

CDM

Camp Dresser & McKee



County of San Bernardino Santa Ana Basin Area

Report of Waste Discharge

Application for Renewal of the Municipal NPDES Stormwater Permit, 2001 - 2006

September 1, 2000

Submitted By

Principal Permittee
San Bernardino County Flood Control District

Co-permittees

- County of San Bernardino
- City of Big Bear Lake
- City of Chino
- City of Chino Hills
- City of Colton
- City of Fontana
- City of Grand Terrace
- City of Highland
- City of Loma Linda
- City of Montclair
- City of Ontario
- City of Rancho Cucamonga
- City of Redlands
- City of Rialto
- City of San Bernardino
- City of Upland
- City of Yucaipa

Prepared by _____

Camp Dresser & McKee *in association with* Larry Walker Associates

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September 1, 2000

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Mr. Naresh Varma
NPDES Coordinator
County of San Bernardino
Department of Public Works
825 East Third Street
San Bernardino, CA 92415-0835

Subject: Submittal - Report of Waste Discharge
Application for Renewal of the Municipal NPDES Permit

Dear Mr. Varma:

Camp Dresser & McKee Inc. is pleased to submit two originals of the final *Report of Waste Discharge* (ROWD) for renewal of the municipal NPDES permit. This September 1 submittal incorporates comments received from the Santa Ana Regional Water Quality Control Board (RWQCB) subsequent to Camp Dresser & McKee's August 16, 2000 submittal¹. Camp Dresser & McKee also delivered two ROWD originals to the RWQCB.

Camp Dresser & McKee thanks the permittees for their participation, contributions, and assistance in developing this report. In addition, Camp Dresser & McKee acknowledges the assistance of subconsultant Larry Walker and Associates. Camp Dresser & McKee staff contributing to this project include Lou Regenmorter, Julie Hampel, Tom Rheiner, Dianne Laurila, Cassandra Tzou, Stephen Liao, Tracy Gaudino, and Jane Gray.

Camp Dresser & McKee looks forward to assisting in the review and negotiation of a new NPDES permit. Please feel free to contact Jeffrey Endicott at (909) 945-3000 if you have any questions or need further assistance.

Very truly yours,

CAMP DRESSER & McKEE INC.

Jeffrey D. Endicott, P.E.
Principal

Craig Matthews, P.E.
Project Manager

¹ The August 16 ROWD was also a "final" report submitted in conformance with our contract schedule and was not marked as a draft. The August 16 ROWD and this September 1 ROWD are distinguishable primarily by the date on the cover.

County of San Bernardino
Santa Ana Basin Area

Report of Waste Discharge

Application for Renewal of the
Municipal NPDES Stormwater Permit

September 1, 2000

Prepared For

San Bernardino County Flood Control District
(Principal Permittee)
825 East Third Street
San Bernardino, California 92415-0835

Prepared By

Camp Dresser & McKee Inc.
In Association with Larry Walker Associates

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Contents

List of Tables.....	iv
List of Figures.....	iv
List of Schedules	v
Appendices.....	v
Electronic Version of ROWD (PDF Format)	v
Section 1	Program Management..... 1-1
1.1	Purpose 1-1
1.2	Accomplishments 1-2
1.3	Proposed Program..... 1-3
1.4	Institutional Arrangements..... 1-3
1.4.1	Management Committee 1-3
1.4.1.1	Program Development 1-5
1.4.1.2	Program Reporting and Monitoring 1-6
1.4.2	Program Participant Arrangements 1-7
1.4.3	Area-wide Interagency Arrangements 1-8
1.4.3.1	County of San Bernardino Department of Public Health (DPH)..... 1-9
1.4.3.2	County of San Bernardino Fire Department - Hazardous Materials Division..... 1-9
1.4.3.3	County of San Bernardino Economic Development/Public Services Group 1-10
1.4.3.4	Miscellaneous Agencies 1-11
1.4.4	Permittee Intra-agency Arrangements..... 1-11
1.5	Fiscal Resources 1-12
1.5.1	Area-Wide Program Funding 1-12
1.5.2	Permittee Program Funding..... 1-13
1.6	Legal Authority..... 1-13
1.7	Performance Commitments 1-14
Section 2	Illegal Discharges..... 2-1
2.1	Purpose 2-1
2.2	Accomplishments 2-1
2.3	Proposed Program..... 2-1
2.4	Proposed Activities 2-3
2.4.1	Outreach..... 2-3
2.4.2	Field Screening/System Surveillance 2-4
2.4.3	Incident Reporting, Response, and Tracking..... 2-4
2.4.4	Enforcement..... 2-5
2.4.5	Training 2-6
2.5	Performance Goals and Commitments 2-7

Section 3	Industrial/Commercial Sources.....	3-1
3.1	Purpose	3-1
3.2	Accomplishments	3-1
3.3	Proposed Program.....	3-1
3.4	Proposed Activities	3-2
	3.4.1 Source Identification.....	3-2
	3.4.2 Industry-Specific BMPs.....	3-3
	3.4.3 Outreach, Site Visit, and Inspection	3-3
	3.4.4 Coordination with the Industrial General Permit	3-6
	3.4.4 Training	3-7
3.5	Performance Goals and Commitments	3-8
Section 4	New Development and Redevelopment	4-1
4.1	Purpose	4-1
4.2	Accomplishments	4-1
4.3	Proposed Program.....	4-2
4.4	Proposed Activities	4-2
	4.4.1 Development Planning.....	4-2
	4.4.1.1 General Conditions to be Applied by Co-permittees	4-3
	4.4.1.2 Special Conditions	4-4
	4.4.1.3 BMP Selection.....	4-4
	4.4.2 Construction Activities.....	4-7
	4.4.3 Post Construction Inspections and Activities	4-8
	4.4.4 Educational Program for Developers and Contractors	4-8
	4.4.5 Training	4-9
4.5	Performance Commitments	4-9
Section 5	Public Agency Activities	5-1
5.1	Purpose	5-1
5.2	Accomplishments	5-1
5.3	Proposed Program.....	5-1
5.4	Proposed Activities	5-3
	5.4.1 Sewage Systems	5-3
	5.4.2 Maintenance Areas and Materials Storage Areas.....	5-3
	5.4.3 Landscape Maintenance.....	5-4
	5.4.4 Storm Drain Systems	5-5
	5.4.5 Streets and Roads.....	5-6
	5.4.6 Municipal Activities Pollution Prevention Strategy (MAPPS) Training	5-7
	5.4.7 Training	5-8
5.5	Performance Goals and Commitments	5-8

Section 6	Residential.....	6-1
6.1	Purpose	6-1
6.2	Program Accomplishments.....	6-1
6.3	Proposed Program.....	6-1
6.3.1	Vehicle Washing and Maintenance	6-2
6.3.2	Landscaping.....	6-2
6.3.3	Home Maintenance.....	6-3
6.3.4	Illegal Dumping	6-3
6.3.5	Pet Ownership	6-3
6.3.6	Swimming Pool/Spa Maintenance.....	6-3
6.4	Performance Commitments	6-4
Section 7	Public Information and Participation	7-1
7.1	Purpose	7-1
7.2	Accomplishments	7-1
7.3	Proposed Program.....	7-2
7.4	Proposed Activities	7-3
7.4.1	General Outreach	7-3
7.4.2	Focused Outreach	7-4
7.4.3	Education Program.....	7-4
7.4.4	Public Participation.....	7-6
7.5	Performance Goals and Commitments	7-6
7.5.1	Performance Commitments for the Area-Wide Program	7-6
7.5.2	Performance Commitments for Individual Permittees	7-7
Section 8	Program Evaluation	8-1
8.1	Purpose	8-1
8.2	Accomplishments	8-1
8.3	Proposed Program.....	8-2
8.4	Proposed Activities	8-2
8.4.1	Indirect Monitoring	8-2
8.4.2	Data Collection.....	8-3
8.4.3	Reporting.....	8-4
8.5	Performance Commitments	8-5
Section 9	Monitoring	9-1
9.1	Purpose	9-1
9.2	Accomplishments	9-2
9.2.1	System Characterization	9-2
9.2.2	BMP Evaluation.....	9-3
9.2.3	Water Quality Monitoring	9-5
9.2.4	Regional Monitoring Coordination.....	9-7

9.2.5	Statistical Analysis	9-7
	9.2.5.1 Pollutant Load Estimates	9-7
	9.2.5.2 Pollutant Source Identification.....	9-8
	9.2.5.3 Evaluations of First Flush Effects.....	9-13
	9.2.5.4 Long Term Trends	9-17
9.3	Proposed Program.....	9-18
9.4	Proposed Activities	9-19
	9.4.1 Drainage Area Characterization and Mapping	9-19
	9.4.2 BMP Effectiveness.....	9-19
	9.4.3 Receiving Water Monitoring	9-20
	9.4.4 Support Coordinated Regional Monitoring	9-24
	9.4.5 Pollutants of Concern.....	9-24
	9.4.6 Source Identification.....	9-24
	9.4.7 Data Analysis.....	9-25
9.5	Performance Goals and Standards	9-25

List of Tables

Table 1-1	Summary of Program Participants.....	1-2
Table 2-1	Proposed Elements for the Illegal Discharges Program.....	2-2
Table 3-1	Proposed Elements for the Industrial/Commercial Sources Program	3-2
Table 3-2	Sample Site Visit and Inspection Responsibility Matrix	3-4
Table 4-1	Non-Structural BMP's.....	4-5
Table 4-2	Structural BMP's	4-6
Table 5-1	Proposed Elements for the Public Agency Activity Program	5-2
Table 5-2	Municipal Activities Pollution Prevention Strategy Training Outline (Existing)	5-7
Table 8-1	Direct and Indirect Monitoring Methods.....	8-2
Table 9-1	Effectiveness of Sedimentation Basin	9-4
Table 9-2	Wet Weather Monitoring Events.....	9-6
Table 9-3	Dry Weather Monitoring Events	9-7
Table 9-4	Mean Annual Loads: Entire Permitted Area	9-8
Table 9-5	T-test results: Comparison of First Flush vs. Main Program Data	9-17
Table 9-6	Planned Receiving Water Monitoring Sites	9-21
Table 9-7	Analytical Parameters for Composite Samples	9-23
Table 9-8	Analytical Parameters for Grab Samples	9-24

List of Figures

Figure 1-1	Chronology of Area-wide NPDES Permit Events.....	1-1
Figure 1-2	Approach Responsibility Matrix	1-6
Figure 1-3	Cost Allocation Flow Diagram	1-12
Figure 2-1	Illegal Discharges (mock incident).....	2-3

Figure 3-1	Outreach and Inspection Program Phases	3-4
Figure 4-1	Drip Irrigation Photo.....	4-4
Figure 5-1	Covered equipment storage area	5-3
Figure 6-1	Sign for household hazardous waste collection center	6-3
Figure 7-1	San Bernardino County Stormwater Program Web Site Home Page ...	7-2
Figure 7-2	Public Information and Participation Program Components	7-3
Figure 7-3	Stencil on Curb Inlet.....	7-5
Figure 8-1	Main Screen from Electronic Reporting System.....	8-3
Figure 9-1	Comparison of Means (BOD, Main Program)	9-10
Figure 9-2	Comparison of Means (NO ₃ -N, Main Program)	9-10
Figure 9-3	Comparison of Means (Total P Main Program)	9-11
Figure 9-4	Comparison of Means (Total Cu, Main Program)	9-11
Figure 9-5	Comparison of Means (Total Zinc, Main Program).....	9-12
Figure 9-6	Comparison of Means (TSS, Main Program)	9-12
Figure 9-7	Mean EMC vs. Time -- BOD.....	9-14
Figure 9-8	Mean EMC vs. Time -- NO ₃ -N	9-14
Figure 9-9	Mean EMC vs. Time -- Total P.....	9-15
Figure 9-10	Mean EMC vs. Time -- Total Cu	9-15
Figure 9-11	Mean EMC vs. Time -- Total Zn	9-16
Figure 9-12	Mean EMC vs. Time -- TSS.....	9-16
Figure 9-13	Proposed Monitoring Sites.....	9-22

List of Schedules

Schedule 1-1	Program Management Implementation Schedule	1-16
Schedule 2-1	Illegal Discharges Implementation Schedule	2-9
Schedule 3-1	Industrial/Commercial Sources Implementation Schedule.....	3-10
Schedule 4-1	New Development and Redevelopment Implementation Schedule...	4-11
Schedule 5-1	Public Agency Activities Implementation Schedule	5-12
Schedule 6-1	Residential Implementation Schedule	6-6
Schedule 7-1	Public Information and Participation Implementation Schedule	7-9
Schedule 8-1	Program Evaluation Implementation Schedule	8-6
Schedule 9-1	Monitoring Implementation Schedule.....	9-26

Appendices

Appendix A	Definitions
Appendix B	WQMP Outline
Appendix C	BMP Lists for Industrial/Commercial Site Visits
Appendix D	Summary Statistics Tables
Appendix E	Mean Annual Loads
Appendix F	ANOVA Results

Electronic Version of ROWD (PDF Format).....CD-ROM Pocket

Section 1

Program Management

1.1 Purpose

Within the San Bernardino County area of the Santa Ana River Basin, management and control of the separate storm sewer system is shared by a number of agencies, including San Bernardino County; the San Bernardino County Flood Control District (SBCFCD); the cities of Big Bear Lake, Chino, Chino Hills, Colton, Fontana, Grand Terrace, Highland, Loma Linda, Montclair, Ontario, Rancho Cucamonga, Redlands, Rialto, San Bernardino, Upland, and Yucaipa; and the State Department of Transportation (Caltrans). Early in the National Pollution Discharge Elimination System (NPDES) permitting process it was recognized that management and control of the separate storm sewer system would require the cooperation of all these agencies. Accordingly, the SBCFCD, San Bernardino County, the 16 cities, and the Santa Ana Regional Water Quality Control Board (RWQCB) agreed that the best management option for the permit area was to issue an area-wide storm water permit as authorized in Section 402(p)(3)(B)(I) of the Clean Water Act. Caltrans elected to obtain an individual permit for all of its facilities state wide.

Acting together under an implementation agreement, the SBCFCD, San Bernardino County, and the 16 cities submitted NPDES Permit Application CA8000200 to the RWQCB on August 29, 1990, for an area-wide storm water discharge permit. Following RWQCB review and public comment, the RWQCB adopted Order Number 90-136, Waste Discharge Requirements, and NPDES Permit Number CA8000200 on October 19, 1990. The NPDES permit was renewed in March 1996 by Order Number 96-32 and NPDES Permit Number CAS618036, which will expire in March 2001.

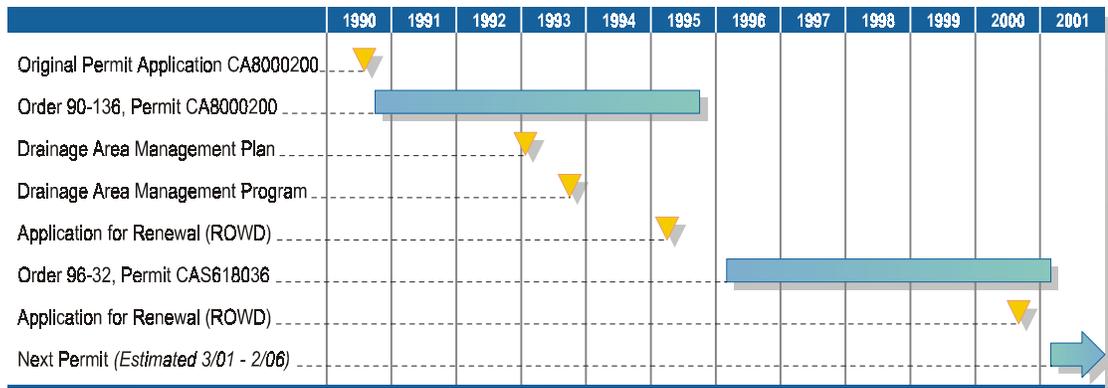


Figure 1-1 - Chronology of Area-wide NPDES Permit Events

Figure 1-1 is a chronological account of the San Bernardino area-wide NPDES Permit.

This Report of Waste Discharge (ROWD) constitutes an application for renewal of the area-wide NPDES permit with the SBCFCD as the principal permittee, and the cities

of Big Bear Lake, Chino, Chino Hills, Colton, Fontana, Grand Terrace, Highland, Loma Linda, Montclair, Ontario, Rancho Cucamonga, Redlands, Rialto, San Bernardino, Upland, Yucaipa, and the unincorporated portions of San Bernardino County as co-permittees. Within this ROWD, separate commitments and activities are established for the principle permittee and for the co-permittees as shown in Table 1-1. Where a commitment or activity is applicable to both the principle permittee and the co-permittees, the generic terms "permittee" or "permittees" are used. This section of the ROWD describes a program structure to effectively manage the area-wide stormwater quality program.

Table 1-1 Summary of Program Participants			
Agency	Lead Department	Proposed Status	Filed Letter of Intent
San Bernardino County Flood Control District	Environmental Management Division	Principal Permittee	Yes
County of San Bernardino	Land Use	Co-permittee	Yes
City of Big Bear Lake	Public Works/Engineering	Co-permittee	Yes
City of Chino	Public Works/Engineering Division	Co-permittee	Yes
City of Chino Hills	Community Development	Co-permittee	Yes
City of Colton	Public Utilities	Co-permittee	Yes
City of Fontana	Public Services	Co-permittee	Yes
City of Grand Terrace	Community Services	Co-permittee	Yes
City of Highland	Public Works/Engineering	Co-permittee	Yes
City of Loma Linda	Public Works	Co-permittee	Yes
City of Montclair	Public Works	Co-permittee	Yes
City of Ontario	Engineering	Co-permittee	Yes
City of Rancho Cucamonga	Engineering	Co-permittee	Yes
City of Redlands	Public Works	Co-permittee	Yes
City of Rialto	Public Works	Co-permittee	Yes
City of San Bernardino	Development Services	Co-permittee	Yes
City of Upland	Public Works	Co-permittee	Yes
City of Yucaipa	Public Works	Co-permittee	Yes

1.2 Accomplishments

During the 1996-01 permit term, program management activities focused on program structure, institutional arrangements, fiscal resources, and legal authority. Specific commitments the permittees made and completed in support of these activities are outlined in Section 1.7 of the 1995 Report of Waste Discharge and include:

- Maintaining the Management Committee as an overall decision making body with designated representatives from each agency. (See Section 1.4.1 for a description of the Management Committee.)

- Coordinating with other area-wide interagencies.
- Providing adequate funding for the area-wide stormwater management program and local stormwater program activities.
- Reviewing and maintaining sufficient legal authority to implement the stormwater management program.

1.3 Proposed Program

The program management structure proposed for the next permit term (assumed March 2001 through February 2006) is essentially the same as that implemented for the 1996-01 permit term, and consists of the following key elements:

- ***Institutional Arrangements.*** The area-wide nature of the proposed permit requires the permittees to work together to manage programs that cross many jurisdictional boundaries. This requires formal mechanisms to set forth the responsibilities of each permittee. The stormwater program also impacts multiple facets of public agency programs and operations, requiring that each permittee have the ability to functionally work across multiple departments within their own agency. The four institutional components of program management are the Management Committee, the program participant arrangements, area-wide interagency arrangements, and permittee intra-agency arrangements.
- ***Fiscal Resources.*** Coordination of the area-wide program and the local agency programs for stormwater quality management will require substantial commitments of resources, including budget, staff, and equipment.
- ***Legal Authority.*** Implementation of the stormwater quality management program will undoubtedly require some changes in routine behaviors in the community. While most of these changes will occur easily as the community comes to understand the benefits of the program, there may be circumstances where enforcement power is necessary, and maintaining the proper legal authority in these instances is essential.

Each of these key program management structure elements is discussed in more detail below.

1.4 Institutional Arrangements

1.4.1 Management Committee

As part of the NPDES permitting process, the SBCFCD, the County of San Bernardino, and the 16 incorporated cities executed the National Pollutant Discharge Elimination System Stormwater Permit Implementation Agreement (Implementation Agreement), which joins these agencies as permittees for submittal of stormwater permit applications and implementation of the NPDES stormwater program. Within the framework of the Implementation Agreement, the permittees formed a Management

Committee to manage efforts to comply with the NPDES Permit. The Management Committee will continue as the overall guidance and decision making body for the 2001-06 permit term.

The Management Committee is made up of one representative from each permittee and will meet on a regular basis (currently once per month, 11 months each year) as required to conduct activities for compliance with the NPDES Permit. The principal permittee chairs the Management Committee and takes the lead role in initiating and developing area-wide program activities necessary to comply with the NPDES Permit. Decisions made by the Management Committee must be approved by a majority vote of the representatives on a one vote per permittee basis.

Each permittee will designate one official representative to the Management Committee. This designation will be done in writing, and will be filed with the principal permittee not later than 30 days from the date of permit adoption by the Regional Board. The designation will be signed by an elected official or other individual authorized by the governing board to make such a designation. Thereafter, any change in official representative to the Management Committee will be made in writing and will become effective upon filing with the principal permittee. Designation of an alternative representative to serve in the absence of the regular representative is optional. This alternative designation will also be written and filed with the principal permittee.

The Management Committee will have two standing subcommittees, one of which will focus on public education and the other on monitoring. The Public Education Committee will meet monthly and the Monitoring Committee will meet on an as-needed basis. Ad hoc subcommittees will be appointed as required to carry out focused studies and to complete specific projects that occur on a less frequent or nonrecurring basis. Membership on specific subcommittees is voluntary; however, those permittees with expertise directly related to the subcommittee's task are encouraged to participate. While the overall responsibility for program development and implementation will remain with the Management Committee, the standing and ad hoc subcommittees provide an efficient mechanism for managing the development of program elements. Accordingly, both standing subcommittees and ad hoc subcommittees report their findings and recommendations to the Management Committee for approval and adoption.

The authority of the Management Committee is limited to providing guidance to the principle permittee with respect to program administration and approving elements of the area-wide stormwater management program. The authority of the Management Committee for the 2001-06 permit term includes the following:

- Guiding the principal permittee in:
 - preparing and implementing an annual Management Committee budget;
 - filing applications for stormwater permits as permittees;

- developing and implementing local and area-wide integrated stormwater management programs with the objective of improving stormwater quality in those portions of the Santa Ana River watershed within the County of San Bernardino;
 - filing compliance reports and annual reports with the Regional Board;
 - establishing performance criteria for management programs;
 - establishing uniform progress reporting formats;
 - monitoring the implementation and effectiveness of area-wide BMPs; and,
 - performing stormwater quality and hydrographic monitoring for permit compliance.
- Approving area-wide management program elements, including:
 - the development and implementation of annual area-wide operating budgets; and,
 - the development and implementation of area-wide BMP programs.

The Management Committee does not propose to assume any responsibility for implementing stormwater quality management programs for individual permittees or for ensuring that individual permittees implement programs consistent with the recommendations of the Management Committee. This responsibility will remain with each individual permittee for their respective jurisdiction. The principal permittee, with guidance from the Management Committee, will be responsible for compliance reporting to the Regional Board. If an individual permittee fails to make or report program progress, it will be reflected in the compliance reports to the Regional Board.

The overall objective of the Management Committee will be to provide guidance to the principal permittee and to approve area-wide program elements required for compliance with the NPDES Permit. This objective will be accomplished through program development and program reporting and monitoring.

1.4.1.1 Program Development

The Management Committee will identify an approach for compliance with each requirement in the NPDES Permit. Proposed program approaches are defined in Sections 2 through 9 of this report. Compliance approaches will consist of the following:

- Single area-wide efforts (area-wide approach)

- Individual permittee efforts based on an area-wide model approach (model approach)
- Individual permittee efforts developed by each permittee (individual approach)

Figure 1-2 provides a responsibilities matrix for each approach.

Area-wide Approach. The Management Committee will be responsible for fully developing programs which will then be implemented by the Management Committee on an area-wide basis. This approach will be limited to those programs and activities that generally apply area-wide and are not practical or cost-effective for implementation by individual permittees. For example, regional mass-media advertising is a program element that will continue to be developed and implemented by the Management Committee.

Approach	Management Committee		Individual Permittee	
	Development	Implementation	Development	Implementation
Area-Wide	●	●		
Model	●			●
Individual	●*		●	●

* Management Committee will develop general guidelines

Figure 1-2 - Approach Responsibility Matrix

Model Approach. The Management Committee will be responsible for development of model programs. The individual permittee will be responsible for reviewing, adapting, and implementing the program within their own jurisdiction. This approach will be used when a program identified for implementation by each permittee is found to have many common elements between permittees. By combining efforts to develop the common elements, the overall cost per permittee to develop the program is reduced. The public displays developed under the Public Information and Participation program are an example of a program element that was developed by the Management Committee for local implementation by each co-permittee.

Individual Approach. The Management Committee will be responsible for developing general guidelines and suggested levels of effort for use by the permittees during development of their individual programs. The individual permittees will then use these guidelines to develop and implement their own respective programs.

1.4.1.2 Program Reporting and Monitoring

The Management Committee developed reporting requirements and an electronic reporting system (database) during the previous permit. These were used by the area-wide program and each permittee in reporting progress in compliance with the NPDES Permit. The reporting program was designed to facilitate unified submittals to the Regional Board.

Data submitted by the permittees and analyzed and assembled into reports by the principal permittee will be used by the Management Committee to monitor and

assess the adequacy of the area-wide program. The individual permittees will be responsible for monitoring and assessing the adequacy of their respective programs. Sections 8 and 9 of this ROWD provide detailed discussions of the techniques that will be used to monitor, assess, and report the adequacy of the area-wide and individual programs.

1.4.2 Program Participant Arrangements

The public agencies involved in the area-wide stormwater program and their proposed status under the 2001-06 permit term are listed in Table 1-1. The table identifies the lead department expected to manage the stormwater program for each agency. Additionally, there is a column that indicates which agencies have filed a letter of intent to continue as a permittee to the area-wide stormwater permit for the 2001-06 term.

Each permittee will designate its lead department for managing the stormwater program, including coordination with other intra-agency departments. This designation will be made in writing, and will be filed with the principal permittee not later than 30 days from the date of permit adoption by the Regional Board. Thereafter, any change in lead department will be made in writing and become effective upon filing with the principal permittee.

As discussed in Section 1.4.1, the permittees have entered into an Implementation Agreement and have formed a Management Committee to manage the area-wide stormwater management program effort. Within the framework of the Implementation Agreement and Management Committee, responsibilities are specifically defined for the principal permittee and the co-permittees. These responsibilities are summarized below.

- Principal Permittee Responsibilities (San Bernardino County Flood Control District)
 - Prepare and implement an annual operating budget with review and approval by the Management Committee*
 - Prepare compliance reports to the Regional Board*
 - Prepare a draft area-wide BMP program for review and approval by the Management Committee*
 - Prepare and submit annual report to the Regional Board*
 - Perform water quality and hydrographic monitoring for permit compliance*
 - Develop uniform criteria for annual inspection of drainage facilities*

* Performed on a cost-shared basis with the co-permittees.

- Chair the Management Committee and take the lead role in initiating and developing programs for permit compliance*
- Perform inspections of Flood Control District Facilities
- Co-permittee Responsibilities (San Bernardino County and 16 Santa Ana Basin Area Cities)
 - Designate a representative to, and participate in, the Management Committee
 - Implement a municipal storm drain facility inspection program within their jurisdiction
 - Submit updated storm drain system maps to principal permittee
 - Prepare watershed characterizations and update land use maps
 - Review, approve, and implement system-wide BMPs and programs for permit compliance
 - Eliminate illegal and illicit connections to the storm drain system
 - Identify legal authority for control of discharges to the storm drain system
 - Provide information to principal permittee as required for preparation of annual reports
 - Adopt and enforce a stormwater pollution control ordinance

The permittees are committed to continuing on as parties to the Implementation Agreement for the duration of the permit. Each permittee states this goal in writing by submitting a letter of intent to the Regional Board. The Management Committee will review the Implementation Agreement and incorporate modifications if necessary.

The principal permittee commits to continuing its leadership role on the Management Committee and the permittees commit to implementing, within their respective jurisdictions, a stormwater quality management program that is consistent with the recommendations of the Management Committee for individual agency programs. These commitments are for the duration of the permit.

1.4.3 Area-wide Interagency Arrangements

A number of agencies with responsibilities that cover multiple jurisdictions have been identified and listed in this section together with a description of their activities and responsibilities as they relate to the stormwater quality management program. During the 1996-01 permit term, the permittees developed a plan and schedule

describing how and when the Management Committee will coordinate its activities with the activities of the area-wide interagencies.

1.4.3.1 County of San Bernardino Department of Public Health (DPH)

The San Bernardino County DPH operates several programs that may impact or help protect stormwater quality, including:

Housing/Property Improvement Program. The Housing Program's goal is to promote an environmentally safe and healthful dwelling environment for County residents and visitors. Program activities are directed to law enforcement and regulations pertaining to environmental quality, sanitation, maintenance, use and occupancy of housing and institutions.

Safe Drinking Water Program. The Safe Drinking Water Program protects drinking water resources by maintaining a comprehensive permitting system for water well construction and destruction; by serving as the Local Primary Agency (LPA) for small water systems; by providing input into the land use process for the County; by assuring that medical wastes are properly handled, stored, and disposed of by generators; and by reviewing on-site sewage disposal conditions. The program also administers Recreational Health services.

Vector Control Program. The Vector Control Program is responsible for protection of the public health through the management and abatement of mosquitoes, flies, fleas, ticks, mites, rats, and other vectors. The program seeks to prevent the transmission of vector-borne disease to humans through the inspection, surveillance, and monitoring of known or suspected breeding and harborage places of public health vectors.

Food Protection Program. The Food Protection Program is entrusted with protecting public health and safety as it relates to the retailing, wholesaling, and handling of food in the County. Services include food facility inspections, food worker training and certification, and compliance investigations.

1.4.3.2 County of San Bernardino Fire Department – Hazardous Materials Division

The San Bernardino County Fire Department has a full service Hazardous Materials Division (HMD) that offers a wide range of capabilities. HMD services include:

Emergency Response and Enforcement Section. Each year, this section responds to more than 250 hazardous materials emergencies throughout the County. The department participates in an interagency coalition with all cities in the County to better utilize the expertise and equipment that exists within participating fire departments. HMD also works with the County District Attorney's Environmental Crime Unit to prosecute illegal dumpers.

Field Services Section (FSS). The FSS provides inspection of over 5,500 businesses that store hazardous materials, have underground storage tanks, or generate

hazardous wastes. The program has shifted focus from enforcement to compliance and provides input to individual businesses and holds small business workshops. The FSS has one full time staff person in the Cal EPA Permit Assistance Center in Ontario and is integrated into the code compliance task forces of some cities.

Local Oversight Program (LOP). The LOP is responsible for overseeing the long-term clean up of hazardous materials at about 200 sites – mostly former underground storage tank sites. LOP also works with individual companies on a contractual basis to clean up more complex contamination.

Household Hazardous Waste Program (HHWP). During the last year of record, the HHWP accepted household hazardous waste from over 28,000 citizens at 14 locations throughout the county. The HHWP has also implemented a pilot program to help very small companies dispose of hazardous waste.

1.4.3.3 County of San Bernardino – Economic Development/Public Services Group

The Economic Development/Public Services Group includes several functions and programs that may impact stormwater quality, including:

Flood Control Function. The San Bernardino County Flood Control District (District) is responsible for operation and maintenance of the regional flood control facility network. In general, the District owns and operates the large regional flood control facilities that cross multiple jurisdictions and receive discharges from both municipally-owned storm drain systems and direct stormwater discharges. The District is extensively involved in the stormwater quality management program and serves as the principle permittee with respect to the area-wide stormwater management program.

Transportation Function. The transportation function of the Department includes the operation, maintenance, and improvement of the County-maintained road system, which encompasses approximately 2,860 miles of roadway. Additional major activities are administration, planning, design, construction, and traffic operations. Routine maintenance activities of the Department include: patching and crack filling, grading unpaved roads, shoulder maintenance, plowing snow on mountain roads, traffic signal maintenance, roadside weed abatement (performed under contract by the Agricultural Commissioner), and pavement striping maintenance.

Many other road improvements are accomplished through cooperative efforts with other public agencies. Such cooperation provides funding opportunities and economy of construction as well as improved services to the traveling public. Agencies involved in such efforts are cities within the county, special districts, federal, state, regional agencies and utility companies. New roads to service developing areas are usually constructed by developers at no cost to the county and then accepted into the County Maintained Road System for maintenance by the Department.

Waste Management Function. Waste Systems Division is entrusted with protecting the public health, safety, and environment with regard to the transport, handling, processing, and disposal of solid waste. Enhancement of the environment, through community education and the clean-up of illegally dumped refuse and waste tires, is provided to County residents.

Regional Parks Function. County of San Bernardino Regional Parks (Regional Parks) operates eight regional parks countywide, four of which are located in the Santa Ana Basin permit area. Regional Parks is responsible for operation and maintenance of these facilities.

Land Use Services, Code Enforcement Function. The County of San Bernardino Code Enforcement is responsible for pesticide use enforcement and weed-fire abatement programs. By properly controlling pesticide use and weed-fire abatement programs, the potential for contamination of stormwater from related activities can be reduced.

1.4.3.4 Miscellaneous Agencies

A number of Federal, State and local agencies may have jurisdiction over all or part of the Santa Ana Basin stormwater permit area. Some of these agencies may conduct activities that should be coordinated under the stormwater quality management program. Due to the state-wide impact of Federal and State programs, the Management Committee suggests that identification of and coordination issues with those agencies be brought before the Storm Water Quality Task Force.

1.4.4 Permittee Intra-agency Arrangements

Each permittee will formally designate its Management Committee representative and lead department for the stormwater quality management program, as discussed in sections 1.4.1 and 1.4.2 respectively. However, within each permittee's agency, a number of other departments, bureaus, and/or divisions conduct activities that can potentially have an impact on stormwater quality and therefore must participate in the implementation of the stormwater quality management program. Participation by other departments, bureaus, and divisions is generally obtained by the lead department communicating the requirements of the program to the other departments, bureaus, or divisions. Upper-level management or the governing body will provide support to each permittee's lead department to ensure that the intra-agency cooperation required for program compliance is obtained.

Some activities conducted by the permittees would require coverage under the General Industrial Activities Stormwater Permit or the General Construction Activities Stormwater Permit if those activities were conducted by a non-permittee. However, the permittees expect that such activities will be covered under the area-wide NPDES permit as they were during the previous permit.

For construction projects that would otherwise require coverage under the General Construction Permit, the permittees will submit a Notice of New Construction (NONC) to the RWQCB in lieu of submitting a Notice of Intent (NOI) and fee to the

State Water Resources Control Board (SWRCB). The permittees will conduct such construction projects in conformance with all other requirements of the General Construction Permit, including preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP).

Industrial activities that would otherwise require coverage under the General Industrial Permit will be conducted in compliance with the requirements of the area-wide NPDES permit and this ROWD. The permittees will not be required to submit a NOI and fee to the SWQCB. However, each permittee will prepare annual inventories of industrial activities and submit these inventories to the principal permittee for inclusion in the annual reports.

1.5 Fiscal Resources

1.5.1 Area-Wide Program Funding

The area-wide program is funded by contributions from all permittees. The principal permittee prepares an annual budget for the Management Committee, and then presents this budget to the Management Committee for approval. Once the budget is approved by the Management Committee, the principal permittee allocates 95 percent of the budget costs to the co-permittees based on percentages calculated using the cost allocation formula

defined in the Implementation Agreement. The remaining five percent of the budget is the principal permittee's share of the area-wide program costs. The allocation formula is based on each agency's adjusted acreage (a function of land use and imperviousness) divided by the area-wide adjusted acreage. Allocation percentages are recalculated once each permit term and as necessary to reflect major changes in land use and imperviousness. The cost allocation process is shown in Figure 1-3.

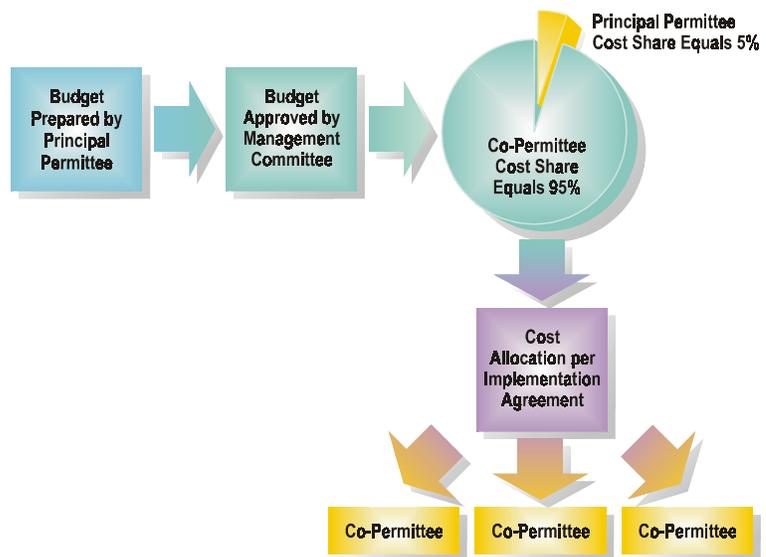


Figure 1-3 - Cost Allocation Flow Diagram

For the 2001-06 permit term, the average annual area-wide budget is expected to be about \$650,000. The permittees are committed to adequately funding the area-wide stormwater quality management program. Area-wide program funding will continue for the duration of the permit.

1.5.2 Permittee Program Funding

Each permittee is responsible for funding the stormwater program within its respective jurisdiction and for contributing to the area-wide program efforts. Funding for the stormwater quality management program can come from a number of sources, including general funds, benefit assessment districts, stormwater utilities, and other miscellaneous sources.

The permittees are committed to adequately funding their local stormwater quality management program for the duration of the permit. Each permittee will prepare annual budgets and keep their governing board informed about program activities and funding requirements that are necessary to comply with permit requirements and implement the program activities established by the Management Committee.

1.6 Legal Authority

The essential legal authorities to control discharges to the storm sewer system, as required by the Clean Water Act and enumerated in the Code of Federal Regulations, are summarized below:

- ***Control Discharges Associated with Industrial Activities.*** Control through ordinance, permit, contract, order or similar means, the contribution of pollutants to the municipal storm drain system by stormwater discharges associated with industrial activity and the quality of stormwater discharged from sites of industrial activity.
- ***Prohibit Illicit Discharges.*** Prohibit through ordinance, order or similar means, illicit discharges to the municipal storm drain system.
- ***Control the Discharge of Material Other Than Stormwater.*** Control through ordinance, order or similar means, discharges to a municipal storm drain system of spills, dumping, or disposal of materials other than stormwater.
- ***Enter Into Interagency Agreements.*** Control through interagency agreements among permittees the contribution of pollutants from one portion of the municipal storm drain system to another portion of the municipal storm drain system.
- ***Require Compliance with Regulations.*** Require compliance with conditions in ordinances, permits, contracts, or orders.
- ***Conduct Inspection, Surveillance, and Monitoring.*** Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with permit conditions including the prohibition on illicit discharges to the municipal storm drain system.

All of the permittees report they have established adequate levels of legal authority to implement the stormwater quality management program. The legal authority for the

permittees that are general law cities is established by the Constitution of the State of California, 1879, and local codes, ordinances, and regulations adopted by the permittees under the broad general powers granted by the State Constitution. The legal authority for the permittees that are charter cities (or charter county) is provided by each charter. All of the permittees have thoroughly reviewed their respective legal authorities and have adopted ordinances as required to ensure adequate coverage of the essential legal authorities detailed above.

The permittees will maintain legal authority sufficient to implement the stormwater quality management program for the duration of the permit.

1.7 Performance Commitments

The permittees propose the following performance commitments to help provide consistency among the permittees programs, define requirements for permit compliance, and measure permittee performance. Performance commitments are proposed as enforceable elements under the area-wide permit:

- (1-1) The Management Committee is proposed as the overall decision making body for the 2001-06 permit term and will continue to meet 11 times each reporting year. The performance commitment for permittee attendance is 9 out of 11 meetings in each reporting year by either the designated permittee representative or the designated alternate.
- (1-2) Each permittee commits to maintaining a representative to the Management Committee, as designated in writing. The designated representative shall have the authority to represent the interests of their agency and vote on binding stormwater program elements that may result in significant impacts to their agency's fiscal, capital, and human resources.
- (1-3) The Management Committee commits to the following standing committees for the reporting year 2001-02:
 - Public Education Subcommittee
 - Monitoring Subcommittee

Thereafter, the Management Committee will periodically evaluate the need for standing sub-committees and ad hoc subcommittees required to accomplish the objectives of the Management Committee.

- (1-4) The Management Committee commits to reviewing the Implementation Agreement during reporting year 2001-02 and presenting recommended changes, if any, to the permittees for adoption. Thereafter, the permittees are committed to continuing on as parties to the Implementation Agreement for the duration of the permit.

- (1-5) The principal permittee commits to continuing its leadership role on the Management Committee for the duration of the permit.
- (1-6) The overall performance commitment for each permittee is to implement, within their jurisdiction, a stormwater quality management program that is consistent with the recommendations of the Management Committee for individual agency programs.
- (1-7) For construction projects that would otherwise require coverage under the General Construction Permit, each permittee commits to filing a NONC with the RWQCB and conducting such construction projects in conformance with all other requirements of the General Construction Permit.
- (1-8) Industrial activities that would otherwise require coverage under the General Industrial Permit will be conducted in compliance with the requirements of the area-wide permit and this ROWD. Each permittee commits to preparing annual inventories of industrial activities and submitting these inventories to the principal permittee for inclusion in the annual reports.
- (1-9) The permittees are committed to funding the area-wide stormwater quality management program. The performance commitment for funding the area-wide program is an average annual budget of \$650,000 over the 2001-06 permit term.
- (1-10) The permittees are committed to funding their local stormwater quality management program. The performance commitments for each permittee are to prepare annual budgets, keep their governing board informed of funding requirements, and fund the local stormwater program as necessary to comply with the conditions of the permit and implement the recommendations of the Management Committee.
- (1-11) The permittees commit to maintaining levels of legal authority sufficient to implement the stormwater quality management program for the duration of the permit.

Section 2

Illegal Discharges

2.1 Purpose

Two obvious forms of stormwater pollution are illegal dumping and illicit connections. Illegal dumping refers to the disposal of non-stormwater materials, such as paint or waste oil, into the storm drain or the discharge of polluted waste streams to the storm drain. Illicit connections refer to unauthorized physical connections from a facility to a municipal storm drain system. The purpose of the program for illegal discharges is to reduce or eliminate these types of stormwater pollution through informing the public of the detrimental effects of illegal dumping on stormwater quality, finding and correcting illicit connections, and responding, investigating, and cleaning up illegal discharges.

2.2 Accomplishments

During the 1996-01 permit term, the illegal discharges program focused on system reconnaissance, plan review, and inlet stenciling. Major accomplishments, as discussed in annual reports to the Regional Water Quality Control Board (RWQCB) include the following:

- Completed a reconnaissance survey for each permittee and used the results to identify areas that show continued evidence of non-permitted, dry-weather flows
- Checked and reviewed plans and site/building inspection for connections to the storm drain system in areas undergoing new development or redevelopment
- Coordinated outreach activities such as storm drain stenciling, producing an informational brochure, and coordinating the hotline to refer reports of solid waste dumping or accumulated sediment and debris in the storm drain system to local maintenance crews for follow-up
- Purchased a training video that was used to train maintenance staff on illegal discharge surveillance and proper clean-up procedures
- Developed a summary format for illegal discharge reporting
- Developed a system to track spill response and report to the Regional Board
- Conducted outreach and public education

2.3 Proposed Program

During the 1996-01 permit term, a reconnaissance survey was completed of each permittee's storm drain system. Because only a small number of illicit connections were uncovered, complete storm drain system inspections for illicit connections were not necessary. Illicit connections generally require significant excavation and

construction, often in the public right-of-way, and are therefore difficult to establish after the initial project construction is complete. The permittees' will continue to monitor for new illicit connections through the plan check and building inspection process and will concentrate on preventing, locating, responding to, and cleaning up illegal dumping.

The illegal discharges program consists of separate program elements developed to cover each type of activity that may impact stormwater quality. For the 2001-06 permit term, the permittees propose revising and regrouping the program elements as shown in Table 2-1. The new organization better reflects the organizational structure of the permittees' proposed program, which shifts its focus from illicit connections to illegal discharges. Details of the program elements are discussed in Section 2.4.

Table 2-1 Proposed Elements for the Illegal Discharges Program	
Proposed Program Elements	Previous Program Elements
Outreach	Illegal Dumping – Outreach Illegal Dumping – Coordination of Alternative Disposal
Field Screening/System Surveillance	Illegal Connections – System Survey Illegal Connections – Ongoing System Inspections Illegal Dumping – System Surveillance
Incident Reporting, Response, and Tracking	Illegal Dumping – Reporting Illegal Dumping – Complaint Response Illegal Dumping – Spill Response Illegal Connections – Reporting
Enforcement	Enforcement Coordination with State Industrial Permits
Training (new Proposed Program Element)	—

The proposed program for the 2001-06 permit term will focus on the following:

- Public outreach activities to raise public awareness and help reduce illegal discharges
- Field screening/surveillance (drive-by inspections) of storm drain facilities
- Documenting, and revising if necessary, illegal discharge response and tracking procedures from initial reporting through spill response and on to possible enforcement and incident closure
- Responding to and cleaning up illegal discharges

- Plan check procedures and building inspections to prevent new illicit connections
- Enforcement
- Training

2.4 Proposed Activities

2.4.1 Outreach

The purpose of this program activity is to reduce the number of illegal discharges by informing the public of the detrimental effects of illegal discharges on stormwater quality and providing practical methods to reduce or eliminate discharges from common public activities. The public information and education program element, which is fully described in Section 7, is specifically designed for this purpose. The program is directed by the Management Committee with input from the Public Education Subcommittee.

In addition to promoting stormwater pollution prevention, the public education program also provides information for reporting spills and other illegal discharges. Outreach materials encourage the public to report illegal discharges to a 24-hour hotline number. When called, the hotline either dispatches the appropriate responders directly or refers the caller to the appropriate contact person. Additional outreach materials and contact information will be available from a Web site related to the contact number. The permittees will continue to distribute outreach materials that publicize the hotline at public events, workshops, and classroom presentations.



Figure 2-1 - The outreach program will help prevent illegal discharges (illustrated by this mock incident).

As part of the outreach program, permittees will also continue to promote public participation in the county's successful and well-established household hazardous waste program. Under this program, residents can dispose of used oil and other types of waste free of charge at permanent collection facilities throughout the permit area. In addition, the County of San Bernardino Fire Department - Hazardous Materials Division (HMD) conducts one-day collection events called "round-ups". Permittees will continue to confirm, update, and disseminate household waste collection information to the public.

Permittees will also maintain storm drain stenciling to increase public awareness and discourage individuals from dumping into a storm drain.

