the Fourteen-Mile Slough weir (5M-25R; Photo 32, on the following page). The mean depth of the Five-Mile Slough at this location is estimated to be approximately ten feet.



**Photo 32: View of Five-Mile Slough at Cumberland Place (5M-25R; October 21, 2004).**  
View is from the south canal bank looking west.

The upstream *in-situ* receiving water monitoring location (5M-2R) will be sited immediately west of Plymouth Road (Photo 33, on the following page). Initial site reconnaissance indicated that at low tide, Five-Mile Slough at the Plymouth Road (5M-2R) location appeared to contain sufficient water, approximately two to three feet (locally), to install *in-situ* monitoring equipment. However, this location will be further evaluated prior to the installation of water quality monitoring equipment as this location is accessible from either side of the channel, especially during low tide. Consequently, the upstream Five-Mile Slough *in-situ* receiving water location may require modification<sup>16</sup> upon further field verification of location suitability and security concerns.

Discharge grab samples for laboratory analyses will be collected monthly from the Lighthouse Drive Pump Station (5M-25) and Alexandria Place Pump Station (5M-28). The Lighthouse Drive Pump Station (5M-25) discharge sampling location (Photo 34, on the following page) represents a large catchment area (approximately 185 acres) as close as possible to the waterway's confluence with Fourteen-Mile Slough and immediately upstream of the 5M-3R receiving water monitoring location. The 5M-25 monitoring location represents urban discharges from relatively older (approximately 25 years old) residential developments.

The Alexandria Place Pump Station (5M-28) sampling location (Photo 35, on the following pages) represents the largest catchment area discharging to Five-Mile Slough, approximately 671 acres. The 5M-28 watershed consists of older residential, commercial and public use (park and golf course) properties.

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<sup>16</sup> Prior to any substantial changes to the upstream Five-Mile Slough *in-situ* monitoring site location, the Permittees will seek written concurrence from the Regional Water Board Executive Officer.





**Photo 33: Five-Mile Slough at Plymouth Road, Stockton, CA (5M-2R; April 14, 2008)**  
View is from the west side of Plymouth Road looking downstream (west toward I-5).



**Photo 34: Five-Mile Slough/Lighthouse Drive Pump Station (5M-25; April 24, 2008)**  
View is from the northwest corner of the pump station (located west of I-5) looking south/southwest.



**Photo 35: Five-Mile Slough/Alexandria Drive Pump Station (5M-28; April 24, 2008)**

View is from the northeast corner of Swenson Park looking north. Five-Mile Slough is behind the pump station with Alexandria Drive to the directly to the east of the photograph.

#### **5.2.6 Mormon Slough**

Mormon Slough originally extended from its confluence with the Stockton DWSC to the Calaveras River at the Bellota Weir. The Stockton Diversion Canal was built in 1910 to carry flows from Mormon Slough around the east side of Stockton and back to the Calaveras River. In 1969 the USACE modified Mormon Slough from its confluence with the Stockton Diversion Canal upstream to Bellota Weir to convey additional flood flows. Flow is not released downstream of Bellota in Mormon Slough except when flood releases are made from New Hogan Dam or when storm runoff flows into the river and channels. Thus, upstream of the Stockton city limits, stretches of Mormon Slough and the Stockton Diversion Canal remain dry for days, weeks, or months at a time during winter and early spring. During the April to October irrigation season, Mormon Slough, east of the Stockton Diversion Canal, receives input to supply irrigation needs.

West of the Stockton Diversion Canal, Mormon Slough no longer receives flow from upstream sources. Portions of the slough from approximately State Route 99 to the Stockton Diversion Canal have been converted to orchards (Figure 1, Attachment A). Upstream of the urbanized area, Mormon Slough receives dominantly residential and agricultural runoff from unincorporated areas; within the SUA, the slough receives stormwater discharge from residential, commercial, and industrial properties. The portion of Mormon Slough from Commercial Street east to Wilson Way has been modified from an open channel to an enclosed culvert. Mormon Slough is frequented by a substantial transient population throughout the year. Although tidally influenced, the waterway east of Lincoln Street Bridge is extremely shallow.

One receiving water *in-situ*, multi-parameter, water quality monitoring station and one urban discharge monitoring location for Mormon Slough was selected based on channel geomorphology, hydrology and security issues. The proposed low DO receiving water *in-situ* and urban discharge monitoring locations



for Mormon Slough are shown in Inset 6, below, and Figure 4, Attachment A. Site specific details are provided in the following section.



**Inset 6: Proposed Mormon Slough Low DO Work Plan Monitoring Locations**  
Receiving Water = MM-4R; Urban Discharge = MM-150

#### **Proposed Mormon Slough Low DO Work Plan Monitoring Locations**<sup>17</sup>

Mormon Slough from the Weber Avenue overcrossing to Commerce Street is predominantly a steep-sided, concrete constructed channel which is inaccessible to foot or boat traffic (Photo 36, on the following page). With the exception of high tide and high stormwater flows, the portion of the slough east of the Lincoln Street Bridge contains insufficient water column to install and operate an *in-situ* monitoring device. In addition, the extent of the slough from the Lincoln Avenue Overcrossing to Wilson Way has a consistently high transient population and security for both equipment and personnel is of paramount concern. The downstream *in-situ* receiving water monitoring location will be sited at the Weber Avenue Bridge (MM-4R; Photo 37, on the following page) approximately 400 feet south of the confluence with the Stockton Channel. Grab samples for laboratory analyses will be collected monthly from the MM-4R receiving water monitoring location.

<sup>17</sup> In a letter dated December 23, 2008, the Regional Water Board TMDL staff indicated that based on the channel geomorphology and hydrology of Mormon Slough, the selected Mormon Slough monitoring stations (MM-150 and MM-4R) as proposed in the originally submitted Low DO Work Plan, dated June 3, 2008, are suitable and consistent the requirements of the 13267 Order.