2.4.2 Field Screening/System Surveillance

The purpose of this program activity is to perform field screening to locate signs of previous, current, and potential illegal discharges and illicit connections to the storm drain system. During the 1996-01 permit term, the permittees conducted extensive surveys of all of their facilities to find illicit connections. With that initial survey of the system complete, permittees will concentrate their efforts on locating and preventing new illicit connections and addressing illegal discharges. During the course of regular maintenance activities, the permittees will conduct visual inspections of existing storm drain inlets, open channels, and basins to look for illegal discharges. These visual inspections could also be coordinated with the educational site visits proposed in Section 3, Industrial/Commercial Sources.

During the 1996-01 permit term, the permittees enlisted the assistance of storm drain maintenance crews and street sweeping personnel to conduct illegal discharge surveillance. During the 2001-06 permit term, permittees will enlist additional staff, including those who regularly observe the storm drain system during scheduled maintenance activities (such as roadway, landscape and facilities staff) or through on-going facility inspections (such as county and city fire and hazardous materials units, building department staff, code enforcement officers, and wastewater pretreatment program personnel). These personnel will enhance the permittees' capability to inspect stormwater facilities within their jurisdictions.

Staff members will be instructed and trained to look for signs of illegal discharges as they conduct their regular activities and immediately report or respond to any observed incidents. Possible signs of illegal discharges include non-stormwater flows, stains, deposited materials, and pipes or hoses. By increasing the stormwater pollution prevention awareness of the existing staff of other departments, the stormwater facilities will receive a higher frequency of surveillance, and the stormwater coordinator can concentrate on follow-up, resolution, and enforcement. Illegal discharge reports that cannot be resolved by local actions are forwarded to the Regional Board.

2.4.3 Incident Reporting, Response, and Tracking

As discussed in Section 2.4.1, the public education and participation program promotes a 24-hour hotline for reporting illegal discharges. However, reports of illegal discharges may originate from a number of different sources and may be reported to a number of different agencies. Potential sources and agencies include private citizens, maintenance and inspection staff, police and fire department, local and national hotlines, and emergency services (911). In the case of fire departments, the reporting and response agency may be the same. In general, incoming calls for hazardous or unknown discharges are routed to a county or local hazardous waste response unit. Calls for sewage spill and known non-hazardous discharges are referred to the appropriate city or county staff.

The incident reporting mechanisms and response procedures that are in place are not always well documented, but appear to be relatively effective nonetheless. Spills and discharges are generally responded to quickly and cleaned up in a timely and appropriate manner. The permittees' spill tracking procedures, however, are relatively undeveloped. During the 1996-01 permit term, the Management Committee developed an electronic reporting system (ERS) to collect and summarize data for annual reports to the Regional Water Quality Control Board (RWQCB). The ERS provides a means for entering and storing incident data but is not set up to facilitate tracking and resolution. Furthermore many permittees do not have a formal system in place for the various departments providing spill response to supply information back to the stormwater coordinator.

To provide reporting, response, and tracking procedures sufficient to address various illegal discharge scenarios, each permittee will provide a description of the following to the principal permittee for inclusion in an annual report to the RWQCB:

- Their existing reporting, response, and incident tracking procedures including contact names and telephone numbers
- Coordination and training activities that are conducted to implement procedures, including incident reporting to the stormwater coordinator for tracking and reporting to the RWQCB
- Any additional procedures or activities that are necessary to provide an effective program, including a time frame for implementation

These procedures and activities will incorporate the field screening/system surveillance program discussed in Section 2.4.2 and the enforcement activities discussed in Section 2.4.4.

Given the diverse organizational structures of the permittees and the existing plans and procedures that are in place, the Management Committee will not attempt to develop a model reporting, response, and tracking procedure. The Management Committee will update the ERS to provide added functionality for incident tracking, follow-up, and resolution.

2.4.4 Enforcement

All permittees have adopted ordinances establishing legal authority to enforce against illegal discharges. In general, the stormwater codes and ordinances are enforced by permittee staff responsible for NPDES compliance. For many permittees, this may include staff from several different departments. The purpose of this program activity is to provide formal enforcement procedures to each permittee's staff.

Usually, standard enforcement methods involve verbal warnings and/or written warnings, stop work notices, contact letters, and then first formal violation letters. Staff usually enforces violations by first inspecting the illegal discharge and then

verbally informing the discharger of the violation. In most cases, the violation is corrected and no further enforcement action is necessary. The approach is to eliminate illegal discharges by educating violators and encouraging their cooperation rather than using enforcement action.

If the initial enforcement methods fail to elicit compliance, enforcement actions may escalate to notices of correction, notices of violation, compliance time schedules, cease and desist orders, and fines. Referral to the district attorney's office then follows in extreme cases. During the 1996-01 permit term, the Management Committee developed formalized enforcement procedures. Each permittee will discuss and coordinate these procedures with participating departments and incorporate the results into the overall procedures described under Section 2.4.3.

These standardized enforcement procedures may be imposed at an increased level or out of sequence depending on the severity and nature of the violation. Enforcement steps may be accelerated if there is evidence of a clear failure to act or an increasing severity of the discharge.

2.4.5 Training

Permittee staff implementing the surveillance, reporting, response, and enforcement activities described in sections 2.4.2 through 2.4.4 will need training to perform these tasks effectively. For example, maintenance staff may come across evidence of potential stormwater pollution or illicit discharges during routine storm drain facility inspections. These maintenance staff need to be trained to recognize, report, and respond to such findings.

Storm drain maintenance staff, response staff, enforcement staff, and staff enlisted to participate in the field screening/system surveillance program will be targeted for stormwater-specific training and education. This may include staff from several departments and programs, including the fire department, code enforcement, wastewater pretreatment, road maintenance, landscape maintenance, and facilities.

The targeted staff will receive general stormwater training and task-specific education and coordination. The general training will be conducted to introduce staff to basic stormwater concepts including regulations, pollutants of concern, potential sources, BMPs, and general program activities. The Municipal Activities Pollution Prevention Strategy (MAPPS) training program, which is discussed further in Section 5.4.6, will be the primary method for providing general stormwater training. Self-guided training methods, such as videotapes and CD-ROMs, may also be used. Additional education and coordination will be conducted as needed to provide task-specific instructions and guidance on illegal discharge identification and subsequent reporting, response, cleanup, investigation, and tracking procedures. The additional education will typically consist of handouts, fact sheets, tailgate meetings, and coordination meetings, either alone or in combination. For those already trained, refresher training shall also be provided at least once during the permit term to keep

staff up-to-date. Training and education activities will be documented and reported annually to the principal permittee.

Since new business practice methods and pollution prevention methods are being developed continually, the Management Committee will periodically assess and, if necessary, update educational materials previously developed for staff training. Proposed changes to the MAPPS training program are discussed in more detail in Section 5.4.6.

2.5 Performance Goals and Commitments

The permittees propose the following performance goals and commitments to help provide consistency among the permittees' programs, define requirements for permit compliance, and measure permittee performance. The permittees will strive to meet performance goals, but only performance commitments will be enforceable elements for compliance.

Outreach – The goal is to inform the public of the detrimental effects of illegal discharges on stormwater quality. The performance commitment is to:

- (2-1) confirm and update the list of household waste collection services.

Distribution of informational materials and promotion of the hotline is addressed in Section 7, Public Information and Participation.

Field Screening/System Surveillance – The goal is to establish and implement a surveillance strategy and mechanism for responding to reports of illegal discharges. The performance commitment is for the following:

- (2-2) Each permittee will visually inspect all publicly maintained inlets, open channels, and basins once each permit year. Visual inspections conducted and documented under the Public Agency Activities program element may be applied to meet this performance commitment.

Incident Reporting, Response, and Tracking – The goal is to report, respond to, and monitor all identified illegal discharges. The permittees propose the following performance commitments:

- (2-3) Each permittee will refer 90% of all documented illegal discharges to the appropriate agency for investigation, containment, cleanup, and tracking.
- (2-4) Each permittee will provide a description of the following to the principal permittee for inclusion in the annual report:
 - Existing reporting, response, and incident tracking procedures including contact names and telephone numbers

- Coordination and training activities that are conducted to help ensure that procedures are properly implemented and that incident reports are conveyed to the stormwater coordinator for tracking and reporting to the RWQCB
- Any additional procedures or activities that are necessary to provide an effective program, including a time frame for implementation
- (2-5) Each permittee will continue to coordinate with county or local HazMat teams for incident response.

Enforcement activities – The performance commitment is for the following:

- (2-6) Each permittee will coordinate and implement the formal enforcement procedures developed during the 1990-95 permit term.

Training – The goal is for all staff enlisted to conduct stormwater inspections as part of their maintenance duties to understand and follow procedures for illegal discharge identification, reporting, response, cleanup, and tracking. The permittees propose the following performance commitments:

- (2-7) Each permittee will provide general stormwater (MAPPS) training for all targeted employees using a formal classroom format (MAPPS training) or self-guided methods. Any current employees whom have not received training will be trained by the end of the second permit year. New employees will be trained at the next scheduled course offering or within six months of starting, whichever occurs first. Training may be delayed while the MAPPS course is being updated as discussed in Section 5. Refresher MAPPS training will be provided at least once during the permit term for staff that have already received training.
- (2-8) Each permittee will provide additional task-specific education and coordination as necessary for staff to understand and implement applicable illegal discharge identification, reporting, response, cleanup, investigation, and tracking procedures.
- (2-9) Each permittee will document and report training, education, and coordination activities to the principal permittee.

Implementation Schedule for Performance Commitments		Permittees	Principal Permittee	Mgt Committee	July 1	Permit Expected	June 30	July 1	June 30	July 1	June 30	July 1	June 30	July 1	June 30	July 1	June 30	July 1	June 30									
					00	CY 2001				CY 2002				CY 2003				CY 2004				CY 2005				06		
Program Area/Performance Commitments						PY 1				PY 2				PY 3				PY 4				PY 5						
		RY 00-01				RY 01-02				RY 02-03				RY 03-04				RY 04-05				RY 04-05						
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
Section 2 - Illegal Discharges																												
1	Confirm and update list of household hazardous waste collection services.	X	X									..				♦				♦				♦				♦
2	Conduct a visual inspection of all above-ground stormwater facilities (channels, inlets, basins).	X	X								
3	Refer 90% of all documented non-stormwater discharges and illegal connections to appropriate agency for investigation, containment, and cleanup.	X	X								
4	Describe/revise spill/dumping incident tracking and reporting procedures.	X	X									..																
5	Continue to coordinate with County or local hazmat team for incident response.	X	X																									
6	Coordinate and implement the formal enforcement procedures developed during the previous permit term.	X	X													..												
7	Provide general stormwater training (MAPPS) for current and new targeted staff.	X	X													..												
8	Provide additional task-specific education and coordination	X	X																									
9	Document and report training, education, and coordination activities.	X	X								

Section 3

Industrial/Commercial Sources

3.1 Purpose

Industrial and commercial businesses can potentially contribute varying types and amounts of pollutants to the stormwater system through poor housekeeping practices. As part of the overall stormwater management plan, stormwater pollution from industrial/commercial sources will be controlled by educating businesses on prevention methods to reduce or eliminate pollutant discharges to the storm drain system. Education and outreach implementation activities will be emphasized, supplemented with inspections and enforcement.

3.2 Accomplishments

During the 1996-01 permit term, the industrial/commercial sources program was directed primarily at identifying the industrial and commercial businesses in each jurisdiction and developing education and outreach materials. Major goals and accomplishments outlined in the 1995 ROWD and subsequent annual reports include the following:

- Compiled and maintained a list of industrial/commercial businesses by SIC code
- Developed stormwater BMPs specific to gas stations/fueling stations and auto repair/vehicle repair shops for use in outreach activities to the targeted groups
- Developed and implemented a stormwater inspection program that utilizes existing inspection programs to check for stormwater elements
- Developed educational material on the stormwater pollution prevention program for public employees
- Notified the Regional Board of any infractions noted or non-compliance actions taken at facilities which fall under the General Industrial Stormwater Permit SIC categories

3.3 Proposed Program

The industrial/commercial sources program consists of separate program elements developed to cover each type of activity that may impact stormwater quality. For the 2001-06 permit term, the permittees propose revising and regrouping the program elements as shown in Table 3-1. The new organization better fits the permittees' proposed program. Details of the programs are discussed in Section 3.4.

Table 3-1 Proposed Elements for the Industrial/Commercial Sources Program	
Proposed Program Elements	Previous Program Elements
Source Identification	Identification of Sources
Industry Specific BMPs	Control Measures
Outreach, Site Visit, and Inspection	Outreach Inspections Local Permits/Incentive Program
Coordination with State Industrial Stormwater Permit	Coordination with State Industrial Stormwater Permit
Training	Training

The proposed program for the 2001-06 permit term will focus on the following:

- Assessing BMPs and updating, if necessary
- Training staff to conduct educational site visits
- Reviewing and revising the standard reporting format for business outreach activities
- Visiting and distributing educational materials (applicable BMPs) to targeted business within each co-permittee's jurisdiction

3.4 Proposed Activities

3.4.1 Source Identification

The first step in controlling industrial/commercial stormwater pollution is to identify potential sources. During the 1996-01 permit term, several industry categories were identified as potentially significant sources of stormwater pollution. These targeted categories include facilities subject to the General Industrial Permit, automotive facilities, and food service facilities. This list was then further refined with a more comprehensive list of industrial and commercial businesses within each co-permittees' jurisdiction. Information was compiled from available data sources such as business license applications, hazardous material inspection programs, and commercially available computer databases.

Each co-permittee will update their list of potential industrial/commercial sources regularly as new businesses are started and others go out of business. Information can be gathered from the available data sources described above and in conjunction

with sources identified through the illegal discharge program. Facilities subject to the General Industrial Permit can be identified by using the following resources:

- The State Water Resources Control Board (SWRCB) database of businesses covered by the General Industrial Permit
- Hazardous materials inventories maintained by the fire or HazMat departments
- Lists of businesses subject to the local wastewater utility's industrial pretreatment program
- City business license records, if applicable. (Note that San Bernardino County does not issue business licenses.)
- Commercially available business listings (e.g., the Dun & Bradstreet database)
- Telephone listings (phone book).

During the 2001-06 permit term, the Management Committee will evaluate additional industrial and commercial categories to identify other significant sources of storm water pollution. Identified significant sources will be added to the list of target industries for outreach and inspection.

3.4.2 Industry-Specific BMPs

The purpose of this program activity is to develop a set of specific stormwater BMPs to be used as part of outreach and education efforts for each industrial/commercial SIC group of facilities requiring site visits. BMPs are primarily education orientated, and are targeted for a general audience. Past activities have shown that BMPs targeting specific sources or categories of sources can be considerably more successful at preventing pollution than universally applicable BMPs. Because new business practice methods and pollution prevention methods are developed continually, existing BMPs may require updating to remain current or to address specific conditions within the county.

The Management Committee will compile a comprehensive list of BMPs using BMPs previously developed and from the BMP handouts from the NPDES Stormwater Multi-Sector General Permit for Industrial Activities (USEPA, 1995) included as Appendix C. The BMPs will be reviewed and updated, as necessary, to suit the specific facilities listed under the source identification program.

3.4.3 Outreach, Site Visit, and Inspection

The purpose of the outreach, site visit, and inspection program activity is to encourage business owners and municipalities to work together to develop and implement appropriate and practicable stormwater pollution BMPs. This program

activity combines outreach with educational site visits to minimize duplicated efforts and prioritize sites for further inspection and follow-up investigations.

Inspections can be a time-consuming, expensive, and difficult process, especially if there are numerous facilities and a limited number of qualified inspectors. In addition, most industrial and commercial properties in the permit area are already subject to one or more inspection programs. Adding another, separate inspection program could create resistance in the business community rather than encourage positive cooperation.

Instead of hiring several additional stormwater inspectors specifically to address stormwater issues, the co-permittees will utilize existing inspection programs to conduct the educational site visits. Existing inspection programs may include County Public Health, county and local fire and hazardous materials, County Toxic Substances Controls, code enforcement, industrial pretreatment, and building and safety. Temporary help may also be hired to conduct educational site visits. Each co-permittee will develop a responsibility matrix for their jurisdiction explaining which existing departments will be responsible for the educational site visits. An example matrix is shown in Table 3-2.

Table 3-2 Sample Site Visit and Inspection Responsibility Matrix			
Type of Industrial/Commercial Inspection	Department	Inspection Type	Type of Business Currently Inspected – Frequency Visited
Educational Site Visit	Building and Safety Fire Department Health Department Street Maintenance HazMat Wastewater Pretreatment	Occupancy Inspection Fire Code Inspection Health Inspection Spill Response Spill Response Compliance Inspection	Industrial/Commercial – Start-up Industrial/Commercial – 3 yrs Restaurants – Annual Street – As Needed Various Industrial – Annual
Stormwater Inspection	—	Stormwater Inspection	Various – As Needed
Enforcement Inspection	Code Enforcement	Enforcement	Various – As Needed

The Outreach and Inspection Program will be completed in phases as shown in Figure 3-1.



Figure 3-1 - Outreach and Inspection Program Phases

The first phase of the program will focus on outreach by communicating with and providing outreach materials to each target business. Typically, the co-permittees will call each target business and talk with an appropriate representative about several topics, which may include the following:

- Business name and address
- Business activities at the site and applicable SIC code(s)
- Potential sources of storm water pollution
- Potential impacts
- Appropriate BMPs
- Criteria for coverage under the State's General Industrial Permit
- How and where to obtain additional assistance

Each co-permittee will follow-up the initial communication by sending a business-specific package of applicable BMPs and general stormwater information. For new businesses, this outreach may be accomplished over the counter during the business license application process. The Regional Water Quality Control Board (RWQCB) will be notified of any new or closing businesses that are likely to be subject to the General Industrial Permit. See Section 3.3.4, below, for more information on coordination with the RWQCB.

During the first two years of the 2001-06 permit term, each permittee will conduct this initial outreach to all targeted businesses at least once. Throughout the permit term, new business in the targeted categories will also receive initial outreach.

The second phase of the outreach and inspection program consists of educational site visits as described above. Visits may be conducted by the co-permittee's stormwater staff or by staff from another department as identified in the responsibility matrix. The purpose, activities, and handout materials for the site visits will be essentially the same as for the initial outreach; however, visiting staff will also perform a visual inspection of the site to accomplish the following:

- Verify business location, name, contact person, and status (active, closed)
- Confirm the business type, activities, and SIC code
- Verify WDID number and confirm that a pollution prevention plan has been prepared (General Industrial Permit sites only)

- Look for outdoor storage areas and other outdoor activities that have the potential to cause stormwater pollution
- Look for proper BMP selection and implementation
- Look for signs of ongoing or past illegal discharges
- Establish priority for follow-up inspections or enforcement action (none, low, med, high)

Each co-permittee will conduct an educational site visit at all targeted businesses at least once during the 2001-06 permit term. Again, the focus of the program will be cooperative outreach and assistance.

Follow-up inspections will be conducted as needed based on the results of the educational site visits. Follow-up inspections will be conducted by the stormwater coordinator or other trained stormwater inspection staff. Follow-up inspections will focus first on eliminating existing discharges, second on providing additional assistance to the business on regulatory compliance, and third on enforcement actions. In some cases, however, immediate response and enforcement action may be necessary.

Each outreach contact, educational site visit, and any necessary follow-up inspections will be documented and the documentation provided to the co-permittee's storm water coordinator. Annual summary information will be provided to the principal permittee for inclusion in the annual reports to the RWQCB. Only documented outreach contacts and site visits can be applied toward achieving the performance commitments proposed in Section 3.5.

As part of the outreach program, the area-wide program has sponsored a clean business incentive program to encourage businesses to reduce pollution from industrial and commercial sources. Permittees will continue this program in the 2001-06 permit term on an experimental basis. However, the program may be discontinued if sufficient public support cannot be generated.

3.4.4 Coordination with the General Industrial Permit

All permittees have legal authority and ordinances in place to prohibit illegal discharges. An element common to all ordinances is that dischargers subject to any general NPDES permit must file a notice of intent and comply with permit requirements. To facilitate enforcement of NDPES requirements, the permittees will maintain a cooperative relationship with the RWQCB in which all parties fulfill their respective responsibilities and share pertinent information in a timely manner.

Although the co-permittees will conduct outreach activities and site visits to General Industrial Permit businesses as described in Section 3.3.3, ultimately, enforcement of

the General Industrial Permit is the responsibility of the RWQCB. The co-permittees will cooperate with and support the RWQCB's enforcement efforts by the following:

- Helping to identify new and existing businesses that require coverage under the General Industrial Permit and to identify businesses that have ceased operation and should be removed from the permit list.
- Sharing summary, and if requested, detailed outreach, site visit, and inspection information
- Initiating abatement, cleanup, and follow-up activities for observed illegal discharges
- Enforcing local stormwater ordinances
- Notifying the RWQCB of any significant violations of the Industrial Permit that are observed, including discharges of reportable quantities
- Referring violations to the RWQCB for further action when permittee's have exhausted ordinance enforcement efforts and failed to obtain compliance.

3.4.5 Training

Co-permittee staff implementing the outreach and inspection program outlined in Section 3.4.3 will need training to perform these tasks effectively. For example, staff conducting educational site visits may come across evidence of illicit discharges. These staff need to be trained to recognize, report, and respond to such findings.

Co-permittee staff conducting the outreach and inspection program will be targeted for stormwater-specific training and education. This may include staff from several departments and programs, including the fire department, code enforcement, wastewater pretreatment, road maintenance, landscape maintenance, and facilities.

The targeted staff will receive general stormwater training and task-specific education and coordination. The general stormwater training will be conducted to introduce staff to basic stormwater concepts including regulations, pollutants of concern, potential sources, BMPs, and general program activities. The MAPPS training program, which is discussed further in Section 5.4.6, will be the primary method for providing general stormwater training. Self-guided training methods, such as videotapes and CD-ROMs may also be used. Additional education and coordination will be conducted as needed to provide task-specific instructions and guidance on outreach and site visits, industry-specific BMPs, General Industrial Permit requirements, illegal discharge identification and subsequent reporting, response, cleanup, investigation, and tracking procedures. The additional education will typically consist of handouts, fact sheets, tailgate meetings, and coordination meetings, either alone or in combination. For those already trained, refresher training will be provided at least once during the permit term to keep staff up-to-date.

Training and education activities will be documented and reported annually to the principal permittee.

Since new business practice methods and pollution prevention methods are being developed continually, the Management Committee will assess and, if necessary, update educational materials previously developed for staff training. Proposed changes to the MAPPS training program are discussed in more detail in Section 5.4.6.

3.5 Performance Goals and Commitments

The permittees propose the following performance goals and commitments to help provide consistency among the co-permittees' programs, define requirements for permit compliance, and measure permittee performance. Co-permittees will strive to meet performance goals, but only performance commitments will be enforceable elements for compliance.

Source Identification – The goal is to identify the potential industrial/commercial sources of stormwater pollution. The performance commitment is the following:

- (3-1) Evaluate additional industrial and commercial categories to identify other significant sources of storm water pollution. Identified significant sources will be added to the list of target industries for outreach and inspection.
- (3-2) Update the list of targeted businesses and their associated SICs annually and submit the updated source lists to the principal permittee for inclusion in the annual report.

Industry-Specific BMPs – The goal is to develop a set of specific stormwater BMPs to be used as part of outreach and education efforts for each industrial/commercial SIC group targeted for site visits. The performance commitments are the following:

- (3-3) Develop industry-specific BMPs for businesses targeted by the industrial/commercial outreach program. The BMPs may be developed by the Management Committee or borrowed from other sources and edited as appropriate for the San Bernardino County program.
- (3-4) Incorporate the BMPs into outreach programs.

Outreach, Site Visit, and Inspection – The goal is to encourage business owners and municipalities to work together to develop and implement appropriate and practicable stormwater pollution BMPs. The permittees propose the following performance commitments:

- (3-5) Each co-permittee will provide one initial outreach, as described in Section 3.4.3 to each facility in their jurisdiction within the targeted industries.

- (3-6) Each co-permittee will conduct one educational site visit as described in Section 3.4.3 to each facility in their jurisdiction within the targeted industries. Follow-up inspections will be conducted if necessary based on the results of the educational site visits.

Coordination with General Industrial Permit – The permittees propose the following performance commitment:

- (3-7) Cooperate with and support the RWQCB's enforcement efforts as described in Section 3.4.4.

Training – The goal is to train stormwater inspectors and educational site visit staff, and all other outreach staff to recognize, solve, and prevent stormwater pollution problems. The performance commitments are the following:

- (3-8) Each co-permittee will provide general stormwater training for all targeted employees using a classroom format (MAPPS training) or a self-guided format such as a videotape. Any current employees whom have not received training will be trained by the end of the second permit year. New employees will be trained at the next scheduled course offering or within six months of starting, whichever occurs first. Training may be delayed while the MAPPS course is being updated as discussed in Section 5. Refresher MAPPS training will be provided at least once during the permit term for staff that have already received training.
- (3-9) Each co-permittee will provide additional task-specific education and coordination as necessary for staff to understand and implement applicable outreach, site visit, and inspection tasks.
- (3-10) Each co-permittee will document and report training, education, and coordination activities to the principal permittee.

Section 4

New Development and Redevelopment

4.1 Purpose

New development and redevelopment activities often offer opportunities to design and implement modern, permanent site and building features that may reduce or eliminate stormwater pollution throughout the lifetime of a facility or development. On the other hand, construction activities associated with development can contribute significant amounts of pollutants if BMPs are not properly deployed or "housekeeping" practices are not implemented. This section describes the process by which the permittees will review new development and redevelopment projects, require structural and non-structural BMPs as appropriate, and monitor construction activities to help reduce or eliminate pollutant discharges to the Maximum Extent Practicable (MEP).

4.2 Accomplishments

During the 1996-01 permit term, the permittees accomplished several significant goals, focusing primarily on incorporating storm water considerations into the development review and approval process. Specific accomplishments, as discussed in the 1995 ROWD and subsequent annual reports to the Regional Water Quality Control Board (RWQCB), include the following:

- ***Review and Revision of CEQA Process.*** The California Environmental Quality Act (CEQA) environmental review process for any project must consider stormwater quality issues. As a goal set during the previous permit, each permittee reviewed its respective CEQA (initial study) preparation and review process to determine if stormwater quality was adequately addressed. Necessary modifications were completed accordingly.
- ***Review and Revision of General Plan Elements.*** A general plan establishes policies and goals for a community and forms the basis for all land use decisions. These policies, goals, and decisions can directly and indirectly impact stormwater quality. Furthermore, addressing stormwater quality issues in the general plan provides a clear foundation for adopting subsequent conditions and standards for controlling and reducing potential stormwater pollutant discharges to the storm drain system.

Each co-permittee reviewed those elements of their general plans that may impact stormwater quality to determine the adequacy of the language and necessary modifications or additions were made during the regular review, revision, and update process.

- ***Model Development and Design Standards.*** The Management Committee, with input from the co-permittees, consultants, and private industry, recently

completed and adopted model guidelines for new development and redevelopment. These guidelines for development planning and construction activities form much of the basis for the program proposed herein.

- **Notice of Intent.** Each co-permittee continued to require proof of filing a Notice of Intent (NOI) prior to issuing grading permits. (Applies only to those co-permittees that issue grading permits.)
- **Training.** Each permittee had the responsibility of educating their staff on stormwater pollution issues. The permittees have trained planning and public works personnel and field inspectors, as appropriate to their position.
- **Project Review and Inspection Procedures.** Each co-permittee reviewed and updated, where appropriate, coordination procedures at both the tentative map phase and final approval phase of a project. Inspection frequencies were maintained at previous levels as required by the permit.

4.3 Proposed Program

The Management Committee developed model Guidelines for New Development and Redevelopment during the 1996-01 permit term, as discussed in Section 4.2. These guidelines will help reduce pollutant discharges to the MEP throughout the life of a project by the following:

- Establishing a development planning and review process
- Requiring certain categories or classes of development to incorporate BMPs into site designs and maintain those BMPs throughout the life of the project
- Establishing procedures and requirements to help ensure the applicable construction projects comply with the State's General Permit for Discharges Associated with Construction Activities (the General Construction Permit)
- Developing an education program for developers and contractors.

The proposed program is for the permittees to implement the Guidelines for New Development and Redevelopment as described in the following section.

4.4 Proposed Activities

4.4.1 Development Planning

Stormwater quality management must be considered during a project's planning phase, implemented during construction, and ultimately maintained for the life of the project. In addition, the program must be adopted and implemented by all co-permittees. It is intended that each new development and redevelopment project will incorporate the approved program of BMPs to reduce or eliminate potential pollutants entering the drainage system to the MEP.

Each municipality (co-permittee) will require BMPs for specified new development and redevelopment through similar processes. The typical process is outlined as follows:

- Modify the approval process for grading, building, and similar permits to include incorporation of the BMPs listed in Section 4.4.1.3, as applicable.
- Provide a copy of Guidelines for New Development and Redevelopment and BMPs to applicants through the permitting process. Applicants will be informed at the earliest possible point of processing of these requirements.
- Require applicants to submit a Water Quality Management Plan (WQMP) at appropriate discretionary and ministerial permit issuance levels. The WQMPs shall include a description of the project and an outline of the BMPs applicable to the project pursuant to this Section. A sample WQMP outline is provided in Appendix B. The WQMP shall also include a location map and a project map identifying storm runoff conveyance facilities and receiving waters that will be impacted by the project.
- Require applicants to refine the WQMP as increasing details concerning the nature of specific uses within the project become available.
- Require incorporation of the identified structural and non-structural BMPs.

4.4.1.1 General Conditions to be Applied by Co-permittees

For discretionary actions that include a precise plan of development:

- If required by the conditions of approval, WQMPs must be submitted for approval prior to issuance of building permits; and
- WQMPs shall identify structural and non-structural BMPs as specified in the guidelines for new development and redevelopment, detail BMP implementation, assign long-term maintenance responsibilities, and reference the location(s) of structural BMPs.

For subdivision of land:

- Prior to recordation, the applicant shall submit a WQMP for review and approval by the agency.

For projects that require coverage under the NPDES General Construction Activities Stormwater Permit (NPDES General Construction Permit):

- Applicants must provide a copy of the State Board Waste Dischargers' Identification Number (WDID) notification documenting coverage under the

NPDES General Construction Permit prior to issuance of grading, surface mining, or paving permits.

All three conditions also functionally apply to public projects where the local jurisdiction technically chooses not to issue formal permits to itself or hired-contractors, but nonetheless undertakes the work.

4.4.1.2 Special Conditions

When a building is being proposed for which no anticipated use is designated, or when an unanticipated element of land use or occupancy is proposed after the basic building has already been completed, the permittees will include language in the permit conditions to require the applicant to submit chemical management plans, if applicable. The submitted chemical management plans will be distributed to the appropriate departments for review and approval. Certificates and permits may be withheld if required BMPs are not or cannot be incorporated.

4.4.1.3 BMP Selection

Each new development will be required to implement appropriate non-structural BMPs and "routine" structural BMPs, as listed in Table 4-1 and Table 4-2, in keeping with the size and type of development, to minimize the introduction of pollutants into the storm drain system. These BMPs are further described in the Guidelines for New Development and Redevelopment.

Later, "special" structural BMPs may be required to address specific water quality problems. The water quality problems, and specific BMP requirements would be identified as part of a watershed planning process, runoff management plan, CEQA process, or other watershed planning method. Efforts will be directed toward determining the effectiveness of structural BMPs before they are required. Those BMPs that demonstrate superior cost-effectiveness may be adopted as special structural BMPs.



Figure 4-1 - Drip irrigation is one way to provide common area efficient irrigation (BMP S2).

**TABLE 4-1
NON-STRUCTURAL BMPs**

Appropriate Non-Structural BMPs	Residential	Industrial	Retail/ Office Center	Restaurants Warehouse/Grocery	Fuel Dispensing	Vehicle Repair/ Maintenance
Homeowner/ Tenant Education (N1)	X	X	X			
Activity Restrictions (N2)	X	X	X	X		X
Common Area Landscape Management (N3)	X	X	X	X		
Catch Basin Inspection (N4)	X	X	X	X	X	X
Common Area Litter Control (N5)	X	X	X	X	X	X
Private Street/ Lot Sweeping (N6)	X	X	X	X		
Underground Storage Tank Compliance (N7)		X		X	X	X
Spill Contingency Plan (N8)		X			X	X
Haz-Mat Disclosure Compliance (N9)		X			X	X
Uniform Fire Code Implementation (N10)		X			X	X
Title 22 CCR Compliance (N11)		X			X	X
Housekeeping of Loading Docks (N12)		X		X		
Employee Training (N13)		X	X	X	X	X
BMP Maintenance (N14)	X	X	X	X	X	X

**TABLE 4-2
STRUCTURAL BMPs**

Routine Structural BMPs	Residential	Industrial	Retail/ Office Center	Restaurants Warehouse/Grocery	Fuel Dispensing	Vehicle Repair/ Maintenance
Control of Impervious Runoff (S1)	X	X	X	X		
Common Area Efficient Irrigation (S2)	X	X	X	X	X	X
Common Area Runoff-Minimizing Landscape (S3)	X	X	X	X	X	X
Community Car Wash Racks (S4)	X					
Wash Water Controls for Food Preparation Areas (S5)				X		
Trash Container Areas (S6)	X	X	X	X	X	X
Self-contained Areas for Washing/ Steam Cleaning/ Repair/ Material Processing (S7)		X		X	X	X
Outdoor Storage (S8)		X		X	X	X
Motor Fuel Concrete Dispensing Area (S9)					X	
Motor Fuel Dispensing Area Canopy (S10)					X	
Air/ Water Supply Area Drainage (S11)					X	
Energy Dissipators (S12)	X	X	X			
Catch Basin Stenciling (S13)	X	X	X			
Inlet Trash Racks (S14)	X	X	X			

4.4.2 Construction Activities

Proper implementation of BMPs during construction activities is essential for reducing water quality impacts. Though the time required for construction is minimal compared to the life of a project, construction activities can be responsible for a majority of the impact if stormwater runoff issues are not handled properly. The following programs for General Construction Permit sites and non-General Permit sites will be implemented to help reduce pollutant discharges from construction sites.

Applicable construction activities will continue to be required to comply with the NPDES General Construction Permit from the State Water Resources Control Board (SWRCB). In order to facilitate the enforcement of the NPDES Permit requirements, it is the desire of the permittees to establish and maintain a cooperative relationship with the Regional Board. This cooperative relationship would require all parties involved to fulfill their respective responsibilities, share pertinent information, and to communicate pertinent or important information in a timely manner. In this spirit, each co-permittee will perform the following for projects that are subject to the General Construction Permit:

- Require a copy of the State Board WDID notification as proof that a NOI has been filed with the SWRCB, as discussed above in Section 4.4.1.1, prior to issuing grading permits.
- Notify the RWQCB of any General Construction Permit infractions or non-compliance noted as part of the permittees existing inspection programs. The existing permittee inspections focus on the concerns and requirements contained in the local ordinances of the permittees. Enforcement of violations of the State Construction Permit will be the responsibility of the Regional Board.

For projects that do not require coverage under the General Construction Permit, the permittees will ensure that the following requirements are defined on permit plan cover sheets as either general or special notes:

- All grading projects, regardless of size, will require an erosion control plan to prevent sediment from entering storm drains or water bodies.
- Construction sites shall be maintained by implementation of BMPs in such a manner that pollutants are not discharged from the site to the MEP.
- The following discharges into the storm drain system are prohibited: discharges that could have an impact on human health or the environment, cause or threaten to cause pollution, contamination, or nuisance; discharges that exceed any applicable water quality standard contained in a Statewide Water Quality Control Plan or local Basin Plan; and discharges containing a hazardous substance equal to or in excess of a reportable quantity listed in Federal Regulations 40 CFR Parts 117 and 302.

- Materials that can cause or contribute to pollution or a violation of any applicable water quality standard include, but are not limited to, sediments, solid or liquid chemicals spills; wastes from paints, stains, sealants, glues, limes, pesticides or herbicides, wood preservatives or solvents; asbestos fibers, paint flakes or stucco fragments; fuels, oils, lubricants, or hydraulic, radiator and battery fluids; fertilizers; vehicle/equipment wash water or concrete wash water; concrete, detergent or floatable wastes; wastes from any engine/equipment steam cleaning or chemical degreasing; and chlorinated potable water line flushings.
- Unless exempted or authorized by an NPDES permit, all non-stormwater discharges require prior approval by the local storm water agency or the State Water Resources Control Board.
- During construction, temporary storage of such materials, identified above, must occur in a designated area, physically separated from potential storm water run off, with ultimate disposal in accordance with local, state, and federal requirements.
- Dewatering of contaminated groundwater, or discharging contaminated solids via surface erosion is prohibited.

4.4.3 Post Construction Inspections and Activities

Co-permittee activities related to development projects that are complete and have begun to function for their intended use are discussed in other sections of this ROWD. Specifically, industrial and commercial activities are discussed in Section 3 and residential activities are addressed in Section 6. Additional corollary activities are discussed in Section 2 (Illegal Discharges) and Section 7 (Public Information and Participation).

4.4.4 Educational Program for Developers and Contractors

The Guidelines for New Development and Redevelopment, with all its attachments, contain the legal, administrative, and technical information needed to acquaint developers and contractors with the NPDES program. San Bernardino County developers and contractors have been implementing erosion control plans for many years and are familiar with that portion of the program. New requirements resulting from the NPDES Permit and the ROWD are contained in the Guidelines for New Development and Redevelopment.

The Building Industry Association and the Associated General Contractors have been asked to assume responsibility for alerting their members of the information contained in the Guidelines for New Development and Redevelopment, which will be made available by the co-permittees as part of the development review process.

4.4.5 Training

Co-permittee staff that implement the new development and redevelopment program will be targeted for stormwater-specific training and education. This may include staff from several departments and programs, including the building department, fire department, and code enforcement.

The targeted staff will receive general stormwater training and task-specific education and coordination. The general stormwater training will be conducted to introduce staff to basic stormwater concepts including regulations, pollutants of concern, potential sources, BMPs, and general program activities. The MAPPS training program will be used as the primary method for providing general stormwater training. Self-guided training methods, such as videotapes and CD-ROMs, may also be used. Additional education and coordination will be conducted as needed to provide task-specific instructions, guidance, and coordination. The additional education will typically consist of handouts, fact sheets, tailgate meetings, and coordination meetings, either alone or in combination. The Construction BMP training course developed during the 1996-01 permit term will also be utilized.

Since new business practice methods and pollution prevention methods are being developed continually, the Management Committee will assess and, if necessary, update educational materials previously developed for staff training. Proposed changes to the MAPPS training program are discussed in more detail in Section 5.4.6.

4.5 Performance Commitments

The permittees propose the following performance standards to help provide consistency among the permittees' programs, define requirements for permit compliance, and measure permittee performance. Performance commitments are proposed as enforceable elements for compliance.

Each co-permittee will implement a program for new development and redevelopment that is consistent with the program developed by the Management Committee during the 1996-01 permit term and as summarized in Section 4 of this Report of Waste Discharge. Specific performance commitments for implementation include the following:

- (4-1) Each co-permittee will review and modify the approval process for building, grading, and similar permits to include incorporation of BMPs as provided in the *Guidelines for New Development and Redevelopment*.
- (4-2) Each co-permittee will require applicants to prepare a WQMP that conforms to the outline in Appendix B and incorporate all identified structural and non-structural BMPs into the completed development.

- (4-3) When a development is being proposed for which no specific use is identified, each co-permittee will require that appropriate BMPs be considered before the development is approved for use and occupancy.
- (4-4) For projects that require coverage under the General Construction Permit, each co-permittee will continue to require the applicant to submit a copy of the State Board WDID notification prior to issuance of a grading permit.
- (4-5) Each permittee will notify the RWQCB of any General Construction Permit violations noted during the permittees site inspection activities for other local permits.
- (4-6) For grading projects that do not require coverage under the General Construction Permit, each co-permittee will require general or special notes on plan sheets as detailed in the new development and redevelopment guidelines.
- (4-7) Each co-permittee will provide general stormwater training for all targeted employees using a classroom format (MAPPS training) or a self-guided format such as a videotape. Any existing employees who have not received training will be trained by the end of the second permit year. New employees will be trained at the next scheduled course offering or within six months of starting, whichever occurs first. Training may be delayed while the MAPPS course is being updated. Refresher MAPPS training will be provided at least once during the permit term for staff that have already received training.
- (4-8) Each co-permittee will provide additional task-specific education and coordination as necessary for staff to understand and implement the program for new development and redevelopment.
- (4-9) Each co-permittee will document and report training, education, and coordination activities to the principal permittee.

Section 5

Public Agency Activities

5.1 Purpose

The permittees recognize the potential impacts, both positive and negative, that municipal activities can have on stormwater quality. The Public Agency Activities program discussed herein is directed at reducing the potential for negative stormwater quality impacts from activities such as municipal landscape maintenance, and implementing other municipal activities that may have a beneficial impact, such as street sweeping and storm drain cleaning.

5.2 Accomplishments

During the 1996-01 permit term, the public agency activity program was directed primarily at developing, reviewing, and adopting plans and procedures to minimize the impact of municipal activities on stormwater quality. Major goals and accomplishments during that period include the following:

- Developing and adopting a model Municipal Activities Pollution Prevention Strategy (MAPPS) for corporation yards and road maintenance
- Reviewing and revising procedures and practices for sewage spill response
- Reviewing and revising maintenance practices for parks and recreation facilities, storm drain systems, and public water bodies
- Continuing street sweeping at existing levels of service
- Training key staff

5.3 Proposed Program

The public agency activities program consists of separate program elements developed to cover each type of public facility or municipal activity that may impact stormwater quality. For the 2001-06 permit term, the permittees propose revising and regrouping the program elements as shown in Table 5-1. The new organization better reflects the permittees' organizational structures and BMP groupings and provides more complete coverage of public agency facilities and activities.

For example, the Parks and Recreation element primarily addressed chemicals used for landscape maintenance, such as pesticides, herbicides, and fertilizers. However, these chemicals are not just used at parks and recreation facilities; they are also used on other publicly owned landscaped areas such as medians, parkways, civic centers, and parking lots. Furthermore, such work is usually performed by staff or contractors working for a public works department, not a parks and recreation program or human services department. Moving this portion of the parks and recreation

program to the maintenance and materials storage program will bring it more in line with other similar activities and better target the staff that will perform the work. The following sections will discuss each program element in detail.

Table 5-1 Proposed Elements for the Public Agency Activity Program	
Proposed Program Elements	Previous Program Elements
Sewage Systems	Sewage Systems
Maintenance Areas and Materials Storage Areas	Corporation Yards Public Facilities (part) Parks and Recreation (part) Public Water Bodies
Landscape Maintenance	Parks and Recreation (part) Public Facilities (part)
Storm Drain Systems	Storm Drain Operation and Management Flood Control
Streets and Roads	Streets and Roads
Municipal Activities Pollution Prevention Strategy Training	---
Training	---

The proposed program for the 2001-06 permit term will focus on the following:

- Developing and implementing site-specific pollution prevention plans for corporation yards and other municipal outdoor materials storage areas
- Developing checklists and fact sheets to help staff more effectively and consistently administer the previously developed plans and programs
- Establishing measurable goals and performance commitments to clarify permit compliance and improve consistency among permittees
- Expanding and defining training requirements
- Requiring contract staff that perform public agency activities addressed by this section to receive the same or equivalent education and training as permittee staff.

The Public Agency Activities program specifically excludes municipal activities and discharges that are covered under a separate NPDES permit, such as publicly owned treatment works.

5.4 Proposed Activities

5.4.1 Sewage Systems

Spills can be a major source of pollution, especially if the discharge reaches the storm drain system or receiving water. It is the policy of all of the permittees to prevent sewage spills from entering the storm drain system to the Maximum Extent Practicable (MEP). During the 1996-01 permit term, the permittees reviewed their sewage spill response policies (or those of the outside sewer utility serving their area) to confirm this goal. Where necessary, written changes were incorporated into operating procedures or spill response plans or cooperative agreements were developed with outside sewer utilities. The permittees propose to continue the current program without change, except to formalize existing training practices as discussed in Section 5.4.7 and adopt the performance commitments outlined in Section 5.5.

5.4.2 Maintenance Areas and Materials Storage Areas

This program element is directed at reducing or eliminating non-stormwater discharges from facilities and activities related to vehicle/equipment maintenance and material or waste storage and disposal. This element only addresses those facilities and activities that are exposed to rainfall or stormwater runoff. This is a new program element that incorporates the previous Corporation Yards and Public Water Bodies program elements and portions of the previous Public Facilities and Parks and Recreation elements. The targeted municipal facilities and activities include the following:

- Facilities used for servicing, fueling, or washing vehicles or equipment. Most often, these facilities are found at corporation yards, however they may also be found at local or regional parks, golf courses, fire stations, police stations, and other areas.
- Outdoor storage areas for chemicals, materials, and wastes associated with municipal activities. Chemicals, materials, and wastes of concern include, but are not limited to vehicle fuels; fluids and wash waters; paving and base materials; pesticides, herbicides, and fertilizers; pool chemicals; algaecides; and materials recovered through household hazardous waste collection programs or spill



Figure 5-1
Covered equipment storage area.
Photo courtesy City of Ontario.

response (HazMat). Chemical and material storage areas may be found at corporation yards, parks, golf courses, fire stations, and other areas.

During the 1996-01 permit term, the Management Committee developed a model MAPPS program and an associated training program. The MAPPS program focuses on reducing or eliminating pollution from corporation yards, but addresses other municipal activities as well. Appropriate elements of the model MAPPS program were adopted by each permittee. During the 2001-06 permit term, the permittees propose to build on the MAPPS program by developing site specific-plans for each maintenance and material storage area. At a minimum, the site-specific plans will include the following:

- A site map showing pertinent site features and storage areas, runoff patterns, and drainage facilities
- A discussion of potential sources of pollution
- A list of applicable BMPs
- Contact information for the person or position responsible for the site
- The name and function of additional staff responsible for implementing BMPs (that will be targeted for training)

Generic BMPs and plan elements can be used for activities that are performed at more than one site, but each site must be evaluated separately. At least annually, the site-specific plans will be reviewed and updated as necessary to reflect site conditions.

The permittees also propose to develop a model inspection checklist, based on the checklist developed for the MAPPS program, and inspect each facility at least once each year. Applicable portions of the model checklist will be incorporated into site-specific checklists by each permittee. The inspection results will be reviewed and signed by the person responsible for the site and the signed inspection forms will be kept on file by the permittee.

Staff targeted for training, as listed in the site-specific plans, will receive training as described in Section 5.4.7.

5.4.3 Landscape Maintenance

The landscape maintenance element addresses outdoor maintenance activities, including the following:

- Landscape irrigation
- Storage and disposal of landscape materials and wastes

- Use of pesticides, herbicides, and fertilizers
- Maintenance of public water bodies, including swimming pools, lakes, ponds, and fountains
- Pavement and walkway cleaning (pressure washing) and related discharges

All of these maintenance activities have a potential for contributing pollutants to stormwater. However, pollutant discharges can be reduced or eliminated to the MEP by developing and implementing good housekeeping practices and other pollution prevention BMPs.