**Photo 36: Mormon Slough north of the Interstate 5/State Route 4 Interchange (April 22, 2008).**  
View is from the east canal bank looking northwest.



**Photo 37: Mormon Slough at the Weber Avenue Bridge (MM-4R; April 15, 2008)**  
View is from the Weber Avenue Bridge looking north at the confluence with the Deep Water Shipping Channel. The new Morelli Boat Ramp, located at the mouth of the slough, is seen in the distance.

Discharge grab samples for laboratory analyses will be collected monthly from the Commerce Street Lift Station (MM-150); all other urban discharge locations along Mormon Slough are gravity outfalls that are

either tidally influenced or contain sporadic urban flows. The MM-150 discharge sampling location (Photo 38, below) represents the largest watershed to Mormon Slough, approximately 955 acres, and consists of older residential, commercial, and industrial properties.



**Photo 38: Mormon Slough Commerce Street Lift Station (MM-150: July 21, 2005)**

The Commerce Street Lift Station is located under the south-bound lane of the Center Street Overpass on the north side of the “drainage”. At this location, Mormon Slough is completely underground.

### **5.3 MONITORING PARAMETERS**

For Mosher Slough, Five Mile Slough, the Calaveras River, and the Stockton Channel, water quality monitoring will consist of the installation of one *in-situ*, multi-parameter YSI Model 6920 (or equivalent) continuous data recorder at two receiving water locations in conjunction with monthly grab sample collection for laboratory analyses at the two receiving water and two urban discharge locations on each designated waterbody (Figure 4, Attachment A). Water quality monitoring at Smith Canal and Mormon Slough will consist of the installation of an *in-situ*, multi-parameter YSI Model 6920 (or equivalent) continuous data recorder at one receiving water location in conjunction with grab sample collection for laboratory analyses at the receiving water and one urban discharge location on each respective waterbody (Figure 4, Attachment A). Monthly grab sample collection will include a minimum of two storm events per year.

Continuous monitoring can provide data that can be analyzed under various averaging periods to distinguish the effects of diurnal, tidal, seasonal, and other meaningful temporal cycles. In addition, both rapid short-term variations in parameters (such as during storm events) and more long-term cyclic changes can be compared. In order to correlate the *in-situ* water quality data with storm events, precipitation totals will be compiled for the greater Stockton area.

### 5.3.1 In-Situ Monitoring Parameters

*In-situ* data recorders will be installed at low tide, mid-depth in order to compensate for tidal influence and the overall shallow depth of Stockton's waterways. Data will be recorded on continuous 15-minute intervals for the following water quality field parameters (Table 3, below).

**Table 3. Low DO Work Plan - In-Situ Water Quality Parameters**

Constituent	Units	Recording Method	Monitoring Schedule and Process
Date	m/d/y	Recorded	Every 15 minutes; field
Time	hh:mm:ss	Recorded	Every 15 minutes; field
Temperature	°C	Recorded	Every 15 minutes; field
Depth	m	Recorded	Every 15 minutes; field
Dissolved Oxygen (DO)	mg/L	Recorded	Every 15 minutes; field
pH	Std. Units	Recorded	Every 15 minutes; field
Oxidation Reduction Potential (ORP)	mV	Recorded	Every 15 minutes; field
Turbidity	NTU	Recorded	Every 15 minutes; field
Salinity	ppt	Recorded	Every 15 minutes; field
Electrical Conductivity (E.C.)	mS/cm	Calculated*	Every 15 minutes; field
Total Dissolved Solids (TDS)	g/L	Calculated*	Every 15 minutes; field
Resistivity	Kohm/cm	Calculated*	Every 15 minutes; field

Units: m/d/y = month/day/year      hh:mm:ss = hour: minute: seconds      °C = degrees Centigrade      m = meters  
mg/L – milligrams per liter      mV = millivolts      NTU – Nephelometric Turbidity Unit  
ppt = parts per trillion      mS/cm = milli-Siemens per centimeter  
g/L = grams per liter      Kohm/cm = kilo-ohms per centimeter

\*Values calculated by the data recorder software

### 5.3.2 Receiving Water/Urban Discharge Grab Sample Collection and Laboratory Analyses

#### Sampling Frequency

Monthly grab sampling events will be conducted for two (2) years, including two (2) qualifying storm events per year as per the proposed Schedule presented in Section 8.0. A qualifying<sup>18</sup> storm event is defined as a storm with a predicted rainfall of at least 0.25 inches of precipitation at a 70% probability of rainfall 72 hours prior to the event. Based on water quality data collected during the Smith Canal Plan monitoring program, storm event grab samples will be collected between two (2) and four (4) days following the qualifying storm event. A storm sampling event will be preceded by, at least, a continuous three (3) day period with no measurable precipitation (defined as less than 0.10 inch of precipitation during the previous 72 hours). The first storm event is anticipated to occur between September and December (targeting the “first flush” storm event) with the second anticipated to occur between January and May. Dry weather monitoring events will be preceded by at least seven (7) days of no measurable rainfall. A day with a storm event too small to generate runoff (typically 0.10 inches of rainfall or less) shall be considered a dry weather day. For safety reasons, field crews will consist of a minimum of two Condor personnel and will occur only during daylight hours.

<sup>18</sup> A qualifying storm event occurs when there is sufficient rainfall within a 24-hour period to monitor at least one drainage basin and one corresponding receiving water station.



## **Water Quality Grab Sample Collection and Laboratory Analyses**

Monthly grab samples will be collected at each *in-situ* and discharge monitoring locations for oxygen-demanding substances and nutrient analyses in order to augment the recorder data<sup>19</sup>. During each event, the total midstream/lake depth at the receiving water sites and the wet well levels at the discharge locations will be recorded. In general, receiving water grab samples will be collected at approximately mid-depth, mid-channel (where possible) using a horizontal stream/lake sampler. The sampling apparatus will be decontaminated in a solution of deionized water and phosphate free soap and subsequently rinsed with site water prior to each use.

Monthly grab samples will be collected at each discharge monitoring location from pump station wet wells or from exposed/accessible gravity outfalls, conditional upon active flow and absence of tidal impact. Grab<sup>20</sup> samples will be collected from the pump station wet wells using a single-use, disposable, polyethylene bailer. If a pump station is equipped with an automated sampler (Isco 3710 or equivalent model), grab samples will collected using the sampler to the greatest extent possible. Optimally, grab samples will be collected while the station's are actively discharging.

Water samples will be transferred directly from the sampling apparatus to pre-cleaned, laboratory supplied containers. Each container will be labeled for sample identification and placed in a cooler chilled to approximately 4° Celsius with ice.

Sample locations and the numbers of sample containers collected will be listed on the Groundwater Monitoring Chain-of-Custody forms. Upon completion of the fieldwork, the water samples will be delivered under chain-of-custody procedures to a California certified laboratory in time to allow analysis of constituents with the shortest holding times. Laboratory analyses and analytical methods are listed in Table 4, below.

**Table 4. Low DO Work Plan Water Quality Laboratory Analyses**

<b>Constituent</b>	<b>Units</b>	<b>Laboratory Analytical Method</b>	<b>Monitoring Schedule and Process<sup>1</sup></b>
Biochemical Oxygen Demand (BOD5)	mg/L	EPA 5210B	Monthly; grab samples
Chemical Oxygen Demand (COD)	mg/L	EPA 5220D	Monthly; grab samples
Total Suspended Solids (TSS)	mg/L	EPA 2540D	Monthly; grab samples
Total Ammonia-Nitrogen	mg/L	EPA 4500NH <sub>3</sub> H	Monthly; grab samples
Nitrate	mg/L	EPA 300.0 / 4500NO <sub>3</sub> F	Monthly; grab samples
Nitrate (as Nitrogen)	mg/L	EPA 300.0 / 4500NO <sub>3</sub> F	Monthly; grab samples
Nitrite	mg/L	EPA 300.0 / 4500NO <sub>2</sub> B	Monthly; grab samples
Nitrite (as Nitrogen)	mg/L	EPA 300.0 / 4500NO <sub>2</sub> B	Monthly; grab samples
Phosphate (Ortho)	mg/L	EPA 4500-P,E	Monthly; grab samples
Total Phosphorous	mg/L	EPA 4500-P E	Monthly; grab samples
Volatile Suspended Solids	mg/L	EPA 160.4 / SM 2540E	Monthly; grab samples

Units: mg/L – milligrams per liter = parts per million (ppm)

<sup>1</sup>Monthly sampling will include two storm events; one anticipated to occur between September and December, the second anticipated to occur between January and May

<sup>19</sup> Grab samples will be collected prior to any maintenance operations on the data recorders.

<sup>20</sup> Where available and operating, grab samples will be collected using the pump stations' automatic samplers.

### 5.3.3 Sediment Grab Sample Collection and Laboratory Analyses

#### Sampling Frequency

Semi-annual (wet and dry season, respectively) sediment grab samples will be collected to assess the organic content/oxygen demand at the specified *in-situ* monitoring locations. Based on water quality data collected during the Smith Canal Plan, wet season sediment grab samples will target the “first flush” storm event of the season and one dry weather monitoring event. The “first flush” sediment sampling event will be collected between two (2) and four (4) following the qualifying storm event. Dry weather monitoring events will be preceded by at least seven (7) days of no measurable rainfall. If at all possible, wet season and dry season sediment sampling events will be separated by approximately six (6) months. Sediment grab samples will be collected subsequent to receiving water sample collection. In addition to the single *in-situ* monitoring locations in Smith Canal and Mormon Slough, semi-annual sediment sampling will be conducted at the upstream and downstream *in-situ* monitoring locations of the following waterways: Mosher Slough, Five-Mile Slough, and the Calaveras River as per the proposed schedule in Section 8.0. For safety reasons, field crews will consist of a minimum of two Condor personnel and will occur only during daylight hours.

#### Sediment Sampling Procedures and Laboratory Analyses

Sediment samples collected using a stainless steel scoop or push sampler will be transferred directly into pre-cleaned, laboratory-supplied clear, wide-mouth (CWM) glass jars and sealed with Teflon-lined lids. Each container will be labeled for sample identification, stored and transported in coolers chilled to approximately 4° Celsius with ice, and delivered under chain-of custody to a State-certified laboratory for sample preparation and laboratory analyses in time to allow analysis of constituents with the shortest holding times. Sample locations and the numbers of sample containers collected will be listed on the Sediment Monitoring Chain-of-Custody forms. Sediment samples will be analyzed according to the analytical methods listed in Table 5, below, or other equivalent approved analytical methods.

Quality assurance/quality control (QA/QC) grab samples consisting of field blanks, field duplicates, or laboratory blanks will be collected from various monitoring locations during the monitoring program. Field blanks will be generated using blank water provided by the laboratory and will be submitted “blind” to the laboratory. In addition, laboratory duplicate analyses may be requested; however, additional sample volume must be collected, per laboratory requirements, for each analysis.