During the 1996-01 permit term, each permittee reviewed, and if necessary modified, maintenance practices used at parks and recreation facilities and public water bodies to include stormwater pollution prevention methods. Each permittee also requires employees and contractors to comply with state regulations for pesticide use and applicator licensing and certification.

To ensure that maintenance staff are familiar with, understand, and implement appropriate good housekeeping practices and pollution prevention BMPs, the Management Committee will develop BMP fact sheets to cover landscape and water body maintenance activities. The fact sheets can be reviewed periodically by maintenance staff during tailgate meetings. Performance commitments for reviews are discussed in Section 5.5. Maintenance staff will also receive training as outlined in Section 5.4.7.

5.4.4 Storm Drain Systems

The new Storm Drain Systems program element in this ROWD covers the Storm Drain System Operation element and the Management and Flood Control element of the previous ROWD.

For local storm drain systems, the program for the 1996-01 permit term focused on system inspection and cleaning and required each permittee to review, and if necessary, modify storm drain maintenance procedures to ensure debris is properly disposed. Permittees also committed to continuing the same level of service through the first year of the permit term with reviews at the end of each fiscal year. No specific thresholds were established for inspections or maintenance.

During the 2001-06 permit term, the permittees propose to refine inspection and cleaning requirements and establish specific performance goals and commitments. Specifically, each permittee will inspect all of their inlets, open channels, and basins at least once during each reporting year and clean those facilities where the inspection reveals one or more of the following conditions:

- 1) The sediment/debris storage volume is 40 percent or more full.

- 2) There is evidence of an illegal discharge.
- 3) Accumulated sediment or debris impairs the hydraulic function of the facility.

Each inspection will be documented and each permittee will provide inspection and cleaning summaries to the principal permittee for inclusion in annual reports. Specific documentation and reporting requirements will be established as part of the overall program evaluation process described in Section 8.

The permittees will also develop a BMP fact sheet for drainage facility inspection, cleaning, and debris disposal. The BMP fact sheet must be reviewed by all inspection and cleaning staff as discussed in Section 5.5. Drainage facility inspection and maintenance staff will also receive training as described in Section 5.4.7.

For flood control facilities, during the 1996-01 permit term, the permittees were required to update flood control practices to incorporate design and maintenance practices to minimize negative impacts on stormwater quality. No additional activities are proposed for flood control facilities.

5.4.5 Streets and Roads

During the previous 1996-01 term, street sweeping was the primary activity under the streets and roads program element. In fact, the majority of the permittees swept all of their streets at least once per year during the last reporting period for which data is available (fiscal year ending June 1999). Also, the MAPPS program, which was used to train key permittee staff, included BMPs for road maintenance and paving (CA2 - Paving Operations), and other general construction BMPs.

During the 2001-06 permit term, the Management Committee will incorporate road construction BMPs into construction specifications that will be included in the contract documents for each applicable project. As contractors review the contract documents and prepare bid packages, this provides a reminder of specific BMPs and practices that must be implemented.

Road maintenance BMPs, however, may not necessarily receive the same recurring scrutiny by municipal maintenance crews, so the Management Committee will prepare a road maintenance BMP fact sheet that can be reviewed during "tailgate" safety meetings. The fact sheet will address typical road maintenance activities such as saw cutting, paving, slurry/fog sealing, painting and striping, and pavement grinding. Road maintenance staff will also receive training as outlined in Section 5.4.7.

The permittees propose to continue street sweeping with the addition of the performance goals and commitments outlined in Section 5.5. The street sweeping performance goals and commitments apply to areas where there is sufficient

continuous curb and gutter to justify street sweeping. Street sweeping is not proposed for areas without significant continuous curb and gutter.

5.4.6 Municipal Activities Pollution Prevention Strategy (MAPPS) Training

During the 1996-01 permit term, the Management Committee developed model municipal activities pollution prevention strategy, appropriate elements of which were adopted by each permittee. Subsequently, an 8-hour training program was developed from the model strategy and in 1997-98 the permittees started training key staff. By the end of the 1999-00 reporting year, over 590 received MAPPS training. An outline of the MAPPS training program is provided in Table 5-2.

Table 5-2 Municipal Activities Pollution Prevention Strategy Training Outline (Existing)
Welcome and Introduction
NPDES Stormwater Regulation Overview
NPDES Stormwater Regulation Video and the SWPPP
Industrial Handbook References
MSDS and the DoT-NAERG
Municipal Handbook References
Construction Handbook References
Construction Video Presentation
Site Walk Inspection Checklist
Review and Final Exam

The permittees propose to review, and revise as necessary, the MAPPS training program to provide a more thorough overview of the program areas outlined in this ROWD and as required by the area-wide NPDES permit. Specific topics to be included or expanded include illegal discharge identification, response, and reporting, the proposed Industrial/Commercial Sources program, the proposed New Development and Redevelopment Program, and the proposed Public Agency Activities program. When developing major revisions to the MAPPS training program, the Management Committee will seek input and coordination from the various intra-agency departments involved in the storm water program.

5.4.7 Training

Permittee staff conducting the public agency activities described in this section will need training to effectively incorporate stormwater pollution prevention practices. For example, landscape maintenance staff will need to learn how to properly store and dispose of landscape wastes and how to develop effective irrigation schedules.

Permittee staff conducting public agency activities will be targeted for stormwater-specific training and education. This may include staff from several departments and programs, including public works, parks and recreation, community services, and maintenance.

The targeted staff will receive general stormwater training and task-specific education and coordination. The general stormwater training will be conducted to introduce staff to basic stormwater concepts including regulations, pollutants of concern, potential sources, BMPs, and general program activities. The MAPPS training program, which is discussed further in Section 5.4.6, will be the primary method for providing general stormwater training. Self-guided training methods, such as videotapes and CD-ROMs may also be used. Additional education and coordination will be conducted as needed to provide task-specific instructions and guidance. The additional education will typically consist of handouts, fact sheets, tailgate meetings, and coordination meetings, either alone or in combination. For those already trained, refresher training will be provided at least once during the permit term to keep staff up-to-date. Training and education activities will be documented and reported annually to the principal permittee.

5.5 Performance Goals and Commitments

The permittees propose the following performance goals and commitments to help provide consistency among the permittees' programs, define requirements for permit compliance, and measure permittee performance. Performance goals represent standards for which the permittees will strive to meet, but only performance commitments will be enforceable elements for compliance.

Contract Staff – The performance goal for the 2001-06 permit term is for the permittees to require contract staff who perform public agency activities identified by this section to receive the same or equivalent education and training as permittee staff. The performance commitment is for the following:

- (5-1) Each permittee will incorporate training requirements into new contracts and contracts that come up for renewal.

Sewage Systems – The performance goal is to prevent all sewage spills from entering storm drains and receiving waters. The performance commitment is the following:

- (5-2) Each permittee will, to the MEP, prevent sewage spills from reaching a receiving water, through timely response, containment, and clean-up.

Maintenance and Material Storage Areas – The goal is to eliminate non-stormwater discharges from maintenance and material storage areas exposed to rainfall or subject to stormwater run-on. The permittees propose the following performance commitments:

- (5-3) Each permittee will develop and maintain site-specific pollution prevention plans for each maintenance or material storage area. Where practical, plans will be retained on site at all times. A sign indicating where the plan is located will be provided at all areas for which plans are located off-site.
- (5-4) The Management Committee will develop a model inspection checklist. The MAPPS checklist may be used as a starting point.
- (5-5) Each permittee will perform annual inspections of each outdoor maintenance and materials storage area.
- (5-6) Each permittee will have those listed as key staff in site-specific plans review the site-specific plan at least once per year.

Landscape Maintenance – The goal is compliance with good housekeeping practices and pollution prevention BMPs for landscape and water body maintenance activities. The performance commitments are the following:

- (5-7) The Management Committee will develop BMP fact sheets for landscape and water body maintenance activities
- (5-8) Landscape and water body maintenance staff will review the fact sheet at least once per year as part of their regular "tailgate" safety meetings.

Storm Drain Systems – The performance commitment for storm drain systems is for the permittees to implement a revised inspection and cleaning program as follows:

- (5-9) Each permittee will inspect all of their inlets, open channels, and basins at least once during each reporting year.
- (5-10) Each permittee will clean those facilities where the inspection reveals one or more of the following conditions:
 - 1) The sediment/debris storage volume is 40 percent or more full.
 - 2) There is evidence of illegal discharge.
 - 3) Accumulated sediment or debris impairs the hydraulic function of the facility.
- (5-11) Each inspection will be documented and each permittee will provide inspection and cleaning summaries to the principal permittee for inclusion in annual reports.

- (5-12) The Management Committee will develop a BMP fact sheet for storm drain cleaning and maintenance activities.
- (5-13) The BMP fact sheet will be reviewed at least once per year by storm drain inspection and maintenance staff as part of their regular "tailgate" safety meetings.

Streets and Roads - The permittees propose the following performance goals and commitments for the Streets and Roads program element.

- (5-14) As a performance commitment, each co-permittee will incorporate road construction BMPs into construction specifications for each applicable project.
- (5-15) As a performance commitment, the Management Committee will develop a road maintenance BMP fact sheet.
- (5-16) The road maintenance BMP fact sheet will be reviewed by maintenance staff at least once per year.
- (5-17) As a performance commitment, each co-permittee will sweep 75 percent of public streets at least once per year. The performance goal for sweeping is 100 percent. An additional goal for the co-permittees' street sweeping program is to sweep streets within the two months preceding the rainy season to maximize the benefit of removing pollutants. This could be accomplished through regular monthly or bi-monthly sweeping or by re-scheduling less frequent programs. The street sweeping performance goals and commitments apply to areas where there is sufficient continuous curb and gutter to justify street sweeping. Street sweeping is not proposed for areas without significant continuous curb and gutter.

MAPPS Training - The performance commitment is the following:

- (5-18) The Management Committee will review, and revise as necessary, the MAPPS training to provide a more thorough overview of the program areas outlined in this ROWD and as required by the area-wide NPDES permit.

Training - The performance commitment is the following:

- (5-19) Each permittee will identify key staff involved in sewage system maintenance, storm drain system inspection and maintenance, landscape maintenance, road and street maintenance, and key staff at maintenance and storage facilities and provide general stormwater training using a formal classroom format (MAPPS) or self-guided methods. Current key staff that have not received training will be trained by the end of the second permit year. New key staff will be trained at the first scheduled MAPPS training or within the first six months on the job, whichever occurs first. Training may be delayed while the MAPPS course is being updated. Refresher MAPPS training will be provided at least once during the permit term for staff that have already received training.

- (5-20) Each permittee will provide additional task-specific education and coordination as necessary for key staff to understand and implement applicable stormwater program procedures.
- (5-21) Each permittee will document and report training, education, and coordination activities to the Principal Permittee.

Implementation Schedule for Performance Commitments		Permittees	Principal Permittee	Mgt Committee	July 1	Permit Expected	June 30	July 1	June 30																
					00	CY 2001				CY 2002				CY 2003				CY 2004				CY 2005			
Program Area/Performance Commitments						PY 1				PY 2				PY 3				PY 4				PY 5			
		RY 00-01		RY 01-02		RY 02-03		RY 03-04		RY 04-05															
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Section 5 - Public Agency Activities																									
1	Incorporate training requirements into new contracts and contracts that come up for renewal.	X	X																						
2	Prevent sewage spills, to MEP, from reaching a receiving water, through timely response, containment, and clean-up.	X																							
3	Develop and maintain site-specific pollution prevention plans for each maintenance and material storage area.	X	X											
4	Develop a model inspection checklist for maintenance and materials storage areas.			X										..											
5	Perform annual inspections of each outdoor maintenance and materials storage area.	X	X															
6	Key staff must review site-specific plans annually.	X	X															
7	Develop landscape and waterbody maintenance BMP fact sheet.			X														..							
8	Landscape and waterbody maintenance staff review fact sheet at least once per year.	X																		
9	Inspect all inlets, basins and channels at least once per year.	X	X						
10	Clean those that meet criteria.	X	X						
11	Document each inspection and provide inspection and cleaning summaries to the principal permittee.	X	X						
12	Develop a BMP fact sheet for storm drain cleaning and maintenance activities.			X										..											
13	Fact sheet to be reviewed at least once per year by cleaning and maintenance staff.	X	X															
14	Incorporate road maintenance BMPs into construction specifications for applicable projects.	X																							
15	Develop road maintenance BMP fact sheet.			X														..							

Section 6

Residential

6.1 Purpose

The purpose of the residential component is to address BMPs to improve the quality of stormwater runoff from residential areas. The residential program will be focused on pollution prevention for the following residential activities:

- Private vehicle washing and maintenance
- Use of chemicals such as pesticides, herbicides and paints
- Private swimming pool maintenance
- Other types of household and landscape maintenance
- Use of safe substitutes for materials presently used

6.2 Program Accomplishments

During the 1996-01 permit term, the residential program focused primarily on public information and household hazardous waste collection. The public information and participation program is covered in more detail in Section 7, but based on random public surveys conducted in 1997 and 1999, it appears that public awareness about the stormwater management program is increasing. For example, awareness that the water in storm drains flows directly to the ocean or bay increased from 30 to 43 percent.

This awareness is reflected in the success of the household hazardous waste program where both the number of participants and the amount of waste collected have both increased dramatically. The 1995 Report of Waste Discharge (ROWD) reported that the household hazardous waste program served 16,500 participants and collected approximately 1.1 million pounds. During the 1998-99 permit year, these numbers have risen to 23,000 participants and 1.6 million pounds. It is likely that the increase is primarily due to a combined influence of public awareness and additional, more convenient collection facilities. Additional information about the household hazardous waste program is available in Section 2.

6.3 Proposed Program

The permittees propose to continue, with minor modifications, existing activities to reduce or eliminate pollutant discharges from residential sources. The proposed activities include the following:

- Public education programs

- Household hazardous waste collection and disposal programs
- Waste oil recycling programs
- Adoption of ordinances which address urban runoff pollution issues

The following discussion summarizes these activities as they relate to the residential program. The proposed five-year public education program is described in Section 7. The program will address education for pollution prevention in all residential source categories.

6.3.1 Vehicle Washing and Maintenance

This category encompasses activities conducted by individuals that involve discharge of pollutants such as motor oil, other vehicle fluids, soaps, and other auto-related pollutants. For the 2001-06 permit term, this residential source category will be addressed in three different ways on an area-wide basis:

- Household hazardous waste round-ups and drop-off centers
- Used motor oil collection centers for recycling used oil
- Public education

These programs are addressed in more detail in Section 6.3.3. and Section 7.

6.3.2 Landscaping

This category encompasses residential activities that involve the use of chemicals such as herbicides, pesticides, and fertilizers. It also encompasses landscape waste and excess irrigation. Planned and present source control BMPs for this category, to continue for the 2001-06 permit term, include the public education program which targets all such activities area-wide, and covers encouraging residents to use alternative (non-polluting) products, proper disposal of landscape wastes, and avoiding excessive irrigation. In addition, the city of Ontario provides compost bins, and the cities of Fontana, Highland, Ontario, and Upland have curbside pickup of green waste. Big Bear requires tree clearing contractors to chip and compost all tree waste.

The Management Committee will also, as part of the public education program, target information displays for alternative products at major retail outlets that carry gardening supplies (point-of-purchase). Displays will include fact sheets and/or brochures that describe: the possible impacts to stormwater that can result from using toxic materials; provide listings of non-toxic alternative products; and provide tips for proper disposal of leftovers when toxic materials are used. Please refer to Section 7, Public Education.



Figure 6-1
Sign for household hazardous waste collection center.

6.3.3 Home Maintenance

This category encompasses homeowners' improper disposal (or use) of such toxic materials as paints, thinners, strippers, varnishes, and insecticides. Two primary BMPs that address these activities for all permittees are household hazardous waste round-ups and drop-off centers, and public education encouraging alternative (non-polluting) products and/or proper disposal. The public education effort will include point-of-purchase displays at major retail outlets to inform residents of non-toxic alternative products and proper disposal methods for leftover toxic materials.

San Bernardino County has implemented an area-wide household hazardous waste collection program with several permanent collection points throughout the permit area and temporary "mobile" collection facilities that are used for local household hazardous waste "round-ups." Many of the co-permittees participate in the County program and some operate their own household hazardous waste program. The co-permittees will continue existing household hazardous waste programs throughout the 2001-06 permit term.

6.3.4 Illegal Dumping

This category encompasses the full array of activities by residents that involve discharge of objects or materials into storm drains, gutters, catch basins, or anywhere rainfall or runoff could carry the materials into the storm drain system. The related pollutants include objects that are part of general littering, as well as large household items and toxic materials. The BMPs that will be continued during the 2001-06 permit term to reduce or eliminate illegal dumping include: public education, conducted in an integrated fashion by all permittees; the storm drain inlet storm drain stenciling program; the 24-hour hotline number for reporting such illegal dumping activities; catch basin cleaning; and street sweeping. Please refer to Section 2, Section 5, and Section 7 for descriptions of specific BMPs.

6.3.5 Pet Ownership

This category refers to improper disposal of fecal matter from pets, primarily in public areas (streets, parks). The area-wide public education program will continue to be the primary method for addressing this activity during the 2001-06 permit term. On a regulatory level, County ordinance prohibits owners from allowing their dogs to defecate in many public areas.

6.3.6 Swimming Pool/Spa Maintenance

Swimming pool and spa maintenance activities can result in discharges of chlorine, algicides, and other chemicals. Programs already in place, such as public education

and ordinances requiring dechlorination prior to discharge, will be continued during the 2001-06 permit term.

6.4 Performance Commitments

The permittees propose the following performance commitments to help provide consistency among the permittees programs, define requirements for permit compliance, and measure permittee performance. Performance commitments are proposed as enforceable elements for compliance. Additional public information and participation goals and commitments are presented in Section 7.

- (6-1) The Management Committee, with guidance from the Public Education Subcommittee, will coordinate public education for residential sources for the duration of the permit as outlined in Section 7.4.
- (6-2) The Management Committee, with guidance from the Public Education Subcommittee, will coordinate point-of-purchase outreach (at major retail outlets) for toxic gardening and household maintenance products. This coordination will continue for the duration of the permit. Public opinion surveys, similar to those conducted in 1997 and 1999, will be used to help target specific retail outlets as outlined in Section 7.4.
- (6-3) Each co-permittee will continue existing Household Hazardous Waste collection programs.
- (6-4) The Management Committee will continue the use of a 24-hour hotline as discussed in Section 6.3.4.

Section 7

Public Information and Participation

7.1 Purpose

A critical factor in the success of any municipal stormwater quality management program is the level of awareness and participation on the part of the general population. Many common public activities such as yard maintenance, vehicle maintenance, and littering can contribute pollutants to storm water runoff. The public information and participation program is targeted at educating the general population about potential sources of stormwater pollution, resulting impacts, and practical methods of reducing or eliminating pollutant discharges from public activities. Elements from the Public Information and Participation program are directly incorporated into other program areas such as the Illegal Discharges and Residential programs. Activities conducted under this program may also benefit the Industrial/Commercial program as informed citizens practice pollution prevention measures in the workplace.

7.2 Accomplishments

Because the permittees understand the importance of public participation, they have developed a very active and extensive public information and participation program. In fact, this program represents the single largest expenditure for the area-wide program.

During the 1996-01 permit term, the public information and participation program has developed and implemented several education outlets and activities, including the following:

- Major Media: Developed and implemented newspaper, radio, and local cable television public service announcements and billboard signs at local baseball stadiums.
- School Presentations: Developed and conducted presentations to fourth and fifth grade elementary school classes and high school automotive classes.
- Point-of-Purchase Campaign: Developed fact sheets with information on integrated waste management and BMPs for yard waste disposal, home repair, and remodeling activities for distribution at garden and home improvement centers.
- Point-of-Discharge Campaign: Implemented storm drain stenciling program to mark all public inlets with receiving water information and anti-pollution messages (also discussed in Section 2, Illegal Discharges).

- Business Recognition Program: Implemented a program to identify "clean" businesses and reward them with public recognition.
- Public Displays: Educational displays were developed to highlight proper use of yard care chemicals and promote the overall stormwater program. The displays were set up at libraries and public buildings throughout the permit area..
- Special Events: Tables/booths were set up at municipal and public special events, such as fairs, festivals, expositions, and home and garden shows. The booths featured a watershed model, handout materials, and promotional giveaway items.
- Web Site: A web site (Figure 7-1) was developed to introduce visitors to stormwater pollution problems, the NPDES program, best management practices, hotlines, and provide links to other programs and environmental sites:

<http://www.co.san-bernardino.ca.us/flood/npdes/home.htm>

- Surveys: Conducted a baseline survey in 1997 and a follow-up survey in 1999 to determine public attitudes and knowledge about the stormwater program and to help gauge the effectiveness of various public education methods.

Brochures, advertisements, and giveaways were developed in both English and Spanish to help reach a wider audience.



Figure 7-1 - The San Bernardino County Stormwater Program Web site home page.

7.3 Proposed Program

The public information and participation program proposed for the 2001-06 permit term will build on the success of the previous program, and will also incorporate lessons learned over the past five years. The 1999 public survey indicated that respondents get most of their information about local issues from newspapers, followed by broadcast television, cable television, and radio. Therefore, the area-wide public information and participation program for the 2001-06 permit term will focus on developing and purchasing newspaper advertising space and will also work with other area-wide programs to purchase advertising on other mass media such as radio and television. The secondary focus of the area-wide program will be on focused, regional outreach activities that cannot be effectively conducted by individual permittees, such as the area-wide point-of-purchase program and the business recognition program.

With the area-wide program emphasis and funding redirected more toward mass media, staffing and funding for the various local programs such as public displays and special events will be transferred to the individual permittees. However, the area-wide program will continue to fund and participate in the coordination and development of school programs and displays, brochures, handouts, and giveaways that can be purchased by the individual permittees for use at local activities.

The area-wide public education program is directed by the Management Committee with input from a Public Education Subcommittee. The subcommittee typically meets monthly to develop and review education materials, coordinate with public education consultants, and recommend program activities to the Management Committee.

7.4 Proposed Activities

The general program described in Section 7.3 and shown in Figure 7-2 encompasses four basic areas of outreach:

- General Outreach
- Focused Outreach
- Education Program
- Public Participation



Figure 7-2 – Public Information and Participation Program Components

7.4.1 General Outreach

The permittees will disseminate general outreach materials developed by the Management Committee to alert the public to the sources, pathways, and impacts of stormwater pollution and provide common-sense BMPs the public can implement to reduce pollutant discharges. The outreach materials will focus on common habits and behaviors that need to be altered to protect surface water resources. Specifics of material type, content, and dissemination method will be determined by the Management Committee with input from the Public Education Subcommittee. The area-wide program will focus more on mass media outlets, such as newspapers, television, and radio, than during the 1996-01 permit term. Mass mailing, such as newsletters and water bill inserts, will also be evaluated for effectiveness and feasibility.

The Public Education Subcommittee will also work cooperatively with nearby regional NPDES programs to pool resources and obtain higher profile advertising opportunities.

The permittees will continue to utilize materials developed during previous permit terms and by other regional programs, including audio and video public service announcements, the program web site, brochures, fact sheets, and giveaways.

The Management Committee will conduct another public survey, similar to the one conducted in 1999, at least once during the 2001-06 permit term to help evaluate the effectiveness of the public information and education program and to help identify new targets and media trends.

7.4.2 Focused Outreach

In addition to the general outreach program discussed in Section 7.4.1, the Public Education Subcommittee will develop, and the permittees will disseminate, focused outreach materials targeted at specific pollutants, activities, population groups, and businesses. Specific outreach efforts will be identified by the Management Committee during the 2001-06 permit term, but will generally include the following:

- Point-of-purchase programs targeting proper use and disposal of common household products and chemicals. Potential target pollutants include herbicides, pesticides, automotive fluids, cleaners, solvents, paint, and pool chemicals. Pet supply retailers may be targeted for outreach on proper clean up and disposal of animal wastes.
- Business/industry outreach targeting specific industries as discussed in Section 3, Industrial Commercial Sources, and Section 4, New Development and Redevelopment. The permittees will continue voluntary dissemination of outreach materials in support of the "clean business award" program, including materials designed to reach participating target businesses and to advertise awarded businesses to the public.

Outreach materials may include brochures, BMP fact sheets, videos, displays, and focused mass media advertising.

7.4.3 Education Program

The permittees propose to continue and expand the already successful education program conducted under the 1996-01 permit term. The existing program includes the following:

- Classroom presentations and materials for fourth or fifth grade elementary students. The storm water presentation, which is about an hour long, is offered to fourth or fifth grade classrooms throughout the permit area and conducted at those classrooms that accept. The presentation topics include the water cycle, watersheds, sources of stormwater pollution, and pollution prevention. Classrooms are also invited to participate in the "adopt a gutter" follow-up activity for further learning. Given the recent focus by the state and local school systems

on standardized testing and test scores, a relatively low percentage of classrooms accept the presentation offer.

- Classroom presentations and materials for high school automotive classes. This program is conducted in the same manner as the fourth/fifth grade program except the presentations focus on automobile maintenance practices and waste oil recycling. The presentations are tailored to fit into one high school class period, which is about 50 minutes.
- Stormwater informational displays for libraries and other public buildings and facilities. Displays are targeted at both public employees and visiting members of the general public. The stormwater displays are typically left on display for about one month. Most of the permittees have limited display space and must rotate through several different displays over the course of a year. Therefore longer display periods for the stormwater program are generally not practical.
- Tables/booths at municipal and public special events, such as fairs, festivals, expositions, and home and garden shows. These events provide an opportunity for the permittees to distribute educational materials, demonstrate a stormwater runoff model, and answer questions. Various handouts and give-away items are used to attract visitors to the display tables and stimulate discussion.
- A point-of-discharge (inlet stenciling) program.
- The Municipal Activities Pollution Prevention Strategy (MAPPS) training for designated staff as described in Section 5.

Responsibility for implementing and funding these general education programs will generally be shifted from the area-wide program to the individual permittees. However, the area-wide program will continue its role in coordinating and conducting classroom presentations and developing supporting materials such as handouts, displays, videos, training, and giveaways that may be purchased and used by the individual permittees. The area-wide program will also provide coordination for shared materials and regional programs.



Figure 7-3 - Stencil on curb inlet.

7.4.4 Public Participation

Public participation will consist primarily of enlisting volunteers from the general public to help the permittees implement the overall NPDES program. Potential areas and sources of assistance include the following:

Potential Areas of Assistance

- Distributing brochures and fact sheets and setting up displays
- Passing out handouts and fact sheets to targeted businesses
- Reporting spills and illegal discharges
- Litter clean up
- Monitoring and research assistance
- Stenciling storm drain inlets

Potential Sources of Assistance

- Elementary, junior high, and high school students – class projects
- Boy Scout and Girl Scout troops, merit badge programs, Eagle Scout projects
- Boys and Girls Clubs, programs for troubled youth
- Environmental organizations

During the 2001-06 permit term, the permittees will review these and other areas and sources of public assistance and solicit help as appropriate.

7.5 Performance Goals and Commitments

The permittees propose the following performance goals and commitments to help provide consistency among the permittees' programs, define requirements for permit compliance, and measure permittee performance. The permittees will strive to meet performance goals; however, only performance commitments will be enforceable elements for compliance. All listed items are performance commitments unless explicitly identified as a performance goal. Performance goals and commitments for the area-wide program are listed in Section 7.5.1 and performance commitments for individual permittees are listed in Section 7.5.2.

7.5.1 Performance Commitments for the Area-Wide Program

- (7-1) Continue the general outreach program as described in Section 7.4.1.

- (7-2) Conduct a stormwater pollution survey to help evaluate and focus the public information and education program.
- (7-3) Continue the focused outreach program as described in Section 7.4.2.
- (7-4) Develop supporting materials for the education program described in Section 7.4.3 on an as needed basis.
- (7-5) Review the potential areas of assistance and potential sources of assistance presented in Section 7.4.4 and solicit public assistance as appropriate.
- (7-6) Staff a stormwater table or booth for three regional public events (such as a fair, festival, or exposition) each permit year, in addition to those events staffed or sponsored by the individual permittees as discussed below.
- (7-7) Conduct classroom presentations for public fourth or fifth grade classrooms during each year of the permit term. The performance commitment is to contact all public fourth or fifth grade classrooms and request permission to make a one-hour presentation about stormwater pollution. The performance goal is to conduct the presentation at 100 percent of those classrooms that accept the invitation. To allow for scheduling difficulties, however, the performance commitment is set at 75 percent.
- (7-8) Conduct classroom presentations for high school automotive classes during each year of the permit term. The performance commitment is to contact all public high school auto shop programs and request permission to make a 50-minute presentation about stormwater pollution. The performance goal is to conduct the presentation at 100 percent of those programs that accept the invitation. To allow for scheduling difficulties, however, the performance commitment is set at 75 percent.

7.5.2 Performance Commitments for Individual Permittees

- (7-9) Each permittee must maintain a stormwater information exhibit on public display for at least one month per permit year.
- (7-10) Each co-permittee must staff a stormwater table or booth for at least one public event (such as a fair, festival, or exposition) each permit year. This is in addition to any tables or booths that may be staffed or sponsored by the regional program as discussed in Section 7.5.1.
- (7-11) Each permittee will maintain legible stencils on all publicly maintained storm drain inlets.
- (7-12) Each permittee will provide stormwater program outreach to all staff at least once per permit year. Outreach will typically take the form of a flyer or

brochure that can be distributed to employee in-boxes or distributed with other employee mail such as paychecks/vouchers.

Section 8

Program Evaluation

8.1 Purpose

The permittees are required to evaluate the activities described in Section 2 through Section 7 on a periodic basis. Such an evaluation is appropriate because it allows the permittees to take stock of their program and to modify it as part of their ongoing effort to meet the Maximum Extent Practicable (MEP) criteria. This section outlines the program evaluation activities and methodologies proposed for the 2001-06 permit term.

8.2 Accomplishments

During the 1996-01 permit term, the permittees committed to developing and implementing a data collection, format, and reporting plan and committed to preparing and submitting a fiscal report, an illegal discharges report, and an annual report for each year of the permit term. The permittees accomplished both of these goals.

The Management Committee conducted a thorough review of the permit requirements and Report of Waste Discharge (ROWD) commitments and then developed a reporting strategy on how to best track permittee activities and report the results to the Regional Water Quality Control Board (RWQCB). The reporting strategy adopted by the Management Committee included the following key recommendations:

- Consolidate the fiscal report, illegal discharges report, and annual report into a single annual report.
- To facilitate efficient and effective reviews, the consolidated annual report should be as streamlined as possible and where it makes sense, present results graphically.
- Because it is paramount that each permittee submit equivalent data, and to make the reporting process as efficient as possible, an electronic (database) reporting system should be developed to collect and collate data from the permittees and prepare summary materials for the consolidated annual report.

The new consolidated annual report format and electronic data reporting system were developed in permit year 1995-96 and incorporated into that year's report and the reports for each subsequent year. The electronic data reporting system was further updated in each of the following three years to improve functionality and incorporate newer, Y2K-compatible software.

8.3 Proposed Program

The overall approach proposed in this section is consistent with the approach incorporated during the 1996-01 permit term and consists of both direct and indirect monitoring methods, data collection and evaluation, and finally, reporting. Direct water quality (conventional) monitoring is important because it can provide data that can help estimate pollutant loads from regional land uses and may even help quantify the impact and effectiveness of the permittees' storm water management program. Indirect (non-conventional) monitoring is useful to evaluate various program activities or BMPs and to develop optimum levels of efforts, i.e., defining MEP. Table 8-1 provides some examples of direct and indirect monitoring methods that will be implemented by the permittees. The proposed direct monitoring program is described in Section 9.

Table 8-1 Direct and Indirect Monitoring Methods			
Target of Evaluation	Type of Monitoring	Examples of Data	Assessment Benefit
Program Activities and BMPs	Indirect Monitoring: Non-Water Quality Measurements	Percentage of Streets Swept	Level of Effort
	Indirect Monitoring: Water Quality Measurement	Weight and Type of Material Removed by Spill Response	Pollutant Load Reduction
Overall Effectiveness of Storm Water Management Program	Direct Monitoring: Water Quality Monitoring	Pollutant Concentrations in Discharges from Various Land Uses Pollutant Concentrations in Receiving Waters Entering and Exiting the Permit Area	Pollutant Load Estimates Pollutant Source Identification Receiving Water Impacts

8.4 Proposed Activities

8.4.1 Indirect Monitoring

The indirect monitoring program proposed for the 2001-06 permit term is similar to what was implemented during the 1996-01 permit term, except that this Report of Waste Discharge (ROWD) establishes performance commitments for specific program elements. This is consistent with the permittees previous commitments. Specific

proposed program activities and the proposed performance commitments for those activities are discussed in sections 2 through 7 of this ROWD.

The overall program may be assessed based on the methods discussed in Section 9 for direct water quality monitoring. Specific program elements, activities, and control measures, however, will be evaluated by considering program goals, monitoring results (both direct and indirect), costs (both capital and staff), implementation schedule, and public/business acceptance. A similar process was used to develop the Drainage Area Management Program and the program activities/control measures identified herein.

During the first permit year, the Management Committee will re-visit specific indirect monitoring requirements based on the new permit and the commitments contained in this ROWD. In general, the indirect monitoring requirements will be developed for the following:

- To evaluate individual permittee participation and compliance with specific permit requirements
- To quantify the impact of specific BMPs and activities
- To evaluate the effectiveness of the overall storm water management program

The indirect monitoring requirements will be developed in conjunction with a review of the reporting strategy discussed in Section 8.4.3 and will be the basis for specific data collection requirements as discussed in Section 8.4.2.

8.4.2 Data Collection

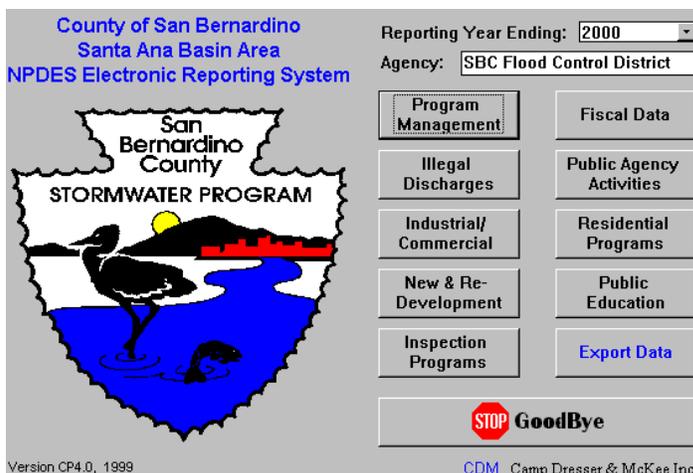


Figure 8-1 - Main Screen from Electronic Reporting System

The Management Committee developed an electronic (database) reporting system, as discussed in Section 8.2, to allow each permittee to input consistent, meaningful information and transmit the information to the principal permittee for inclusion in the annual reports. The reporting system consists of two separate modules, or programs, that run on standard PCs under the Microsoft Windows operating system. The first module is for use by the permittees. The permittees navigate the various program areas using button "switchboards" and enter the required data on specially tailored

input screens. The reporting system employs several methods to help ensure that permittees enter all of the necessary data in the correct format and using the right units, including the following:

- Validation rules (for example, checking a date or number to make sure it is in the correct range)
- Input masks (automatic data input formatting, for example, providing placeholders and characters for a telephone number: (_ _ _) _ _ _ - _ _ _ _)
- Data checks (for example, checking that each form is complete before allowing a permittee to export data to the principal permittee)
- Instructions and help menus to assist the permittees understand the context, reason, and use for the data they enter

After the end of each reporting year the permittees finish entering the required data and then export the data to the principal permittee for analysis and inclusion in the annual report.

The second module is for use by the principal permittee. It is very similar to the first module except that it allows data to be uploaded from the permittees and can generate pre-formatted summary charts for the annual report.

Once the indirect monitoring and reporting requirements are established, the Management Committee will review the electronic reporting system and make revisions as necessary.

8.4.3 Reporting

During the 1996-01 permit term, all summary reporting requirements were combined into a single annual report. The report is designed to be functional, concise, and easy to comprehend. The general outline for the report is as follows:

- Introduction
- Program Administration - Provides background information on how the area-wide program is organized and administered. Includes summaries of permittee participation and program budget and expenditures.
- Program Status - This section is the heart of the indirect monitoring program and summarizes the status of each program area and specific activities as required by the permit and the ROWD.
- Water Quality Monitoring Program - Includes the results and analysis of the water quality monitoring effort.

- Overall Program Effectiveness – Focuses on overall BMP implementation, long-term water quality trends, and program goals.
- Program Activities for Next Reporting Year – Discusses proposed goals and activities for the next permit year and outlines any proposed changes.

The permittees propose to retain the general reporting strategy, format, and outline that were used during the 1996-01 permit term. During the 2001-06 permit term, however, the Management Committee will review the report in detail and make revisions as necessary to incorporate and address the new ROWD and permit.

8.5 Performance Commitments

The permittees propose the following performance commitments to help provide consistency among the permittees programs, define requirements for permit compliance, and measure permittee performance. Performance commitments are proposed as enforceable elements for compliance.

- (8-1) The Management Committee will re-visit specific indirect monitoring requirements based on the new permit and the commitments contained in this ROWD as discussed in Section 8.4.1.
- (8-2) The Management Committee will review the annual report in detail and make revisions as necessary to incorporate and address the new ROWD and permit. The basic format and outline of the current annual report will be retained.
- (8-3) Once the indirect monitoring and reporting requirements are revised as discussed in the previous two bullets, the Management Committee will review the electronic reporting system and make revisions as necessary.

Section 9

Monitoring

9.1 Purpose

The essential goal of the Monitoring Program is to provide information that can be used to support effective implementation of the area-wide stormwater program. In support of this overall goal, the permittees have identified the following specific objectives for the Monitoring Program:

1. Evaluate the effectiveness of specific BMPs
2. Assess stormwater contributions to receiving water pollutant loadings and evaluate potential receiving water impacts
3. Identify and prioritize stormwater pollutants of concern
4. Identify sources of high priority stormwater pollutants

This Report of Waste Discharge (ROWD) represents an opportunity to re-evaluate and assess the status of the monitoring program, and to modify it as appropriate for the 2001-06 permit term. The objectives listed above build upon the work previously done during the first two permit terms, while adjusting the emphasis to meet the changing needs of the area-wide stormwater program.

Among the most pressing concerns for permittees are the impending Total Maximum Daily Loads (TMDLs) that will be developed within the next several years by the State of California, under the requirements of Clean Water Act (CWA) Section 303(d). CWA Section 303(d) requires states to identify those water bodies which are not meeting water quality standards (i.e., "impaired"), and to develop TMDLs for all waters listed as impaired.

On the 1998 Section 303(d) list (USEPA, SWRCB, 1998), within San Bernardino County, waters within the Big Bear Lake watershed are listed as impaired due to copper, mercury, unspecified metals, nutrients, noxious aquatic plants, sedimentation/siltation, and pathogens. The sources are listed as resource extraction, construction/land development, snow skiing activities, and unknown non-point sources. Waters within the Upper Santa Ana River watershed are listed as impaired due to pathogens, from non-point sources.

Under the TMDL process, Waste Load Allocations must be established for all sources to limit discharges of the problem constituents, and to ensure that water quality standards are being met. An implementation plan will then be developed, specifying the steps by which the regulated discharges will be expected to meet their respective Waste Load Allocations.

It is essential to have accurate data on flows and concentrations from both the sources (including urban runoff/stormwater) and the receiving waters for this process, to accurately account for receiving water levels and loadings from the various sources.

Other issues facing the Permittees include a recent request from the Santa Ana RWQCB (3/23/00) for a technical investigation of bacteriological water quality impairments in the upper Santa Ana River, stemming from continued impairment of the body contact recreational beneficial use of this waterway. The RWQCB has asked that this effort be coordinated between the Riverside and San Bernardino County stormwater programs. There are also other opportunities to coordinate with or support other regional monitoring efforts.

9.2 Accomplishments

During the 1996-01 permit term, the Monitoring Program has been active in the following areas:

- system characterization;
- BMP evaluation;
- stormwater discharge and receiving water quality monitoring;
- coordination of water quality monitoring with other regional efforts; and
- statistical analysis of monitoring data.

The results of these various activities are described in the following sections. In the presentations that follow, several constituents representing various aspects of water quality were selected for in-depth statistical analysis:

- biochemical oxygen demand (BOD), a measure of overall pollutant levels;
- nitrate, a key soil and water nutrient;
- total phosphorous, a key soil and water nutrient;
- copper, a common heavy metal pollutant in stormwater;
- zinc, a common heavy metal pollutant in stormwater; and
- total suspended solids (TSS), a measure of the sediment load in water.

9.2.1 System Characterization

The principal permittee, with input from the co-permittees, has updated land use and drainage maps for the watersheds covered within the permitted area, and continued the process of incorporating this information into a geographic information system (GIS) electronic format. Pertinent features of the watersheds, including the storm

drain systems, receiving waters, and land uses, have been updated using data from the Southern California Associated Governments (SCAG), as reviewed by the cities.

Water quality monitoring data characterizing stormwater discharges and receiving water quality are summarized in Section 9.2.3, below.

9.2.2 BMP Evaluation

The Permittees have completed a preliminary assessment of the effectiveness of sedimentation basins in removing sediment and other key pollutants, using existing data from the monitoring program. There are numerous sedimentation basins located on streams and channels throughout San Bernardino County; the primary purpose of these basins is to trap sediment and prevent its downstream transport.

Data from a monitoring site that does not have an upstream sedimentation basin (site 9, "R-2") were compared to data from a site in a somewhat similar watershed that does have a basin upstream (site 1). Average concentrations from several years of monitoring (1994-99) are shown for these two sites in Table 9-1.

Statistical tests were also used to compare data for the selected representative constituents: BOD, nitrate, phosphorous, copper, zinc, and TSS. The comparisons were run using the "t-test", a common statistical testing procedure for testing two similar sets of data, at the 95% confidence level. Data were log-transformed to assure normal distribution prior to testing. All available monitoring data from sites 1 and 9 were used in the tests, and the tests were run separately for both the first flush (FF) and main program (MP) data. The results are summarized in Table 9-1.

The results of the comparison were mixed. While site 9 (without sediment basin) had higher average concentrations of general minerals and dissolved solids (TDS), site 1 (with sedimentation basin) had higher average concentrations of nutrients, BOD and suspended solids (TSS). Trace metals results were mixed. Of the six constituents for which t-tests were run, five (BOD, TSS, zinc, phosphorous and nitrate) were higher in site 1 at a statistically significant level ($p < 0.05$), while the copper test was inconclusive.

The results are in some ways surprising, especially with respect to the higher overall sediment levels at the site with the upstream sediment basin (site 1). This is likely due to inherent differences in the two watersheds, including the fact that Site 1 is influenced by urban runoff discharges, while Site 9 is not.

Similar results were obtained in comparisons of site 1 to sites 6 and 7, which do not have upstream sedimentation basins but are located in the Big Bear Lake watershed. The study could perhaps be performed more effectively with monitoring conducted synoptically upstream and downstream of a specific sedimentation basin.

Table 9-1 Effectiveness of Sedimentation Basin			
Constituent⁽¹⁾	Mean Concentration (mg/L)		p-value⁽²⁾
	w/ Sed. Basin (Site 1)	w/out Sed. Basin (Site 9)	
BOD	19	4.817	<0.0001
COD	100	101.120	
TDS	99	188.167	
TSS	193	46.5 ⁽⁴⁾	<0.0001
Cu, tr ⁽³⁾	0.032	0.005	
Pb, tr	0.016	0.036	
Zn, tr	0.166	0.040	<0.0001
Ba, tr	0.091	0.138	
Cr, tr	0.024	<DL	
Fe, tr	7.535	9.761	
Mn, tr	0.153	1.812	
P-Ortho	0.141	<DL	
P-Total	0.573	0.230	<0.0001
NO2-N	0.093	<DL	
NO3-N	1.870	0.982	0.0002
TKN	3.748	3.296	
NH ₄ -N	0.923	0.109	
N-Total	5.922	4.250	
PH	7.287	7.967	
EC	121.609	264.500	
Oil & Grease	4.500	2.683	
Total Hardness as CaCO ₃	57.826	153.375	
Ca	15.826	40.458	
Mg	4.457	12.417	
Na	5.736	16.917	
K	4.405	4.375	
Total Alkalinity as CaCO ₃	32.609	123.208	
HCO ₃	39.304	144.917	
SO ₄	10.274	18.504	
Cl	3.827	9.821	
F	0.215	0.517	

Notes:

- 1) Site 1 "Main Program" data were compared to Site 9 "Wet Weather" sampling
- 2) p-values are based on paired t-tests using a lognormal distribution of the data
- 3) p-values could not be determined because most of the data were non-detected
- 4) Extreme outlier (66000 mg/L) was removed from data set to calculate mean
- 5) "tr" refers to "total recoverable" analysis

9.2.3 Water Quality Monitoring

The water quality monitoring program was continued as planned, with minor modifications. The Permittees continued to conduct wet-weather and dry-weather monitoring for both stormwater discharges and receiving waters. The stormwater discharge monitoring involved both "First Flush" (first 30 minutes of runoff) and "Main Program" (first two hours of runoff) composite sampling and analysis. Receiving water samples were collected as one-time grabs. During the 1996-01 permit term, PAH analysis and dry weather monitoring were discontinued, with approval from the Regional Board, due to the preponderance of non-detect results and the need to shift resources to offset the cost of participation in the Southern California Coastal Waters Research Program (SCCWRP).

Table 9-2 summarizes the 24 wet weather monitoring events conducted throughout the history of the stormwater monitoring program, from 1994-99 (additional events were monitored during the 1999-2000 wet season). Dry weather monitoring events are summarized in Table 9-3. The sites that have been monitored throughout the past several years have been well characterized by this extensive monitoring effort.

Descriptive statistics were developed summarizing water quality results for the 1994-99 monitoring data, including information about the number of samples, frequency of detection, minimum, maximum, mean, standard deviation, median, 95th percentile, and minimum analytical detection limit. The data were organized in the following categories:

- Stormwater Discharges (Sites 1-7), First Flush (Wet Weather) Data
- Stormwater Discharges (Sites 1-7), Main Program (Wet Weather) Data
- Stormwater Discharges (Sites 1-7), Dry Weather Data
- Receiving Waters (Sites 8-10), Wet Weather Data
- Receiving Waters (Sites 8-10), Dry Weather Data

For each category, statistics are provided for all sites combined, as well as for each site individually over the 1994-99 time period in Appendix D.

Given the amount of monitoring that has been done for these sites, it is reasonable at this time to reduce the emphasis on routine monitoring and focus the monitoring program on the objectives listed in section 9.1. For the 2001-06 permit term, it is proposed that a limited number of stormwater discharge sites be monitored on an ongoing basis at a lower frequency, to continue to provide information related to pollutant loadings, receiving water impacts and long-term program effectiveness (see sections 9.3 and 9.4).