**Table 5. Low DO Work Plan Sediment Sample Laboratory Analyses**

Constituent	Units	Laboratory Analytical Method	Monitoring Schedule <sup>1</sup> and Process
Biochemical Oxygen Demand (BOD <sub>5</sub> )	mg/kg	EPA 5210B	Semi-Annual; grab samples
Chemical Oxygen Demand (COD)	mg/kg	EPA 4124	Semi-Annual; grab samples
Sediment Oxygen Demand (SOD)	g/m <sup>2</sup> day	Calculation	Semi-Annual; grab samples
Total Organic Carbon (TOC)	mg/kg	SW 9060	Semi-Annual; grab samples

Units: mg/kg = milligrams per kilogram = parts per million (ppm)

g/m<sup>2</sup> day = grams per meter squared per day

<sup>1</sup>Sediment sampling will occur once following a wet season storm event (anticipated September through December) and once during the dry season (anticipated May through August)

## 5.4 FIELD PROCEDURES

After approximately 30-days in operation, data download and equipment maintenance and calibration activities will be conducted for each of the *in-situ* data recorders. The deep water *in-situ* monitoring locations anticipated at the downstream Lower Calaveras River, Mosher Slough, Five-Mile Slough, Mormon Slough sites, and the Stockton Channel and Yosemite Lake sites will be accessed by boat. At each designated monitoring site, the boat will be tied off or anchored to prevent drifting. If deploying an anchor is necessary, care will be taken to limit artificial increase of the turbidity in the area. Prior to sample collection, the water depth at each receiving water location will be measured to the nearest 0.01-foot with a weighted tape measure.

Pending field conditions, a vertical DO profile, including temperature and ORP, will be conducted using a weighted tape measure and calibrated YSI 556 MPS (or equivalent) water quality field instrument. Vertical DO profiling will be reported on a quarterly basis at those in-situ monitoring locations where there is sufficient water depth (greater than four feet). In general, strong currents and insufficient water depth preclude vertical DO profiling of the deeper waterways (Stockton Channel and downstream Calaveras River) and the upstream in-situ monitoring locations, respectively. Quarterly vertical DO profiling will be conducted as per the monitoring schedule proposed in Section 8.0.

Grab sample collection for laboratory analyses will occur concomitantly with monthly operations and maintenance activities. During each monthly event, the following field parameters will be collected at each location: date, time, weather, water temperature, DO, pH/oxidation-reduction potential (ORP), specific conductivity (EC), salinity, turbidity, total dissolved solids (TDS), and flow velocity, if possible. Field parameters will be collected using a calibrated YSI 556 MPS (or equivalent) water quality field instrument equipped with sensors to monitor water temperature, DO, pH/ORP, EC, salinity, and TDS. Turbidity will be measured using a Hach 2100P (or equivalent) turbidity meter. If possible, receiving water flow quantity will be estimated by measuring flow velocity and estimating channel geometry. Pump station operation times will be recorded on a monthly basis and during the stormwater sampling events. Prior to each sampling event, all field equipment will be calibrated according to manufacturer's standards and recommendations. Calibration methods and records are kept with each meter. Field observations will be recorded during each event.

To the maximum extent possible, receiving water grab samples will be collected at mid-stream, mid-depth using a discrete depth horizontal lake sampler. At those receiving water locations with minimal water column, a long-handled dipping pole with a collection container will be utilized in order to minimize bottom sediment resuspension. Samples will be transferred from the collection container immediately into the proper sample containers and properly labeled for identification.

Whenever possible, grab samples from discharge locations will be collected using the station's automatic sampler. The unit installed at the LPPS (SC-1) consists of a stainless steel intake strainer, Teflon lined intake tubing, flexible pump tubing, a peristaltic pump, a composite sample bottle, a refrigerated housing unit, and a controller. Grab samples from the remaining pump stations will be collected by manually drawing a sample from the station's wet well using a single-use disposable bailer or long-handled dipping pole with a collection container. Samples will be transferred from the collection container immediately into the proper sample containers and properly labeled for identification.

Sediment sampling sites will be located using a hand-held global positioning system (GPS) unit to provide site consistency between sampling events. In general, sediment samples will be collected from mid-channel locations from the deepest portion of each waterway. Deeper water sediment monitoring locations will be accessed by boat. At each designated monitoring site, the boat will be tied off or

anchored to prevent drifting. If deploying an anchor is necessary, care will be taken to limit artificial increase of the turbidity in the area. Prior to sample collection, the water depth at each receiving water location will be measured to the nearest 0.01-foot with a weighted tape measure.

A single composite sample<sup>21</sup> of unconsolidated fine-grain sediment from wadeable and non-wadeable waters will be obtained from each above-noted (Section 5.3.2) sediment sampling location. For wadeable waters, sediment samples will be collected utilizing a stainless-steel, hand-operated push sampler or stainless steel scoop (for waters less than two feet deep). Field personnel will move and stand on the downstream side of the sample site in order to create the least disturbance to the sampling site as possible. Samples will be collected from approximately the upper six inches of surface sediment. Dependent upon availability of soft substrate, samples will be collected either from a single mid-channel location or from an area of approximately 0.5 square meters (m<sup>2</sup>) from the streambed.

For non-wadeable waters, sampling will utilize a boat-mounted, stainless-steel, hand-operated push sampler. When using a boat, all engines will be turned off and the samples collected upstream from the engines or any other machinery that may release exhaust fume/oils into the sample. In order to collect enough sediment for all necessary analyses, sediment cores will be collected in a consecutive fashion within a 0.5 m<sup>2</sup> area from the surface (top 0 - 6 inches) at each sampling location. The upper six inches of surface sediment from a sufficient number of cores will serve to make-up the composite sample for analysis. Sampling will be conducted with standard care to minimize disturbance of the sediment during collection. Samples will be composited in the field, although a sample may be collected from a single location based on the availability of soft substrate.

All field analytical and sampling equipment will be decontaminated by washing in a solution of deionized water and laboratory-grade non-phosphate detergent and double-rinsed with deionized water prior to use at each sample location. All rinsate will be properly disposed of.