Table 9-2 Wet Weather Monitoring Events										
Storm Event Date	Monitoring Sites									
	1	2	3	4	5	6	7	R-1	R-2	R-3
2/7/94	C/C	C/C	C/C	C/C	C/C	C/C ⁽³⁾	C/C ⁽³⁾	G	G	G
2/17/94 ⁽¹⁾	C/C	C/C	C/C	C/C	C/C	NR	NR	G	G	G
3/19/94	C/C	C/C	C/C	C/C ⁽²⁾	C/NR ⁽²⁾	C/C	C/NR ⁽²⁾	G	G	G
11/10/94	C/C	C/C	C/C	NR	C/NR	NR	NR	G	G	G
1/23/95	NR	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
3/10/95	C/C	C/C	C/C	C/C	C/C	C/NR	C/C	G	G	G
12/12/95	C/C	NR	C/C	NR	C/C	C/C	C/C	G	G	G
1/31/96	C/C	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
2/19/96	C/C	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
3/4/96	C/C	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
3/13/96	C/C	C/C	C/C	NR	C/C	C/C	C/C	G	G	G
10/30/96	C/C	C/C	NR	C/C	C/C	C/C	C/C	G	G	G
11/21/96	C/C	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
12/09/96	C/C	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
11/11/97 ⁽¹⁾	C/C	C/C	C/C	NR/C	C/C	NR	NR	G	G	G
11/26/97	C/C	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
1/9/98	C/C	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
2/3/98	C/C	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
3/25/98	C/C	C/C	C/C	C/C	C/C	C/C	C/C	G	G	G
11/8/98	C/C	C/C	C/C	NR	C/C	C/C	NR		G	G
1/25/99 ⁽¹⁾	C/C	C/C	C/C	C/C	C/C	C/C	C/C		G	G
2/9/99 ⁽¹⁾	C/C	C/C	C/C ⁽²⁾	C/C	C/C	C/C	C/C		G	G
3/16/99 ⁽¹⁾	C/C	C/C	C/C	C/C	C/C	C/C	C/C		G	G
4/7/99 ⁽¹⁾	C/C	C/C	C/C	C/C	C/C	C/C	C/C		G	G

⁽¹⁾ no PAH samples collected at any station

⁽²⁾ only O&G measured for FF event

⁽³⁾ only OH and CO₃ measured

“C/C” - composite sample for first flush/composite sample for main program

“G” - grab sample

“NR” - not sampled. Unless otherwise noted, “NR” means not sampled for both FF and MP events.

**Table 9-3
Dry Weather Monitoring Events**

Monitoring Event Date	Monitoring Sites									
	1	2	3	4	5	6	7	R-1	R-2	R-3
6/8/94	C	C	C	NR	C	C	C	NR	NR	NR
8/16/94	C	C	C	NR	C	NR	C	NR	NR	NR
11/1/94	NR	C	C	C	C	NR	C	G	G	G
6/6/95	C	C	C	C	C	C	C	G	G	G
8/14/95	C	C	C	NR	C	C	NR	G	G	G
7/30/96	C	C	C	C	C	NR	C	G	G	G
8/20/97	C	C	C	C	C	NR	C	G	G	G
7/29/98	C	C	C	C	C	C	C	G	G	G

“C” - composite sample
 “G” - grab sample
 “NR” - not sampled.

9.2.4 Regional Monitoring Coordination

The Permittees' are considering options to work with Riverside and Orange Counties to develop a standard approach to water quality monitoring. Possible opportunities for regional cooperation include the development of a monitoring plan to investigate bacteriological water quality impairments in the upper Santa Ana River watershed, and continuing to support and cooperate with regional monitoring to be performed by the SCCWRP.

9.2.5 Statistical Analysis

The principal Permittee has conducted statistical analysis of monitoring data in the following areas:

- pollutant loading estimates
- identification of pollutant sources
- evaluating first flush effects
- evaluating long-term trends

The results of these efforts are described in the following sections.

9.2.5.1 Pollutant Load Estimates

The principal Permittee has computed estimated annual loadings for discharges from the Permitted area for selected key constituents. A spreadsheet model was developed for this purpose, based on the CDM Water Management Model (WMM). The annual loadings are calculated from rainfall, runoff, and watershed area data, as well as

average pollutant concentrations for representative land uses within the Permitted area. The model also accounts for the effects of retention basins, spreading grounds and similar facilities. The estimated mean annual loads discharged from the permitted area are shown in Table 9-4. Detailed breakdowns of estimated loadings from specific drainage areas and land use types are shown in Appendix E.

Table 9-4 Mean Annual Loads: Entire Permitted Area		
Constituent type	Constituent	Mean Annual Load (tons/yr)
Oxygen Demand & Solids	BOD	1,683
	COD	10,052
	TDS	10,996
	TSS	16,350
Heavy Metals	Copper	2.63
	Lead	1.6
	Zinc	15.34
Nutrients	Dissolved P	11.2
	Total P	47.9
	NO _{2,3}	137.5
	TKN	303.5

The results of the loading model should be considered to be preliminary, due to a variety of simplifying assumptions. The model assumes the presence of two basic types of BMPs: retention basins (BMP #1) and spreading grounds (BMP #2). In the absence of local data on pollutant removal efficiencies from these facilities, literature values were used from USEPA, the WMM model, and sources within the State of California. The model does not account for the multiple, nested or series treatments which occur in many drainage areas, and considers only the effects of the initial (primary) treatment BMP for each drainage area. Certain other simplifying assumptions also were made with respect to the distribution of land uses treated by the different types of BMPs within each drainage area. Many of these simplifying assumptions can be overcome through integration of the loading model with the County GIS database system.

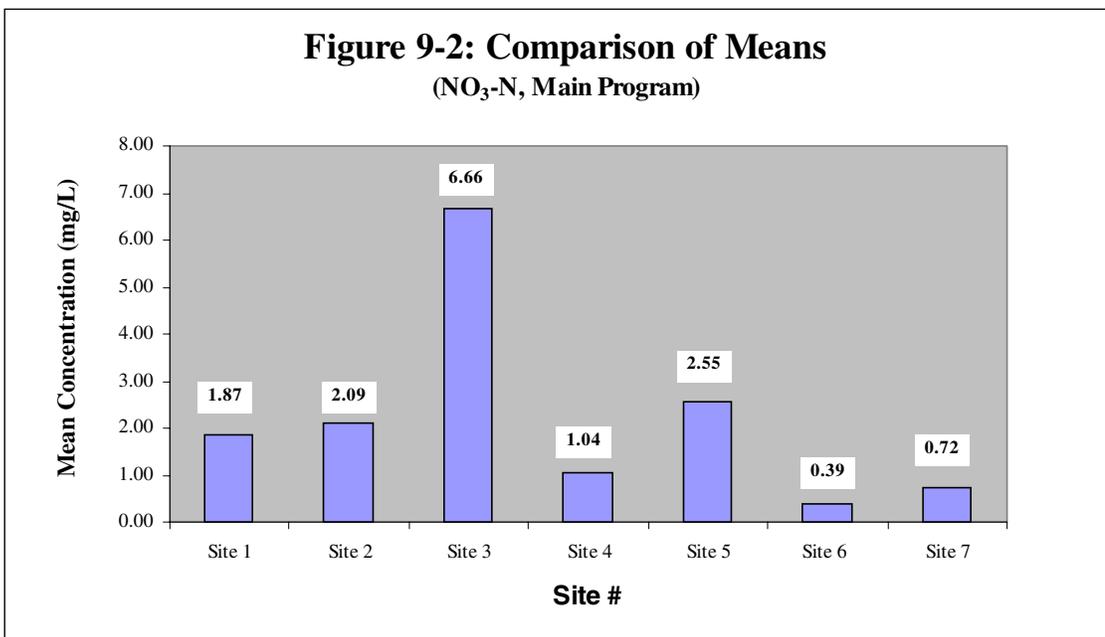
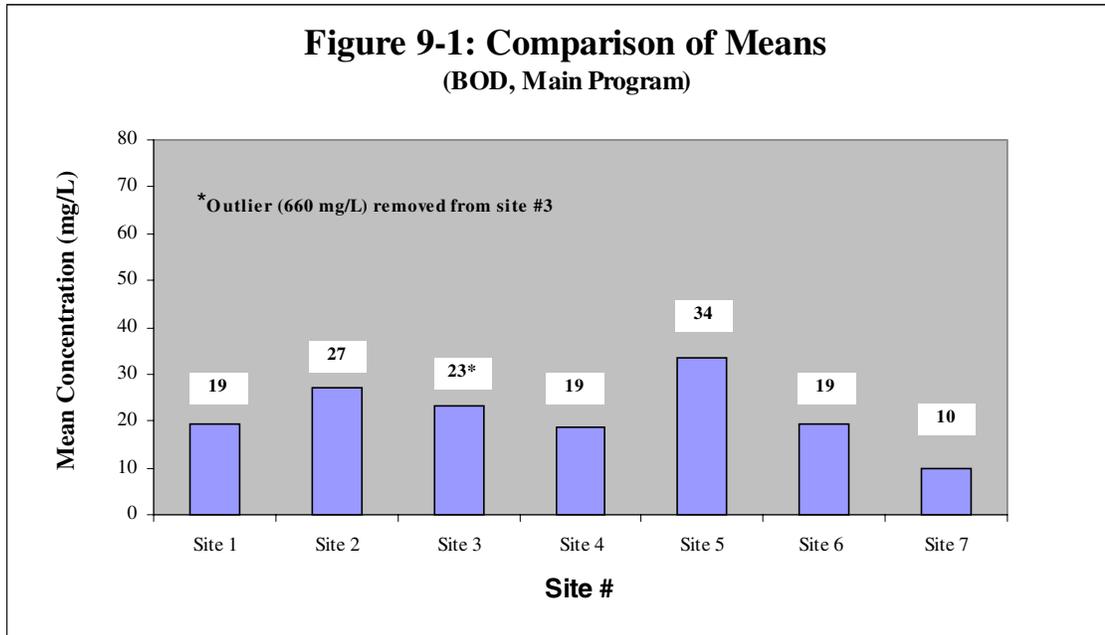
9.2.5.2 Pollutant Source Identification

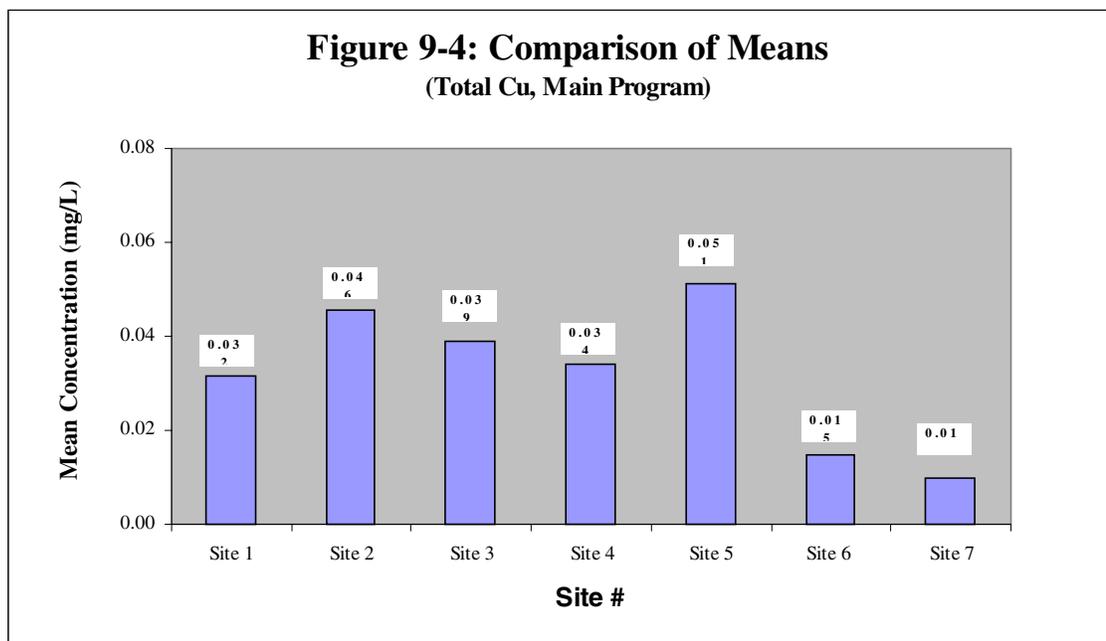
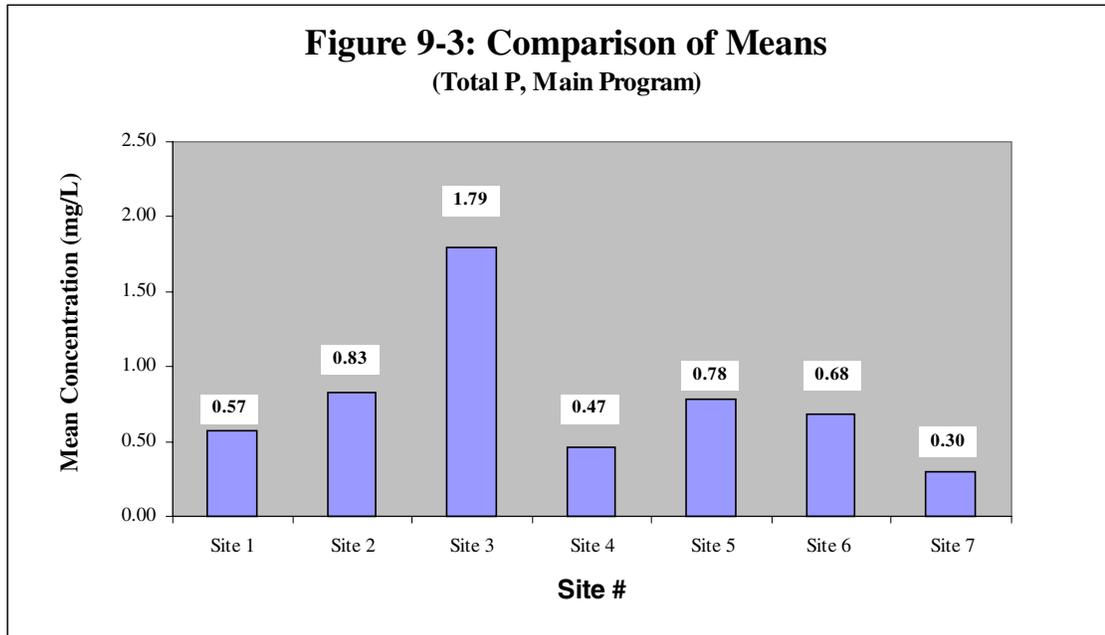
The wet weather monitoring data from the seven stormwater discharge monitoring sites were compared in an effort to identify any significant sources of common stormwater pollutants. The mean concentrations of selected constituents (BOD, nitrate, phosphorous, copper, zinc, TSS) are compared for these sites in Figures 9-1 through 9-6 for both the First Flush and Main Program data.

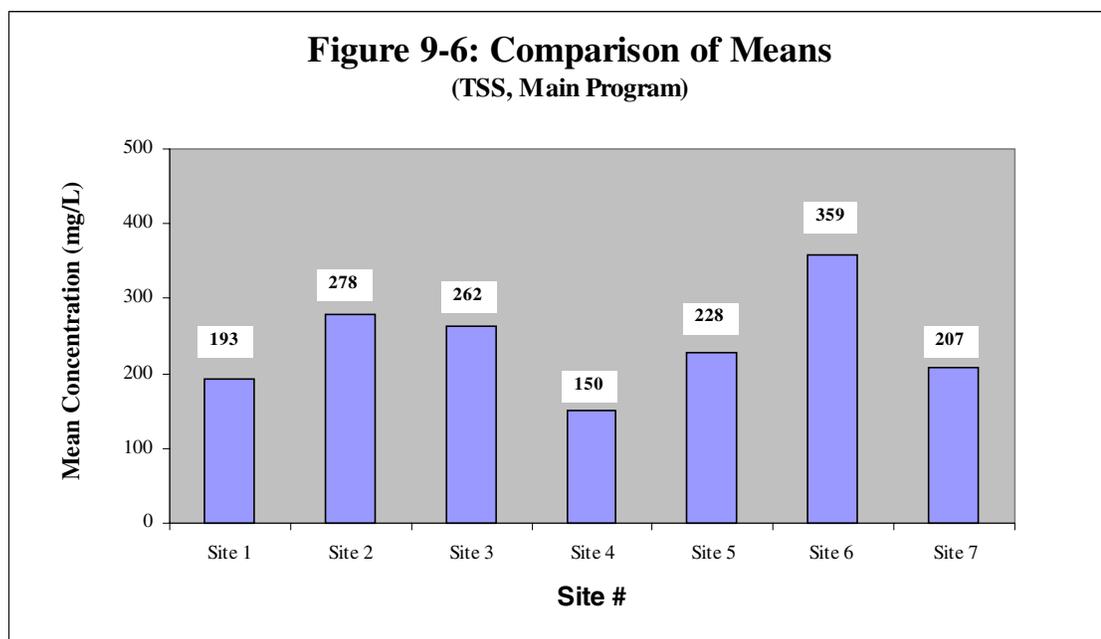
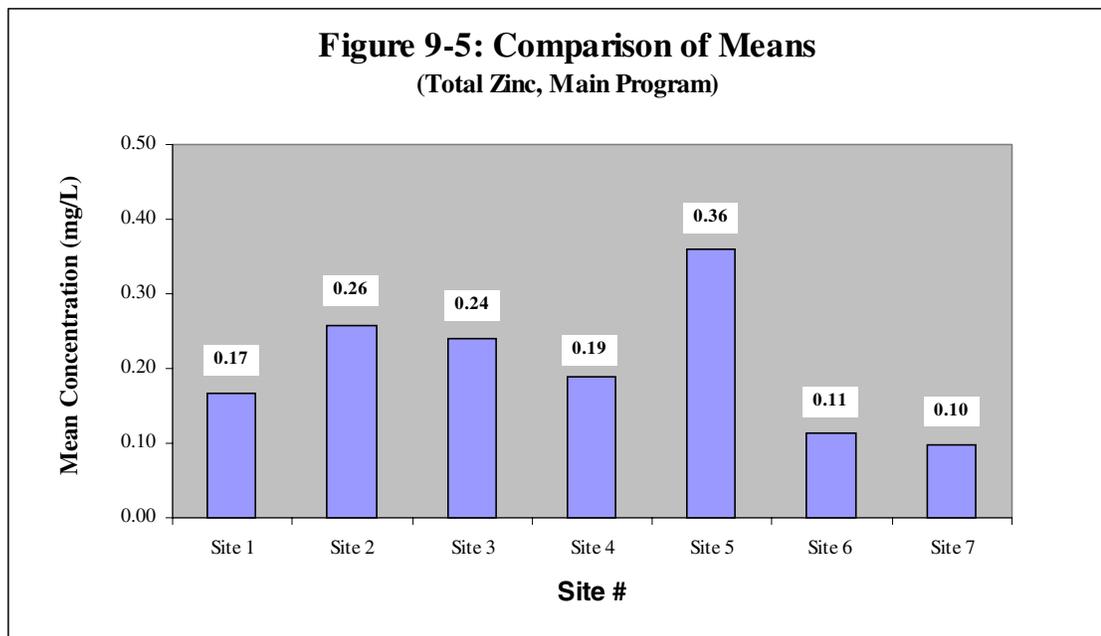
From Figures 9-1 through 9-6 it is apparent that Site 5 (a mixed commercial/light industrial area) has the highest average concentrations for BOD, copper, zinc and TSS, while site 3 (influenced by mixed land uses, including agricultural runoff) has the highest average concentrations for nitrate and phosphorous, for both First Flush and Main Program data. The lowest average concentrations for BOD, phosphorous, copper and zinc were observed at site 7 (located in a fairly pristine, forested area in the Big Bear Lake watershed). Site 6 (located in a mixed residential, recreational, forested area of the Big Bear Lake watershed) showed the lowest average concentration for nitrate, while site 4 (in an industrial area) had the lowest average TSS concentration.

The analysis of variance (ANOVA) statistical test was used to evaluate whether any of the observed differences are statistically significant for these six constituents. The ANOVA results confirm the presence of statistically significant differences among sites for both First Flush and Main Program data, for the six constituents tested. The results of the ANOVA testing are presented in Appendix F.

This analysis points to the commercial/industrial area represented by site 5 as a significant source of BOD, metals, and suspended solids. Similarly, the mix of urban and agricultural land uses characterized by the site 3 monitoring data represent a significant source of nutrients.







9.2.5.3 Evaluations of First Flush Effects

Stormwater pollutants tend to build up during dry periods, and then wash off (to varying degrees) during rainfall events. For this reason, it is often thought that stormwater runoff concentrations will exhibit a “first flush” effect, both seasonally and within each storm event. Both types of first flush effect were evaluated using the monitoring program data.

Intra-event First Flush Effect

The First Flush data were compared graphically to the Main Program data for each sampling date over the monitoring period from 1994-99, for the six selected constituents (BOD, nitrate, phosphorous, copper, zinc, TSS), using data from stormwater discharge monitoring sites 1-7 combined (see Figures 9-7 through 9-12). (For each sampling date, the plotted point equals the average concentration from all seven sites for that date.)

Visual comparisons of the First Flush to Main Program data plotted in Figures 9-7 through 9-12 clearly depict a fairly consistent intra-event first flush effect. For BOD, copper, zinc and TSS the average First Flush data are clearly higher than the Main Program data for nearly every sampling date. While the results are less dramatic for nitrate and phosphorous, in most cases First Flush data are higher than or roughly equal to Main Program data.

To evaluate the statistical significance of the intra-storm first flush effect, the First Flush data were compared to the Main Program data via t-test, for the same six constituents, again using data from sites 1-7 combined, and also combining all sampling dates from 1994-99. The t-test results are summarized in Table 9-5. The t-test confirms that the differences observed are in fact statistically significant for the constituents tested.

These tests indicate that the efforts of the stormwater program in reducing pollutant discharges can be particularly productive when directed towards the initial period of runoff events.

The extensive data compiled for intra-event first flush stormwater quality has conclusively demonstrated the significance of this effect. It is therefore proposed that collection of the “First Flush” composite samples be discontinued, and replaced with an expanded “Main Program” composite that would cover all or most of the runoff events monitored (see sections 9.3, 9.4). Such full-event composite samples are more useful in determining “event mean concentration” (EMC) for each pollutant, providing a more accurate picture of runoff quality for use in loading calculations and other data analysis.

Figure 9-7: Mean EMC vs. Time -- BOD
[Sites 1-7, Main Program vs. FF]

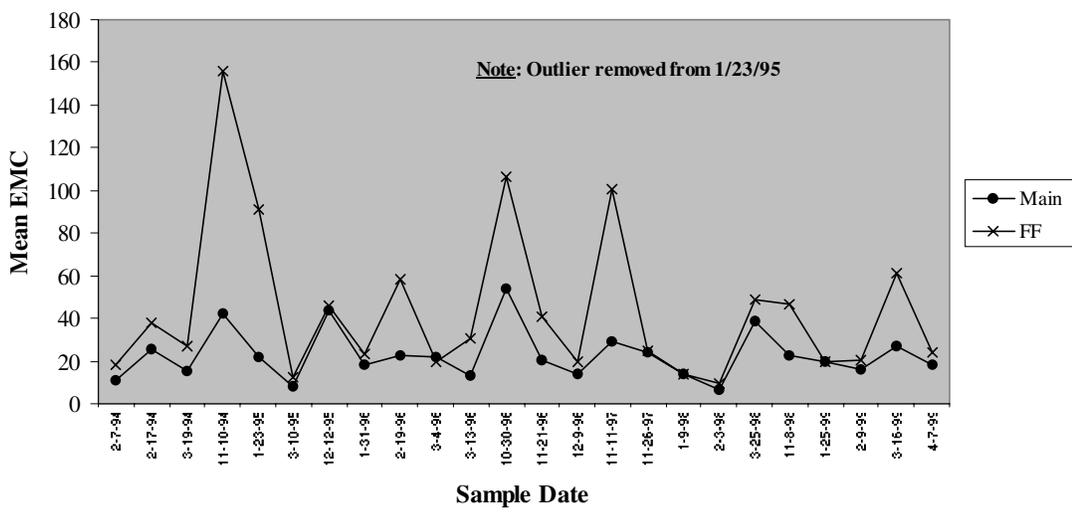


Figure 9-8: Mean EMC vs. Time -- NO₃-N
[Sites 1-7, Main Program vs. FF]

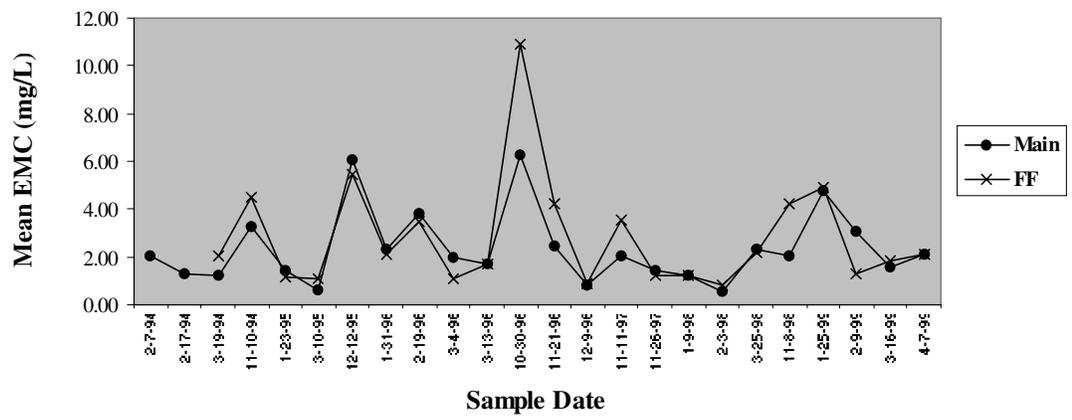


Figure 9-9: Mean EMC vs. Time -- Total P
[Sites 1-7, Main Program vs. FF]

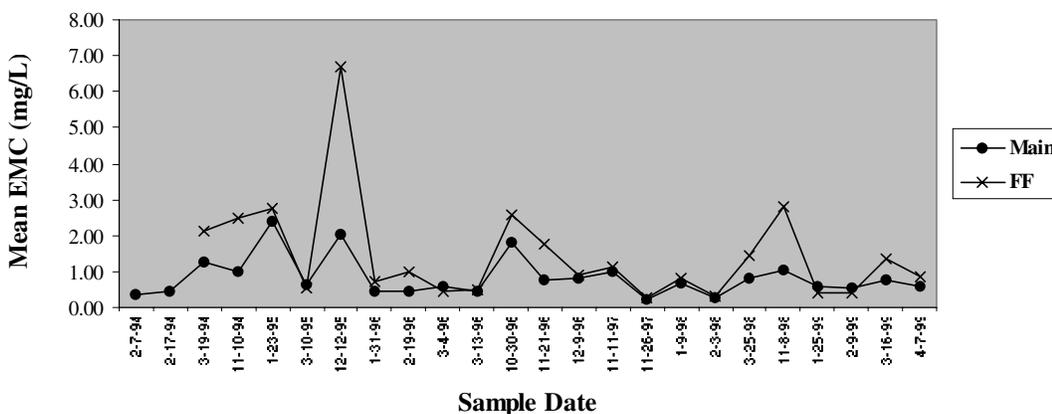


Figure 9-10: Mean EMC vs. Time -- Total Cu
[Sites 1-7, Main Program vs. FF]

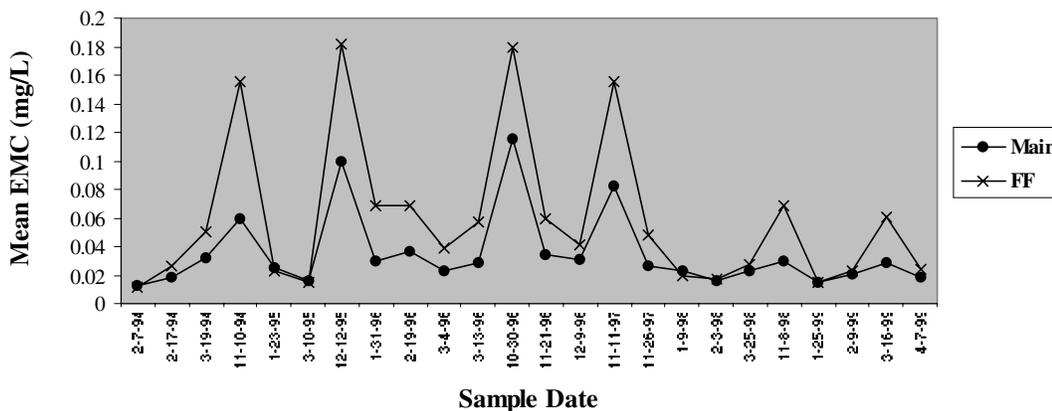


Figure 9-11: Mean EMC vs. Time -- Total Zn
[Sites 1-7, Main Program vs. FF]

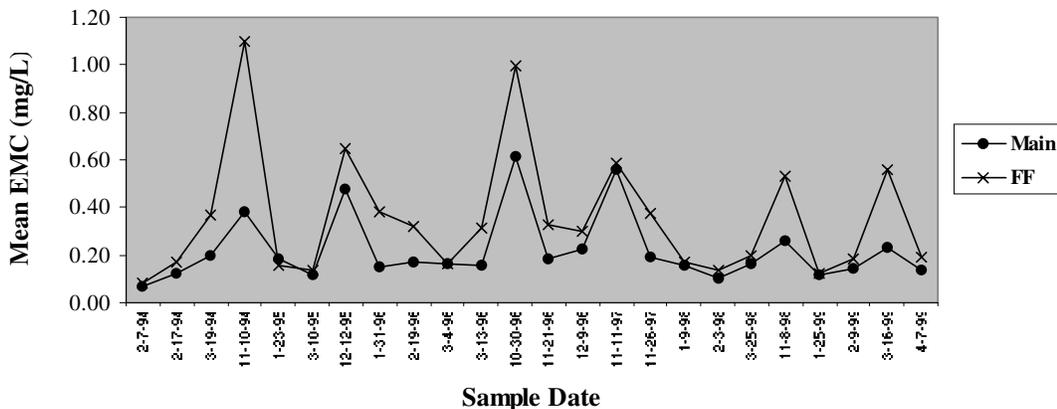
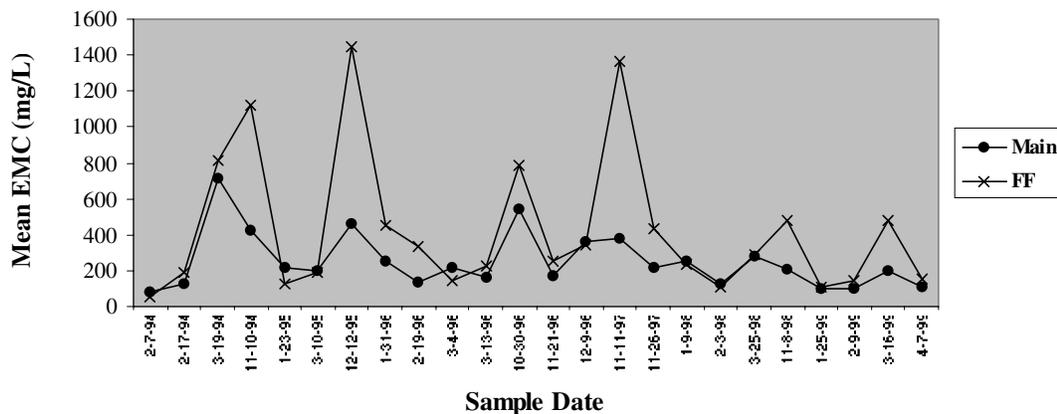


Figure 9-12: Mean EMC vs. Time -- TSS
[Sites 1-7, Main Program vs. FF]



Constituent	p-value
BOD	<0.0001
TSS	0.0033
NO3-N	0.2246
Total PO4	0.0019
Total Cu	<0.0001
Total Zn	<0.0001

Note: all "p" values below 0.05 indicate a statistically significant result.

Seasonal First Flush Effect

Figures 9-7 through 9-12 also can be used to evaluate the presence of a seasonal first flush effect. Each plot exhibits several obvious peaks for both the First Flush and Main Program data. In most cases, these peaks occur on the first sampling date of the season (e.g., 11/10/94, 12/12/95, 10/30/96, and 11/11/97), lending support to the idea of a seasonal first flush effect.

As more data are compiled for this program, more detailed statistical analysis may be used to evaluate and describe the seasonal first flush effect. However, these preliminary results indicate that the efforts of the stormwater program could be productively directed toward reducing discharges of pollutants during storm events occurring after prolonged dry periods; for example when scheduling street sweeping or catch basin cleaning.

9.2.5.4 Long Term Trends

A preliminary evaluation of trends can be accomplished using the data plotted in Figures 9-7 through 9-12, covering the period 1994-99. These plots show no obvious upward or downward trends in the data over this period. In fact, the notable feature of the graphs is the variability in the data from storm to storm, with occasional peaks (occurring in most cases during the seasonal "first flush" monitoring event, as discussed above).

Due to the inherent variability of stormwater data, and the gradual implementation of the management program over time, it is unlikely that trends would be readily observable over the initial five year monitoring period. Both a longer period of record, and additional statistical analysis of the data will likely be required before any such trends become evident.

9.3 Proposed Program

The overall goal of the proposed Monitoring Program is to provide information in support of effective implementation of the area-wide stormwater program. The proposed Monitoring Program outlined below builds on the data generated previously, but refocuses the program objectives and activities towards the evaluation of BMP effectiveness, identification of key pollutants of concern and their sources, evaluation of impacts from urban runoff sources to local receiving waters, and participation in regional monitoring and research programs as they pertain to stormwater quality. A key function of the Monitoring Program is to provide data that can be used to help direct pollutant control activities under the area-wide stormwater program; thereby helping to improve the stormwater program's overall effectiveness.

The specific objectives of the Monitoring Program will be addressed through a multi-faceted effort, including the following principle activities:

- Drainage area characterization and mapping: land use characterization and drainage system mapping efforts will be continued and refined, using the San Bernardino County GIS as a basis.
- BMP effectiveness studies: the usefulness of sedimentation basins and other available technologies as stormwater BMPs will be further evaluated. The results of this work will be used to assist the permittees in selecting and implementing effective BMPs.
- Receiving water monitoring: selected sites will be monitored for key chemical and physical constituents, focusing on sites upstream and downstream of the urbanized area on the Santa Ana River and Cucamonga Creek. The receiving water data will be used in conjunction with the stormwater discharge loading estimates to evaluate the relative contributions of stormwater discharges to receiving water quality. The results of this work will be used to help identify pollutants of concern, as well as support related watershed management efforts, including development of TMDLs. Receiving water monitoring will be coordinated with other regional monitoring efforts in the local watersheds; this may include consideration of additional types of monitoring activities beyond water chemistry monitoring.
- Conduct additional monitoring to provide bacteriological data in cooperation with Riverside County, in response to the request made by the RWQCB for a Technical Report for the Investigation of Bacteriological Impairments in the Upper Santa Ana River.
- Support and participate in coordinated regional monitoring efforts, including the multi-county/SCCWRP Stormwater Monitoring/Research Cooperative Program.
- Pollutants of concern identification: The stormwater discharge and receiving water monitoring data will be used in conjunction with the GIS-based mapping

information to identify pollutants of concern. This will involve evaluating the monitoring data in light of regulatory and other concerns to identify and prioritize the stormwater pollutants that are most in need of control.

- Source identification investigations: further work will be done to identify general and specific sources of high priority pollutants of concern. The results of this work will be used to help direct stormwater control efforts to effectively target significant pollutant sources.
- Data analysis: monitoring data will be analyzed using appropriate statistical techniques, in support of all Monitoring Program objectives. This will be especially important for assessing the relative contributions of stormwater discharges to receiving water loadings, evaluating BMP effectiveness, and evaluating the long-term effectiveness of the area-wide stormwater program.

The monitoring subcommittee will meet as needed to help plan and direct monitoring activities (see Performance Commitments in Section 1).

9.4 Proposed Activities

The various monitoring activities proposed for the 2001-06 permit term are further described in the following sections.

9.4.1 Drainage Area Characterization and Mapping

Land use maps and the associated database are being updated currently, using data from SCAG. The land use data have been reviewed by the individual permittees. Land uses and drainage areas are relatively complete and accurate; work continues on refining the drainage routings and other details. The data are being updated in GIS format.

This work will continue to completion in the near-term by the principal permittee, and will be updated periodically to accommodate land use and drainage system changes, as well as to incorporate corrections and updates/modifications as necessary to the GIS database.

The land use and drainage system information (including drainage boundaries and areas) will be available in printed map and electronic GIS database formats to the permittees and the RWQCB. Maps will be updated and submitted to the Regional Board by the second quarter of FY 2000-01 and every five years thereafter. This information will be used to refine the stormwater loading estimates and provide input for the source identification process.

9.4.2 BMP Effectiveness

The permittees will plan and conduct studies to further evaluate the usefulness of sedimentation basins and other available technologies as stormwater BMPs. This will involve special monitoring studies designed to evaluate the performance of specific

stormwater BMPs, by monitoring water quality and quantity entering and leaving selected BMPs. The results of this work will be used to assist the Management Committee in selecting and implementing effective stormwater BMPs.

9.4.3 Receiving Water Monitoring

Receiving water monitoring will continue during the 2001-06 permit term, with logistical and procedural modifications designed to improve the usefulness of the monitoring data in stormwater program decision-making. Receiving water monitoring also will be planned in coordination with other regional monitoring activities. The following changes are planned:

- Eliminate sampling restrictions related to the 72 hour dry period, the two week inter-event period, etc., as these restrictions are no longer mandated by EPA and unduly restrict monitoring logistics.
- Reduce the number of wet weather monitoring events from four to three annually.
- Modify receiving water monitoring to collect samples upstream and downstream of the urban influence from locations along Cucamonga Creek and the Santa Ana River (see Table 9-6). This will involve:
 - Identifying appropriate upstream and downstream sites along the Santa Ana River, in coordination with other monitoring efforts in the watershed;
 - Moving site 1 (formerly considered to be a stormwater discharge characterization site) slightly upstream of the current location in Cucamonga Creek, above the urban influence;
 - Retaining Site 2 as the downstream receiving water site on Cucamonga Creek (this site will be converted from its previous status as a stormwater discharge site);
 - Eliminating the City Creek site due to complications arising from the influence of upstream tunnel construction.
 - Coordinating receiving water monitoring with other regional monitoring efforts. This could involve adjusting the planned receiving water monitoring locations.
- Eliminate constituents that are rarely detected or deemed unnecessary (COD, silver). Add sampling and analysis for known water quality problems, including all section 303(d)-listed constituents, plus organophosphorous pesticides (especially diazinon and chlorpyrifos), which have been frequently found to be the cause of toxicity in urban runoff. Coliform monitoring will be introduced to address the section 303(d) listings for pathogens, and to address the bacteriological study request from the RWQCB. Selection of monitoring constituents can be refined as necessary by identifying a list of pollutants of

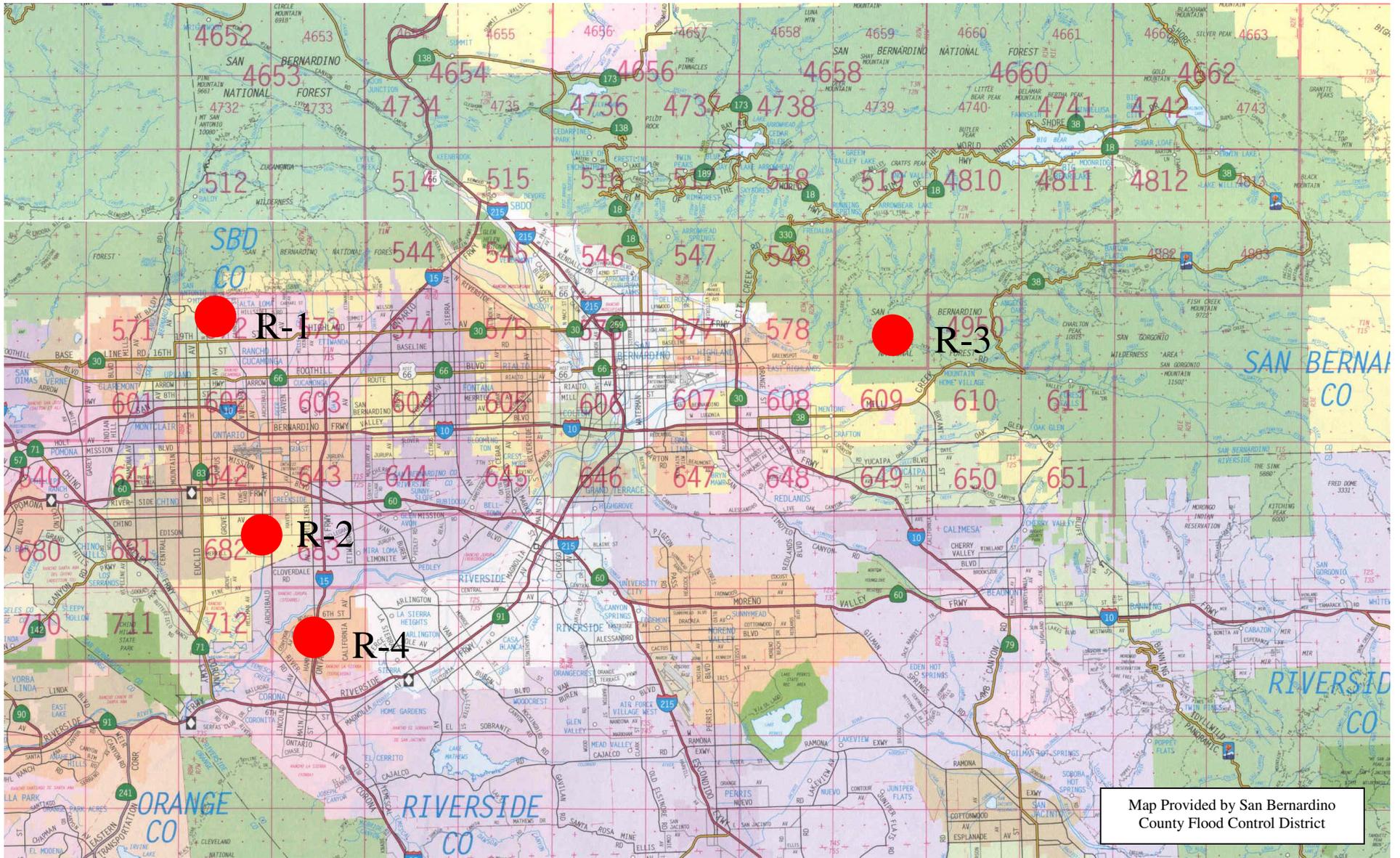
concern (see Section 9.4.4), and also to coordinate with other regional monitoring efforts. See Table 9-7 for a listing of the planned monitoring constituents, methods, and target analytical detection/reporting limits.

- Switch laboratory methods to improve analytical detection limits and thus provide better quantification of metals concentrations. Alternative methods are provided for most metals; for mercury, a switch to EPA method 1631 will be necessary to achieve sufficiently low levels for routine quantification. (See Table 9-7.)
- Consider additional monitoring methods to complement the planned water chemistry monitoring.

The planned receiving water monitoring sites are listed in Table 9-6, along with summary descriptive information. The locations of the planned receiving water monitoring sites are shown graphically on Figure 9-13.

Planned monitoring constituents are listed in Table 9-7 for composite sample parameters and Table 9-8 for grab sample parameters. The permittees will meet with representatives of other regional receiving water quality monitoring programs prior to or early in the 2001-06 permit term to determine means of effectively coordinating the San Bernardino receiving water monitoring activities with other planned or ongoing receiving water quality monitoring efforts.

Table 9-6 Planned Receiving Water Monitoring Sites				
Site No.	Location	Primary Land Use	Nearest SBCFCD Rain Gauge	Station Number
R-1	Cucamonga Creek above crosswalls	Open/forest	Cucamonga Canyon at mouth	1309
R-2	Cucamonga Creek @ Hwy 60	Commercial and Industrial	Ontario Fire Department	1335
R-3	Santa Ana River – 6 mi. upstream of 7 Oaks Dam	Open/forest	Santa Ana - Manzanita Flat	3002
R-4	Santa Ana River @ Hamner Ave.	Urbanized, Mixed Use	Chino Airport	1360



Locations of Proposed Sampling sites for ROWD:

- R-1 Cucamonga Creek, above crosswalls (above former site 1).
- R-2 Cucamonga Creek, below Hwy 60 (former site 2).
- R-3 Santa Ana River, at upper Edison powerhouse, 6 miles upstream from Seven Oaks Dam (above former site R-3, aka Site 10).
- R-4 Santa Ana River at Hamner Avenue (former site R-1, aka Site 8).

Figure 9-13
Proposed Monitoring Sites

Table 9-7 Analytical Parameters for Composite Samples			
Constituent	EPA Method	Units	Reporting Limit
Dissolved Metals			
Arsenic	206.3	µg/L	0.5
Cadmium	213.2; 200.8	µg/L	0.2
Chromium	218.2; 200.8	µg/L	1.0
Copper	220.2; 200.8	µg/L	1.0
Iron	200.9	µg/L	25.0
Lead	239.2; 200.8	µg/L	0.5
Mercury *	1631	µg/L	0.005
Nickel	249.2; 200.8	µg/L	2.0
Selenium	289.2; 270.3	µg/L	2.0
Zinc	200.8	µg/L	5.0
Total Recoverable Metals			
Arsenic	206.3	µg/L	0.5
Cadmium	213.2; 200.8	µg/L	0.2
Chromium	218.2; 200.8	µg/L	1.0
Copper	220.2; 200.8	µg/L	1.0
Iron	200.9	µg/L	25.0
Lead	239.2; 200.8	µg/L	0.5
Mercury *	1631	µg/L	0.005
Nickel	249.2; 200.8	µg/L	2.0
Selenium	289.2; 270.3	µg/L	2.0
Zinc	200.8	µg/L	5.0
Conventionals			
BOD ₅	405.1	mg/L	2
TOC	415.1	mg/L	1
TDS	160.1	mg/L	10
TSS	160.2	mg/L	4
Total Hardness	130.2	mg/L	1
Nutrients			
Total Phosphorous	365.1	mg/L	0.05
Diss. Phosphorous	365.1	mg/L	0.05
TKN	351.3	mg/L	0.1
Nitrate plus Nitrite	353.1-3	mg/L	0.1
Total Nitrogen	calculate	mg/L	
Ammonia-N	350.3	mg/L	0.1
Organics			
OP Pesticides	8141	µg/L	varies

* Mercury may also be sampled as a grab sample.