#### **5.4.1 Health and Safety Procedures**

All personnel who participate in fieldwork during the low DO monitoring program will attend a safety indoctrination. Copies of a program specific Health and Safety Plan (HASP) shall be available to all field crews and will be located in each on-site field vehicle.

Field crews will consist of at least two persons wearing clean, powder-free nitrile gloves and appropriate personal protective equipment (life vest, safety glasses, reflective vests, hard hats, steel toes, etc.) for the specific monitoring/sampling event.

“Clean sampling” techniques are required to minimize the potential for cross-contamination of the water quality samples including: never sample near a running vehicle; avoid allowing rainwater to drip from rain gear into sample bottles; do not breath, sneeze, or cough in the direction of an open sample bottle.

A drowning hazard exists at the shoreline, along streams, and at water bodies. If fieldwork is required in water greater than three feet deep or without any protective structure (such as a guard rail) to prevent falling into the waterway, appropriate safety equipment (personal floatation device) will be worn.

Adequate swimming ability will be required of all field crew members conducting receiving water monitoring. Field crew members will wear personal floatation devices at sampling locations where there is the potential danger of falling into water greater than three feet deep.

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<sup>21</sup> Sediment sample volumes to be collected will be based on laboratory analytical requirements



To minimize the potential of sample contamination and personnel exposure, crew members will change gloves whenever something not known to be clean has been touched and/or between sampling locations.

No smoking, eating, or drinking will be allowed during sample collection. Field personnel should refrain from touching their face while sampling until thoroughly washing their hands. Liquids should be kept in, and consumed at, the field vehicle. Field crew members should wash their hand with antibacterial soap (located in the field vehicle) prior to consuming any food or drinks.

All electronic equipment will be kept as dry as possible.

Heat stress will be a hazard during hot weather and will be intensified when personnel are in protective clothing (if necessary). To prevent heat stress, personnel will be required to take breaks as needed, and consume adequate quantities of liquid.

No field personnel will enter a manhole or storm pipe without first obtaining an approved confined-space entry permit.

In the event traffic control is necessary, traffic control must be set up before conducting any work where field personnel may be exposed to traffic. Standard traffic control measures include parking vehicles to shield personnel from traffic or using hazard lights or traffic safety cones to identify work areas.

## **6.0 STOCKTON CHANNEL BUBBLER SYSTEM EFFECTIVENESS ASSESSMENT**

In May 2006, the City completed construction of a “bubbler” system in the Stockton Channel as part of the City’s Stockton Channel Water Quality Improvement Project. The system was originally designed by HDR Engineering Inc., (HDR) to address blue-green algae problems in the waterway. At the time of the initial study, DO was considered adequate, but significant temperature stratification was a concern. After investigating chemical, biological, and physical solutions to this problem, HDR selected a bubbler system to increase circulation. Interspersed along the reach of the Stockton Channel from McLeod Lake to the I-5 overpass are eight (8) laterals which extend from the south shore of the Stockton Channel roughly 75% across the waterway along its bottom. The laterals are pipes with 1/16” diameter holes in them every three (3) feet that diffuse air into the water column. A “blower” building located on the south side of the Stockton Channel houses two (2) 25-horsepower blowers as well as all the system’s electrical components and controls. Each blower supplies 240 standard cubic feet per minute (SCFM) at 14 pounds per square inch (PSI) of pressure. The rising bubbles create mixing cells in the water column, preventing thermal stratification and inhibiting the growth of blue-green algae. The bubbler system is operated continuously from April to October and intermittently for maintenance-only purposes from November to March. Water quality field parameters and limited duration *in-situ* monitoring conducted in the Stockton Channel during late 2008 indicate that DO increases when the bubbler system is active.

*In-situ* monitoring data from the Stockton Channel generated during the Low DO Plan monitoring program may be used to assess the effectiveness of the bubbler system in minimizing low DO events. Water column profiling of temperature may also be conducted to assess the bubbler system’s effect on previously observed temperature stratification.

## 7.0 REPORTING

In compliance with Provision D(28)(b)(ii) of the Permit, Provision II(I)(2) of Monitoring and Reporting Program R5-2007-0173, and 13267 Letter Section 4(h), the Permittees will provide Low DO Work Plan monitoring program updates in the forthcoming Annual Reports. A comprehensive final report for the Low DO Work Plan will be submitted to the Regional Water Board by December 1, 2012. The final Dissolved Oxygen Monitoring and Assessment Report shall include:

- A summary of the project;
- Map of sampling locations;
- Description of activities performed; methods used;
- Project results and conclusions; and,
- BMP assessment, selection, and implementation program.

## 8.0 PROPOSED SCHEDULE

The 13267 Letter requires a two-year, low DO monitoring program for the Lower Calaveras River, Mosher Slough, Stockton DWSC near McLeod Lake, Five-Mile Slough, and Mormon Slough; a one-year, monitoring program is required for Smith Canal. Due to the number of waterbodies being examined and the intensive nature of the work, the Low DO Work Plan proposes a staggered schedule for the Low DO monitoring program as shown in Table 6, below. Data recorder download and maintenance and grab sample collection for laboratory analyses will occur on a monthly schedule. Grab sample events will include a minimum of two storm events per year.

The Low DO Monitoring and Assessment Final Report due to the Regional Water Board December 1, 2012.