Table 9-8 Analytical Parameters for Grab Samples			
Constituent	EPA Method	Units	Reporting Limit
Conventionals/General			
Oil and Grease	1664	mg/L	5
Field pH	150.1	---	N/A
Field Specific Conductance	120.1	umhos/cm at 20°C	1
Microbiology			
Fecal and Total Coliform	SM 9221 ⁽¹⁾	MPN/100mL	200 ⁽²⁾
Fecal Streptococcus	SM 9230 ⁽¹⁾	MPN/100mL	200 ⁽²⁾

- ⁽¹⁾ Method number refers to Standard Methods
⁽²⁾ Utilize a detection limit of 2 MPN/100 mL for blanks.

9.4.4 Support Coordinated Regional Monitoring

The permittees will provide financial and logistical support to the multi-county SCCWRP Stormwater Monitoring/Research Cooperative Program, and consider other opportunities that may be presented.

9.4.5 Pollutants of Concern

The stormwater discharge and receiving water monitoring data will be used to identify pollutants of concern. This will involve assessing the monitoring results in the context of regulatory imperatives and other concerns within the Permitted area. Issues that may be used to identify and prioritize stormwater pollutants include:

- Pollutants listed as causes of impairment in local Section 303(d) listings;
- Stormwater pollutants that may cause or contribute to exceedances of Basin Plan or California Toxics Rule standards;
- Pollutants known to be causes of toxicity in urban runoff;
- Pollutants known to be of significant local or regional concern to the public.

The net result of this effort will be a prioritized list of pollutants that are most in need of control. This list can then be used to prioritize the source identification work (see section 9.4.6).

9.4.6 Source Identification

The Management Committee will investigate means of further determining the sources of key pollutants of concern, on a pollutant-by-pollutant basis. This will involve evaluating the monitoring data in conjunction with the GIS-based mapping information and other available information on stormwater pollutant sources to

identify general and specific sources of high priority pollutants within the permitted area. This may include review and comparisons of the San Bernardino stormwater monitoring data with data from other municipalities; literature reviews and related research; or additional, targeted monitoring of suspected sources in stormwater discharges or receiving waters. The results of this work will be used to help direct stormwater control efforts to effectively target significant pollutant sources.

9.4.7 Data Analysis

The discharge and receiving water data will be analyzed using appropriate statistical techniques, in support of all Monitoring Program objectives. This will include the following specific activities:

- Using the improved GIS-based land use and drainage information to refine pollutant loading estimates and assess the relative contributions of stormwater discharges to receiving water loadings;
- Analyzing the monitoring data in reference to regulatory water quality objectives; and
- Evaluating BMP effectiveness.

9.5 Performance Commitments

The permittees propose the following performance commitments for the 2001-06 permit term. Performance commitments are proposed as enforceable elements under the area-wide permit.

- (9-1) Complete the GIS-based mapping of drainage area information, including drainage system facilities, land uses, and receiving waters. Revise and update on an as-needed basis.
- (9-2) Evaluate the effectiveness of selected BMPs and evaluate their usefulness within the area-wide stormwater program.
- (9-3) Conduct receiving water monitoring at four sites (upstream and downstream of the urban area in Cucamonga Creek and Santa Ana River) for three wet weather events annually.
- (9-4) Investigate sources of bacteriological impairments in the upper Santa Ana River. Plan study during 2000-01.

Appendix A

Abbreviations, Acronyms, and Definitions

Appendix A

Abbreviations, Acronyms, and Definitions

Abbreviations

ac	acre
cy	cubic yards
ft	feet
gal	gallon
gpm	gallons per minute
ha	hectares
hr	hour
in	inches
lf	linear feet
l	liter
m	meter
mm	millimeter
s	second

Acronyms

BMP	Best Management Practice
CEQA	California Environmental Quality Act
CWA	Clean Water Act
DAMP	Drainage Area Management Plan
EPA	Environmental Protection Agency

FSS	Field Services Section
HHWP	Household Hazardous Waste Program
HMD	Hazardous Materials Division
LOP	Local Oversight Program
MAPPS	Municipal Activities Pollution Prevention Strategy
MEP	Maximum Extent Practicable
MSDS	Material Safety Data Sheets
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NONC	Notice of New Construction
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
ROWD	Report of Waste Discharge
RWQCB	California Regional Water Quality Control Board (Typically refers to the Santa Ana RWQCB)
SBCFCD	San Bernardino County Flood Control District
SCAG	Southern California Associated Governments
SCCWRP	Southern California Coastal Waters Research Project
SIC	Standard Industrial Classification
SWPPP	Storm Water Pollution Prevention Plan
SWQ	Storm Water Quality
SWRCB	California State Water Resources Control Board
TMDL	Total Maximum Daily Load
WDID	Waste Discharge Identification Number
WLA	Waste Load Allocations

WQMP	Water Quality Management Plan
Y2K	Calendar Year 2000.

Definition of Terms

Beneficial Use: One of the various ways that water can be used for the benefit of people and/or wildlife. Examples include drinking, swimming, industrial and agricultural water supply, and the support of fresh and saline aquatic habitats. (Source: *Water Quality Control Plan, Santa Ana River Basin (8)*, 1995. California Regional Water Quality Control Board, Santa Ana Region)

Best Management Practice (BMP): A program, technology, process, siting criteria, operational method or measure, or engineered system; which when implemented, will prevent, control, remove, or reduce pollution.

Clean Water Act (CWA): The Federal Water Pollution Control Act enacted in 1972 by Public Law 92-500 and amended by the Water Quality Act of 1987. The Clean Water Act prohibits the discharge of pollutants to Waters of the United States unless said discharge is in accordance with an NPDES permit. The 1987 amendments include guidelines for regulating municipal, industrial, and construction storm water discharges under the NPDES program.

Co-permittees: The cities of Big Bear Lake, Chino, Chino Hills, Colton, Fontana, Grand Terrace, Highland, Loma Linda, Montclair, Ontario, Rancho Cucamonga, Redlands, Rialto, San Bernardino, Upland, Yucaipa, and the County of San Bernardino. The 17 permittees that are not the principal permittee. See "Permittees" and "Principal Permittee."

Environmental Protection Agency (EPA): Agency that issued the regulations to control pollutants in stormwater runoff discharges (The Clean Water Act and NPDES permit requirements).

General Construction Permit: The NPDES General Permit for Storm Water Discharges Associated with Construction Activity. SWRCB Order No. 99-08-DWQ, NPDES General Permit No. CAS000002 or its subsequent replacement.

General Industrial Permit: Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities. SWRCB Order No. 97-03-DWQ, NPDES General Permit No. CAS000001 or its subsequent replacement.

Illegal Dumping: The disposal of non-stormwater material, such as paint or waste oil, or polluted waste streams to a storm drain system.

Illegal Discharges: Any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except those that are covered by or exempted by a National Pollutant Discharge Elimination System (NPDES) permit. Within this Report of Waste Discharge, illegal discharges are divided into two general categories: illegal dumping and illicit connections.

Illicit Connections: Unauthorized connections from a facility to a storm drain system.

Maximum Extent Practicable: The highest appropriate level of implementation, taking into account equitable considerations of synergistic, additive, and competing factors; including, but not limited to, gravity of the problem, fiscal feasibility, public health risks, societal concerns, and social benefits.

National Pollutant Discharge Elimination System (NPDES) Permit: The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits under the Clean Water Act. A permit issued pursuant to the Clean Water Act that requires the discharge of pollutants to Waters of the United States from storm water be controlled.

Non-Storm Water Discharge: Any discharge to a storm drain system or receiving water that is not composed entirely of storm water.

Notice of Intent (NOI): A form that must be completed and submitted to the State Water Resources Control Board (SWRCB) as part of the process for obtaining coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (General Construction Permit) or the NPDES General Permit for Storm Water Discharges Associated with Industrial Activity (General Industrial Permit). The form provides basic project information and informs the SWRCB that the project owner intends to comply with the terms of the permit.

The permittees' construction and general industrial activities were covered under the previous permit (NPDES No. CAS618036, Order No. 96-32), so coverage under the general permits was not required. To satisfy notification requirements of the previous permit, however, the permittees had to submit a Notice of New Construction (NONC) to the Regional Water Quality Control Board for each construction project that would otherwise require coverage under the General Permit. The next area-wide permit will likely contain similar provisions.

Notice of New Construction: Under the previous NPDES permit (CAS618036, Order No. 96-32) the permittees would submit a Notice of New Construction (NONC) to the Regional Water Quality Control Board as notification that the permittee agency is initiating construction activities that would otherwise require coverage under the

General Construction Permit. The NONC also notified the RWQCB that the permittee would comply with the requirements of the General Construction Permit. See NOI, above.

Notice of Termination: A form that must be submitted to the appropriate Regional Water Quality Control Board (RWQCB) when a construction site has been re-stabilized or a business industrial activity has ceased and the owner wishes to terminate coverage under the appropriate general permit (General Construction Permit or General Industrial Permit).

Permanent BMP: BMPs that are installed during construction and designed to provide long-term storm water quality protection following a project's completion.

Permit: As used within this ROWD, "the 2001-06 Permit" refers to the NPDES Permit expected to be issued by the Santa Ana RWQCB in March 2001 to regulate the discharge of stormwater runoff from the Santa Ana River Watershed within San Bernardino County. The "1996-01 permit" refers to Stormwater Permit Order No. 96-32, NPDES Permit No. CAS618036, which was issued in March 1996 and expires in March 2001.

Permittees: Those agencies covered by "the Permit". Consists of the principal permittee (San Bernardino County Flood Control District) and the 17 co-permittees (the cities of Big Bear Lake, Chino, Chino Hills, Colton, Fontana, Grand Terrace, Highland, Loma Linda, Montclair, Ontario, Rancho Cucamonga, Redlands, Rialto, San Bernardino, Upland, Yucaipa, and the County of San Bernardino).

Pollution: The man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water. An alteration of the quality of the water of the state by waste to a degree which unreasonably affects either the waters for beneficial uses or facilities that serve these beneficial uses.

Principal Permittee: The permittee designated to manage the area-wide program. Currently the principal permittee is the San Bernardino County Flood Control District (SBCFCD).

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. For this permit, the RWQCB is the RWQCB - Santa Ana Region.

Reporting Year: The 12-month period starting July 1 and ending the following June 30. The annual reports submitted to the RWQCB cover permittee activities for each reporting year.

Report of Waste Discharge (ROWD): Constitutes the application to the RWQCB for the next area-wide NPDES permit. The ROWD also describes the area-wide storm water program proposed by the permittees for the next permit term.

Sediment: Organic or inorganic material that is carried by or suspended in water and that settles out to form deposits in the storm drain system or receiving waters.

State Water Resources Control Board (SWRCB): California agency that implements and enforces Clean Water Act Section 402(p) NPDES permit requirements, is issuer and administrator of these permits as delegated by EPA, the lead agency for the nine Regional Water Quality Control Boards.

Storm Drain System: Streets, gutters, inlets, conduits, natural or 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.

Stormwater: Rainfall runoff, snow melt runoff, and surface runoff and drainage.

Storm Water Pollution Prevention Plan (SWPPP): A plan required by the General Construction Permit and the Industrial Activities Permit that includes site map(s), an identification of construction/contractor activities that could cause pollutants in the storm water, and a description of measures or practices to control these pollutants. It must be prepared and approved before construction begins.

Total Maximum Daily Loads (TMDL): The maximum amount of a pollutant that a water body can assimilate and still meet ambient water quality standards. TMDLs are established for water quality-limited segments, which are defined as “any segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after the application of technology-based effluent limitations...” (40 CFR 130.2(j)). TMDLs are implemented through waste load allocations (WLA) applied to point sources and load allocations (LA) applied to non-point sources.

Waste Discharge Identification Number (WDID): The unique project number issued by the SWRCB upon receipt of the Notice of Intent (NOI).

Waste Load Allocations (WLA): The maximum load of pollutants each discharger of waste is allowed to release into a particular waterway. Discharge limits are usually required for each specific water quality criterion being, or expected to be, violated. Also, the portion of a stream’s total assimilation capacity assigned to an individual discharge.

Waters of the United States: Defined by EPA regulations to include:

(1) Navigable water

- (2) Tributaries of navigable water
- (3) Interstate waters
- (4) All other waters, such as intrastate lakes, rivers and streams, the use, degradation, or destruction of which would affect interstate or foreign commerce, including such waters:
 - (a) which are or could be used by interstate travelers for recreation and other purposes, or
 - (b) from which fish or shellfish could be taken and sold in interstate commerce, or
 - (c) which are used or could be used for industrial purposes by industries engaged in interstate commerce
- (5) All impoundments of waters otherwise defined as waters of the United States
- (6) Tributaries of waters described herein
- (7) The territorial sea; and
- (8) Wetlands adjacent to waters otherwise defined as waters of the United States

(See the *Guidance Manual for the Preparation of Part 1 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems* (USEPA, 1991) for more information.)

Appendix B

Water Quality Management Plan Outline

Water Quality Management Plan

Cover Page

Name of Project
Name of Company
Date

Next Page

Signed statement (with date) certifying that the provisions of the WQMP have been accepted by the applicant and that the applicant will strive to have the plan carried out by all future successors.

Report Table of Contents

- I. Tract or Discretionary permit number(s) and condition number(s). Spell out conditions verbatim.
- II. Project Description
 1. Type of Project.
 2. Project Size
 3. Homeowners Association or Property Owner's Association Formation.
- III. Site Description
 1. Identify the watershed the project is in.
 2. Is there a pre-existing water quality problem that has been identified in the watershed planning process?
- IV. Best Management Practices (BMP)
 1. List and describe applicable structural and non-structural BMPs from Tables 1 and 2 that are applicable to your project, depending on the proposed land use, size, and use of a property owners' association.
- V. Inspection/ Maintenance Responsibility for BMPs
- VI. Figures
 1. Location Map
 2. Site Plan (acceptable reduced drainage map) identifying storm drain facilities and receiving waters.

Appendix C
BMP Lists for
Industrial/Commercial Site Visits

BMP Lists for Industrial/Commercial Site Visits

Part 2.V.B of the Permit requires Permittees to conduct specific activities related to industrial/commercial education. They must collect information on industrial/commercial facilities, conduct educational site visits at those facilities, incorporate information from an approved best management practices (BMP) list into their outreach measures, and report quarterly on the facilities visited. Guidance to assist Permittees with the implementation of their programs is provided in other documents. This document presents the lists of BMPs that must be approved by the Regional Board before they can be incorporated into Permittee programs.

The Permit requires the Principal Permittee, in consultation with the Permittees, to develop BMP lists for each group of facilities that requires educational site visits. These groups of facilities include:

- All industrial groups regulated under Phase 1 of the Federal stormwater program (Phase 1 Facilities)
- Motor vehicle repair shops, motor vehicle body shops, motor vehicle parts and accessories facilities, gas stations, and restaurants (Other Specific Facilities).

The BMPs must:

- Address multiple pollutants.
- Initially focus on pollutant source minimization, education, good housekeeping, and site design alternatives.
- Target source areas and activities with the highest potential to generate substantial pollutant loads.

The BMP lists are included as Attachment 1: Phase 1 Facilities, and Attachment 2: Other Specific Facilities. Once the BMP lists have been approved by the Regional Board, they must be incorporated into outreach measures conducted during the educational site visits. This may include using them as fact sheets to hand out to appropriate facilities, incorporating their information into educational materials, or using them to increase the knowledge of staff who will be conducting the site visits.

There is no expectation on the part of the Regional Board, nor does the Permit require, that such lists be completed by a Permittee during the course of conducting an educational site visit at a facility. In addition, there is no expectation on the part of the Regional Board that these lists be utilized by Permittees at their own municipal facilities. BMPs appropriate for municipal facilities are described in the Public Agency Activities Model Program. Permittees must comply with the requirements of that Model Program at their own municipal facilities.

The BMP lists are not required to be implemented by all facilities but are only suggested BMPs. They are provided as guidance to help facility owners develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Some facilities may be subject to other state or federal environmental protection programs such as the Resource Conservation and Recovery Act (RCRA) and the Underground Storage Tank (UST) program. Implementing the BMPs suggested in this document does not replace a facility's requirement to comply with these other programs.

Generally, source controls will be easier and less costly for facilities to implement in the near term. These types of controls include good housekeeping activities, employee training, and methods to reduce the source of pollutants by substituting products, reducing their use, and using/storing them inside. Structural controls may need to be carefully considered to ensure they are appropriate and cost-effective. For some activities, however, such as land disturbing activities, structural controls may be the primary solution.

The following discussion explains the source of the BMP lists.

Phase 1 Facilities

In California, the General Industrial Storm Water Permit (General Industrial Permit-Renewed April 1997) is the stormwater regulatory document for industrial facilities. On September 29, 1995, USEPA issued the NPDES Storm Water Multi-Sector General Permit for Industrial Activities (Multi-Sector Permit) to serve as a general permit for industrial facilities in most other areas of the United States. The Multi-Sector Permit provides lists of typical activities, pollutant sources, pollutants, and suggested BMPs for industrial facilities, breaking them out into 29 "sectors" of industrial activity. The lists of BMPs in the Multi-Sector Permit were developed following an extensive survey of facilities, a review of existing Stormwater Pollution Prevention Plans, and additional discussion and review. With this in mind, the list of BMPs in Attachment 1 was taken directly from the Multi-Sector Permit. The BMPs were edited slightly to put them in a common format. Care was taken to avoid interpreting the BMP, adding to or deleting from its intent. For additional guidance on pollutant sources, special considerations and references, please see the original Multi-Sector Permit.

Other Specific Facilities

The BMP lists for these facilities are arranged into three sections: Vehicle Service Facilities, Gasoline Stations, and Restaurants. The BMP lists represent a compilation of activities developed by other stormwater management programs and wastewater agencies. The basis for the vehicle service facility BMPs is the document *Your Shop Can Make a Difference! What vehicle service shops can do to protect water quality in the Bay and Delta* (Bay Area Stormwater Management Agencies Association and Bay Area Dischargers Association, 1995). The Gasoline Station BMPs are based on the

document Retail Gasoline Outlet BMPs (California Storm Water Quality Task Force, in press). These BMPs are very detailed due to extensive refinement over several years by state task forces and committees that included industry representatives. The bases for the restaurant BMPs are a wide range of documents created throughout Los Angeles County.

BMP List Index

Table 1 is an index to all BMP lists and their SIC codes.

Table 1 Index of BMP Lists for Industrial/Commercial Facilities		
Attachment 1		
Page Section	SIC Codes (exceptions in parentheses)	Industry Types
A	24 (2434)	Timber Products Facilities
B	26	Paper and Allied Products Mfg Facilities
C	28 (283)	Chemicals and Allied Products Mfg Facilities
D	29	Asphalt Paving and Roofing Materials Manufacturers and Lubricant Manufacturers
E	32	Glass, Clay, Concrete, and Gypsum Product Facilities
F	33	Primary Metals Facilities
G	10	Metal Mining Facilities
H	12	Coal Mines and Coal Mining-Related Facilities
I	13	Oil & Gas Extraction Facilities
J	14	Mineral Mining and Processing Facilities
K	4953	Hazardous Waste Treatment, Storage or Disposal Facilities
L	4953	Landfills and Land Application Sites
M	5015	Automobile Salvage Yards
N	5093	Scrap & Waste Recycling
O	4911	Steam Electric Power Generating Facilities
P	40	Vehicle and Equipment Maintenance Areas at Land

Table 1		
Index of BMP Lists for Industrial/Commercial Facilities		
Attachment 1		
Page Section	SIC Codes (exceptions in parentheses)	Industry Types
	41 42 43 5171	Transportation Facilities
Q	44	Vehicle and Equipment Maintenance Areas at Water Transportation Facilities
R	373	Ship & Boat Building or Repairing Yards
S	45	Vehicle and Equipment Maintenance and Deicing Areas at Air Transportation Facilities
T	4952	Treatment Works
U	20 21	Food and Kindred Products Facilities
V	22 23	Textile Mills, Apparel, and Other Fabric Product Manufacturing Facilities
W	2434 25	Wood and Metal Furniture and Fixture Manufacturing Facilities
X	27	Printing and Publishing Facilities
Y	30 39	Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries
Z	31	Leather Tanning and Finishing Facilities
AA	34	Fabricated Metal Products Industry
AB	35 (357) 37 (373)	Facilities that Manufacture Transportation Equip., Industrial, or Commercial Machinery
AC	357 38 36	Manufacturers of Electronic and Electrical Equipment
Attachment 2		

<p align="center">Table 1 Index of BMP Lists for Industrial/Commercial Facilities</p>		
<p>Attachment 1</p>		
<p>Page Section</p>	<p>SIC Codes (exceptions in parentheses)</p>	<p>Industry Types</p>
<p>Page Section</p>	<p>SIC Codes (exceptions in parentheses)</p>	<p>Commercial Types</p>
AD	5013 5014 7532-7534 7536-7539	Vehicle Service Facilities
AE	5541	Gasoline Stations
AF	5812	Restaurants

Attachment 1
BMPs for Phase 1 Facilities

Timber Products Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Log, Lumber, and Other Wood Product Storage Areas

- Divert storm water around storage areas with ditches, swales and/or berms.
 - Locate storage areas on stable, well-drained soils with slopes of 2-5 percent.
 - Line storage areas with crushed rock or gravel or porous pavement to promote infiltration, minimize discharge and provide sediment and erosion control.
 - Stack materials to minimize surface areas of materials exposed to precipitation.
 - Practice good housekeeping measures such as frequent removal of debris.
 - Provide collection and treatment of runoff with containment basins, sedimentation ponds and infiltration basins.
 - Use ponds for collection, containment and recycle for log spraying operations.
 - Use silt fence and rip rap check dams in drainage ways.
-

Residue Storage Areas

- Locate stored residues away from drainage pathways and surface waters.
- Avoid contamination of residues with oil, solvents, chemically treated wood, trash, etc.
- Limit storage time of residues to prevent degradation and generation of leachates.
- Divert storm water around residue storage areas with ditches, swales and/or berms.
- Assemble piles to minimize surface areas exposed to precipitation.
- Spray surfaces to reduce windblown dust and residue particles.
- Place materials on raised pads of compacted earth, clay, shale, or stone to collect and drain runoff.
- Cover and/or enclose stored residues to prevent contact with precipitation using silos, van trailers, shed, roofs, buildings or tarps.
- Limit slopes of storage areas to minimize velocities of runoff which may transport residues.
- Provide collection and treatment of runoff with containment basins, sedimentation ponds and infiltration basins.
- Use silt fence and rip rap check dams in drainage ways.

Loading and Unloading and Material Handling Areas

- Provide diversion berms and dikes to limit run on.
 - Cover loading and unloading areas.
 - Enclose material handling systems for wood wastes.
 - Cover materials entering and leaving areas.
 - Provide good housekeeping measures to limit debris and to provide dust control.
 - Provide paved areas to enable easy collection of spilled materials.
-

Chemical Storage Areas

- Provide secondary containment around chemical storage areas.
 - Inventory of fluids to identify leakage.
 - Locate storage areas away from high traffic areas and surface waters.
 - Develop spill prevention, containment and countermeasure (SPCC) plans and implement.
 - Cover and/or enclose chemical storage areas.
 - Provide drip pads to allow for recycling of spills and leaks.
-

Wood Surface Protection and Preserving Activities

- Extend drip time in process areas before moving to storage areas.
- Pave and berm areas used by equipment that has come in contact with treatment chemicals.
- Dedicate equipment that is used for treatment activities to that specific purpose only to prevent the tracking of treatment chemicals to other areas on the site.
- Locate treatment chemical loading and unloading areas away from high traffic areas where tracking of the chemical may occur.
- Provide drip pads under conveyance equipment from treatment process areas.
- Provide frequent visual inspections of treatment chemical loading and unloading areas during and after activities occur to identify any spills or leaks needing clean-up.
- Cover and/or enclose treatment areas.
- Provide containment in treated wood storage areas.
- Cover storage areas to prevent contact of treated wood products with precipitation.
- Elevate stored, treated wood products to prevent contact with run on/runoff.

Paper and Allied Products Manufacturing Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Outdoor Loading and Unloading

- Confine loading/unloading activities to a designated response and control area.
 - Avoid loading/unloading materials in the rain.
 - Cover loading/unloading area/or conduct these activities indoors.
 - Develop and implement spill plans.
 - Use berms or dikes around area page 50850.
 - Inspect containers for leaks or damage prior to loading.
 - Use catch buckets, drop cloths, and other spill prevention measures where liquid materials are loaded/unloaded.
 - Provide paved areas to enable easy collection of spilled materials.
-

Raw and/or Waste Material Storage Areas

- Confine storage to a designated area.
- Store materials inside.
- Cover storage areas with a roof or tarp.
- Use dikes or berms for storage tanks and drum storage.
- Cover dumpsters used for waste paper and other materials.
- Store materials on concrete pads to allow for recycling and spills of leaks.
- Expedite recycling process for exposed scrap paper.
- Develop and implement spill plans.
- Provide paved areas to enable easy collection of spilled materials.
- Provide good housekeeping (i.e., dust and debris collection) where cyclones are utilized.

Log, Lumber and Other Wood Product Storage Areas

- Divert storm water around storage areas with ditches, swales, and/or berms.
- Practice good housekeeping measures such as frequent removal of debris.
- Line storage areas with crushed rock or gravel or porous pavement to promote infiltration, minimize discharge and provide sediment and erosion control.
- Use ponds for collection, containment and recycle for log spraying operations.

Chemical and Allied Products Manufacturing Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Good Housekeeping

- Schedule regular pickup and disposal of garbage and waste materials or other measures to dispose of waste. Individuals responsible for waste management and disposal should be informed of the procedures established under the plan.
- Routinely inspect for leaks and conditions of drums, tanks and containers. Ensure that spill cleanup procedures are understood by employees.
- Keep an up to date inventory of all materials present at the facility. While preparing the inventory, all containers should be clearly labeled. Hazardous containers that require special handling, storage, use and disposal considerations should be clearly marked and readily recognizable.
- Maintain clean ground surfaces by using brooms, shovels, vacuum cleaners or cleaning machines. Employee training should address procedures for equipment and containers cleaning and washing. The training should emphasize the human hazards and the potential environmental impacts from the discharges of washwaters.
- Facilities should consider evaluating existing security systems such as fencing, lighting, vehicular traffic control, and securing of equipment and to prevent accidental or intentional entry which could cause a discharge of pollutants to waters of the United States.

Material Handling and Storage Areas

- For areas where liquid or powdered materials are stored, facilities should consider providing either diking, curbing, or berms.
- For all other outside storage areas including storage of used containers, machinery, scrap and construction materials, and pallets, facilities should consider preventing or minimizing storm water runoff to the storage area by using curbing, culverting, gutters, sewers or other forms of drainage control.
- For all storage areas, roofs, covers or other forms of appropriate protection should be considered to prevent exposure to weather. In areas where liquid or powdered materials are transferred in bulk from truck or rail cars, permittees should consider appropriate measures to minimize contact of material with precipitation.
- Permittees should consider providing for hose connection points at storage containers to be inside containment areas and drip pans to be used in areas which are not in a containment area, where spillage may occur (e.g., hose reels, connection points with rail cars or trucks) or equivalent measures.
- In areas of transfer of contained or packaged materials and loading/unloading areas, permittees should consider providing appropriate protection such as overhangs or door skirts to enclose trailer ends at truck loading/unloading docks or an equivalent.
- In order to prevent facilities from discharging contaminated storm water from areas where precipitation is contained, contained areas should be restrained by valves or other positive means to prevent the discharge of a spill or leak. Containment units may be emptied by pumps or ejectors; however, these should be manually activated. Flapper type drain valves should not be used to drain containment areas. Valves used for the drainage of containment areas should, as far as is practical, be of manual, open or closed design. If facility drainage is not engineered as above, the final discharge point of all in-facility sewers should be equipped to prevent the discharge in the event of an uncontrolled spill of materials.
- Use storm water management practices to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site.
- For areas with a potential for significant soil erosion, use permanent stabilization practices to stabilize disturbed areas. The measures will minimize the amount of sediment materials in the discharge.

Asphalt Paving and Roofing Materials Manufacturers and Lubricant Manufacturers

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Material Storage, Handling, and Processing

- Cover material storage and handling areas with an awning tarp or roof.
- Practice good stockpiling practices such as: storing materials on concrete or asphalt pads; surrounding stockpiles with diversion dikes or curbs; and revegetating areas used for stockpiling in order to slow runoff.
- Use curbing, diking or channelization around material storage, handling and processing areas to divert run on around areas where it can come into contact with material stored or spilled on the ground.
- Utilize secondary containment measures such as dikes or berms around asphalt storage tanks and fuel oil tanks.
- Use dust collection systems (i.e., baghouses) to collect airborne particles generated as a result of material handling operations or aggregate drying.
- Properly dispose of waste materials from dust collection systems and other operations.
- Remove spilled material and dust from paved portions of the facility by shoveling and sweeping on a regular basis.
- Utilize catch basins to collect potentially contaminated storm water.
- Implement spill plans to prevent contact of runoff with spills of significant materials.
- Clean material handling equipment and vehicles to remove accumulated dust and residue.
- Use a detention pond or sedimentation basin to reduce suspended solids.
- Use an oil/water separator to reduce the discharge of oil/ grease.

Glass, Clay, Cement, Concrete, and Gypsum Product Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Storing Dry Bulk Materials

- Store materials in an enclosed silo or building. Materials may include sand, gravel, clay, cement, fly ash, kiln dust, and gypsum.
- Cover material storage piles with a tarp or awning.
- Divert run on around storage areas using curbs, dikes, diversion swales or positive drainage away from the storage piles.
- Install sediment basins, silt fence, vegetated filter strips, or other sediment removal measures downstream/downslope.
- Only store washed sand and gravel outdoors.

Handling Bulk Materials

- Use dust collection systems (e.g., bag houses) to collect airborne particles generated as a result of handling operations.
- Remove spilled material and settled dust from paved portions of the facility by shoveling and sweeping on a regular basis.
- Periodically clean material handling equipment and vehicles to remove accumulated dust and residue.
- Install sediment basins, silt fence, vegetated filter strips, or other sediment removal measures downstream/downslope.

Mixing Operations

- Use dust collection systems (e.g., bag houses) to collect airborne particles generated as a result of mixing operations.
- Remove spilled material and settled dust from the mixing area by shoveling and sweeping on a regular basis.
- Clean exposed mixing equipment after mixing operations are complete.
- Install sediment basins, silt fence, vegetated filter strips, or other sediment removal measures downstream/downslope.

Vehicle and Equipment Washing

- Designate vehicle and equipment wash areas that drain to recycle ponds or process wastewater treatment systems.
- Train employees on proper procedure for washing vehicles and equipment including a discussion of the appropriate location for vehicle washing.
- Conduct vehicle washing operation indoors or in a covered area.
- Clean wash water residue from portions of the site that drain to storm water discharges.

Dust Collection

- Maintain dust collection system and baghouse. Properly remove and recycle or dispose of collected dust to minimize exposure of collected dust to.
-

Pouring and Curing Pre-cast Concrete Products

- Pour and cure precast products in a covered area.
- Clean forms before storing outdoors.

Primary Metals Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Metal Product Stored Outside Such as Returns, Scrap Metal, Turnings, Fines, Ingots, Bars, Pigs, Wire

- Store all wastes indoors or in sealed drums, covered dumpsters, etc.
- Minimize raw material storage through effective inventory control.
- Minimize run on from adjacent properties and stabilized areas to areas with exposed soil with diversion dikes, berms, curbing, concrete pads, etc.

Outdoor Storage or Handling of Fluxes

- Store fluxes in covered hoppers, silos, or indoors and protect from wind-blown losses.
 - Stabilize areas surrounding storage and material handling areas and establish schedule for sweeping.
-

Storage Piles, Bins, or Material Handling of Coke or Coal

- Where possible store coke and coal under cover or indoors and protect from wind-blown losses.
 - Prevent or divert run on from adjacent areas with swales, dikes, or curbs.
 - Minimize quantities of coke or coal stored onsite through implementation of effective inventory control.
 - Trap particulates originating in coke or coal storage or handling areas with filter fabric fences, gravel outlet protection, sediment traps, vegetated swales, buffer strips of vegetation, catch-basin filters, retention/detention basins or equivalent.
-

Storage or Handling of Casting Sand

- Store raw sand in silos, covered hoppers, or indoor whenever possible.
- Prevent or divert run on from adjacent areas with swales, dikes, or curbs.
- Minimize quantities of sand stored onsite through implementation of effective inventory control.
- Tarp or otherwise cover piles.
- Trap particulates originating in coke or coal storage or handling areas with filter fabric fences, gravel outlet protection, sediment traps, vegetated swales, buffer of vegetation, catch-basin filters, retention/detention basins or equivalent.

Vehicle Fueling and Maintenance

- See the fact sheet “Vehicle and Equipment Maintenance Areas at Land Transportation Facilities.”
-

Outdoor Storage Tanks or Drums of Gas, Diesel, Kerosene, Lubricants, Solvents

- Store tanks and drums inside when possible.
- Establish regular inspection of all tanks and drums for leaks, spills, corrosion, damage, etc.
- Utilize effective inventory control to reduce the volume of chemicals stored onsite.
- Prevent run on to and runoff from tank and drum storage areas, provide adequate containment to hold spills and leaks.
- Prepare and train employees in dealing with spills and leaks properly, use dry clean-up methods when possible.

Slag or Dross Stored or Disposed of Outside in Piles or Drums

- Collect waste waters used for granulation of slag.
 - Store slag and dross indoors, under cover, or in sealed containers.
 - Establish regular disposal of slag or dross to minimize quantities stored and handled onsite.
 - Minimize run on to slag storage areas with diversion dikes, berms, curbing, vegetated swales.
 - Trap particulates originating in slag storage areas with filter fabric fences, gravel outlet protection, sediment traps, vegetated swales, buffer strips of vegetation, catch-basin filters, retention/detention basins or equivalent.
-

Fly Ash, Particulate Emissions, Dust Collector Sludges and Solids, Baghouse Dust

- Store all dusts and sludges indoors to prevent contact with storm water or losses due to wind.
- Establish regular disposal schedule to minimize quantities of pollutants stored and handled onsite.

Storage and Disposal of Waste Sand or Refractory Rubble in Piles Outside

- Move piles under cover or tarps whenever possible.
 - Establish regular disposal schedule to minimize quantities stored onsite.
 - Stabilize areas of waste product storage and perform regular sweeping of area.
-

Scrap Processing Activities (Shredding Etc.)

- See the fact sheet “Scrap and Waste Recycling Facilities.”

Machining Waste Stored Outside or Exposed to Storm Water-fines, Turnings, Oil, Borings, Gates, Sprues, Scale

- Store all wastes indoors or in sealed drums, covered dumpsters, etc.
- Stabilize areas of waste product storage and perform regular sweeping and cleaning of any residues.
- Consider using booms, oil/water separators, sand filters, etc. for outfalls draining areas where oil is potentially present.
- Minimize run on from adjacent properties and stabilized areas to areas with exposed soil with diversion dikes, berms, curbing, concrete pads, etc.

Obsolete Equipment Stored Outside

- Where possible, dispose of unused equipment properly, or move indoors.
- Cover obsolete equipment with a tarp or roof.
- Consider using booms, oil/water separators, sand filters, etc. for outfalls draining areas where oil is potentially present.
- Minimize runoff coming into contact with old equipment through berms, curbs, or placement on a concrete pad.

Material Losses from Handling Equipment Such as Conveyors, Trucks, Pallets, Hoppers, Etc.

- Schedule frequent inspections of equipment for spills or leakage of fluids, oil, or fuel.
- Inspect for collection of particulate matter on and around equipment and clean. Where possible cover these areas to prevent losses to wind and precipitation.
- Store pallets, hoppers, etc. which have residual materials on them under cover, with tarps, or inside.

Losses During Charging of Coke Ovens or Sintering Plants

- Cover any exposed areas related to furnace charging/material handling activities.
- Stabilize areas around all material handling areas and establish regular sweeping.
- Route runoff from particulate generating operations to sediment traps, vegetated swales, buffer strips of vegetation, catch-basin filters, retention/detention basins or equivalent.

Particulate Emissions from Blast Furnaces, Electric Arc Furnaces, Induction Furnaces and Fugitive Emissions from Poorly Maintained or Malfunctioning Baghouses, Scrubbers, Electrostatic Precipitators, Cyclones

- Establish schedule for inspection and maintenance of all pollution control equipment-check for any particulate deposition from leaks, spills, or improper operation of equipment and remedy.
- Route runoff from particulate generating operations to sediment traps, vegetated swales, buffer strips of vegetation, catch-basin filters, retention/detention basins or equivalent.

Storage of Products Outside after Painting, Pickling, or Cleaning Operations

- Store all materials inside or under cover whenever possible.
- Prevent run on to product storage areas through curbs, berms, dikes, etc.

- Consider using booms, oil/water separators, sand filters, etc. for outfalls draining areas where oil is potentially present.
- Remove residual chemicals from intermediate or finished products before storage or transport outside.

Casting Cooling or Shakeout Operations Exposed to Precipitation or Wind

- Perform all pouring, cooling, and shakeout operations indoors in areas with roof vents to trap fugitive particulate emissions.
 - Recycle into process as much casting sand as possible.
-

Landfilling or Open Pit Disposal of Wastes Onsite

- See the fact sheet "Landfills and Land Application Sites."

Losses of Particulate Matter from Machining Operations (Grinding, Drilling, Boring, Cutting). Through Deposition or Storage of Products Outside.

- Store all intermediate and finished products inside or under cover.
 - Consider using booms, oil/water separators, sand filters, etc. for outfalls draining areas where oil is potentially present.
 - Clean products of residual materials before storage outside.
 - Stabilize storage areas and establish sweeping schedule.
-

Areas of the Facility with Unstabilized Soils Subject to Erosion.

- Minimize run on from adjacent properties and stabilized areas to areas with exposed soil with diversion dikes, berms, vegetated swales, etc.
- Stabilize all high traffic areas including all vehicle entrances, exits, loading, unloading, and vehicle storage areas.
- Conduct periodic sweeping of all traffic areas.
- Trap sediment originating in unstabilized areas. Filter fabric fences, gravel outlet protection, sediment traps, vegetated swales, buffer strips of vegetation, catch-basin filters, retention/detention basins or equivalent.
- Inspect and maintain all BMPs on a regular basis.
- Provide employee training on proper installation and maintenance of sediment and erosion controls.

Improper Connection of Floor, Sink, or Process Wastewater Drains.

- Inspect and test all floor, sink, and process wastewater drains for proper connection to sanitary sewer and remove any improper connections to storm sewer or waters of the United States.

Metal Mining Facilities; Coal Mines and Coal Mining-Related Facilities; Mineral Mining and Processing Facilities

Land Disturbance Activities

<i>Land-disturbed Area</i>	<i>Discharge Diversions</i>	<i>Conveyance Systems</i>	<i>Runoff Dispersion</i>	<i>Sediment Control and Collection</i>	<i>Vegetation</i>	<i>Containment</i>	<i>Treatment</i>
Haul Roads and Access Roads	Dikes, curbs, berms	Channels, gutters, culverts, rolling dips, road sloping, roadway water deflectors	Check dams, rock outlet protection, level spreaders, stream alteration, drop structures	Gabions, riprap, native rock retaining walls, straw bale barriers, sediment traps/catch basins, vegetated buffer strips	Seeding, willow cutting establishment		
Pits, Quarries, or Underground Mines.	Dikes, curbs, berms	Channels, gutters	Serrated slopes, benched slopes, contouring, stream alteration	Sediment settling ponds, straw bale barrier, siltation berms	Seeding	Plugging and grouting	Chemical/physical treatment
Overburden, Waste Rock and Raw Material Piles	Dikes, curbs, berms	Channels, gutters	Serrated slopes, benched slopes, contouring, stream alteration	Plastic matting, plastic netting, erosion control blankets, mulch-straw, compaction, sediment/settling ponds, silt fences, siltation berms	Topsoiling, seedbed preparation, seeding	Capping	Chemical/physical treatment, artificial wetlands
Reclamation	Dikes, curbs, berms	Channels, gutters	Check dams, rock outlet protection, level spreaders, serrated slopes, benched slopes, contouring, drain fields, stream alteration, drop structures	Gabions, riprap, native rock retaining walls, biotechnical stabilization, straw bale barriers, sediment traps/catch basins, vegetated buffer strips, silt fences, siltation berms, brush sediment barriers	Topsoiling, seedbed preparation, seeding, willow cutting establishment	Capping, plugging and grouting	Chemical/physical treatment, wetlands

Oil and Gas Extraction Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

General Activities

- Utilize diking and other forms of containment and diversion around storage tanks, drums of oil, acid, production chemicals, and liquids, reserve pits, and impoundments.
- Use diking and other forms of containment and diversion around material handling and processing areas.
- Use porous pads under drum and tank storage areas.
- Use covers and/or lining for waste reserve and sludge pits to avoid overflows and leaks.
- Use drip pans, catch basins, or liners during handling of materials such as tank bottoms.
- Reinject or treat produced water instead of discharging it.
- Limit the amount of land disturbed during construction of access roads and facilities.
- Employ spill plans for pipelines, tanks, drums, etc.
- Recycle oily wastes, drilling fluids and other materials onsite, or dispose of properly.
- Take wastes offsite to be disposed of instead of burying them.
- Use oil water separators.

Hazardous Waste Treatment, Storage, or Disposal Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Outdoor Unloading and Loading

- Confine loading/unloading activities to a designated area.
- Consider performing loading/unloading activities indoors or in a covered area.
- Consider covering loading/unloading area with permanent cover (e.g., roofs) or temporary cover (e.g., tarps).
- Close storm drains during loading/unloading activities in surrounding areas.
- Avoid loading/unloading materials in the rain.
- Inspect the unloading/loading areas to detect problems before they occur.
- Inspect all containers prior to loading/unloading of any raw or spent materials.
- Consider berming, curbing, or diking loading/ unloading areas.
- Use dry clean-up methods instead of washing the areas down.
- Train employees on proper loading/unloading techniques.

Landfills and Land Application Sites

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Land Disturbance Activities

- Stabilize soils with temporary seeding, mulching, and geotextiles; leave vegetative filter strips along streams.
 - Implement structural controls such as dikes, swales, silt fences, filter berms, sediment traps and ponds, outlet protection, pipe slope drains, check dams, and terraces to convey runoff, to divert storm water flows away from areas susceptible to erosion, and to prevent sediments from entering water bodies.
 - Frequently inspect all stabilization and structural erosion control measures and perform all necessary maintenance and repairs.
 - Stabilize haul roads and entrances to landfill with gravel or stone.
 - Construct vegetated swales along road.
 - Clean wheels and body of trucks or other equipment as necessary to minimize sediment tracking (but contain any wash waters [process wastewaters]).
 - Frequently inspect all stabilization and structural erosion control measures and perform all necessary maintenance and repairs.
-

Application of Fertilizers, Pesticides, and Herbicides

- Observe all applicable Federal, State, and local regulations when using these products.
- Strictly follow recommended application rates and methods (i.e., do not apply in excess of vegetative requirements).
- Have materials such as absorbent pads easily accessible to clean up spills.

Exposure of Chemical Material Storage Areas to Precipitation

- Provide barriers such as dikes to contain spills.
 - Provide cover for outside storage areas.
 - Have materials such as absorbent pads easily accessible to clean up spills.
-

Exposure of Waste at Open Face

- Minimize the area of exposed open face as much as is practicable.
- Divert flows around open face using structural measures such as dikes, berms, swales, and pipe slope drains.
- Frequently inspect erosion and sedimentation controls.

Waste Tracking Onsite

- Clean wheels and exterior of trucks or other equipment as necessary to minimize waste tracking (but contain any wash waters [process wastewaters]).

Uncontrolled Leachate

- Frequently inspect leachate collection system and landfill for leachate leaks.
- Maintain landfill cover and vegetation.
- Maintain leachate collection system.

Automobile Salvage Yards

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Dismantling and Vehicle Maintenance

- Drain all fluids from vehicles upon arrival at the site.
 - Segregate the fluids and properly store or dispose of them.
 - Maintain an organized inventory of materials used in the maintenance shop.
 - Keep waste streams separate (e.g., waste oil and mineral spirits). Nonhazardous substances that are contaminated with a hazardous substance is considered a hazardous substance.
 - Recycle anti-freeze, gasoline, used oil, mineral spirits, and solvents.
 - Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly.
 - Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries).
 - Drain oil filters before disposal or recycling.
 - Store cracked batteries in a non-leaking secondary container.
 - Promptly transfer used fluids to the proper container. Do not leave full drip pans or other open containers around the shop. Empty and clean drip pans and containers.
 - Do not pour liquid waste down floor drains, sinks, or outdoor storm drain inlets.
 - Plug floor drains that are connected to the storm or sanitary sewer. If necessary, install a sump that is pumped regularly.
 - Inspect the maintenance area regularly for proper implementation of control measures.
 - Filtering storm water discharges with devices such as oil-water separators.
 - Train employees on proper waste control and disposal procedures.
-

Outdoor Vehicle, Equipment, and Parts Storage

- Use drip pans under all vehicles and equipment waiting for maintenance and during maintenance.
- Store batteries on impervious surfaces. Curb, dike or berm this area.
- Confine storage of parts, equipment and vehicles to designated areas.
- Cover all storage areas with a permanent cover (e.g., roofs) or temporary cover (e.g., canvas tarps).
- Install curbing, berms or dikes around storage areas.
- Inspect the storage yard for filling drip pans and other problems regularly.
- Train employees on procedures for storage and inspection items.

Vehicle, Equipment and Parts Washing Areas

- Avoid washing parts or equipment outside.
- Use phosphate-free biodegradable detergents.
- Consider using detergent-based or water-based cleaning systems in place of organic solvent degreasers.
- Designate an area for cleaning activities.
- Contain steam cleaning washwaters or discharge under an applicable NPDES permit.
- Ensure that washwaters drain well.
- Inspect cleaning area regularly.
- Install curbing, berms or dikes around cleaning areas.
- Train employees on proper washing procedures.

Liquid Storage in Above Ground Containers

- Maintain good integrity of all storage containers.
- Install safeguards (such as diking or berming) against accidental releases at the storage area.
- Inspect storage tanks to detect potential leaks and perform preventive maintenance.
- Inspect piping systems (pipes, pumps, flanges, couplings, hoses, and valves) for failures or leaks.
- Train employees on proper filling and transfer procedures.

Improper Connection with Storm Drains

- Plug all floor drains if it is unknown whether the connection is to storm drain or sanitary sewer systems.
- Alternatively, install a sump that is pumped regularly.
- Perform dye testing to determine if interconnections exist between sanitary water system and storm drain system.
- Update facility schematics to accurately reflect all plumbing connections.
- Install a safeguard against vehicle washwaters and parts cleaning waters entering the storm drain unless permitted.
- Maintain and inspect the integrity of all underground storage tanks; replace when necessary.
- Train employees on proper disposal practices for all material.

Scrap and Waste Recycling Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Inbound Recyclable and Waste Material Control

- Provide public education brochures on acceptable recyclable materials.
 - Educate curbside pick-up drivers on acceptable materials. Reject unacceptable materials at the source.
 - Employee training.
 - Provide totally-enclosed drop-off containers for public.
 - Establish program to encourage suppliers of scrap, waste and other salvageable materials to drain residual fluids prior to arrival at the facility.
 - Establish acceptance program for handling, storage and disposal of lead-acid batteries.
 - Establish procedures for rejecting or handling, storing and disposal of hazardous wastes and other nonhazardous residual fluids.
 - Establish procedures to properly handle industrial turnings and cuttings and prohibiting cutting oils and metallic fines from coming in contact with runoff.
 - Identify inspector training requirements.
-

Outside Scrap Material Storage: Liquids

- Conduct inspections for fluids, e.g., oils, transmission fluids, antifreeze, brake fluid, and fuels. Establish handling/ storage/disposal procedures for these materials.
- Drain and collect liquids in a designated area.
- Provide covered storage or impervious areas with curbing/berms or other appropriate containment.
- Store liquid materials in covered areas or impervious areas with curbing/berms or other appropriate measure.
- Establish spill prevention procedures.
- Provide adequate supply of materials for dry clean up of spills or leaks.
- Prevent runoff into liquid storage areas. Store liquid wastes in materially compatible containers.
- Minimize/eliminate the accumulation of liquid wastes.
- Establish procedures if hazardous wastes are discovered after material accepted.
- Conduct periodic inspections of storage areas.
- Conduct preventative maintenance of BMPs as necessary.

Outside Scrap Material Storage: Bulk Solid Materials

- Store only processed materials, i.e., baled plastic and aluminum and glass cullet.
- Provide containment pits with sumps pumps that discharge to sanitary sewer system. Prevent discharge of residual fluids to storm sewer.
- Provide dikes and curbs around bales of waste paper.
- Use tarpaulins or covers over bales of wastepaper.
- Conduct regularly scheduled sweeping of storage areas to minimize particulate buildup.
- Minimize runoff from coming into areas where significant materials are stored, e.g., diversion structures such as curbing, berms, containment trenches, surface grading, and elevated concrete pads or other equivalent measure.
- Use adsorbents to collect leaking or spills of oil, fuel, transmission and brake fluids, e.g., dry absorbent, drip pans.
- Install media filters such as catch basin filters and sand filters.
- Install oil/water separator in storage areas with vehicle transmissions and engines. Locate spill plans under stored vehicles.
- Provide non-recyclable waste storage bins and containers.
- Conduct periodic inspections.
- Conduct preventative maintenance as necessary.
- Provide equipment operator training to minimize damage to controls, e.g., curbing and berms.

Storage Other: Lightweight Materials

- Store equivalent of the average daily volume of recyclable materials indoors.
- Provide good housekeeping.
- Disconnect all floor drains from storm sewer system.
- Prohibit illicit discharges and illegal dumping to floor drains that are connected to the storm sewer.
- Direct tipping floor washwaters to sanitary sewer system if permitted by local sanitary authority.
- Identify/provide supplier training or information bulletins on requirements for acceptance of lightweight materials.
- Encourage supplier participation in program to minimize/eliminate, as practicable, volume of semisolid and liquid residues in recyclable materials, e.g., residual fluids in aluminum and plastic containers.
- Provide covered storage, container bins or equivalent for lighter-weight materials such as glass, plastics, aluminum cans, paper, cardboard.
- Minimize/eliminate residue from bottles, containers, etc. from coming in contact with runoff. Establish dry clean up methods.
- Establish procedures and employee training for the handling, storage and disposal of residual fluids from small containers.
- Prohibit washdown of tipping floor areas.
- Provide good housekeeping to eliminate particulate and residual materials buildup. Establish cleaning schedule for high traffic areas.
- Provide covered disposal containers or equivalent for residual waste materials.
- Eliminate floor drains discharging to storm sewer.

Residual Non-recyclable Materials

- Store residual non-recyclable materials in covered containers for transport to a proper disposal facility.
 - Bale residual non-recyclable materials and cover with tarpaulin or equivalent.
-

Recyclable Material Processing.

- Conduct processing operations indoors. Clean up residual fluids.
- Conduct routine preventive maintenance on all processing equipment.
- Schedule frequent good housekeeping to minimize particulate and residual materials buildup.

Scrap Processing Operations

- Provide training to equipment operators on how to minimize exposure of runoff to scrap processing areas.
- Schedule frequent cleaning of accumulated fluids and particulate residue around all scrap processing equipment.
- Schedule frequent inspections of equipment for spills or leakage of fluids, oil, fuel, hydraulic fluids.
- Conduct routine preventive maintenance of equipment per original manufacturer's equipment (OME) recommendations. Replace worn or malfunctioning parts.
- Site process equipment on elevated concrete pads or provide runoff diversion structures around process equipment, berms, containment trenches or surface grading or other equivalent measure. Discharge runoff from within bermed areas to a sump, oil/ water separator, media filter or discharge to sanitary sewer.
- Conduct periodic maintenance and clean out of all sumps, oil/water separators, media filters.
- Dispose of residual waste materials properly (e.g., according to RCRA).
- Provide curbing, dikes, and berms around scrap processing equipment to prevent contact with runoff.
- Where practicable, locate process equipment (e.g., balers, briquetters, small compactors) under an appropriate cover.
- Provide cover over hydraulic equipment and combustion engines. Provide dry clean up materials, e.g., dry-adsorbents, drip pans, absorbent booms, etc. to prevent contact of hydraulic fluids, oils, fuels, etc., with storm water runoff.
- Provide alarm, pump shutoff, or sufficient containment for hydraulic reservoirs in the event of a line break.
- Stabilize high traffic areas (e.g., concrete pads, gravel, pavement) around processing equipment, where practicable.
- Provide site gages or overflow protection devices for all liquid and fuel storage reservoirs and tanks.
- Establish spill prevention and response procedures, including employee training.
- Provide containment bins or equivalent for shredded material, especially lightweight materials such as fluff (preferably at the discharge of these materials from the air classification system).

Supplies for Process Equipment

- Locate storage drums containing liquids, including oils and lubricants indoors. Alternatively, site palletized drums and containers on an impervious surface and provide sufficient containment around the materials. Provide sumps, oil/water separators, if necessary.
- Conduct periodic inspections of containment areas and containers/drums for corrosion.
- Perform preventive maintenance of BMPs, as necessary.
- Instruct employees on proper material handling and storage procedures.

Scrap Lead Acid Battery Program

- Establish inspection and acceptance procedures for scrap lead-acid batteries.

- Provide supplier training on acceptance practices for scrap batteries.
- Provide employee training on the safe handling, storage and disposition of scrap batteries.
- Separate all scrap batteries from other scrap materials.
- Store scrap batteries under cover or equivalent.
- Establish procedures for the storage, handling, disposition of cracked or broken batteries in accordance with applicable Federal regulations, e.g., RCRA.
- Establish procedures to collect and dispose of leaking battery acid according to Federal regulations, e.g., RCRA.
- Provide covered storage or equivalent to prevent exposure to either precipitation or runoff.

Vehicle and Equipment Maintenance

- Avoid washing equipment and vehicles outdoors.
- Eliminate outdoor maintenance areas.
- Establish an inventory of materials used in the maintenance shop that could become a potential pollutant source with storm water runoff, e.g., fuels, solvents, oils, lubricants.
- Store and dispose of oily rags, filters (oil and air), batteries, engine coolant, transmission fluid, use oil, brake fluid, and solvents in a manner that minimizes potential contact with runoff and in compliance with State and Federal regulations.
- Label and track recycling of waste materials, e.g., batteries, solvent, used oil.
- Drain oil filters before disposal or recycling.
- Drain all fluids from all parts or components that will become scrap material or secondhand parts.
- Store liquid waste materials in compatible containers.
- Store and dispose used batteries in accordance with scrap lead acid battery program.
- Disconnect all floor drains connected to storm sewer system.
- Prohibit non-storm water discharges, e.g., dumping of used liquids down floor drains and washdown of maintenance areas.
- Provide employee training on appropriate storage and disposal of waste materials.
- Provide good housekeeping measures.
- Conduct inspections of work areas for compliance with BMPs.

Fueling

- Establish spill prevention and clean-up procedures.
- Provide dry-absorbent materials or equivalent.
- Provide employee training, i.e., avoid topping off fuel tanks.
- Divert runoff from fueling areas.
- Use spill and overflow protection devices.
- Provide high level alarm on fuel storage tanks.
- Minimize/eliminate runoff onto fueling areas.
- Reduce exposure of fueling areas to precipitation by covering the fueling area.
- Provide dry adsorbents to clean up fuel spills.
- Conduct periodic inspections of fueling areas.
- Provide curbing or posts around fuel pumps to prevent collisions during vehicle ingress and egress.

Vehicle and Equipment Washing

- Avoid washing vehicles and equipment outdoors.
- Use biodegradable, phosphate free detergents.
- Recycle wash water.
- Provide vehicle wash rack with dedicated trap.
- Use autoshut-off valves on washing equipment.

Outdoor Vehicle Parking and Storage

- Use drip pans under all equipment and vehicles waiting maintenance.
- Cover vehicle and equipment storage areas.
- Conduct inspections of storage and parking areas for leaks and filled drip pans.
- Provide employee training.

Vehicle and Equipment Painting (where applicable)

- Keep paint and solvents away from traffic areas.
- Conduct sanding and painting in nonexposed areas, e.g., under cover, in accordance with OSHA standards.
- Cleanup accumulated particulate matter.
- Minimize overspraying parts.
- Dispose or recycle paint, solvents and thinner properly.
- Provide training to employees.
- Conduct periodic inspections of paint spraying areas.

Erosion and Sediment Control

- Minimize runoff from adjacent properties, e.g., diversion dikes, berms, or equivalent.
- Trap sediment at downgradient locations and outlets serving unstabilized areas. This may include filter fabric fences, gravel outlet protection, sediment traps, vegetated or riprap swales, vegetated strips, diversion structures, catch-basin filters, retention/detention basins or equivalent.
- Runoff containing oil and grease may include the use of absorbent booms or sand filters in front of outlet structures or other equivalent measures.
- Stabilize all high traffic areas, including all vehicle entrances and exit points.
- Conduct periodic sweeping of all traffic areas.
- Conduct inspections of BMPs.
- Perform preventative maintenance as needed on BMPs.
- Provide employee training on the proper installation and maintenance of erosion and sediment controls.

Activities Specific to Liquid Waste Recycling Facilities:

Individual Drum/Container Storage

- Ensure container/drums are in good condition. Store waste materials in materially compatible drums.
- Use containers that meet National Fire Protection Association (NFPA) guidelines.
- Put individual containers on pallets. Limit stack height of individual containers/drums. Provide straps, plastic wrap, or equivalent around stacked containers to provide stability.
- Label/mark drums. Segregate hazardous and flammable wastes. Comply with NFPA guidelines for segregation of flammable wastes.
- Provide adequate clearance to allow material movement and access by material handling equipment.
- Provide semipermanent or permanent cover over wastes.
- Provide adequate clearance between stored materials to allow movement and handling.
- Establish clean up procedures, including the use of dry adsorbents, in the event of spills or leaks.
- Prohibit washing down of material storage areas.
- Disconnect or seal all floor drains from storm sewer system.
- Develop spill prevention, countermeasures and control (SPCC) procedures for all liquid container storage areas. Ensure employees are familiar with SPCC procedures. Schedule/conduct periodic employee training.
- Provide secondary containment, dikes, berms, containment trench, sumps, or other equivalent measure, in all storage areas.

Bulk Liquid Storage

- Use welded pipe connections versus flange connections. Inspect all flange gaskets for deterioration.
- Apply corrosion inhibitors to exposed metal surfaces.

- Provide high level alarms for storage tanks.
- Provide redundant piping, valves, pumps, motors, as necessary, at all pumping stations.
- Provide manually activated shutoff valves in the event of spill. Install visible and/or audible alarms in the event of a spill.
- Install manually activated drainage valves, or equivalent, versus flapper-type drain valves.
- Provide adequate security against vandalism and tampering.
- Provide secondary containment around all bulk storage tanks, including berms, dikes, surface impoundments or equivalent. Ensure surfaces of secondary containment areas are adequately sealed to prevent leaks.
- Provide stationary boxes around all return and fill stations to eliminate/minimize hose drainage and minor waste transfer spills.

Waste Transfer Areas

- Provide secondary containment or equivalent measures around all liquid waste transfer facilities.
 - Provide cover over liquid waste transfer areas.
 - Establish clean up procedures for minor spills including the use of dry adsorbents.
-

Inspections

- Conduct inspections of all material storage, handling and transfer areas.
 - Document signs of corrosion, worn parts or components on pumps and motors, leaking seals and gaskets.
 - Conduct periodic nondestructive testing (NDT) of all bulk storage tanks for signs of deteriorating structural integrity.
-

Preventive Maintenance

- Conduct periodic preventive maintenance of all structural controls, replace worn parts on components on valves, pumps, motors per manufacturer's recommendations.

Vehicle Maintenance (if applicable)

- Establish an inventory of materials used in the maintenance shop that could become a potential pollutant source with storm water runoff, e.g., fuels, solvents, oils, lubricants.
- Store and dispose of oily rags, filters (oil and air), batteries, engine coolant, transmission fluid, use oil, brake fluid, and solvents in a manner that minimizes potential contact with runoff and in compliance with State and Federal regulations.
- Label and track recycling of waste materials, e.g., batteries, solvent, used oil.
- Drain oil filters before disposal or recycling.
- Drain all fluids from all parts or components that will become scrap material or secondhand parts.
- Store liquid waste materials in compatible containers.
- Store and dispose used batteries in accordance with scrap lead acid battery program.
- Disconnect all floor drains connected to storm sewer system.
- Prohibit non-storm water discharges, e.g., dumping of used liquids down floor drains and washdown of maintenance areas.
- Provide employee training on appropriate storage and disposal of waste materials.
- Provide good housekeeping measures.
- Conduct inspections of work areas for compliance with BMPs.

Vehicle Cleaning (if applicable)

- Avoid washing vehicles and equipment outdoors.
- Use biodegradable, phosphate free detergents.
- Recycle wash water.
- Provide vehicle wash rack with dedicated sediment trap.
- Use autoshut-off valves on washing equipment.

Training

- Provide employee training on proper material handling and storage procedures. Require familiarization with applicable SPCC measures.

Steam Electric Power Generating Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Fugitive Dust Emissions

- Consider establishing procedures to minimize offsite tracking of coal dust. To prevent offsite tracking the facility may consider specially designed tires, or washing vehicles in a designated area before they leave the site, and controlling the wash water.

Delivery Vehicles

- Develop procedures for the inspection of delivery vehicles arriving on the plant site, and ensure overall integrity of the body or container.
- Develop procedures to control leakage or spillage from vehicles or containers, and ensure that proper protective measures are available for personnel and environment.

Fuel Oil Unloading Areas

- Use containment curbs in unloading areas.
- During deliveries station personnel familiar with spill prevention and response procedures may be present to ensure that any leaks or spills are immediately contained and cleaned up.
- Use spill and overflow protection (drip pans, drip diapers, and/or other containment devices should be placed beneath fuel oil connectors to contain any spillage that may occur during deliveries or due to leaks at such connectors).

Chemical Loading/Unloading Areas

- Use containment curbs at chemical loading/unloading areas to contain spills.
- During deliveries station personnel familiar with spill prevention and response procedures may be present to ensure that any leaks or spills are immediately contained and cleaned up.
- Where practicable chemical loading/unloading areas should be covered, and chemicals should be stored indoors.

Miscellaneous Loading/Unloading Areas

- Consider covering the loading area.
- Minimize storm water runoff to the loading area by grading, berming, or curbing the area around the loading area to direct storm water away from the area.
- Locate the loading/unloading equipment and vehicles so that leaks can be controlled in existing containment and flow diversion systems.

Liquid Storage Tanks

- Use protective guards around tanks.
- Use containment curbs.
- Use spill and overflow protection (drip pans, drip diapers, and/or other containment devices should be placed beneath chemical connectors to contain any spillage that may occur during deliveries or due to leaks at such connectors).
- Use dry cleanup methods.

Large Bulk Fuel Storage Tanks

- Comply with applicable State and Federal laws, including Spill Prevention Control and Countermeasures (SPCC).
 - Use containment berms.
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Oil/Chemical Storage

- The structural integrity of all above ground tanks, pipelines, pumps and other related equipment should be visually inspected on a weekly basis.
 - All repairs deemed necessary based on the findings of the inspections should be completed immediately to reduce the incidence of spills and leaks occurring from such faulty equipment.
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Oil Bearing Equipment in Switchyards

- Consider level grades and gravel surfaces to retard flows and limit the spread of spills.
 - Collect storm water runoff in perimeter ditches.
-

Residue Hauling Vehicles

- Inspect all residue hauling vehicles for proper covering over the load, adequate gate sealing and overall integrity of the body or container.
- Vehicles without load covers or adequate gate sealing, or with poor body or container conditions may be repaired as soon as practicable.

Ash Loading Areas

- Reduce and/or control the tracking of ash or residue from ash loading areas. Where practicable, clear the ash building floor and immediately adjacent roadways of spillage, debris and excess water before each loaded vehicle departs.

Areas Adjacent to Disposal Ponds or Landfills

- Develop procedures to reduce ash residue which may be tracked on to access roads traveled by residue trucks or residue handling vehicles.
- Reduce ash residue on exit roads leading into and out of residue handling areas.

Landfills, Scrapyards, and General Refuse Sites

- See the fact sheet “Scrap and Waste Recycling Facilities.”
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Vehicle Maintenance Activities

- See the fact sheet “Vehicle and Equipment Maintenance Areas at Land Transportation Facilities.”

Material Storage Areas

- Consider flat yard grades, runoff collection in graded swales or ditches, erosion protection measures at steep outfall sites (e.g., concrete chutes, riprap, stilling basins), covering lay down areas, storing the materials indoors, covering the material with a temporary covering made of polyethylene, polyurethane, polypropylene, or hypalon.
- Storm water runoff may be minimized by constructing an enclosure or building a berm around the area.

Vehicle and Equipment Maintenance Areas at Land Transportation Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Fueling

- Use spill and overflow protection.
 - Minimize runoff of storm water into the fueling area by grading the area such that storm water only runs off.
 - Reduce exposure of the fuel area to storm water by covering the area.
 - Use dry cleanup methods for fuel area rather than hosing the fuel area down.
 - Use proper petroleum spill control.
 - Perform preventive maintenance on storage tanks to detect potential leaks before they occur.
 - Inspect the fueling area to detect problems before they occur.
 - Train employees on proper fueling techniques.
-

Vehicle and Equipment Maintenance

- Maintain an organized inventory of materials used in the maintenance shop.
- Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly.
- Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries).
- Drain oil filters before disposal or recycling.
- Drain and contain all fluids from wrecked vehicles and "parts" cars.
- Store cracked batteries in a nonleaking secondary container.
- Promptly transfer used fluids to the proper container; do not leave full drip pans or other open containers around the shop. Empty and clean drip pans and containers.
- Do not pour liquid waste down floor drains, sinks, or outdoor storm drain inlets.
- Plug floor drains that are connected to the storm or sanitary sewer. Alternatively, install a sump that is pumped regularly.
- Inspect the maintenance area regularly for proper implementation of control measures.
- Train employees on proper waste control and disposal procedures.

Outdoor Vehicle and Equipment Storage and Parking

- Use drip pans under all vehicles and equipment waiting for maintenance.
 - Cover the storage area with a roof.
 - Inspect the storage yard for filling drip pans and other problems regularly.
 - Train employees on procedures for storage and inspection items.
-

Locomotive Sanding Areas

- Cover sand storage piles.
 - Install sediment traps.
 - Install curbs or dikes around storage piles to minimize storm water runoff.
-

Painting Areas

- Keep paint and paint thinner away from traffic areas to avoid spills.
 - Spray paint in an Occupational Safety and Health Act (OSHA) approved hood.
 - Use effective spray equipment that delivers more paint to the target and less over-spray.
 - Avoid sanding in windy weather and collect and dispose of waste properly.
 - Recycle paint, paint thinner, and solvents.
 - Inspect painting procedures to ensure that they are conducted properly.
 - Train employees on proper sanding, painting, and spraying techniques.
-

Vehicle or Equipment Washing Areas

- Avoid washing parts or equipment outside.
 - Use phosphate-free biodegradable detergents.
 - Designate an area for cleaning activities.
 - Contain and recycle washwaters.
 - Ensure that washwaters drain well.
 - Inspect cleaning area regularly.
 - Train employees on proper washing procedures.
-

Liquid Storage in Above Ground Storage

- Maintain good integrity of all storage containers.
- Install safeguards (such as diking or berming) against accidental releases at the storage area.
- Inspect storage tanks to detect potential leaks and perform preventive maintenance.
- Inspect piping systems (pipes, pumps, flanges, couplings, hoses, and valves) for failures or leaks.
- Train employees on proper filling and transfer procedures.

Cold Weather Activities

- Minimize salt application.
- Use uncontaminated dirt or ash, if use is necessary.

- Train employees on proper salt, dirt, sand, or ash application.

Improper Connections to Storm Drain

- Plug all floor drains connected to storm drain or if connection is unknown. Alternatively, install a sump that is pumped regularly.
- Perform smoke or dye testing to determine if interconnections exist between sanitary water system and storm drain system.
- Update facility schematics to accurately reflect all plumbing connections.
- Install a safeguard against vehicle washwaters entering the storm sewer unless permitted.
- Maintain and inspect the integrity of all underground storage tanks; replace when necessary.
- Train employees on proper disposal practices for all materials.

Vehicle and Equipment Maintenance Areas at Water Transportation Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Pressure Washing

- Collect discharge water and remove all visible solids before discharging to a sewer system, or where permitted, to a drainage system, or receiving water.
- Perform pressure washing only in designated areas where wash water containment can be effectively achieved.
- Use no detergents or additives in the pressure wash water.
- Direct deck drainage to a collection system sump for settling and/or additional treatment.
- Implement diagonal trenches or berms and sumps to contain and collect wash water at marine railways.
- Use solid decking, gutters, and sumps at lift platforms to contain and collect wash water for possible reuse.

Surface Preparation, Sanding, and Paint Removal.

- Enclose, cover, or contain blasting and sanding activities to the extent practical to prevent abrasives, dust, and paint chips from reaching storm sewers or receiving water.
- Where feasible, cover drains, trenches, and drainage channels to prevent entry of blasting debris to the system.
- Prohibit uncontained blasting or sanding activities performed over open water.
- Prohibit blasting or sanding activities performed during windy conditions which render containment ineffective.
- Inspect and clean sediment traps to ensure the interception and retention of solids prior to entering the drainage system.
- Sweep accessible areas of the drydock to remove debris and spent sandblasting material prior to flooding.
- Collect spent abrasives routinely and store under a cover to await proper disposal.

Painting

- Enclose, cover, or contain painting activities to the maximum extent practical to prevent overspray from reaching the receiving water.
- Prohibit uncontained spray painting activities over open water.
- Prohibit spray painting activities during windy conditions which render containment ineffective.
- Mix paints and solvents in designated areas away from drains, ditches, piers, and surface waters, preferably indoors or under cover.
- Have absorbent and other cleanup items readily available for immediate cleanup of spills.
- Allow empty paint cans to dry before disposal.
- Keep paint and paint thinner away from traffic areas to avoid spills.
- Recycle paint, paint thinner, and solvents.
- Train employees on proper painting and spraying techniques, and use effective spray equipment that delivers more paint to the target and less overspray.

Drydock Maintenance

- Clean and maintain drydock on a regular basis to minimize the potential for pollutants in the storm water runoff.
- Sweep accessible areas of the drydock to remove debris and spent sandblasting material prior to flooding.
- If hosing may be used as a removal method, collect wash water to remove solids and potential metals.
- Clean the remaining areas of the dock after a vessel has been removed and the dock raised.
- Remove and properly dispose of floatable and other low-density waste (wood, plastic, insulations, etc.).

Drydocking

- Use plastic barriers beneath the hull, between the hull and drydock walls for containment.
- Use plastic barriers hung from the flying bridge of the drydock, from the bow or stern of the vessel, or from temporary structures for containment.
- Weight the bottom edge of the containment tarpaulins or plastic sheeting during a light breeze.
- Use plywood and/or plastic sheeting to cover open areas between decks when sandblasting (scuppers, railings, freeing ports, ladders, and doorways).
- Install tie rings or cleats, cable suspension systems, or scaffolding to make implementation containment easier.

Nondrydock Containment

- Hang tarpaulin from the boat, fixed, or floating platforms to reduce pollutants transported by wind.
- Pave or tarp surfaces under marine railways.
- Clean railways before the incoming tide.

- Haul vessels beyond the high tide zone before work commences or halt work during high tide.
- Place plastic sheeting or tarpaulin underneath boats to contain and collect waste and spent materials and clean and sweep regularly to remove debris.
- Use fixed or floating platforms with appropriate plastic or tarpaulin barriers as work surfaces and for containment when work is performed on a vessel in the water to prevent blast material or paint overspray from contacting storm water or the receiving water.
- Sweep, rather than hose, debris present on the dock.

Engine Maintenance and Repairs

- Maintain an organized inventory of materials used in the maintenance shop.
- Dispose of greasy rag, oil filters, air filters, batteries, spent coolant, and degreasers properly.
- Label and track the recycling of waste material (i.e., used oil, spent solvents, batteries).
- Drain oil filters before disposal or recycling.
- Store cracked batteries in a non-leaking secondary container.
- Promptly transfer used fluids to the proper container; do not leave full drip pans or other open containers around the shop. Empty and clean drip pans and containers.
- Do not pour liquid waste down floor drains, sinks, or outdoor storm drain inlets.
- Plug floor drains that are connected to the storm or sanitary sewer; if necessary, install a sump that is pumped regularly.
- Inspect the maintenance area regularly for proper implementation of control measures.
- Train employees on proper waste control and disposal procedures.

Material Handling: Bulk Liquid Storage and Containment.

- Store permanent tanks in a paved area surrounded by a dike system which provides sufficient containment for the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank.
- Maintain good integrity of all storage tanks.
- Inspect storage tanks to detect potential leaks and perform preventive maintenance.
- Inspect piping systems (pipes, pumps, flanges, couplings, hoses, valves) for failures or leaks.
- Train employees on proper filling and transfer procedures.

Material Handling: Containerized Material Storage

- Store containerized materials (fuels, paints, solvents, etc. in a protected, secure location and away from drains.
- Store reactive, ignitable, or flammable liquids in compliance with the local fire code.
- Identify potentially hazardous materials, their characteristics, and use.
- Control excessive purchasing, storage, and handling of potentially hazardous materials.
- Keep records to identify quantity, receipt date, service life, users, and disposal routes.
- Secure and carefully monitor hazardous materials to prevent theft, vandalism, and misuse of materials.
- Educate personnel for proper storage, use, cleanup, and disposal of materials.
- Provide sufficient containment for outdoor storage areas the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank.
- Use temporary containment where required by portable drip pans.
- Use spill troughs for drums with taps.

Material Handling Designated Material Mixing Areas

- Mix paints and solvents in designated areas away from drains, ditches, piers, and surface waters. Locate designated areas preferably indoors or under a shed.
- If spills occur,
 - stop the source of the spill immediately
 - contain the liquid until cleanup is complete
 - deploy oil containment booms if the spill may reach the water
 - cover the spill with absorbent material
 - keep the area well ventilated
 - dispose of cleanup materials properly
 - do not use emulsifier or dispersant

Shipboard Process Water Handling

- Keep process and cooling water used aboard ships separate from sanitary wastes to minimize disposal costs for the sanitary wastes.
- Keep process and cooling water from contact with spent abrasives and paint to avoid discharging these pollutants.
- Inspect connecting hoses for leaks.

Shipboard Sanitary Waste Disposal

- Discharge sanitary wastes from the ship being repaired to the yard's sanitary system or dispose of by a commercial waste disposal company.
- Use appropriate material transfer procedures, including spill prevention and containment activities.

Bilge and Ballast Water

Vehicle and Equipment Maintenance Areas at Water Transportation Facilities

- Collect and dispose of bilge and ballast waters which contain oils, solvents, detergents, or other additives to a licensed waste disposal company.

Ship and Boat Building or Repairing Yards

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Pressure Washing

- Collect discharge water and remove all visible solids before discharging to a sewer system, or where permitted, to a drainage system, or receiving water.
- Perform pressure washing only in designated areas where wash water containment can be effectively achieved.
- Use no detergents or additives in the pressure wash water.
- Direct deck drainage to a collection system sump for settling and/or additional treatment.
- Implement diagonal trenches or berms and sumps to contain and collect wash water at marine railways.
- Use solid decking, gutters, and sumps at lift platforms to contain and collect wash water for possible reuse.

Surface Preparation, Sanding, and Paint Removal

- Enclose, cover, or contain blasting and sanding activities to the extent practical to prevent abrasives, dust, and paint chips from reaching storm sewers or receiving water.
- Where feasible, cover drains, trenches, and drainage channels to prevent entry of blasting debris to the system.
- Prohibit uncontained blasting or sanding activities performed over open water.
- Prohibit blasting or sanding activities performed during windy conditions which render containment ineffective.
- Inspect and clean sediment traps to ensure the interception and retention of solids prior to entering the drainage system.
- Sweep accessible areas of the drydock to remove debris and spent sandblasting material prior to flooding.
- Collect spent abrasives routinely and store under a cover to await proper disposal.

Painting

- Enclose, cover, or contain painting activities to the maximum extent practical to prevent overspray from reaching the receiving water.
- Prohibit uncontained spray painting activities over open water.
- Prohibit spray painting activities during windy conditions which render containment ineffective.
- Mix paints and solvents in designated areas away from drains, ditches, piers, and surface waters, preferably indoors or under cover.
- Have absorbent and other cleanup items readily available for immediate cleanup of spills.
- Allow empty paint cans to dry before disposal.
- Keep paint and paint thinner away from traffic areas to avoid spills.
- Recycle paint, paint thinner, and solvents.
- Train employees on proper painting and spraying techniques, and use effective spray equipment that delivers more paint to the target and less overspray.

Drydock Maintenance

- Clean and maintain drydock on a regular basis to minimize the potential for pollutants in the storm water runoff.
- Sweep accessible areas of the drydock to remove debris and spent sandblasting material prior to flooding.
- If hosing may be used as a removal method, collect wash water to remove solids and potential metals.
- Clean the remaining areas of the dock after a vessel has been removed and the dock raised.
- Remove and properly dispose of floatable and other low-density waste (wood, plastic, insulations, etc.).

Drydocking

- Use plastic barriers beneath the hull, between the hull and drydock walls for containment.
- Use plastic barriers hung from the flying bridge of the drydock, from the bow or stern of the vessel, or from temporary structures for containment.
- Weight the bottom edge of the containment tarpaulins or plastic sheeting during a light breeze.
- Use plywood and/or plastic sheeting to cover open areas between decks when sandblasting (scuppers, railings, freeing ports, ladders, and doorways).
- Install tie rings or cleats, cable suspension systems, or scaffolding to make implementation containment easier.

Nondrydock Containment

- Hang tarpaulin from the boat, fixed, or floating platforms to reduce pollutants transported by wind.
- Pave or tarp surfaces under marine railways.
- Clean railways before the incoming tide.

- Haul vessels beyond the high tide zone before work commences or halt work during high tide.
- Place plastic sheeting or tarpaulin underneath boats to contain and collect waste and spent materials and clean and sweep regularly to remove debris.
- Use fixed or floating platforms with appropriate plastic or tarpaulin barriers as work surfaces and for containment when work is performed on a vessel in the water to prevent blast material or paint overspray from contacting storm water or the receiving water.
- Sweep, rather than hose, debris present on the dock.

Engine Maintenance and Repairs

- Maintain an organized inventory of materials used in the maintenance shop.
- Dispose of greasy rag, oil filters, air filters, batteries, spent coolant, and degreasers properly.
- Label and track the recycling of waste material (i.e., used oil, spent solvents, batteries).
- Drain oil filters before disposal or recycling.
- Store cracked batteries in a non-leaking secondary container.
- Promptly transfer used fluids to the proper container; do not leave full drip pans or other open containers around the shop. Empty and clean drip pans and containers.
- Do not pour liquid waste down floor drains, sinks, or outdoor storm drain inlets.
- Plug floor drains that are connected to the storm or sanitary sewer; if necessary, install a sump that is pumped regularly.
- Inspect the maintenance area regularly for proper implementation of control measures.
- Train employees on proper waste control and disposal procedures.

Material Handling: Bulk Liquid Storage and Containment

- Store permanent tanks in a paved area surrounded by a dike system which provides sufficient containment for the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank.
- Maintain good integrity of all storage tanks.
- Inspect storage tanks to detect potential leaks and perform preventive maintenance.
- Inspect piping systems (pipes, pumps, flanges, couplings, hoses, valves) for failures or leaks.
- Train employees on proper filling and transfer procedures.

Material Handling: Containerized Material Storage

- Store containerized materials (fuels, paints, solvents, etc. in a protected, secure location and away from drains.
- Store reactive, ignitable, or flammable liquids in compliance with the local fire code.
- Identify potentially hazardous materials, their characteristics, and use.
- Control excessive purchasing, storage, and handling of potentially hazardous materials.
- Keep records to identify quantity, receipt date, service life, users, and disposal routes.
- Secure and carefully monitor hazardous materials to prevent theft, vandalism, and misuse of materials.
- Educate personnel for proper storage, use, cleanup, and disposal of materials.
- Provide sufficient containment for outdoor storage areas the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank.
- Use temporary containment where required by portable drip pans.
- Use spill troughs for drums with taps.

Material Handling Designated Material Mixing Areas

- Mix paints and solvents in designated areas away from drains, ditches, piers, and surface waters. Locate designated areas preferably indoors or under a shed.
- If spills occur,
 - stop the source of the spill immediately
 - contain the liquid until cleanup is complete
 - deploy oil containment booms if the spill may reach the water
 - cover the spill with absorbent material
 - keep the area well ventilated
 - dispose of cleanup materials properly
 - do not use emulsifier or dispersant

Shipboard Process Water Handling

- Keep process and cooling water used aboard ships separate from sanitary wastes to minimize disposal costs for the sanitary wastes.
- Keep process and cooling water from contact with spent abrasives and paint to avoid discharging these pollutants.
- Inspect connecting hoses for leaks.

Shipboard Sanitary Waste Disposal

- Discharge sanitary wastes from the ship being repaired to the yard's sanitary system or dispose of by a commercial waste disposal company.
- Use appropriate material transfer procedures, including spill prevention and containment activities.

Bilge and Ballast Water

- Collect and dispose of bilge and ballast waters which contain oils, solvents, detergents, or other additives to a licensed waste disposal company.

Vehicle and Equipment Maintenance and Deicing Areas at Air Transportation Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Aircraft, Ground Vehicle and Equipment Maintenance Areas

- Perform all maintenance activities indoors.
- Maintain an organized inventory of materials used.
- Drain all parts of fluids prior to disposal.
- Prohibit the practice of hosing down the apron or hangar floor.
- Use dry cleanup methods in the event of spills.
- Collect the storm water runoff from maintenance and/or service areas and provide treatment or recycling.

Aircraft, Ground Vehicle, and Equipment Cleaning Areas

- Perform all cleaning operations indoors.
- Collect the storm water runoff from the area and provide treatment or recycling.

Aircraft, Ground Vehicle, and Equipment Storage Areas

- The storage of aircraft, ground vehicles, and equipment awaiting maintenance may be confined to designated areas.
- Store aircraft and ground vehicles indoors.
- Use drip pans for the collection of fluid leaks.
- Consider perimeter drains, dikes or berms surrounding storage areas.

Material Storage Areas

- Storage units of all materials (e.g., used oils, hydraulic fluids, spent solvents and waste aircraft fuel) may be maintained in good condition, so as to prevent contamination of storm water, and plainly labeled (e.g., “used oil,” “Contaminated Jet A,” etc.).
- Store materials indoors.
- Maintain a centralized storage areas for waste materials.
- Install berms and dikes around storage areas.

Airport Fuel System and Fueling Areas

- Where above ground storage timers are present, pollution prevention plan requirements should be consistent with requirements established in 40 CFR 112.7 guidelines for the preparation and implementation of a Spill Prevention Control and Countermeasure (SPCC) plan.

Deicing Operations

- Evaluate present chemical application rates to ensure against excessive over application. Devices which meter the amount of chemical being applied to runways help to prevent over application.
- Emphasize anti-icing operations which would preclude the need to deice; less chemical is required to prevent the formation of ice on a runway than is required to remove ice from a runway.
- Consider installing runway ice detection systems (RID) otherwise known as “pavement sensors” which monitor runway temperatures. Pavement sensors provide an indication of when runway temperatures are approaching freezing conditions, thus alerting operators of the need to conduct anti-icing operations.
- Deicing/anti-icing chemicals applied during extremely cold, dry conditions, are often ineffective since they do not adhere to the ice surface and may be scattered as a result of windy conditions or aircraft movement. In an effort to improve the efficiency of the application, operators should consider prewetting the deicing chemical to improve the adhesion to the iced surface.
- Consider using chemicals which have less of an environmental impact on receiving waters. Potassium acetate, has a lower oxygen demand than glycol, is nontoxic to aquatic habitat or humans, and was approved by the FAA for runway deicing operations in November, 1991 (AC No. 150/520030A CHG 1).
- Consider pretreating aircraft with hot water or forced air prior to the application of chemical deicer to reduce the amount of chemical deicer used during the operation.
- When deicing/anti-icing operations are conducted on aircraft during periods of dry weather, operators should ensure that storm water inlets are blocked to prevent the discharge of deicing/anti-icing chemicals to the storm sewer system. Mechanical vacuum systems or other similar devices can then be used to collect the spent deicing chemical from the apron surface for proper disposal to prevent those materials from later becoming a source of storm water contamination.
- Establishing a centralized deicing station would provide better control over aircraft deicing/anti-icing operations in that it enables operators to readily collect spent deicing/anti-icing chemicals.
- Once spent deicer/anti-icer chemicals are collected, operators can select from various methods of disposal such as disposal to sanitary sewer facility, retention and detention ponds, or recycling.

Treatment Works

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Preparation of Biological and Physical Treatment Process

- Use drip pans under drums and equipment where feasible.
- Store process chemicals inside buildings.
- Inspect the storage yard for filling drip pans and other problems regularly.
- Train employees on procedures for storing and inspecting chemicals.

Soil Amending and Grass Fertilizing

- Use the appropriate amount of fertilizer.
- Do not overfertilize.
- Train employee on proper fertilizing techniques.

Liquid Storage in Above Ground Storage Containers

- Maintain good integrity of all storage containers.
- Install safeguards (such as diking or berming) against accidental releases at the storage area.
- Inspect storage tanks to detect potential leaks and perform preventive maintenance.
- Inspect piping systems (pipes, pumps, flanges, couplings, hoses, and valves) for failures or leaks.
- Train employees on proper filling and transfer procedures.

Pest Control

- Minimize pesticide application.
- Only apply pesticide if needed.
- Train employees on proper pesticide application.

Sludge Drying Beds

- Ensure drying bed is draining properly (e.g., check for clogging); avoid overfilling drying bed; grade the land to divert flow around drying bed; berm, dike, or curb drying bed areas; cover drying beds.

Sludge Storage Piles

- Confine storage of sludge to a designated area as far from any receiving water body as possible; store sludge on an impervious surface (e.g., concrete pad); grade the land to divert flow around storage piles; berm, dike, or curb sludge storage piles; cover sludge storage piles.

Sludge Transfer

- Promptly remove any sludge spilled during transfer; conduct transfer operations over an impervious surface; avoid transferring sludge during rain events; grade the land to divert flow around transfer areas; berm, curb, or dike transfer areas; avoid locating transfer operations near receiving water bodies.

Incineration-Ash Impoundments/ Piles

- Line ash impoundments with clay (or other type of impervious material); ensure ash impoundments will hold maximum volume of ash and a 10-year, 24-hour rain event; curb, berm, or dike ash storage areas; avoid locating ash storage areas near receiving water bodies.

Miscellaneous

- Properly dispose of grit/scum; properly dispose of screens on a daily basis; maximize vegetative cover to stabilize soil and reduce erosion.

Food and Kindred Products Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Raw Material Unloading/Product Loading

- Ensure that a facility representative is present during unloading/loading activities.
- Inspect the unloading/loading areas to detect problems before they occur.
- Close storm drains during loading/unloading activities in surrounding area.
- Inspect all containers prior to unloading/loading of any raw or spent materials.
- Install backflow prevention devices on liquid transfer equipment.
- Inspect all connection equipment (e.g., hoses and couplings), and replace when necessary, before performing unloading/loading activities.
- Perform all unloading/loading activities in a covered and/or enclosed areas.
- Use drip pans when loading/unloading liquid product.
- Situate loading/unloading areas indoors or in a covered area.
- Use rubber seals in truck loading dock areas to contain spills indoors.
- Drain hoses back into truck, railcar, etc. after loading/unloading materials.
- Install high level alarm on tanks to prevent overfilling.
- Ensure that berms and dikes are built around the unloading/loading areas, if applicable.
- If outside or in covered areas, minimize run on of storm water into the unloading/loading areas by grading the areas to ensure that storm water runs off.
- Use dry cleanup methods for unloading/loading areas rather than washing the areas down.
- Train employees on proper unloading/loading techniques.
- Initiate an inventory control for all raw and spent materials.

Storage Containers: Liquid Storage

- Inspect the external condition (corrosion, leaks) of the containers.
- Inspect the general area around the containers.
- Ensure that beams and dikes are built around the containers.
- Cover and/or enclose.
- Bulkhead liquid storage tanks indoors (i.e., tank outlets located inside buildings).
- Ensure that all containers are closed (e.g., valves shut, lids and manways sealed, caps closed).
- Wash containers indoors before storing empty containers outdoors.
- If outside or in a covered area, minimize run on of storm water into a storage area by grading area to ensure that storm water runs “off” and not “on”.
- Train employees on proper storage techniques (e.g., filling and transferring contents).
- Maintain employee training on proper handling and transportation of materials.
- Maintain an inventory control of all raw and spent materials.
- Employ measures to protect against spillage from the overflows (e.g., high level sensors, alarms).

Storage Containers: Solid Storage

- Consider vacuum emission control systems for airborne dust and particulate matter.
-

Waste Management: Wastewater

- Perform treatment processes in-house, if possible.
- Inspect the outside pipe connections (couplings, valve seals and gaskets, flanges, etc.) of the treatment system for leaks, corrosion, and poor maintenance upkeep.

Waste Management: Solid Waste

- Inspect the general area around the solid waste (e.g., look for signs of leaching).
- Store waste so that it is physically contained (dumpsters, drums, bags).
- Store waste in an enclosed/covered area.
- If outside or in a covered area, minimize exposure to storm water by grading the area to ensure that storm water runs “off” and not “on”.
- Ensure hazardous waste disposal practices are performed in accordance with Federal, State, and local requirements.
- Route trash compactor leakage to treatment system or sanitary sewer.

Waste Management: Air Emissions

- Clean around vents and stacks to atmosphere from process and storage areas.
- Place tubs around vents and stacks for easy collection of settling particles.
- Inspect air emission control systems (e.g., baghouses) regularly and repair and replace as necessary.
- Route overflows/condensates from process vents to onsite treatment system or to the sanitary sewer.

Pest Control

- Follow manufacturers directions for application of pest control materials to site.
- Time application for dry weather conditions.
- Store partially full containers indoors or undercover.
- Apply insecticides during breeding months.
- Protect rat bait houses from storm water.

Improper Connections to the Storm Drain

- Perform smoke or dye testing to determine if interconnections exist between the sanitary sewer and storm drain.
- Plug all floor drains leading to storm drains.
- Update facility schematics to accurately reflect all plumbing connections.

General

- Offer employee incentives so that employees will develop cost effective, worker efficient BMPs.
- Request outside firm to conduct a storm water inspection/audit.
- Inspect material transfer lines/connections for leaks or signs of wear and repair or replace as necessary.

Activities for Specific Facilities:

Meat Products

- Inspect area around animal holding pens.
 - Enclose/cover fowl hanging area.
 - Enclose/cover the animal holding pens.
 - Grade the areas around the animal holding pens to ensure storm water runs “off” and not “on” to the holding pen.
 - Train employees on proper material (i.e., hide, hair, feathers, animal parts) clean-up procedures around and within the animal holding pens.
 - Store animal manure and other materials from clean-up activities in appropriate containers in an enclosed/covered area.
 - Area for trailers holding empty bird cages should have storm water run on/runoff controls in place.
 - Use mechanical sweepers around site to clean up fugitive feathers, dust, and manure.
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Dairy Products

- Inspect area around aged/spoiled dairy products.
 - Store aged/spoiled dairy products in enclosed area.
 - Train employees on proper disposal methods for all aged/spoiled dairy products.
 - Ensure that all aged/spoiled product (e.g., bottles, cartons, plastic containers) are disposed of in a proper manner (bagged, covered).
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Canned Frozen and Preserved Fruits, Vegetables, and Frozen Specialties

- Inspect all fruit and vegetable storage areas.
 - Store all fruits and vegetables in appropriate containers (e.g., bins, bushels, baskets, buckets) and in enclosed/covered areas.
 - Store empty fruit and vegetable containers in an enclosed/covered area.
 - Train employees on proper handling/disposal methods for fresh/rotten fruits and vegetables.
 - Consider air emission control systems for all cooking processes to reduce particulate matter.
 - Minimize fruit and vegetable storage time outdoors.
-

Grain Mills

- Inspect the general area around the grain storage.
- Store all grain in appropriate containers (e.g., silos, hoppers) in an enclosed/covered area.
- Train employees on grain handling procedures.
- Consider a vacuum control system in all grain mixing areas.

Bakery Products

- Inspect ingredient storage areas.
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- Store all ingredients (e.g., corn sweeteners, flour, shortening, syrup, vegetable oils) in appropriate containers (e.g., tanks, drums, bags) in an enclosed/covered area.
- Remove flour/oil dust accumulation around ventilation exhaust systems.
- Install an air emission control system for all baking processes to reduce particulate matter.

Sugar and Confectionery

- Consider a vacuum control system in all granular and powdered processing areas.
-

Fats & Oils

- Inspect all fats and oils storage areas.
- Store all fats and oils, (e.g., butcher shop materials, hair, hide, tallow, bone meal, and offal) in enclosed/covered areas.
- Ensure all fats and oils are physically contained.

Beverages

- Ensure grain is stored in enclosed/covered area.
- Consider an air emission control system for all grain handling and brewing processes.
- Protect reusable beverage containers that are stored outdoors from storm water contact.

Textile Mills, Apparel, and Other Fabric Product Manufacturing Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Preparation (e.g., Desizing and Scouring).

- Waste stream reuse for typical bleach unit processing; recycle J-box or kier drain wastes to saturator.
- Make use of countercurrent washing.
- Use washer waste from scour operation for batch scouring.

Dyeing

- Perform analysis of spent dye baths for residual materials.
- Where feasible, obtain background information and data necessary before making product substitutions. This includes OSHA form 20 data and technical data.
- Be aware of potential problem chemicals, such as aryl phenol ethoxylates, chlorinated aromatics, chlorinated aromatics, and metals.
- Employ pad batch dyeing to eliminate the need for salts and chemical specialties from the dyebath, with associated reduction in cost and pollution source reduction.