**Table 6: Low DO Work Plan Implementation Schedule**

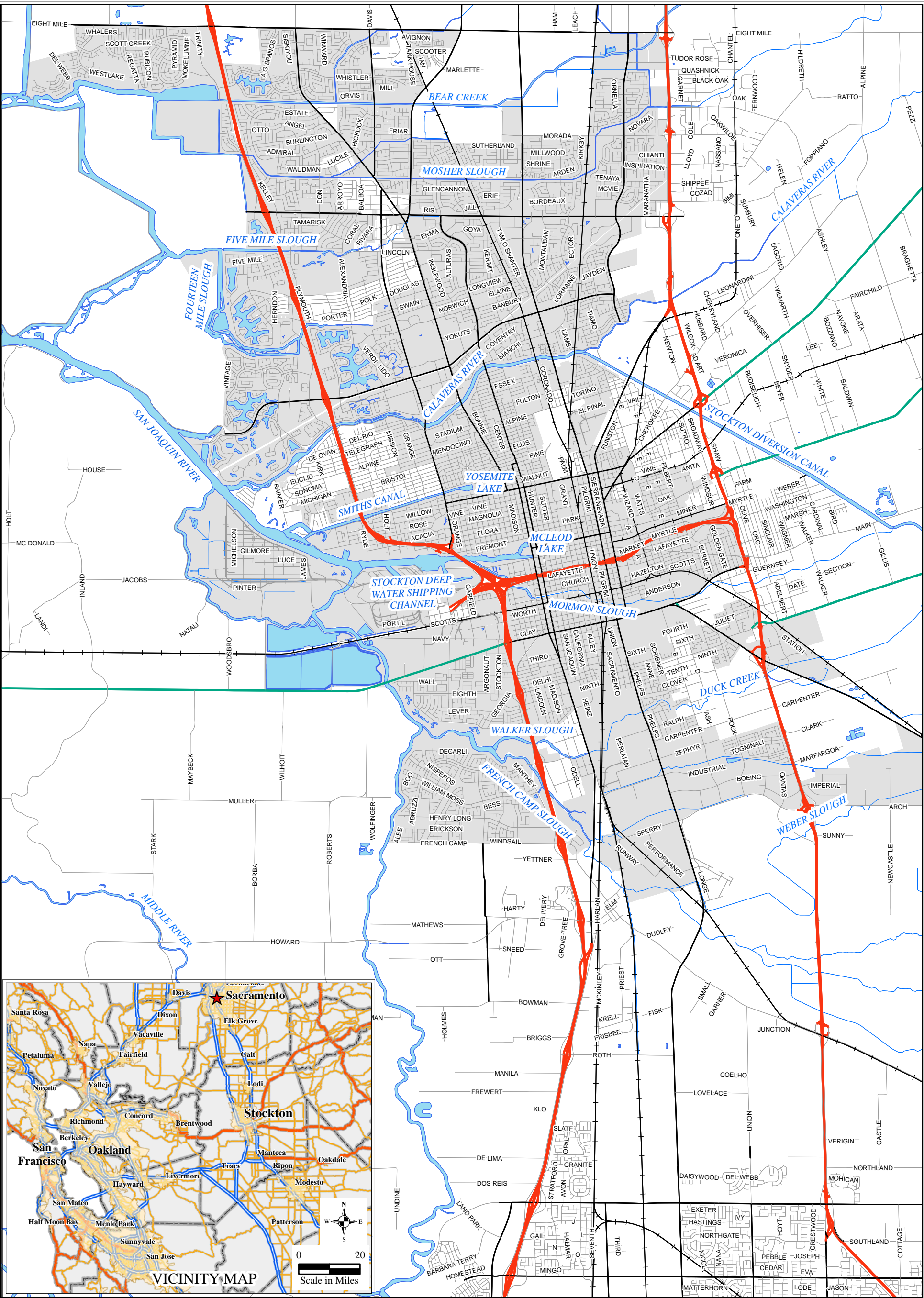
Implementation Phase	Waterbodies	Start Date	End Date
Low DO Work Plan Submittal			June 6, 2008
Phase I	Smith Canal	November 14, 2008	December 1, 2009
Phase II	Mosher Slough	April 15, 2009	May 31, 2011
Phase III	Lower Calaveras River Stockton Channel Five-Mile Slough Mormon Slough	July 1, 2009	July 31, 2011
Low DO Plan Final Report			December 01, 2012

Notes: DO = Dissolved Oxygen

Monthly receiving water and urban discharge grab sample events will include two storm events; one to target the “first flush” storm event anticipated to occur between September and December, the second anticipated to occur between January and May

Sediment grab sample events will occur once following a wet season storm event (anticipated September through December) and once during the dry season (anticipated May through August)

## **ATTACHMENT A**



**LEGEND**

Approximate Boundary of Stockton Urbanized Area (2007)

Water Bodies

Map compiled at scale indicated and in color. Projection: Lambert Conformal Conic  
NAD 1983 California State Plane Coordinate System, Zone III.  
All zoning, street, and water body data created by County of San Joaquin and  
City of Stockton GIS Departments (data current as of 8/07).

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LOW DO PLAN  
SAN JOAQUIN WATERWAYS WITHIN THE  
GREATER STOCKTON  
URBANIZED AREA  
STOCKTON, CALIFORNIA