Finishing

- Reuse residual portions of finish mixes as much as possible by adding back to them the required components to make up the next mix.
- Return noncontact cooling water and stream condensates to either a hot water holding tank or a clear well. If neither is available, segregate waste streams from sources which do not generally require treatment from other waste streams that do require treatment.

General Water Conservation Techniques

- Use "low liquor ratio" dyeing machines where practicable.
- Use of foam processing (mercerizing, bleaching, dyeing, finishing) where practicable as a water conservation process.

Chemical Screening and Inventory Control

- Employ prescreening practices to evaluate and consider chemicals on a wide range of environmental and health impact criteria.
 - Develop and perform a routine raw material quality control program.
 - Review and develop procedures for source reduction of metals.
 - Promptly transfer used fluids to the proper container; do not leave full drip pans or other open containers around the shop. Empty and clean drip pans and containers.
 - Do not pour liquid waste down floor drains, sinks, or outdoor storm drain inlets.
 - Plug floor drains that are connected to the storm or sanitary sewer; if necessary, install a sump that is pumped regularly.
 - Inspect the maintenance area regularly for proper implementation of control measures.
 - Train employees on proper waste control and disposal procedures.
-

Material Handling: Bulk Liquid Storage and Containment

- Store permanent tanks in a paved area surrounded by a dike system which provides sufficient containment for the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank.
- Maintain good integrity of all storage tanks.
- Inspect storage tanks to detect potential leaks and perform preventive maintenance.
- Inspect piping systems (pipes, pumps, flanges, couplings, hoses, valves) for failures or leaks.
- Train employees on proper filling and transfer procedures.

Material Handling: Containerized Material Storage

- Store containerized materials (fuels, paints, solvents, etc.) in a protected, secure location and away from drains.
- Store reactive, ignitable, or flammable liquids in compliance with the local fire code.
- Label all materials clearly.
- Identify potentially hazardous materials, their characteristics, and use.
- Control excessive purchasing, storage, and handling of potentially hazardous materials.
- Keep records to identify quantity, receipt date, service life, users, and disposal routes.
- Secure and carefully monitor hazardous materials to prevent theft, vandalism, and misuse of materials.
- Educate personnel for proper storage, use, cleanup, and disposal of materials.
- Provide sufficient containment for outdoor storage areas for the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank.
- Use temporary containment where required by portable drip pans.
- Use spill troughs for drums with taps.

Material Handling: Designated Material Mixing Areas

- Mix solvents in designated areas away from drains, ditches, and surface waters.

- If spills occur,
 - stop the source of the spill immediately
 - contain the liquid until cleanup is complete
 - deploy oil containment booms if the spill may reach the water
 - cover the spill with absorbent material
 - keep the area well ventilated
 - dispose of cleanup materials properly
 - do not use emulsifier or dispersant

Wood and Metal Furniture and Fixture Manufacturing Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Outdoor Unloading and Loading

- Confine loading/unloading activities to a designated area.
- Perform all loading/unloading activities in a covered or enclosed area.
- Close storm drains during loading/unloading activities in surrounding areas.
- Avoid loading/unloading materials in the rain.
- Inspect all containers prior to loading/unloading of any raw or spent materials.
- Berm, curb, or dike loading/unloading areas.
- Use dry clean-up methods instead of washing the areas down.
- Train employees on proper loading/unloading techniques.

Outdoor Material Storage

- Confine storage of raw materials, parts, and equipment to designated areas.
- Train employees on proper waste control and disposal.
- Berm, curb, or dike any areas around tanks.
- Ensure that all containers are properly sealed and valves closed.
- Inventory all raw and spent materials.
- Inspect air emission control systems regularly, and repair or replace when necessary.
- Store wastes in covered, leak proof containers (e.g., dumpsters, drums).
- Store wastes in enclosed and/or covered areas.
- Ensure hazardous and solid waste disposal practices are performed in accordance with applicable Federal, State, and local requirements.
- Ship all wastes to offsite landfills or treatment facilities.

Printing and Publishing Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Plate Preparation

- Use aqueous-developed lithographic plates or wipe-on plates.

Printing

- Use press wipes as long as possible before discarding or laundering; dirty ones for the first pass, clean ones for the second pass.
- Squeeze or centrifuge solvent out of dirty rags.
- Set up an in-house dirty rag cleaning operation if warranted or send to approved industrial laundries, if available.
- Dedicate press for inks with hazardous pigments/solvents.
- Segregate used oil from solvents or other materials.
- Use water-based inks in gravure and flexographic printing process.

Clean Up

- Label sinks as to proper disposal of liquids.
- Keep equipment in good condition.
- Use doctor blades and squeegees to remove as much ink as possible prior to cleaning with solvent and rags.
- Control solvent use during equipment cleaning, use only what you need.
- Designate special areas for draining or replacing fluids.
- Substitute nontoxic or less toxic cleaning solvents.
- Recover waste solvents onsite with batch distillation if warranted or utilize professional solvent recyclers.
- Centralize liquid solvent cleaning in one location. Have refresher courses in operating and safety procedures.

Stencil Preparation for Screen Printing

- Recapture excess ink from silkscreen process before washing the screen to decrease amount of ink used and cleaning emulsion used.

Material Handling and Storage Areas

- Store containerized materials (fuels, paints, inks, solvents, etc.) in a protected, secure location and away from drains.
- Store reactive, ignitable, or flammable liquids in compliance with the local fire code.
- Identify potentially hazardous materials, their characteristics, and use.
- Eliminate/reduce exposure to storm water.
- Control excessive purchasing, storage, and handling of potentially hazardous materials.
- Keep records to identify quantity, receipt date, service life, users, and disposal routes secure and carefully monitor hazardous materials to prevent theft, vandalism, and misuse of materials.
- Educate personnel for proper storage, use, cleanup, and disposal of materials.
- Maintain good integrity of all storage tanks inspect storage tanks to detect potential leaks and perform preventive maintenance.
- Provide sufficient containment for outdoor storage areas for the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank.
- Use temporary containment where required by portable drip pans.
- Use spill troughs for drums with taps.
- Train employees on proper filling and transfer procedures.
- Inspect piping systems (pipes, pumps, flanges, couplings, hoses, valves) for failures or leaks.
- Handle solvents in designated areas away from drains, ditches, and surface waters. Locate designated areas preferably indoors or under a shed.
- If spills occur,
 - stop the source of the spill immediately
 - contain the liquid until cleanup is complete
 - deploy oil containment booms if the spill may reach the water
 - cover the spill with absorbent material
 - keep the area well ventilated
 - dispose of cleanup materials properly
 - do not use emulsifier or dispersant

Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Outdoor Unloading and Loading

- Confine loading/unloading activities to a designated area.
- Consider performing loading/unloading activities indoors or in a covered area.
- Consider covering loading/unloading area with permanent cover (e.g., roofs) or temporary cover (e.g., tarps).
- Close storm drains during loading/unloading activities in surrounding areas.
- Avoid loading/unloading materials in the rain.
- Inspect the unloading/loading areas to detect problems before they occur.
- Inspect all containers prior to loading/unloading of any raw or spent materials.
- Consider berming, curbing, or diking loading/unloading areas.
- Dead-end sump where spilled materials could be directed.
- Drip pans under hoses.
- Use dry clean-up methods instead of washing the areas down.
- Train employees on proper loading/unloading techniques and spill prevention and response.

Outdoor Material Storage

- Confine storage of materials, parts, and equipment to designated areas.
- Consider secondary containment using curbing, berming, or diking all liquid storage areas.
- Train employees on proper waste control and disposal.
- Train employees in spill prevention and response.
- Consider covering tanks.
- Ensure that all containers are closed (e.g., valves shut, lids sealed, caps closed).
- Wash and rinse containers indoors before storing them outdoors.
- If outside or in covered areas, minimize run on by grading the land to divert flow away from containers.
- Leak detection and container integrity testing.
- Direct runoff to onsite retention pond.
- Inventory all raw and spent materials.
- Clean around vents and stacks.
- Place tubs around vents and stacks to collect particulate.
- Inspect air emission control systems (e.g., baghouses) regularly, and repair or replace when necessary.
- Store wastes in covered, leak proof containers (e.g., dumpsters, drums).
- Consider shipping all wastes to offsite landfills or treatment facilities.
- Ensure hazardous waste disposal practices are performed in accordance with Federal, State, and local requirements.

Zinc Handling

- Train employee train regarding the handling and emptying of zinc bags.
- Indoor storage of zinc bags.
- Thoroughly cleanup zinc spills without washing the zinc into a storm drain.
- Consider the use of 2,500 pound sacks (from which spills are less likely) rather than 50 to 100 pound sacks.
- Provide a cover for the dumpster or move the dumpster inside.
- Provide a lining for the dumpster.
- Review dust collectors and baghouses as possible sources of zinc. Improperly operating dust collectors or baghouses may be replaced or repaired as appropriate; the plan may also provide for regular maintenance of these facilities.
- Review dust generation from rubber grinding operations and as appropriate, install a dust collection system.
- Prevent and/or clean up drips or spills of zinc stearate slurry which may be released to a storm drain. Alternate compounds to zinc stearate may also be considered.

Leather Tanning and Finishing Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Temporary Outdoor Storage of Fresh or Brine Cured Hides

- Store hides indoors if possible.
- Cover the hides with a roof or temporary covering (e.g., polyethylene, tarpaulin etc.).
- Minimize storm water run on by enclosing the area or building a berm around the area.
- Inspect area regularly for proper implementation of good housekeeping and control measures.

Beamhouse Operations

- Store chemical drums & bags and empty lime & depilatory chemical containers indoors if possible, preventive maintenance.
- Cover chemical drums & bags, empty lime & depilatory chemical containers and leather scraps with roof or temporary covering (e.g., tarpaulins, polyethylene) and store on elevated impermeable surface.
- Curbing, containment dikes around chemical storage, empty lime & depilatory chemical containers and leather scrap storage area.
- Inspect area regularly for leaking drums, broken bags, proper implementation of good housekeeping and control measures, (broken cracked dikes), material inventory, material storage and operation & maintenance.
- Clean up leaks & spills quickly & completely, use drip pans for leaking equipment.
- Good Housekeeping-all paved areas should be swept regularly, eliminate unnecessary flushing with water and label chemical drums and containers.
- Employee training on good housekeeping, proper handling of chemicals.

Tanyards

- BMPs for Tanyards (empty chemical containers and hides, leather dust, shavings) are the same as those listed above for Beamhouse Activities.

Retan and Wet Finish

- Dust reduction through frequent inspection of vacuum, collector (bag & cyclone), and filter systems.
 - Dust reduction through enclosure and covering.
 - Preventive maintenance/inspection of dust collection systems.
 - Good Housekeeping-regular sweeping of paved areas, eliminate unnecessary flushing with water and label chemical drums and containers.
 - Employee training on good housekeeping, proper handling of chemicals.
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Dry Finish

- Preventive maintenance, inspection of spray booths.
 - Employee training on proper disposal of spent solvents.
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Receiving and Shipping

- Cover shipping & receiving area.
- Cover trucks.
- Vehicle positioning-locating trucks while transferring materials to prevent spills onto the ground surface.
- Grade berm or curb area to prevent storm water run on contamination, divert rain gutters away from loading area.
- Clean spills immediately.
- Inspect trucks for leaks.
- Employee training in spill prevention.

Liquid Storage in Above Ground Tanks

- Clearly tag valves to avoid human error.
- Install overflow protection devices on tank systems to warn operator or to automatically shut down transfer pumps when tanks reach full capacity.
- Secondary containment around tanks.
- Employee training.
- Inspection of tank foundations, connections, coatings, valves and piping systems.
- Comply with existing spill prevention, cleanup and countermeasure plans (SPCC plan) and State and Federal laws.
- Integrity testing by qualified professional.

Improper Connections to Storm Drains

- Plug all floor drains connected to storm drain.
 - Perform smoke or dye testing to determine if interconnections exist between sanitary water system and storm drain system.
 - Update facility schematics to accurately reflect all plumbing connections.
 - Install a safeguard against washwaters from processing areas entering the storm sewer unless permitted.
 - Train employees on proper disposal practices for all materials.
-

Waste Management

- Conduct waste reduction assessment-develop guidelines for the elimination of waste generation emissions.
- Institute industrial waste source reduction and recycling BMPs.
- Move waste management activities indoors (after safety concerns are addressed) and cover waste piles, dumpsters, hoppers, place on impermeable elevated surfaces.
- Prevent storm water run on by curbing, building berms.
- Cover trucks & inspect for leaking wastes.
- Inspection of waste management areas for leaking containers, spills, damaged containers, uncovered waste piles, dumpsters, hoppers.
- Inspection of roof areas & outside equipment.
- Develop and maintain proper erosion control or site stabilization measures.
- Train employees on proper disposal practices for all materials.

Fabricated Metal Products Industry

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Metal Fabricating Areas

- Sweep fabrication areas. Absorb dust through a vacuum system to avoid accumulation on roof tops and onto the ground.
 - Sweep on a regular basis all accessible paved areas.
 - Maintain floors in a clean and dry condition.
 - Remove waste and dispose of regularly.
 - Remove obsolete equipment expeditiously.
 - Train employees on good housekeeping measures.
-

Storage Areas for Raw Metal

- The storage of raw materials should be under a covered area whenever possible and protected from contact with the ground.
 - The amount of material stored should be minimized to avoid corrosive activity from longterm exposed materials.
 - Diking or berming the area to prevent or minimize runoff may be considered.
 - Check raw metals for corrosion.
 - Keep area neat and orderly, stack neatly on pallets or off the ground; and cover exposed materials.
-

Receiving, Unloading, and Loading Areas

- These areas should be enclosed where feasible using either curbing, berming, diking or other accepted containment systems in case of spills during delivery of chemicals such as lubricants, coolants, rust preventatives, solvents, oil, sodium hydroxide, hydrochloric acid, calcium chloride, polymers, sulfuric acid, and other chemicals used in the metal fabricating processes.
- Directing roof down spouts away from loading sites and equipment and onto grassy or vegetated areas should help prevent storm water contamination by pollutants that have accumulated in these areas.
- Clean up spills immediately.
- Check for leaks and remedy problems regularly.
- Unload under covered areas when possible.

Storage of Heavy Equipment

- Vehicles should be stored indoors when possible.
- If stored outdoors, the use of gravel, concrete or other porous surfaces should be considered to minimize or prevent heavy equipment from creating ditches or other conveyances that would cause sedimentation runoff and increase TSS loadings.
- Clean equipment prior to storage.
- Divert drainage to the grass swales, filter strips, retention ponds, or holding tanks.

Metal Working Fluid Areas

- Store used metal working fluid with fine metal dust indoors.
- Use tight sealing lids on all fluid containers.
- Use straw, clay absorbents, sawdust, or synthetic absorbents to confine or contain any spills, or other absorbent material and establish recycling programs for used fluids when possible.

Unprotected Liquid Storage Tanks

- Cover all tanks whenever possible.
 - Berm tanks whenever possible.
 - Dike area or install grass filters to contain spills.
 - Keep area clean.
 - Check piping, valves and other related equipment on a regular basis.
-

Chemical Cleaners and Rinse Water

- Use drip pans and other spill devices to collect spills or solvents and other liquid cleaners.
- Recycle wastewater.
- Store recyclable waste indoors or in covered containers.
- Substitute nontoxic cleaning agents when possible.

Raw Steel Collection Areas

- Materials should be kept in a covered storage bin or kept inside until pickup.
- The use of pitched structures should be considered.
- Collect scrap metals, fines, iron dust and store under cover and recycle.

Paints and Painting Equipment

- Paint and sand indoors when possible.
- Avoid painting and sandblasting operations outdoors in windy weather conditions.
- If done outside, enclose sanding and painting areas with tarps or plastic sheeting.
- Use waterbased paints when possible.
- Use tarps, drip pans, or other spill collection devices to contain and collect spills of paints, solvents or other liquid material.

Vehicle and Equipment Maintenance Areas

- Changing fluids or parts should be done indoors when possible.
- If maintenance is performed outdoors, fluids used in maintaining these vehicles should be contained in the area by using drip pans, large plastic sheets, canvas or other similar controls under the vehicles, or berming the area.
- Hydraulic fluids should be properly stored to prevent leakage and storm water contamination.
- Discard fluids properly or recycle if possible.

Hazardous Waste Storage Areas

- All hazardous waste may be stored in sealed drums.
- Establish centralized drum storage satellite areas throughout the complex to store these materials.
- Store indoors or under cover where possible.
- Do not stack containers in such a way as to cause leaks or damage to the containers.
- Use pallets to store containers when possible.
- Store materials with adequate space for traffic without disturbing drums.
- Maintain low inventory level of chemicals based on need.
- Dike or use grass swales, ditches or other containment to prevent runoff or runoff in case of spills.
- Label materials clearly.
- Check for corrosion and leakage of storage containers.
- Properly dispose of outdated materials.
- Post notices prohibiting dumping of materials into storm drains.
- All other applicable Federal, State, and local regulations may be followed.

Transporting Chemicals to Storage Areas

- Forklift operators should be trained to avoid puncturing drums.
- Store drums as close to operational building as possible.
- Label all drums with proper warning and handling instructions.

Finished Products (Galvanized) Storage

- Materials should be stored in such a way to minimize contact with precipitation and runoff.

- Consider storing finished products indoors, on a wooden pallets concrete pad, gravel surface, or other impervious surface.
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Wooden Pallets and Empty Drums

- Clean contaminated wooden pallets.
- Cover empty drums.
- Cover contaminated wooden pallets.
- Store drums and pallets indoors.
- Clean empty drums.
- Store pallets and drums on concrete pads.

Retention Ponds (Lagoon)

- Provide routine maintenance.
- Remove excess sludge periodically.
- Aerate periodically to maintain pond's aerobic character and ecological balance.

Facilities that Manufacture Transportation Equipment, Industrial, or Commercial Machinery

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Outdoor Unloading and Loading

- Confine loading/unloading activities to a designated area.
 - Consider performing loading/unloading activities indoors or in a covered area.
 - Consider covering loading/unloading area with permanent cover (e.g., roofs) or temporary cover (e.g., tarps).
 - Close storm drains during loading/unloading activities in surrounding areas.
 - Avoid loading/unloading materials in the rain.
 - Inspect the unloading/loading areas to detect problems before they occur.
 - Inspect all containers prior to loading/unloading of any raw or spent materials.
 - Consider berming, curbing, or diking loading/unloading areas.
 - Use dry cleanup methods instead of washing the areas down.
 - Train employees on proper loading/unloading techniques.
-

Outdoor Material Storage

- Confine storage of materials, parts, and equipment to designated areas.
- Consider curbing, berming, or diking all liquid storage areas.
- Train employees on proper waste control and disposal.
- Consider covering tanks.
- Ensure that all containers are closed (e.g., valves shut, lids sealed, caps closed).
- Wash and rinse containers indoors before storing them outdoors.
- If outside or in covered areas, minimize runoff of storm water by grading the land to divert flow away from containers.
- Inventory all raw and spent materials.
- Clean around vents and stacks.
- Place tubs around vents and stacks to collect particulate.
- Inspect air emission control systems (e.g., baghouses) regularly, and repair or replace when necessary.
- Store wastes in covered, leak proof containers (e.g., dumpsters, drums).
- Consider shipping all wastes to offsite landfills or treatment facilities.
- Ensure hazardous waste disposal practices are performed in accordance with Federal, State, and local requirements.

Manufacturers of Electronic and Electrical Equipment

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Outdoor Unloading and Loading

- Confine loading/unloading activities to a designated area.
- Consider performing loading/unloading activities indoors or in a covered area.
- Consider covering loading/unloading area with permanent cover (e.g., roofs) or temporary cover (e.g., tarps).
- Close storm drains during loading/unloading activities in surrounding areas.
- Avoid loading/unloading materials in the rain.
- Inspect the unloading/loading areas to detect problems before they occur.
- Inspect all containers prior to loading/unloading of any raw or spent materials.
- Consider berming, curbing, or diking loading/unloading areas.
- Dead-end sump where spilled materials could be directed.
- Drip pans under hoses.
- Use dry clean-up methods instead of washing the areas down.
- Train employees on proper loading/unloading techniques and spill prevention and response.

Outdoor Material Storage

- Confine storage of materials, parts, and equipment to designated areas.
- Consider secondary containment using curbing, berming, or diking all liquid storage areas.
- Train employees in spill prevention and response techniques.
- Train employees on proper waste control and disposal.
- Consider covering tanks.
- Ensure that all containers are closed (e.g., valves shut, lids sealed, caps closed).
- Wash and rinse containers indoors before storing them outdoors.
- If outside or in covered areas, minimize run on of storm water by grading the land to divert flow away from containers.
- Leak detection and container integrity testing.
- Direct runoff to onsite retention pond.
- Inventory all raw and spent materials.
- Clean around vents and stacks.
- Place tubs around vents and stacks to collect particulate.
- Inspect air emission control systems (e.g., baghouses) regularly, and repair or replace when necessary.
- Store wastes in covered, leak proof containers (e.g., dumpsters, drums).
- Consider shipping all wastes to offsite landfills or treatment facilities.
- Ensure hazardous waste disposal practices are performed in accordance with Federal, State, and local requirements.

Attachment 2

BMPs for Other Specific Facilities

Vehicle Service Facilities

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Changing Oil and Other Fluids

- Whenever possible, change vehicle fluids indoors and only on floors constructed of non-porous materials. Avoid working over asphalt and dirt floors – surfaces that absorb vehicle fluids.
- If vehicle fluids must be removed outdoors, always use a drip pan. Prevent spills from reaching the street or storm drain by working over an absorbent mat and covering nearby storm drains, or working in a bermed area. If necessary, use absorbent socks to create a bermed area.
- When draining fluids into a drain pan, place a larger drip pan (e.g., 3' x 4') under the primary drain pan to catch any spilled fluids.
- Divert storm water around storage areas with ditches, swales and/or berms. Transfer fluids drained from vehicles to a designated waste storage area as soon as possible. Drain pans and other open containers of fluids should not be left unattended unless they are covered and within secondary containment.
- Store waste containers of antifreeze and oil within secondary containment. Antifreeze and waste oil should be stored separately and recycled, or disposed of as hazardous waste.
- Never pour vehicle fluids or other hazardous wastes into sinks, toilets, floor drains, outside storm drains, or in the garbage. These substances should be kept in designated storage areas until recycled or safe disposal.
- Drain fluids from leaking or wrecked vehicles as soon as possible, to avoid leaks and spills.
- Consider using a quarter barrel, vacuum pump, or drain pan with built-in pump to transfer fluids.

Cleaning Engines and Parts, and Flushing Radiators

- Eliminate discharges from these operations to the sanitary sewer and storm drains. Use a licensed service to haul and recycle or dispose of wastes.
- Designate specific areas or service bays for engine, parts, or radiator cleaning. Do not wash or rinse parts outdoors.
- Use self-contained sinks and tanks when working with solvents. Keep sinks and tanks covered when not in use.
- Inspect degreasing solvent sinks regularly for leaks, and make necessary repairs immediately.
- Avoid soldering over drip tanks. Sweep up drippings and recycle or dispose as hazardous waste.
- Rinse and drain parts over the solvent sink or tank, so that solvents will not drip or spill onto the floor. Use drip boards or pans to catch excess solutions and divert them back to a sink or tank.
- Allow parts to dry over the hot tank. If rinsing is required, rinse over the tank as well.
- Collect and reuse parts cleaning solvents and water used in flushing and testing radiators. When reuse is no longer possible, these solutions may be hazardous wastes, and must be disposed of properly.
- Never discharge cleaning solutions used for engines or parts into the sewer system without adequate treatment. Most facilities have these solutions hauled off-site as hazardous waste because of the permits necessary for on-site treatment.
- Rinse water may only be discharged to the sanitary sewer with adequate treatment and approval of the sewage treatment plant.
- Never discharge wastewater from steam cleaning, or engine/parts cleaning to a street, gutter, or storm drain.
- Sweep or use a vacuum to clean up dust and debris from scraping or bead blasting radiators.
- Use static tanks for rinsing to reduce the volume of discharged rinse water.
- Use counter-current rinsing to reduce water usage and rinse water discharges.

Washing Cars and Other Vehicles

Regular Activity

- If car washing is a central business activity, the most desirable option is to treat and recycle the wash water.
- Designate a vehicle washing area and wash cars and trucks only in that area. This “wash pad” should be bermed or protected from storm drains and should drain to an oil/water separator before discharging to the sewer.
- Cover an outside wash pad or minimize the area of an uncovered pad to reduce the amount of rainwater reaching the sewer. Consult the local sewage treatment plant for guidance.
- Minimize the use of acid-based wheel cleaners. These products may require additional treatment (beyond oil/water separation) before discharge to the sewer.

Occasional Activity

- Even biodegradable soap is toxic to fish and wildlife. Whenever possible, take vehicles to a commercial car wash.
- If soap is used in washing, the wash water must be collected and discharged, preferably with treatment, to the sanitary sewer. This water cannot be discharged to a storm drain.
- Never rinse off spray-on acid-based wheel cleaners where rinse water may flow to a street, gutter, or storm drain.

New Vehicles

- If cleaning the exterior of new vehicles with only water, the discharged water may go directly to the storm drain.
- Always protect the storm drains from solvents used to remove protective coatings from new cars. Discharges of these solvents to the sanitary sewer must receive adequate treatment and approval of the sewage treatment plant.

Body Repair and Painting

- Whenever possible, conduct all body repair and painting work indoors or under cover.
- When receiving damaged vehicles, inspect for leaks. Use drip pans if necessary.
- When cleaning auto body parts before painting, minimize use of hose-off degreasers. Brush off loose debris and use rags to wipe down parts.
- Use dry cleanup methods such as vacuuming or sweeping to clean up dust from sanding metal or body filler. Debris from wet sanding can be allowed to dry overnight on the shop floor, then swept and vacuumed. Liquid from wet sanding should not be discharged to the storm drain.
- Minimize waste paint and thinner by carefully calculating paint needs based on surface area and using the proper sprayer cup size.
- Do not use water to control overspray or dust in the paint booth unless this wastewater is collected. This water should be treated before discharge into the sewer system.
- Clean spray guns in a self-contained cleaner. Recycle the cleaning solution when it becomes too dirty to use. Never discharge cleaning waste to the sewer or storm drain.
- Use sanding tools equipped with a vacuum to pick up debris and dust.
- Reduce waste by using low-volume paint mixing equipment and high-efficiency painting tools.

Keeping a Clean Shop

- Use drip pans under leaking vehicles to capture fluids.

- Sweep or vacuum the shop floor frequently. Use mopping as an alternative to hosing down work areas.
- If mopping is used to clean shop floors:
 - Spot clean any spilled oil or fluids using absorbents or rags.
 - Use dry cleanup methods: Sweep the floor using absorbents.
 - After steps 1 and 2 above (if mopping is still needed), mop and discharge mop water to the sanitary sewer.
- Do not pour mop water into the parking lot, street, gutter, or storm drain.
- Remove unnecessary hoses to discourage washing down floors and outside paved areas.
- Regularly sweep parking lots and areas around facility instead of washing them down with water.
- Clean fuel dispensing areas with absorbent instead of water.
- Collect all metal filings, dust, and paint chips from grinding, shaving, and sanding, and dispose of the waste properly. Never discharge these wastes to the storm drain or sanitary sewer.
- Collect all dust from brake pads separately and dispose of the waste properly. Never discharge these wastes to the storm drain or sanitary sewer.
- Send rags to an industrial laundry.
- Consider using an oleophilic mop (picks up oil and not water) to reduce the volume of waste liquids collected and to reduce disposal cost.

Storage

- Store hazardous materials and wastes where they are protected from rain and in a way that prevents spills from reaching the sanitary sewer or storm drain.
- Keep lids on waste barrels and containers, and store them indoors or under cover to reduce exposure to rain.
- All hazardous wastes must be labeled according to hazardous waste regulations. Consult the Fire Department or a local hazardous waste agency for details.
- Keep wastes separated to increase waste recycling/disposal options and to reduce costs.
- Never mix waste oil with fuel, antifreeze, or chlorinated solvents. Consult a hazardous waste hauler for details.
- Double-contain all bulk fluids to prevent accidental discharges to the sewer and storm drain. Consult the Fire Department for details.
- Keep storage areas clean and dry. Conduct regular inspections so that leaks and spills are detected as soon as possible.
- Carefully transfer fluids from drip pans or collection devices to designated waste storage areas, as soon as possible.
- When receiving vehicles to be parted or scavenged, park them on a paved surface and immediately drain and collect gasoline and other fluids properly.
- Drain all fluids from components, such as engine blocks, that may be stored for reuse or reclamation. Keep these components under cover and on a drip pan or sealed floor.
- Store new batteries securely to avoid breakage and acid spills during earthquakes. Shelving should be secured to the wall. Store used batteries indoors and in plastic trays to contain potential leaks. Recycle old batteries.

Spill Control

- The best spill control is prevention.
- Maintain and keep current, as required by other regulations, a spill response plan and ensure that employees are trained on the elements of the plan.
- Minimize the distance between waste collection points and storage areas.
- Contain and cover all solid and liquid wastes – especially during transfer.
- Purchase and maintain the proper absorbent materials for containment and cleanup of different spills, and make sure they are easily accessible anywhere in the shop. Saturated absorbents generally must be disposed of as hazardous waste.
- Clean up spills immediately and completely. Spills are not considered cleaned up until the absorbent is picked up.
- Cover nearby downstream storm drains when transferring fuel from tank truck to fuel tank.
- Seal or remove floor drains to prevent accidental discharge to the sewer system.

Recycling / Treatment

- Recycle solvents, paints, oil filters, antifreeze, motor oil, batteries, and lubricants.
- Set up a system (separate, well-labeled containers in a convenient location) to make it easy for employees to separate wastes and to recycle.
- Choose treatment systems that are easy to maintain and repair.

- Properly maintain and service all pretreatment equipment, including sumps, separators, and grease traps to ensure proper functioning. Follow manufacturer's maintenance instructions and consider using a licensed service to conduct maintenance on a regular basis.
- Frequently inspect equipment for malfunctioning parts, leaks, and the accumulation of pollutants such as oil and grease. Since pretreatment equipment is supposed to remove pollutants, a lack of accumulation may be a sign of a malfunction.
- Retain only a licensed service to haul away and dispose of wastes.
- Install self-contained, zero-discharge treatment systems that recycle wastewater.

Purchasing

- Ask a local supplier for information on less toxic chemical cleaners and other products. There are alternatives to chlorinated solvents; chlorofluorocarbons; and 1,1,1, trichloroethane (TCA).
- Ask a local supplier for information on the composition of brake pads. Recent studies have shown that brake dust washed off streets by rain may be the single biggest contributor of copper, a major pollutant, to waterways. Awareness and understanding of this problem and the available alternatives will help create future solutions.
- Minimize inventory by purchasing only as much product as needed in the foreseeable future. This will reduce storage space needs, inventory tracking costs, and liability for storing hazardous materials and waste.

Education and Training

- Train all employees upon hiring – and annually thereafter – on personal safety, chemical management, and proper methods for handling and disposing of waste. Make sure that all employees understand stormwater discharge prohibitions, wastewater discharge requirements, and these best management practices. Use a training log or similar method to document training.
- Post instructional/informational signs around the shop for customers and employees. Put signs above all sinks prohibiting discharges of vehicle fluids and wastes. Put signs on faucets (hose bibbs) reminding employees and customers to conserve water and not to use water to clean up spills.
- Label drains within the facility boundary, by paint/stencil (or equivalent), to indicate whether they flow to an oil/water separator, directly to the sewer, or to a storm drain. Labels are not necessary for plumbing fixtures directly connected to the sanitary sewer.

Gasoline Stations

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Existing Facilities:

Fuel Dispensing Areas

- Maintain fuel dispensing areas using dry cleanup methods such as sweeping for removal of litter and debris, or use of rags and absorbents for leaks and spills. Fueling areas should never be washed down unless the wash water is collected and disposed of properly.
- Fit underground storage tanks with spill containment and overfill prevention systems meeting the requirements of Section 2635(b) of Title 23 of the California Code of Regulations.
- Fit fuel dispensing nozzles with “hold-open latches” (automatic shutoffs) except where prohibited by local fire departments.
- Post signs at the fuel dispenser or fuel island warning vehicle owners/operators against “topping off” of vehicle fuel tanks.

Facility - General

- “Spot clean” leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.
- Maintain and keep current, as required by other regulations, a spill response plan and ensure that employees are trained on the elements of the plan.
- Manage materials and waste to reduce adverse impacts on storm water quality.
- Train all employees upon hiring and annually thereafter on proper methods for handling and disposing of waste. Make sure that all employees understand storm water discharge prohibitions, wastewater discharge requirements, and these best management practices. Use a training log or similar method to document training.
- Label drains within the facility boundary, by paint/stencil (or equivalent), to indicate whether they flow to an oil/water separator, directly to the sewer, or to a storm drain. Labels are not necessary for plumbing fixtures directly connected to the sanitary sewer.
- Inspect and clean if necessary, storm drain inlets and catch basins within the facility boundary before October 1 each year.

Outdoor Waste Receptacle Area

- Spot clean leaks and drips routinely to prevent runoff of spillage.
- Minimize the possibility of storm water pollution from outside waste receptacles by doing at least one of the following:
 - use only watertight waste receptacle(s) and keep the lid(s) closed, or grade and pave the waste receptacle area to prevent run-on of storm water, or
 - install a roof over the waste receptacle area, or
 - install a low containment berm around the waste receptacle area, or
 - use and maintain drip pans under waste receptacles.

Air/Water Supply Area

- Minimize the possibility of storm water pollution from air/water supply areas by doing at least one of the following:
- Spot clean leaks and drips routinely to prevent runoff of spillage, or
 - grade and pave the air/water supply area to prevent run-on of storm water, or
 - install a roof over the air/water supply area, or
 - install a low containment berm around the air/water supply area.

New or Substantially Remodeled Facilities:

Note: Substantially Remodeled Facilities - One of the following criteria must be met before a facility is deemed to be substantially remodeled and the design elements described above are required to be included in the new design and construction:

- the canopy cover over the fuel dispensing area is new or is being substantially replaced (not including cosmetic/facial appearance changes only) and the footing is structurally sufficient to support a cover of the minimum dimensions described above, or
- one or more fuel dispensers are relocated or added in such a way that the Portland cement concrete (or, equivalent) paving and grade break or the canopy cover over the fuel dispensing area do not meet the minimum dimensions as defined above. Replacement of existing dispensers or underground storage tanks do not, by themselves, constitute a substantial remodel.

Fuel Dispensing Areas

- Fuel dispensing areas must be paved with Portland cement concrete (or, equivalent smooth impervious surface), with a 2% to 4% slope to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of storm water to the extent practicable. The fuel dispensing area is defined as extending 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus 1 foot, whichever is less. The paving around the fuel dispensing area may exceed the minimum dimensions of the “fuel dispensing area” stated above.
- The fuel dispensing area must be covered, and the cover’s minimum dimensions must be equal to or greater than the area within the grade break or the fuel dispensing area, as defined above. The cover must not drain onto the fuel dispensing area.

Note: Special note on the paving BMP. This best management practice is not specifically intended to apply to facilities that install a new canopy where no canopy existed.

Note: Special note on the canopy BMP. This best management practice is not specifically intended to apply to facilities that:

- are located in geographic areas not subject to federal or state storm water regulations
- do not discharge storm water either directly to surface waters or indirectly, through municipal separate storm drain systems
- do not add fuel dispensers
- replace, relocate, or add fuel dispensers within the parameters described in the BMP
- increase their throughput of fuel dispensed without modifying their equipment
- make only cosmetic or facial appearance changes to their existing canopy

Outdoor Waste Receptacle Area

- Grade and pave the outdoor waste receptacle area to prevent run-on of storm water to the extent practicable.
-

Air/Water Supply Area

- Grade and pave the air/water supply area to prevent run-on of storm water to the extent practicable.

Note: For the purposes of the waste receptacle area and air/water supply area BMPs only, the facility is considered substantially remodeled if the area around the waste receptacle area or air/water supply area is being regraded or repaved.

Restaurants

The following comprehensive list of Best Management Practices (BMPs) are not required to be implemented by all facilities but are only *suggested BMPs* that may be appropriate for this industry type or sector. The BMPs are provided as guidance to help facility owners conduct a site-specific assessment and develop their own programs to reduce potential pollutants to the storm drain system and receiving waters. Facility owners may develop and use additional BMPs if desired.

Housekeeping

- Clean floor mats, filters, and garbage cans in a mop sink, floor drain, or proper outside area connected to the sanitary sewer with an oil/water separator. Don't wash them in a parking lot, alley, sidewalk, or street.
- Pour washwater into a janitorial or mop sink. Don't pour onto a parking lot, alley, sidewalk, or street.
- Use dry methods for spill cleanup (sweeping, cat litter, etc.). Don't hose down spills.
- Keep dumpster area clean and lid closed. Don't fill it with liquid waste or hose it out.
- Cover, repair or replace leaky dumpsters and compactors, and/or drain the pavement beneath them to the sanitary sewer.

Recycling and Disposal

- Separate wastes. Keep recyclable wastes in separate containers according to the type of material. They are easier to recycle if separated.
- Recycle grease and oil. Don't pour it into sinks, floor drains, or onto a parking lot or street. Look in the yellow pages for "Renderers" or call the County of Los Angeles' Recycling & Household Hazardous Waste Hotline (888) CLEANLA.
- Recycle the following materials:
 - food waste (non-greasy, non-animal food waste can be composted)
 - paper and cardboard
 - container glass, aluminum, and tin
 - pallets and drums
- Dispose of toxic waste properly. Toxic waste includes used cleaners, and rags (soaked with solvents, floor cleaners, and detergents). For disposal information call: (888) CLEANLA.

Purchasing

- Use non-disposable products. Serve food on ceramic dishware rather than paper, plastic or Styrofoam, and use cloth napkins rather than paper ones. If disposable products must be used, choose paper instead of Styrofoam.
- Buy the least toxic products available. Look for "non-toxic," "non-petroleum based," "free of ammonia, phosphates, dye, or perfume," or "readily biodegradable" on the label.
- Avoid chlorinated compounds, petroleum distillates, phenols, and formaldehyde.
- Use water-based products.
- Look for and purchase "recycled" and "recyclable" containers. In doing so, a use for the recyclable materials that people collect and recycle is ensured.

Education and Training

- By including urban runoff training in employee orientations and reviews, employees can help prevent pollution. Promote these BMPs:
 - Storage containers should be regularly inspected and kept in good condition.
 - Place materials inside rigid, durable, water-tight and rodent-proof containers with tight fitting covers.
 - Store materials inside a building or build a covered area that is paved and designed to prevent runoff from entering storm drains.
 - Place temporary plastic sheeting over materials or containers and secure the cover with ties and weighted objects. (Not appropriate for storing liquids.)
 - Post BMPs where employees and customers can see them. Showing customers ocean protection is good public relations.
 - Explain BMPs to other food businesses through business associations or chambers of commerce.
 - Stencil catch basins near the workplace with Stormwater Program stencils that say “No Dumping: This drains to ocean.”

Appendix D

Summary Statistics Tables

Summary Statistics (Sites 1-7, First Flush, WW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	147	135	92%	3.34	380	41	53	19	137	1
Cl*	mg/L	137	135	99%	0.6	130	18.6	22.6	11.0	61.6	0.5
CO ₃ *	mg/L	139	11	8%	<3	24					2
COD*	mg/L	147	144	98%	10.23	2850	264	374	140	925	5
EC*	mmho/cm	147	147	100%	38	1420	345	266	270	741	0.1
F	mg/L	137	134	98%	0.07	2.6	0.31	0.28	0.30	0.64	0.1
HCO ₃ *	mg/L	137	136	99%	9.34	519	123	100	88	311	2
O&G	mg/L	147	115	78%	1	180	11	19	5	34	1
OH*	mg/L	139	2	1%	<3	3					2
pH	units	147	147	100%	6.7	9.0	7.6	0.5	7.5	8.4	NA
SO ₄ *	mg/L	137	137	100%	3	290	37.8	40.8	27.0	84.2	0.5
TDS*	mg/L	147	147	100%	35	1510	257	203	220	577	5
Total Alkalinity as CaCO ₃ *	mg/L	137	137	100%	13	425	103	84	73	280	2
Total Hardness as CaCO ₃ *	mg/L	137	137	100%	14	670	172	146	130	430	2
TSS	mg/L	147	147	100%	5	3900	383	579	200	1591	5
<i>Metals</i>											
Ag, tr	mg/L	147	1	1%	<0.01	0.17					0.01
As, tr	mg/L	147	8	5%	<0.01	0.02					0.01
B, tr	mg/L	137	43	31%	0.027	4.4	0.12	0.39	0.027	0.40	0.1
Ba, tr	mg/L	147	88	60%	0.03	1	0.13	0.15	0.07	0.47	0.1
Ca	mg/L	137	137	100%	4	200	46	40	38	113	1
Cd, tr	mg/L	141	11	8%	<0.01	0.03					0.01
Cr, tr	mg/L	146	41	28%	0.0056	0.16	0.015	0.022	0.006	0.06	0.02
Cu, tr	mg/L	147	122	83%	0.005	0.47	0.06	0.08	0.03	0.24	0.01
Fe, tr	mg/L	147	147	100%	0.17	86	9.94	13.58	5.90	33.70	0.02
Hg, tr	mg/L	147	5	3%	<0.001	0.003					0.001
K	mg/L	136	135	99%	0.813	132	9	13	6	21	1
Mg	mg/L	137	137	100%	1	62	13	12	9	38	1
Mn, tr	mg/L	147	146	99%	0.01	2.6	0.29	0.34	0.19	0.86	0.01
Na	mg/L	137	137	100%	1	97	19	19	12	59	1
Pb, tr	mg/L	147	108	73%	0.005	0.28	0.03	0.04	0.02	0.13	0.01
Se, tr	mg/L	140	6	4%	<0.005	0.025					0.005
Zn, tr	mg/L	147	146	99%	0.01	2.70	0.33	0.42	0.17	1.24	0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	137	116	85%	0.1	23	1.7	2.8	0.9	5.8	0.1
NO ₂ -N	mg/L	137	63	46%	0.04	4.6	0.2	0.5	0.04	0.7	0.1
NO ₃ -N*	mg/L	137	128	93%	0.1	30.0	2.7	4.2	1.2	8.3	0.1
N-Total	mg/L	137	137	100%	0.3	94	10.9	15.2	4.8	33.8	0.2
P-Ortho*	mg/L	137	101	74%	0.02	17.00	0.44	1.68	0.13	1.02	0.05
P-Total	mg/L	137	134	98%	0.04	24.00	1.34	2.62	0.55	4.42	0.05
TKN	mg/L	137	137	100%	0.3	84.0	7.9	12.3	3.6	26.2	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	104	0	0%							10
Acenaphthylene*	mg/L	104	0	0%							10
Acenaphthene*	mg/L	104	0	0%							10
Anthracene*	mg/L	104	0	0%							10
Benzo(a)anthracene*	mg/L	104	0	0%							10
Benzo(a)pyrene*	mg/L	104	0	0%							10
Benzo(b)fluoranthene*	mg/L	104	0	0%							10
Benzo(ghi)perylene*	mg/L	104	0	0%							10
Benzo(k)fluoranthene*	mg/L	104	0	0%							10
Chrysene*	mg/L	104	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	104	0	0%							10
Fluoranthene*	mg/L	104	0	0%							10
Fluorene*	mg/L	104	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	104	0	0%							10
Naphthalene*	mg/L	104	0	0%							10
Phenanthrene*	mg/L	104	0	0%							10
Pyrene*	mg/L	104	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 1: WW First Flush

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	23	22	96%	2	210	39	51	17	128	1
Cl*	mg/L	21	20	95%	0.62	28	7.4	8.6	3.0	24.0	0.5
CO ₃ * ²⁻	mg/L	21	0	0%							2
COD*	mg/L	23	23	100%	20	1400	249	352	110	1052	5
EC*	mmho/cm	23	23	100%	38	640	176	169	99	556	0.1
F	mg/L	21	19	90%	0.078	1.6	0.34	0.33	0.30	0.80	0.1
HCO ₃ * ⁻	mg/L	21	21	100%	15	201	62	58	37	200	2
O&G	mg/L	21	14	67%	1	26	6	6	4	14	1
OH*	mg/L	21	0	0%							2
pH	units	23	23	100%	6.7	8.1	7.3	0.4	7.2	7.9	NA
SO ₄ * ⁻²	mg/L	21	21	100%	3	79	17.4	20.8	9.1	70.0	0.5
TDS*	mg/L	23	23	100%	45	609	157	158	96	554	5
Total Alkalinity as CaCO ₃ * ²⁻	mg/L	21	21	100%	13	170	52	48	30	165	2
Total Hardness as CaCO ₃ * ²⁻	mg/L	21	21	100%	14	636	114	166	44	530	2
TSS	mg/L	23	23	100%	40	2500	409	577	170	1501	5
<i>Metals</i>											
Ag, tr	mg/L	23	0	0%							0.01
As, tr	mg/L	23	0	0%							0.01
B, tr	mg/L	21	4	19%	<0.1	0.2					0.1
Ba, tr	mg/L	23	15	65%	0.03	0.7	0.14	0.17	0.05	0.48	0.1
Ca	mg/L	21	21	100%	4	191	33	50	12	150	1
Cd, tr	mg/L	23	3	13%	<0.01	0.02					0.01
Cr, tr	mg/L	23	7	30%	0.0065	0.09	0.018	0.022	0.0065	0.067	0.02
Cu, tr	mg/L	23	22	96%	0.003	0.47	0.07	0.11	0.02	0.29	0.01
Fe, tr	mg/L	23	23	100%	1.8	47	10.73	11.43	5.90	33.90	0.02
Hg, tr	mg/L	23	2	9%	<0.001	0.003					0.001
K	mg/L	21	20	95%	1.03	28	7	7	4	21	1
Mg	mg/L	21	21	100%	1	38	8	11	4	38	1
Mn, tr	mg/L	23	23	100%	0.04	1.2	0.26	0.30	0.16	0.88	0.01
Na	mg/L	21	21	100%	1	32	10	10	6	32	1
Pb, tr	mg/L	23	20	87%	0.004	0.22	0.04	0.05	0.02	0.14	0.01
Se, tr	mg/L	23	2	9%	<0.005	0.006					0.005
Zn, tr	mg/L	23	23	100%	0.07	1.80	0.36	0.46	0.18	1.44	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	21	19	90%	0.03	0.38	0.14	0.11	0.11	0.38	0.05
NH ₄ -N*	mg/L	21	21	100%	0.2	8.8	1.8	2.0	0.9	5.0	0.1
NO ₂ -N	mg/L	21	8	38%	0.02	4.6	0.4	1.0	0.02	0.7	0.1
NO ₃ -N*	mg/L	21	21	100%	0.4	12.0	2.8	3.0	1.6	8.9	0.1
N-Total	mg/L	21	21	100%	1.2	66	13.1	18.6	4.8	62.0	0.2
P-Total	mg/L	21	21	100%	0.15	6.30	1.11	1.52	0.54	4.50	0.05
TKN	mg/L	21	21	100%	0.8	53	9.9	14.9	3.5	49.0	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	16	0	0%							10
Acenaphthylene*	mg/L	16	0	0%							10
Acenaphthene*	mg/L	16	0	0%							10
Anthracene*	mg/L	16	0	0%							10
Benzo(a)anthracene*	mg/L	16	0	0%							10
Benzo(a)pyrene*	mg/L	16	0	0%							10
Benzo(b)fluoranthene*	mg/L	16	0	0%							10
Benzo(ghi)perylene*	mg/L	16	0	0%							10
Benzo(k)fluoranthene*	mg/L	16	0	0%							10
Chrysene*	mg/L	16	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	16	0	0%							10
Fluoranthene*	mg/L	16	0	0%							10
Fluorene*	mg/L	16	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	16	0	0%							10
Naphthalene*	mg/L	16	0	0%							10
Phenanthrene*	mg/L	16	0	0%							10
Pyrene*	mg/L	16	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 2: WW First Flush