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Scale in Miles

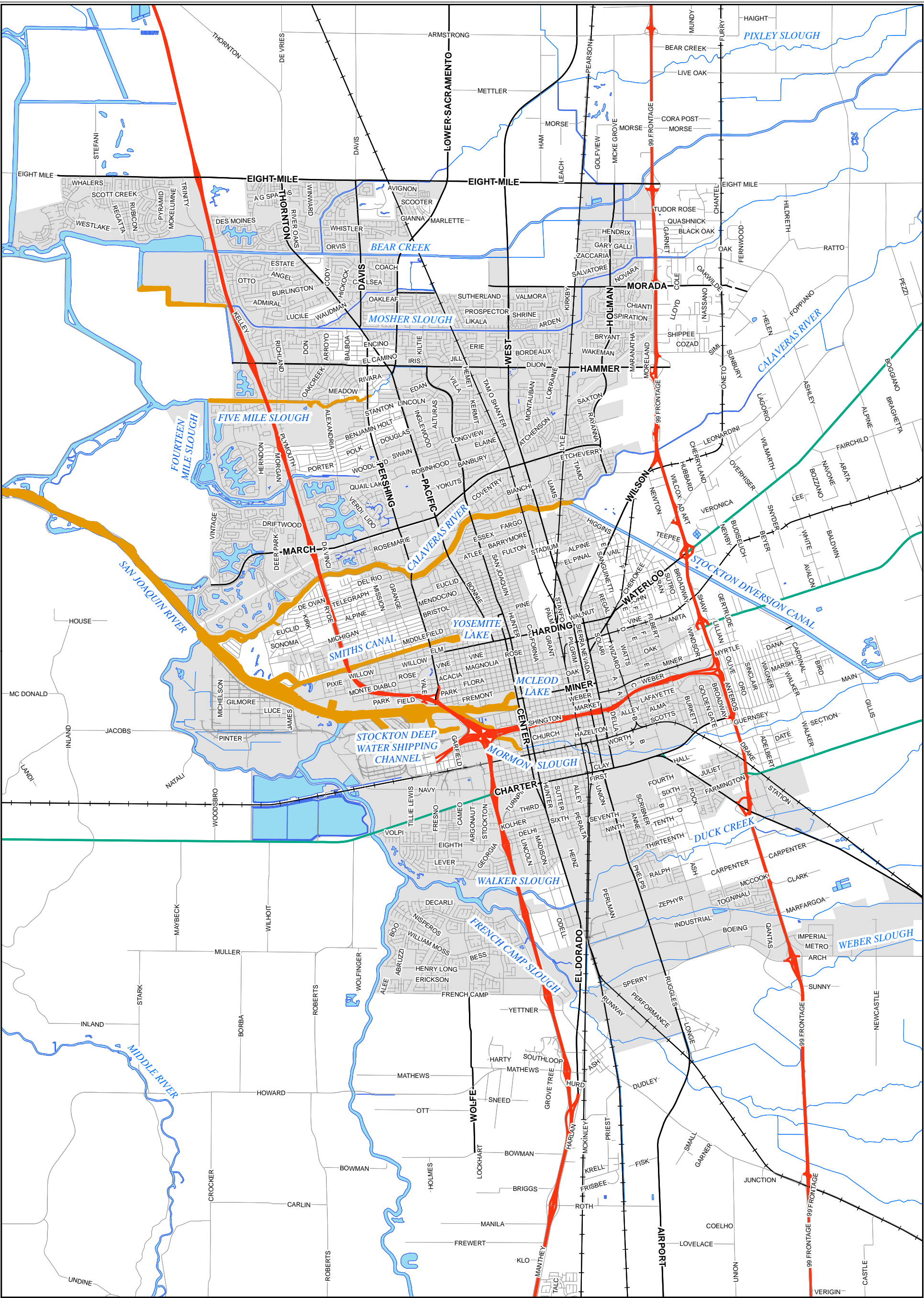
FIGURE  
1

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**LEGEND**

Waterway Segments  
303(d)-Listed for  
Low Dissolved Oxygen

Approximate Boundary of  
Stockton Urbanized Area (2007)

Water Bodies

Map compiled at scale indicated and in color. Projection: Lambert Conformal Conic NAD 1983 California State Plane Coordinate System, Zone III. All zoning, street, and water body data created by County of San Joaquin and City of Stockton GIS Departments (data current as of 8/07).

IMPAIRED PORTIONS OF STOCKTON WATERWAYS  
303(d) - LISTED FOR LOW DISSOLVED OXYGEN  
WITHIN THE GREATER STOCKTON URBANIZED AREA  
STOCKTON, CALIFORNIA

00.6251.252.5

Scale in Miles

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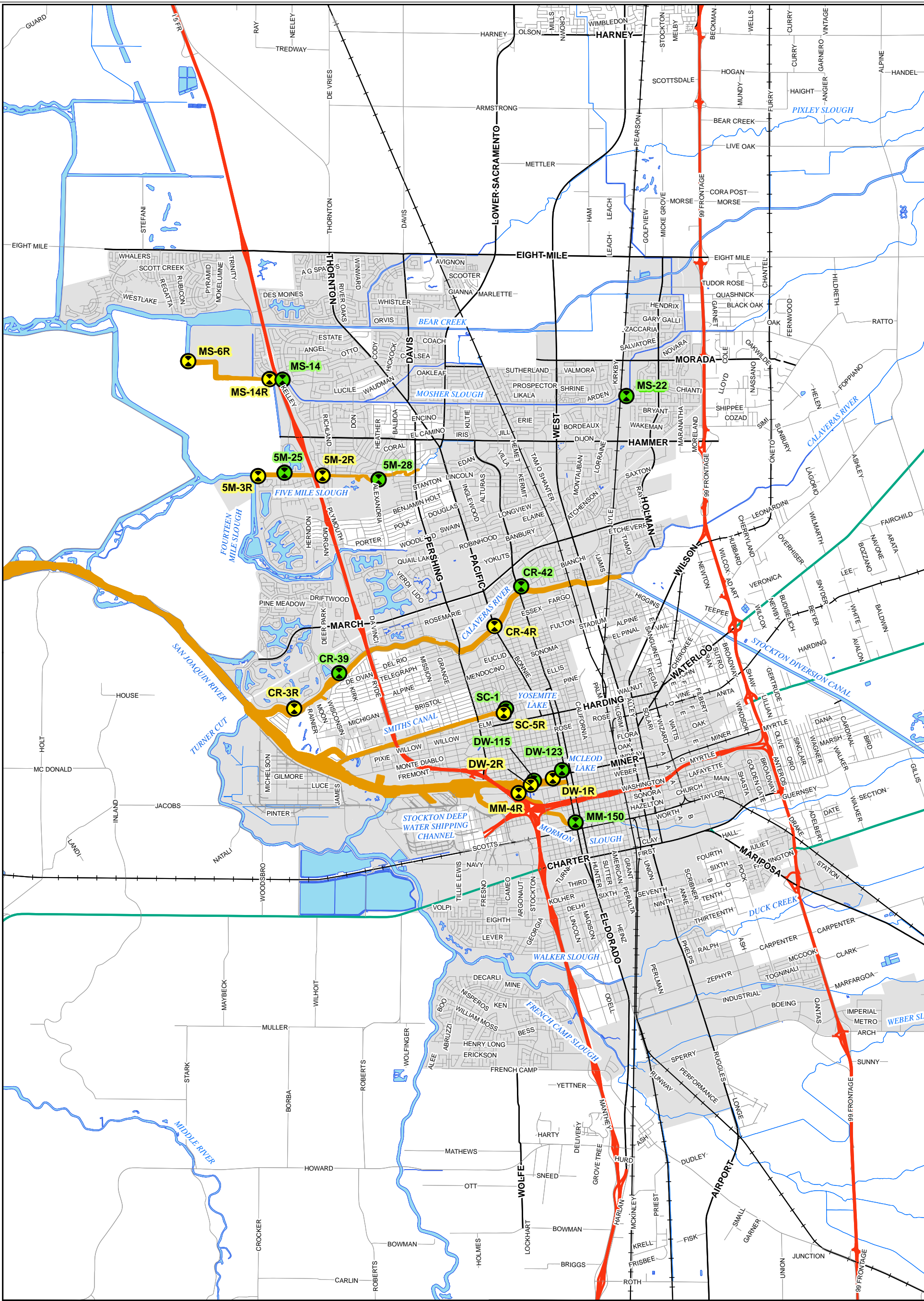
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FIGURE  
3

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**LEGEND**

Waterway Segments  
303(d)-Listed for  
Low Dissolved Oxygen

Water Bodies

Approximate Boundary of  
Stockton Urbanized Area (2007)

Proposed Discharge Grab Sample  
Monitoring Locations

Proposed Receiving Water *In-Situ*  
and Grab Sample Monitoring Locations

Map compiled at scale indicated and in color. Projection: Lambert Conformal Conic NAD 1983 California State Plane Coordinate System, Zone III. All zoning, street, and water body data created by County of San Joaquin and City of Stockton GIS Departments (data current as of 8/07).

PROPOSED LOW DO MONITORING  
LOCATIONS WITHIN THE  
GREATER STOCKTON URBANIZED AREA  
STOCKTON, CALIFORNIA

0 0.625 1.25 2.5

Scale in Miles

**FIGURE  
4**

5418\_F4.MXD

## **ATTACHMENT B**



## RESOURCE REFERENCE LIST

California Department of Water Resources, September 2007, Calaveras River Fish Migration Barriers Assessment Report

California Regional Water Quality Control Board, Central Valley Region Draft Staff Report on Recommended Changes to California's Clean Water Act Section 303(d) list – Appendix B

California Regional Water Quality Control Board, Central Valley Region, Order No. R5-2002-0181; NPDES No. CAS083470, Waste Discharge Requirements (City of Stockton and County of San Joaquin Stormwater Discharges from Municipal Separate Storm Sewer System, San Joaquin County).

California Regional Water Quality Control Board, Central Valley Region, Order No. R5-2007-0173; NPDES No. CAS083470, Waste Discharge Requirements (City of Stockton and County of San Joaquin Stormwater Discharges from Municipal Separate Storm Sewer System, San Joaquin County).

California Regional Water Quality Control Board, Central Valley Region. November 2007 *Requirement for Technical Report Pursuant to California Water Code Section 13267* (City of Stockton and County of San Joaquin Stormwater Discharges from Municipal Separate Storm Sewer System, San Joaquin County).

Chen, C.W., and Tsai, W. 1997. *Evaluation of Alternatives to Meet the Dissolved Oxygen Objectives for the Lower San Joaquin River*. (Prepared for the State Water Resources Control Board on behalf of the City of Stockton Municipal Utilities Department by Systech Engineering, Inc., San Ramon, CA).

Chen, Carl W., and Tsai, Wangteng, February 23, 1999. *Application of Stockton's Water Quality Model to Evaluate Storm water Impact on Smith Canal*. Prepared for City of Stockton, Department of Municipal Utilities Storm Water Management Program.

Chen, C.W., and Tsai, W. June 2001. *Improvements and Calibrations of Lower San Joaquin River DO Model, Final Draft Report*.

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Condor Earth Technologies. March 2004. *Dissolved Oxygen Work Plan (Waste Discharge Requirements Order Number R5-2002-0181)*. Prepared for the City of Stockton, Department of Municipal Utilities and San Joaquin County, CA.

### **RESOURCE REFERENCE LIST (CONTINUED)**

Condor Earth Technologies. October 2006. *Smith Canal Drainage Area Analysis and Dissolved Oxygen Work Plan Final Report*. Prepared for the City of Stockton, Department of Municipal Utilities and San Joaquin County, CA.

Jones & Stokes Associates, and Litton, G.M. October 2004. *Final Aeration Technology Feasibility Report for the San Joaquin River Deep Water Ship Channel*. Prepared for the California Bay-Delta Authority, Sacramento, California.

Jones & Stokes Associates, and Litton, G.M. February 2005. *Evaluation of Tidal Mixing and Exchange of Storm water in the City of Stockton Canals*. Prepared for the Municipal Utilities Department, City of Stockton, CA.

Larry Walker and Associates. September 2003. City of Stockton Stormwater Management Plan. Prepared for the Municipal Utilities Department, City of Stockton, and San Joaquin County, CA.

Larry Walker and Associates. April 2004. City of Stockton and San Joaquin County Pathogen Plan. Prepared for the Municipal Utilities Department, City of Stockton, and San Joaquin County, CA.