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	23	21	91%	7	185	46	46	31	153	1
Cl*	mg/L	21	21	100%	2	58	12.2	13.0	9.0	31.0	0.5
CO ₃ *	mg/L	21	0	0%							2
COD*	mg/L	23	22	96%	35	890	276	234	190	745	5
EC*	mmho/cm	23	23	100%	39	650	225	152	170	550	0.1
F	mg/L	21	21	100%	0.1	2.6	0.41	0.52	0.30	0.60	0.1
HCO ₃ *	mg/L	21	21	100%	21	180	72	45	52	150	2
O&G	mg/L	23	18	78%	0.7	23	5	5	4	13	1
OH*	mg/L	21	0	0%							2
pH	units	23	23	100%	6.7	8.3	7.5	0.4	7.4	8.2	NA
SO ₄ *	mg/L	21	21	100%	5.3	74	20.4	16.5	14.0	44.0	0.5
TDS*	mg/L	23	23	100%	35	570	184	136	130	359	5
Total Alkalinity as CaCO ₃ *	mg/L	21	21	100%	18	150	60	38	43	130	2
Total Hardness as CaCO ₃ *	mg/L	21	21	100%	26	240	93	69	67	239	2
TSS	mg/L	23	23	100%	22	1010	303	269	230	845	5
<i>Metals</i>											
Ag, tr	mg/L	23	1	4%	<0.01	0.17					0.01
As, tr	mg/L	23	3	13%	<0.01	0.01					0.01
B, tr	mg/L	21	9	43%	0.053	0.4	0.12	0.098	0.053	0.30	0.1
Ba, tr	mg/L	23	12	52%	0.05	0.4	0.12	0.091	0.056	0.27	0.1
Ca	mg/L	21	21	100%	7	68	26	19	20	67	1
Cd, tr	mg/L	22	0	0%							0.01
Cr, tr	mg/L	23	6	26%	0.008	0.05	0.013	0.010	0.008	0.029	0.02
Cu, tr	mg/L	23	22	96%	0.007	0.22	0.06	0.05	0.04	0.14	0.01
Fe, tr	mg/L	23	23	100%	0.66	28	7.92	6.95	5.40	20.80	0.02
Hg, tr	mg/L	23	0	0%							0.001
K	mg/L	21	21	100%	2	17	8	4	7	14	1
Mg	mg/L	21	21	100%	1	18	7	5	4	17	1
Mn, tr	mg/L	23	23	100%	0.03	0.69	0.20	0.18	0.15	0.56	0.01
Na	mg/L	21	21	100%	4	52	17	13	13	44	1
Pb, tr	mg/L	23	17	74%	0.005	0.09	0.02	0.02	0.02	0.09	0.01
Se, tr	mg/L	21	1	5%	<0.005	0.025					0.005
Zn, tr	mg/L	23	23	100%	0.05	1.30	0.34	0.31	0.21	0.84	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	21	21	100%	0.05	2.30	0.37	0.49	0.18	0.72	0.05
NH ₄ -N*	mg/L	21	21	100%	0.4	16	3.0	3.3	1.9	6.6	0.1
NO ₂ -N	mg/L	21	16	76%	0.1	0.7	0.2	0.2	0.2	0.5	0.1
NO ₃ -N*	mg/L	21	21	100%	0.7	16.0	3.0	3.5	1.7	7.1	0.1
N-Total	mg/L	21	21	100%	1.9	37	12.8	10.2	8.1	33.0	0.2
P-Total	mg/L	21	21	100%	0.21	4.00	1.38	1.27	0.71	3.60	0.05
TKN	mg/L	21	21	100%	1.2	27.0	9.5	7.5	6.1	23.0	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	16	0	0%							10
Acenaphthylene*	mg/L	16	0	0%							10
Acenaphthene*	mg/L	16	0	0%							10
Anthracene*	mg/L	16	0	0%							10
Benzo(a)anthracene*	mg/L	16	0	0%							10
Benzo(a)pyrene*	mg/L	16	0	0%							10
Benzo(b)fluoranthene*	mg/L	16	0	0%							10
Benzo(ghi)perylene*	mg/L	16	0	0%							10
Benzo(k)fluoranthene*	mg/L	16	0	0%							10
Chrysene*	mg/L	16	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	16	0	0%							10
Fluoranthene*	mg/L	16	0	0%							10
Fluorene*	mg/L	16	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	16	0	0%							10
Naphthalene*	mg/L	16	0	0%							10
Phenanthrene*	mg/L	16	0	0%							10
Pyrene*	mg/L	16	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 3: WW First Flush

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	22	22	100%	7	380	58	84	27	182	1
Cl*	mg/L	20	20	100%	12	130	49.0	33.4	40.0	120.5	0.5
CO ₃ *	mg/L	20	1	5%	<3	15					2
COD*	mg/L	22	22	100%	20	2850	384	609	205	1137	5
EC*	mmho/cm	22	22	100%	160	1420	519	317	445	1238	0.1
F	mg/L	20	20	100%	0.1	0.5	0.27	0.10	0.30	0.50	0.1
HCO ₃ *	mg/L	20	20	100%	55	519	132	103	106	278	2
O&G	mg/L	22	13	59%	0.54	42	6	10	2	21	1
OH*	mg/L	20	2	10%	<3	3					2
pH	units	22	22	100%	6.8	9.0	7.5	0.4	7.5	8.2	NA
SO ₄ *	mg/L	20	20	100%	13	130	43.7	28.4	36.5	79.7	0.5
TDS*	mg/L	22	22	100%	150	910	339	189	280	685	5
Total Alkalinity as CaCO ₃ *	mg/L	20	20	100%	45	425	110	84	89	228	2
Total Hardness as CaCO ₃ *	mg/L	20	20	100%	64	649	182	138	145	374	2
TSS	mg/L	22	22	100%	20	3900	508	817	323	1200	5
<i>Metals</i>											
Ag, tr	mg/L	22	0	0%							0.01
As, tr	mg/L	22	2	9%	<0.01	0.02					0.01
B, tr	mg/L	20	15	75%	0.073	0.4	0.19	0.12	0.20	0.40	0.1
Ba, tr	mg/L	22	14	64%	0.03	1	0.15	0.22	0.10	0.40	0.1
Ca	mg/L	20	20	100%	17	156	48	34	40	103	1
Cd, tr	mg/L	21	1	5%	<0.01	0.02					0.01
Cr, tr	mg/L	22	9	41%	0.006	0.16	0.021	0.034	0.006	0.059	0.02
Cu, tr	mg/L	22	18	82%	0.008	0.33	0.06	0.07	0.03	0.15	0.01
Fe, tr	mg/L	22	22	100%	0.36	84	11.58	18.08	6.75	29.85	0.02
Hg, tr	mg/L	22	1	5%	<0.001	0.003					0.001
K	mg/L	20	20	100%	6	132	20	29	11	68	1
Mg	mg/L	20	20	100%	5	62	15	13	11	32	1
Mn, tr	mg/L	22	21	95%	0.014	1.7	0.28	0.37	0.18	0.72	0.01
Na	mg/L	20	20	100%	11	85	42	22	38	76	1
Pb, tr	mg/L	22	15	68%	0.004	0.15	0.03	0.04	0.01	0.10	0.01
Se, tr	mg/L	21	2	10%	<0.005	0.014					0.005
Zn, tr	mg/L	22	22	100%	0.05	1.60	0.35	0.37	0.22	0.93	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	20	19	95%	0.05	9.60	1.16	2.09	0.68	3.43	0.05
NH ₄ -N*	mg/L	20	20	100%	0.4	23	2.8	4.9	1.5	7.3	0.1
NO ₂ -N	mg/L	20	12	60%	0.07	0.7	0.2	0.2	0.1	0.6	0.1
NO ₃ -N*	mg/L	20	20	100%	0.2	30.0	6.2	6.2	5.0	11.0	0.1
N-Total	mg/L	20	20	100%	4.2	94	21.9	21.4	14.5	66.5	0.2
P-Total	mg/L	20	20	100%	0.28	24	3.83	5.80	1.65	15.45	0.05
TKN	mg/L	20	20	100%	1.2	84.0	15.0	20.9	8.9	63.1	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	16	0	0%							10
Acenaphthylene*	mg/L	16	0	0%							10
Acenaphthene*	mg/L	16	0	0%							10
Anthracene*	mg/L	16	0	0%							10
Benzo(a)anthracene*	mg/L	16	0	0%							10
Benzo(a)pyrene*	mg/L	16	0	0%							10
Benzo(b)fluoranthene*	mg/L	16	0	0%							10
Benzo(ghi)perylene*	mg/L	16	0	0%							10
Benzo(k)fluoranthene*	mg/L	16	0	0%							10
Chrysene*	mg/L	16	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	16	0	0%							10
Fluoranthene*	mg/L	16	0	0%							10
Fluorene*	mg/L	16	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	16	0	0%							10
Naphthalene*	mg/L	16	0	0%							10
Phenanthrene*	mg/L	16	0	0%							10
Pyrene*	mg/L	16	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 4: WW First Flush

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
Conventional											
BOD*	mg/L	18	17	94%	4	90	24	23	16	70	1
Cl*	mg/L	16	15	94%	0.48	12	4.0	3.5	3.5	11.3	0.5
CO ₃ *	mg/L	16	2	13%	<3	9					2
COD*	mg/L	18	18	100%	20	410	133	103	101	342	5
EC*	mmho/cm	18	18	100%	49	290	115	72	87	273	0.1
F	mg/L	16	16	100%	0.1	0.4	0.27	0.10	0.30	0.40	0.1
HCO ₃ *	mg/L	16	15	94%	15.26	73	40	18	34	69	2
O&G	mg/L	18	18	100%	2.1	90	15	20	10	36	1
OH*	mg/L	16	0	0%							2
pH	units	18	18	100%	7.1	9.0	7.8	0.6	7.7	8.8	NA
SO ₄ *	mg/L	16	16	100%	3.3	37	9.7	8.8	6.3	25.8	0.5
TDS*	mg/L	18	18	100%	44	260	96	67	66	260	5
Total Alkalinity as CaCO ₃ *	mg/L	16	16	100%	15	64	34	15	30	61	2
Total Hardness as CaCO ₃ *	mg/L	16	16	100%	30	120	59	28	47	120	2
TSS	mg/L	18	18	100%	35	410	150	100	140	334	5
Metals											
Ag, tr	mg/L	18	0	0%							0.01
As, tr	mg/L	18	0	0%							0.01
B, tr	mg/L	16	1	6%	<0.1	0.1					0.1
Ba, tr	mg/L	18	8	44%	0.03	0.12	0.069	0.026	0.054	0.11	0.1
Ca	mg/L	16	16	100%	9	41	19	9	15	39	1
Cd, tr	mg/L	17	1	6%	<0.01	0.004					0.01
Cr, tr	mg/L	17	5	29%	0.014	0.03	0.016	0.004	0.014	0.022	0.02
Cu, tr	mg/L	18	18	100%	0.01	0.11	0.04	0.03	0.04	0.11	0.01
Fe, tr	mg/L	18	18	100%	1.5	7.5	4.23	1.93	4.25	7.25	0.02
Hg, tr	mg/L	18	0	0%							0.001
K	mg/L	16	16	100%	1	6	3	1	2	5	1
Mg	mg/L	16	16	100%	1	6	3	1	3	5	1
Mn, tr	mg/L	18	18	100%	0.06	0.45	0.24	0.12	0.24	0.42	0.01
Na	mg/L	16	16	100%	2	12	5	4	4	12	1
Pb, tr	mg/L	18	17	94%	0.008	0.07	0.03	0.02	0.03	0.062	0.01
Se, tr	mg/L	17	0	0%							0.005
Zn, tr	mg/L	18	18	100%	0.06	0.66	0.25	0.17	0.18	0.63	0.01
Nutrients											
P-Ortho*	mg/L	16	15	94%	0.06	0.32	0.17	0.09	0.15	0.32	0.05
NH ₄ -N*	mg/L	16	16	100%	0.3	5.3	1.4	1.3	1.0	4.0	0.1
NO ₂ -N	mg/L	16	9	56%	0.05	0.4	0.1	0.1	0.1	0.3	0.1
NO ₃ -N*	mg/L	16	15	94%	0.1	7.1	1.4	1.9	0.6	5.3	0.1
N-Total	mg/L	16	16	100%	1	19	5.4	5.6	3.5	16.8	0.2
P-Total	mg/L	16	16	100%	0.15	1.20	0.50	0.31	0.42	1.13	0.05
TKN	mg/L	16	16	100%	0.6	12.0	3.9	3.7	2.4	11.3	0.1
Organics											
2-Chloronaphthalene*	mg/L	12	0	0%							10
Acenaphthylene*	mg/L	12	0	0%							10
Acenaphthene*	mg/L	12	0	0%							10
Anthracene*	mg/L	12	0	0%							10
Benzo(a)anthracene*	mg/L	12	0	0%							10
Benzo(a)pyrene*	mg/L	12	0	0%							10
Benzo(b)fluoranthene*	mg/L	12	0	0%							10
Benzo(ghi)perylene*	mg/L	12	0	0%							10
Benzo(k)fluoranthene*	mg/L	12	0	0%							10
Chrysene*	mg/L	12	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	12	0	0%							10
Fluoranthene*	mg/L	12	0	0%							10
Fluorene*	mg/L	12	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	12	0	0%							10
Naphthalene*	mg/L	12	0	0%							10
Phenanthrene*	mg/L	12	0	0%							10
Pyrene*	mg/L	12	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 5: WW First Flush

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
Conventional											
BOD*	mg/L	23	23	100%	15	270	80	57	63	145	1
Cl*	mg/L	21	21	100%	2	97	24.4	23.9	18.0	64.0	0.5
CO ₃ *	mg/L	21	0	0%							2
COD*	mg/L	23	23	100%	105	2000	540	466	410	1434	5
EC*	mmho/cm	23	23	100%	57	1360	413	323	350	1076	0.1
F	mg/L	21	21	100%	0.1	1	0.42	0.27	0.30	0.90	0.1
HCO ₃ *	mg/L	21	21	100%	27	290	103	66	79	232	2
O&G	mg/L	24	24	100%	5	48	19	13	16	47	1
OH*	mg/L	21	0	0%							2
pH	units	23	23	100%	6.7	8.2	7.2	0.4	7.1	7.9	NA
SO ₄ *	mg/L	21	21	100%	5	290	71.8	76.8	46.0	230.0	0.5
TDS*	mg/L	23	23	100%	58	1510	367	329	340	967	5
Total Alkalinity as CaCO ₃ *	mg/L	21	21	100%	23	240	82	50	65	150	2
Total Hardness as CaCO ₃ *	mg/L	21	21	100%	39	670	216	194	150	630	2
TSS	mg/L	23	23	100%	85	3200	726	824	400	2120	5
Metals											
Ag, tr	mg/L	23	0	0%							0.01
As, tr	mg/L	23	3	13%	<0.01	0.01					0.01
B, tr	mg/L	21	13	62%	0.03	4.4	0.38	0.94	0.10	0.80	0.1
Ba, tr	mg/L	23	17	74%	0.07	0.6	0.23	0.17	0.17	0.50	0.1
Ca	mg/L	21	21	100%	11	200	64	59	45	200	1
Cd, tr	mg/L	22	4	18%	<0.01	0.02					0.01
Cr, tr	mg/L	23	11	48%	0.01	0.1	0.03	0.030	0.01	0.1	0.02
Cu, tr	mg/L	23	23	100%	0.02	0.35	0.12	0.11	0.08	0.33	0.01
Fe, tr	mg/L	23	23	100%	2.2	59	15.88	16.94	10.00	54.40	0.02
Hg, tr	mg/L	23	2	9%	<0.001	0.003					0.001
K	mg/L	20	20	100%	2	33	10	8	9	30	1
Mg	mg/L	21	21	100%	2	40	13	12	8	39	1
Mn, tr	mg/L	23	23	100%	0.07	1.4	0.45	0.41	0.30	1.29	0.01
Na	mg/L	21	21	100%	3	97	28	25	19	80	1
Pb, tr	mg/L	23	23	100%	0.01	0.28	0.08	0.07	0.05	0.19	0.01
Se, tr	mg/L	22	1	5%	<0.005	0.005					0.005
Zn, tr	mg/L	23	22	96%	0.09	2.70	0.73	0.65	0.49	1.78	0.01
Nutrients											
P-Ortho*	mg/L	21	16	76%	0.02	17.00	0.99	3.67	0.15	0.55	0.05
NH ₄ -N*	mg/L	21	21	100%	0.4	7.5	2.3	2.0	1.7	6.1	0.1
NO ₂ -N	mg/L	21	16	76%	0.06	1.4	0.4	0.5	0.2	1.3	0.1
NO ₃ -N*	mg/L	21	20	95%	0.2	29.0	3.8	6.1	2.1	8.2	0.1
N-Total	mg/L	21	21	100%	1.4	82	16.2	18.3	11.0	41.0	0.2
P-Total	mg/L	21	21	100%	0.24	4.90	1.42	1.27	1.20	4.50	0.05
TKN	mg/L	21	21	100%	0.5	52.0	12.0	12.6	8.3	34.0	0.1
Organics											
2-Chloronaphthalene*	mg/L	14	0	0%							10
Acenaphthylene*	mg/L	14	0	0%							10
Acenaphthene*	mg/L	14	0	0%							10
Anthracene*	mg/L	14	0	0%							10
Benzo(a)anthracene*	mg/L	14	0	0%							10
Benzo(a)pyrene*	mg/L	14	0	0%							10
Benzo(b)fluoranthene*	mg/L	14	0	0%							10
Benzo(ghi)perylene*	mg/L	14	0	0%							10
Benzo(k)fluoranthene*	mg/L	14	0	0%							10
Chrysene*	mg/L	14	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	14	0	0%							10
Fluoranthene*	mg/L	14	0	0%							10
Fluorene*	mg/L	14	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	14	0	0%							10
Naphthalene*	mg/L	14	0	0%							10
Phenanthrene*	mg/L	14	0	0%							10
Pyrene*	mg/L	14	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 6: WW First Flush

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	20	18	90%	5	60	17	13	15	34	1
Cl*	mg/L	20	20	100%	2.5	54	17.5	14.7	12.0	47.4	0.5
CO ₃ *	mg/L	21	0	0%							2
COD*	mg/L	20	20	100%	20	305	110	73	94	253	5
EC*	mmho/cm	20	20	100%	61	770	457	198	500	723	0.1
F	mg/L	20	19	95%	0.08	0.3	0.21	0.09	0.20	0.30	0.1
HCO ₃ *	mg/L	20	20	100%	46	380	201	93	210	342	2
O&G	mg/L	20	13	65%	0.9	40	8	11	4	36	1
OH*	mg/L	21	0	0%							2
pH	units	20	20	100%	6.9	8.3	8.0	0.3	8.1	8.3	NA
SO ₄ *	mg/L	20	20	100%	4	100	49.9	24.3	50.0	80.1	0.5
TDS*	mg/L	20	20	100%	100	500	310	108	340	443	5
Total Alkalinity as CaCO ₃ *	mg/L	20	20	100%	38	310	164	75	170	282	2
Total Hardness as CaCO ₃ *	mg/L	20	20	100%	53	511	255	105	258	387	2
TSS	mg/L	20	20	100%	10	2370	299	518	180	831	5
<i>Metals</i>											
Ag, tr	mg/L	20	0	0%							0.01
As, tr	mg/L	20	0	0%							0.01
B, tr	mg/L	20	1	5%	<0.1	0.1					0.1
Ba, tr	mg/L	20	11	55%	0.063	0.6	0.12	0.12	0.07	0.22	0.1
Ca	mg/L	20	20	100%	16	126	64	26	63	95	1
Cd, tr	mg/L	19	2	11%	<0.01	0.03					0.01
Cr, tr	mg/L	20	3	15%	<0.02	0.06					0.02
Cu, tr	mg/L	20	11	55%	0.003	0.12	0.02	0.03	0.01	0.07	0.01
Fe, tr	mg/L	20	20	100%	0.21	86	11.30	19.55	5.40	35.65	0.02
Hg, tr	mg/L	20	0	0%							0.001
K	mg/L	20	20	100%	2.2	22	6	4	5	11	1
Mg	mg/L	20	20	100%	3.1	47	23	10	24	35	1
Mn, tr	mg/L	20	20	100%	0.02	2.6	0.39	0.56	0.24	0.77	0.01
Na	mg/L	20	20	100%	2.6	33	12	8	10	28	1
Pb, tr	mg/L	20	9	45%	0.003	0.08	0.01	0.02	0.003	0.04	0.01
Se, tr	mg/L	19	0	0%							0.005
Zn, tr	mg/L	20	20	100%	0.02	0.69	0.12	0.14	0.09	0.26	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	20	7	35%	0.009	1.20	0.10	0.27	0.009	0.25	0.05
NH ₄ -N*	mg/L	20	11	55%	0.06	0.5	0.1	0.1	0.1	0.3	0.1
NO ₂ -N	mg/L	20	2	10%	<0.1	0.9					0.1
NO ₃ -N*	mg/L	20	15	75%	0.1	1.3	0.4	0.3	0.3	0.7	0.1
N-Total	mg/L	20	20	100%	0.3	8.3	2.2	2.1	1.6	6.8	0.2
P-Total	mg/L	20	19	95%	0.05	3.60	0.60	0.82	0.33	1.99	0.05
TKN	mg/L	20	20	100%	0.3	7.9	1.8	2.1	1.3	6.7	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	16	0	0%							10
Acenaphthylene*	mg/L	16	0	0%							10
Acenaphthene*	mg/L	16	0	0%							10
Anthracene*	mg/L	16	0	0%							10
Benzo(a)anthracene*	mg/L	16	0	0%							10
Benzo(a)pyrene*	mg/L	16	0	0%							10
Benzo(b)fluoranthene*	mg/L	16	0	0%							10
Benzo(ghi)perylene*	mg/L	16	0	0%							10
Benzo(k)fluoranthene*	mg/L	16	0	0%							10
Chrysene*	mg/L	16	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	16	0	0%							10
Fluoranthene*	mg/L	16	0	0%							10
Fluorene*	mg/L	16	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	16	0	0%							10
Naphthalene*	mg/L	16	0	0%							10
Phenanthrene*	mg/L	16	0	0%							10
Pyrene*	mg/L	16	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 7: WW First Flush

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	18	12	67%	5	21	10	5	9	18	1
Cl*	mg/L	18	18	100%	5	31	12.8	6.1	11.5	22.5	0.5
CO ₃ *	mg/L	19	8	42%	2.54	24	7	7	3	21	2
COD*	mg/L	18	16	89%	8	200	69	59	50	158	5
EC*	mmho/cm	18	18	100%	230	750	519	168	550	725	0.1
F	mg/L	18	18	100%	0.1	0.3	0.24	0.07	0.25	0.30	0.1
HCO ₃ *	mg/L	18	18	100%	120	400	252	85	270	358	2
O&G	mg/L	19	15	79%	0.6	180	15	41	5	45	1
OH*	mg/L	19	0	0%							2
pH	units	18	18	100%	6.8	8.5	8.2	0.4	8.3	8.4	NA
SO ₄ *	mg/L	18	18	100%	14	85	47.5	23.3	43.5	84.2	0.5
TDS*	mg/L	18	18	100%	190	500	339	105	370	500	5
Total Alkalinity as CaCO ₃ *	mg/L	18	18	100%	98	330	218	75	230	330	2
Total Hardness as CaCO ₃ *	mg/L	18	18	100%	150	410	279	86	290	402	2
TSS	mg/L	18	18	100%	5	890	192	225	183	499	5
<i>Metals</i>											
Ag, tr	mg/L	18	0	0%							0.01
As, tr	mg/L	18	0	0%							0.01
B, tr	mg/L	18	0	0%							0.1
Ba, tr	mg/L	18	11	61%	0.06	0.2	0.096	0.039	0.085	0.17	0.1
Ca	mg/L	18	18	100%	35	100	68	21	74	98	1
Cd, tr	mg/L	17	0	0%							0.01
Cr, tr	mg/L	18	0	0%							0.02
Cu, tr	mg/L	18	8	44%	0.006	0.02	0.01	0.005	0.006	0.02	0.01
Fe, tr	mg/L	18	18	100%	0.17	17	6.15	5.96	5.65	17.00	0.02
Hg, tr	mg/L	18	0	0%							0.001
K	mg/L	18	18	100%	4	11	6	2	6	8	1
Mg	mg/L	18	18	100%	14	38	26	8	26	38	1
Mn, tr	mg/L	18	18	100%	0.01	0.56	0.22	0.16	0.21	0.48	0.01
Na	mg/L	18	18	100%	6	25	13	5	12	20	1
Pb, tr	mg/L	18	7	39%	0.008	0.03	0.01	0.007	0.008	0.02	0.01
Se, tr	mg/L	17	0	0%							0.005
Zn, tr	mg/L	18	18	100%	0.01	0.23	0.09	0.06	0.09	0.18	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	18	4	22%	0.002	0.61	0.04	0.14	0.002	0.13	0.05
NH ₄ -N*	mg/L	18	6	33%	0.06	0.3	0.10	0.07	0.06	0.2	0.1
NO ₂ -N	mg/L	18	0	0%							0.1
NO ₃ -N*	mg/L	18	16	89%	0.2	1.7	0.7	0.4	0.6	1.5	0.1
N-Total	mg/L	18	18	100%	0.7	4.3	1.87	0.88	2.20	2.77	0.2
P-Total	mg/L	18	16	89%	0.04	0.85	0.25	0.23	0.18	0.71	0.05
TKN	mg/L	18	18	100%	0.4	3.9	1.2	0.8	0.9	2.3	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	14	0	0%							10
Acenaphthylene*	mg/L	14	0	0%							10
Acenaphthene*	mg/L	14	0	0%							10
Anthracene*	mg/L	14	0	0%							10
Benzo(a)anthracene*	mg/L	14	0	0%							10
Benzo(a)pyrene*	mg/L	14	0	0%							10
Benzo(b)fluoranthene*	mg/L	14	0	0%							10
Benzo(ghi)perylene*	mg/L	14	0	0%							10
Benzo(k)fluoranthene*	mg/L	14	0	0%							10
Chrysene*	mg/L	14	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	14	0	0%							10
Fluoranthene*	mg/L	14	0	0%							10
Fluorene*	mg/L	14	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	14	0	0%							10
Naphthalene*	mg/L	14	0	0%							10
Phenanthrene*	mg/L	14	0	0%							10
Pyrene*	mg/L	14	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Summary Statistics (Sites 8-10, Receiving Water, WW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	67	29	43%	2.04	33	6	7	2	20	1
Cl*	mg/L	67	67	100%	3	97	20.1	25.1	9.0	76.8	0.5
CO ₃ *	mg/L	67	7	10%	<3	12					2
COD*	mg/L	67	42	63%	2.37	2100	65	258	12	154	5
EC*	mmho/cm	67	67	100%	160	958	355	209	270	879	0.1
F	mg/L	67	67	100%	0.2	1.6	0.50	0.25	0.40	0.94	0.1
HCO ₃ *	mg/L	67	67	100%	76	710	142	83	120	237	2
O&G	mg/L	67	24	36%	0.279	47	2	6	0	4	1
OH*	mg/L	67	0	0%							2
pH	units	67	67	100%	7.0	8.4	8.0	0.3	8.1	8.3	NA
SO ₄ *	mg/L	67	67	100%	7	110	33.8	27.9	22.0	93.9	0.5
TDS*	mg/L	67	67	100%	105	620	239	124	200	513	5
Total Alkalinity as CaCO ₃ *	mg/L	67	67	100%	63	710	120	82	100	200	2
Total Hardness as CaCO ₃ *	mg/L	67	67	100%	57	1500	172	186	110	346	2
TSS	mg/L	67	57	85%	0.852	66000	1419	8063	28	2770	5
<i>Metals</i>											
Ag, tr	mg/L	67	0	0%							0.01
As, tr	mg/L	67	7	10%	<0.01	0.08					0.01
B, tr	mg/L	67	20	30%	0.02	3	0.11	0.37	0.02	0.30	0.1
Ba, tr	mg/L	67	17	25%	0.016	5.6	0.19	0.70	0.02	0.57	0.1
Ca	mg/L	67	67	100%	16	350	45	43	33	78	1
Cd, tr	mg/L	64	6	9%	<0.01	0.03					0.01
Cr, tr	mg/L	67	14	21%	0.007	0.36	0.02	0.05	0.007	0.08	0.02
Cu, tr	mg/L	67	23	34%	0.003	0.32	0.02	0.05	0.003	0.11	0.01
Fe, tr	mg/L	67	67	100%	0.03	200	16.73	35.53	1.30	89.80	0.02
Hg, tr	mg/L	67	2	3%	<0.001	0.003					0.001
K	mg/L	67	67	100%	1	48	7	8	3	20	1
Mg	mg/L	67	67	100%	4	150	14	20	8	39	1
Mn, tr	mg/L	66	56	85%	0.002	42	0.96	5.13	0.04	2.28	0.01
Na	mg/L	67	67	100%	10	89	27	20	19	77	1
Pb, tr	mg/L	67	16	24%	0.003	1.10	0.03	0.13	0.003	0.07	0.01
Se, tr	mg/L	64	1	2%	<0.005	0.006					0.005
Zn, tr	mg/L	67	38	57%	0.003	0.80	0.08	0.16	0.01	0.41	0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	67	25	37%	0.05	1.6	0.2	0.2	0.09	0.5	0.1
NO ₂ -N	mg/L	67	7	10%	<0.1	0.3					0.1
NO ₃ -N*	mg/L	67	60	90%	0.04	10.0	2.0	2.8	0.6	8.0	0.1
N-Total	mg/L	67	67	100%	0.2	75	4.1	9.4	1.2	9.7	0.2
P-Ortho*	mg/L	67	23	34%	0.02	1.30	0.19	0.33	0.02	0.96	0.05
P-Total	mg/L	67	40	60%	0.04	3.90	0.65	0.94	0.15	2.60	0.05
TKN	mg/L	67	65	97%	0.05	65.0	2.1	7.9	0.5	5.4	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	60	0	0%							10
Acenaphthylene	mg/L	60	0	0%							10
Acenaphthene	mg/L	60	0	0%							10
Anthracene	mg/L	60	0	0%							10
Benzo(a)anthracene	mg/L	60	0	0%							10
Benzo(a)pyrene	mg/L	60	0	0%							10
Benzo(b)fluoranthene	mg/L	60	0	0%							10
Benzo(ghi)perylene	mg/L	60	0	0%							10
Benzo(k)fluoranthene	mg/L	60	0	0%							10
Chrysene	mg/L	60	0	0%							10
Dibenzo(a,h)anthracene	mg/L	60	0	0%							10
Fluoranthene	mg/L	60	0	0%							10
Fluorene	mg/L	60	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	60	0	0%							10
Napthalene	mg/L	60	0	0%							10
Phenanthrene	mg/L	60	0	0%							10
Pyrene	mg/L	60	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 8 (Receiving Water, WW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	19	14	74%	4	31	11	7	9	22	1
Cl*	mg/L	19	19	100%	10	97	52.0	28.1	55.0	91.6	0.5
CO ₃ *	mg/L	19	3	16%	<3	6					2
COD*	mg/L	18	17	94%	7	240	64	63	33	168	5
EC*	mmho/cm	19	19	100%	200	958	578	278	660	915	0.1
F	mg/L	19	19	100%	0.2	1.1	0.46	0.21	0.40	0.74	0.1
HCO ₃ *	mg/L	19	19	100%	88	275	168	64	180	253	2
O&G	mg/L	19	9	47%	1	7	2	1	1	3	1
OH*	mg/L	19	0	0%							2
pH	units	19	19	100%	7	8.4	7.9	0.3	7.9	8.3	NA
SO ₄ *	mg/L	19	19	100%	15	110	60.1	31.6	72.0	101.0	0.5
TDS*	mg/L	19	19	100%	150	620	374	156	380	594	5
Total Alkalinity as CaCO ₃ *	mg/L	19	19	100%	73	228	141	53	150	212	2
Total Hardness as CaCO ₃ *	mg/L	19	19	100%	156	390	241	58	248	336	2
TSS	mg/L	19	19	100%	7	2800	793	940	415	2710	5
<i>Metals</i>											
Cd, tr	mg/L	18	4	22%	0.004	0.02	0.007	0.005	0.004	0.02	0.01
Ag, tr	mg/L	19	0	0%							0.01
As, tr	mg/L	19	5	26%	0.006	0.03	0.01	0.007	0.006	0.02	0.01
B, tr	mg/L	19	16	84%	0.05	3	0.3	0.7	0.2	0.6	0.1
Ba, tr	mg/L	19	10	53%	0.06	0.8	0.20	0.21	0.10	0.62	0.1
Ca	mg/L	19	19	100%	37	85	63	15	68	82	1
Cr, tr	mg/L	19	8	42%	0.02	0.1	0.04	0.03	0.02	0.08	0.02
Cu, tr	mg/L	19	14	74%	0.006	0.13	0.04	0.04	0.02	0.11	0.01
Fe, tr	mg/L	19	19	100%	0.45	120.0	27.7	35.3	13.0	102.0	0.02
Hg, tr	mg/L	19	0	0%							0.001
K	mg/L	19	19	100%	1	35	12	8	10	29	1
Mg	mg/L	19	19	100%	12	51	20	10	17	39	1
Mn, tr	mg/L	19	19	100%	0.02	3.10	0.62	0.80	0.31	2.11	0.01
Na	mg/L	19	19	100%	17	89	50	25	56	83	1
Pb, tr	mg/L	19	11	58%	0.01	0.10	0.04	0.03	0.02	0.08	0.01
Se, tr	mg/L	18	0	0%							0.005
Zn, tr	mg/L	19	19	100%	0.01	0.55	0.16	0.17	0.10	0.46	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	19	19	100%	0.05	1.3	0.60	0.39	0.55	1.21	0.05
NH ₄ -N*	mg/L	19	13	68%	0.1	0.7	0.3	0.2	0.3	0.5	0.1
NO ₂ -N	mg/L	19	4	21%	0.023	0.3	0.05	0.07	0.02	0.1	0.1
NO ₃ -N*	mg/L	19	19	100%	1.2	9.6	5.2	3.0	5.7	9.3	0.1
N-Total	mg/L	19	19	100%	3.4	10	7.5	2.0	8.3	10.0	0.2
P-Total	mg/L	19	19	100%	0.13	2.80	1.42	0.73	1.20	2.62	0.05
TKN	mg/L	19	18	95%	0.33	5.7	2.3	1.8	1.7	5.6	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	18	0	0%							10
Acenaphthylene	mg/L	18	0	0%							10
Acenaphthene	mg/L	18	0	0%							10
Anthracene	mg/L	18	0	0%							10
Benzo(a)anthracene	mg/L	18	0	0%							10
Benzo(a)pyrene	mg/L	18	0	0%							10
Benzo(b)fluoranthene	mg/L	18	0	0%							10
Benzo(ghi)perylene	mg/L	18	0	0%							10
Benzo(k)fluoranthene	mg/L	18	0	0%							10
Chrysene	mg/L	18	0	0%							10
Dibenzo(a,h)anthracene	mg/L	18	0	0%							10
Fluoranthene	mg/L	18	0	0%							10
Fluorene	mg/L	18	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	18	0	0%							10
Napthalene	mg/L	18	0	0%							10
Phenanthrene	mg/L	18	0	0%							10
Pyrene	mg/L	18	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 9 (Receiving Water, WW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	24	9	38%	1	33	5	7	2	11	1
Cl*	mg/L	24	24	100%	5	16.0	9.8	2.5	9.5	13.9	0.5
CO ₃ *	mg/L	24	0	0%							2
COD*	mg/L	24	13	54%	1	2100	101	426	8	75	5
EC*	mmho/cm	24	24	100%	160	390	265	57	260	366	0.1
F	mg/L	24	24	100%	0.3	1.40	0.52	0.26	0.40	0.97	0.1
HCO ₃ *	mg/L	24	24	100%	76	710	145	123	120	169	2
O&G	mg/L	24	9	38%	0.1	47	3	9	0.1	3	1
OH*	mg/L	24	0	0%							2
pH	units	24	24	100%	7.1	8.3	8.0	0.3	8.1	8.2	NA
SO ₄ *	mg/L	24	24	100%	8	45.0	18.5	9.2	15.0	37.3	0.5
TDS*	mg/L	24	24	100%	120	280	188	39	180	250	5
Total Alkalinity as CaCO ₃ *	mg/L	24	24	100%	63	710	123	126	95	139	2
Total Hardness as CaCO ₃ *	mg/L	24	24	100%	57	1500	153	288	90	156	2
TSS	mg/L	24	16	67%	0	66000	2795	13463	8	291	5
<i>Metals</i>											
Ag, tr	mg/L	24	0	0%							0.01
As, tr	mg/L	24	1	4%	<0.01	0.08					0.01
B, tr	mg/L	24	1	4%	<0.1	0.29					0.1
Ba, tr	mg/L	24	1	4%	<0.1	5.6					0.1
Ca	mg/L	24	24	100%	16	350	40	66	26	41	1
Cd, tr	mg/L	23	0	0%							0.01
Cr, tr	mg/L	24	1	4%	<0.02	0.36					0.02
Cu, tr	mg/L	24	2	8%	<0.01	0.32					0.01
Fe, tr	mg/L	24	24	100%	0.03	200.00	9.76	40.63	0.24	11.19	0.02
Hg, tr	mg/L	24	1	4%	<0.001	0.0014					0.001
K	mg/L	24	24	100%	1	48	4	10	2	12	1
Mg	mg/L	24	24	100%	4	150	12	29	6	12	1
Mn, tr	mg/L	24	16	67%	0.0007	42.00	1.81	8.56	0.02	0.59	0.01
Na	mg/L	24	24	100%	10	25	17	4	16	25	1
Pb, tr	mg/L	24	1	4%	<0.01	1.10					0.01
Se, tr	mg/L	23	0	0%							0.005
Zn, tr	mg/L	24	6	25%	0.0005	0.80	0.04	0.16	0.0005	0.05	0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	24	5	21%	0.014	1.6	0.1	0.3	0.01	0.2	0.1
NO ₂ -N	mg/L	24	1	4%	<0.1	0.3					0.1
NO ₃ -N*	mg/L	24	22	92%	0.14	10.0	1.0	1.9	0.6	1.4	0.1
N-Total	mg/L	24	24	100%	0.2	75.0	4.3	15.1	0.9	3.6	0.2
P-Ortho*	mg/L	24	0	0%							0.05
P-Total	mg/L	24	8	33%	0.01	3.90	0.23	0.79	0.01	0.37	0.05
TKN	mg/L	24	24	100%	0.1	65.0	3.3	13.2	0.5	2.3	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	23	0	0%							10
Acenaphthylene	mg/L	23	0	0%							10
Acenaphthene	mg/L	23	0	0%							10
Anthracene	mg/L	23	0	0%							10
Benzo(a)anthracene	mg/L	23	0	0%							10
Benzo(a)pyrene	mg/L	23	0	0%							10
Benzo(b)fluoranthene	mg/L	23	0	0%							10
Benzo(ghi)perylene	mg/L	23	0	0%							10
Benzo(k)fluoranthene	mg/L	23	0	0%							10
Chrysene	mg/L	23	0	0%							10
Dibenzo(a,h)anthracene	mg/L	23	0	0%							10
Fluoranthene	mg/L	23	0	0%							10
Fluorene	mg/L	23	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	23	0	0%							10
Napthalene	mg/L	23	0	0%							10
Phenanthrene	mg/L	23	0	0%							10
Pyrene	mg/L	23	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 10 (Receiving Water, WW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	24	6	25%	1	25	3	6	1	15	1
Cl*	mg/L	24	24	100%	3	15	5.3	2.4	5.0	8.7	0.5
CO ₃ *	mg/L	24	4	17%	<3	12					2
COD*	mg/L	24	12	50%	2	240	28	55	6	110	5
EC*	mmho/cm	24	24	100%	160	500	269	68	263	373	0.1
F	mg/L	24	24	100%	0.3	1.6	0.52	0.27	0.50	0.70	0.1
HCO ₃ *	mg/L	24	24	100%	89	153	119	15	120	139	2
O&G	mg/L	24	6	25%	0.2	6	0.9	2	0	4	1
OH*	mg/L	24	0	0%							2
pH	units	24	24	100%	7.1	8.3	8.1	0.3	8.2	8.3	NA
SO ₄ *	mg/L	24	24	100%	7	110	28.2	22.6	21.0	57.1	0.5
TDS*	mg/L	24	24	100%	105	330	183	52	162	259	5
Total Alkalinity as CaCO ₃ *	mg/L	24	24	100%	73	156	101	17	100	127	2
Total Hardness as CaCO ₃ *	mg/L	24	24	100%	74	390	137	92	95	348	2
TSS	mg/L	23	22	96%	1	4800	538	1219	27	2958	5
<i>Metals</i>											
Ag, tr	mg/L	24	0	0%							0.01
As, tr	mg/L	24	1	4%	<0.01	0.042					0.01
B, tr	mg/L	24	3	13%	<0.1	0.11					0.1
Ba, tr	mg/L	24	6	25%	0.03	1	0.13	0.23	0.03	0.50	0.1
Ca	mg/L	24	24	100%	21	77	36	16	29	75	1
Cd, tr	mg/L	23	2	9%	<0.01	0.03					0.01
Cr, tr	mg/L	24	5	21%	0.014	0.08	0.02	0.02	0.01	0.08	0.02
Cu, tr	mg/L	24	7	29%	0.006	0.11	0.02	0.03	0.006	0.10	0.01
Fe, tr	mg/L	24	24	100%	0.07	91	15.03	29.04	1.35	85.50	0.02
Hg, tr	mg/L	24	1	4%	<0.001	0.003					0.001
K	mg/L	24	24	100%	2	21	5	5	3	17	1
Mg	mg/L	24	24	100%	4	47	12	12	6	39	1
Mn, tr	mg/L	23	21	91%	0.002	2.8	0.39	0.80	0.04	2.33	0.01
Na	mg/L	24	24	100%	10	51	19	8	17	28	1
Pb, tr	mg/L	24	4	17%	<0.01	0.051					0.01
Se, tr	mg/L	23	1	4%	<0.005	0.006					0.005
Zn, tr	mg/L	24	13	54%	0.002	0.40	0.06	0.12	0.01	0.34	0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	24	7	29%	0.067	0.2	0.1	0.05	0.07	0.20	0.1
NO ₂ -N	mg/L	24	2	8%	<0.1	0.2					0.1
NO ₃ -N*	mg/L	24	19	79%	0.13	1.8	0.4	0.4	0.3	0.9	0.1
N-Total	mg/L	24	24	100%	0.2	8.2	1.2	1.8	0.7	4.5	0.2
P-Ortho*	mg/L	24	4	17%	<0.06	0.090					0.05
P-Total	mg/L	24	13	54%	0.01	3.70	0.43	0.91	0.06	2.41	0.05
TKN	mg/L	24	23	96%	0.062	6.2	0.8	1.4	0.3	3.9	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	19	0	0%							10
Acenaphthylene	mg/L	19	0	0%							10
Acenaphthene	mg/L	19	0	0%							10
Anthracene	mg/L	19	0	0%							10
Benzo(a)anthracene	mg/L	19	0	0%							10
Benzo(a)pyrene	mg/L	19	0	0%							10
Benzo(b)fluoranthene	mg/L	19	0	0%							10
Benzo(ghi)perylene	mg/L	19	0	0%							10
Benzo(k)fluoranthene	mg/L	19	0	0%							10
Chrysene	mg/L	19	0	0%							10
Dibenzo(a,h)anthracene	mg/L	19	0	0%							10
Fluoranthene	mg/L	19	0	0%							10
Fluorene	mg/L	19	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	19	0	0%							10
Napthalene	mg/L	19	0	0%							10
Phenanthrene	mg/L	19	0	0%							10
Pyrene	mg/L	19	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Summary Statistics (Sites 1-7, Dry Weather)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	63	55	87%	3.27	270	33	45	15	109	1
Cl	mg/L	62	62	100%	2	230	41.9	40.7	35.5	104.8	1
CO ₃	mg/L	62	30	48%	2.346	42	11	12	2	36	3
COD*	mg/L	63	59	94%	8.03	2000	197	325	100	644	5
EC*	mmho/cm	63	63	100%	57	1360	601	258	570	1084	0.1
F	mg/L	62	62	100%	0.1	8.6	0.56	1.06	0.40	1.00	0.1
HCO ₃	mg/L	62	62	100%	27	342	176	88	170	328	3
O&G	mg/L	62	41	66%	0.2	395	41	107	3	364	1
OH	mg/L	62	0	0%							3
pH	units	63	63	100%	6.7	9.5	8.2	0.8	8.3	9.3	NA
SO ₄ *	mg/L	62	62	100%	5	290	78.9	60.3	59.0	190.0	0.5
TDS*	mg/L	62	62	100%	58	1510	439	220	393	765	5
Total Alkalinity as CaCO ₃	mg/L	62	62	100%	23	280	160	68	153	275	3
Total Hardness as CaCO ₃	mg/L	62	62	100%	39	670	236	119	225	367	3
TSS	mg/L	62	59	95%	2.07	2140	212	459	36	1555	5
<i>Metals</i>											
Ag, tr	mg/L	63	0	0%							0.01
As, tr	mg/L	63	4	6%	<0.01	0.04					0.01
B, tr	mg/L	62	37	60%	0.056	4.4	0.24	0.55	0.10	0.40	0.1
Ba, tr	mg/L	63	20	32%	0.02	0.5	0.10	0.12	0.06	0.40	0.1
Ca	mg/L	62	62	100%	11	200	69	36	66	130	1
Cd, tr	mg/L	62	3	5%	<0.01	0.02					0.01
Cr, tr	mg/L	63	10	16%	<0.02	0.1					0.02
Cu, tr	mg/L	63	46	73%	0.005	0.35	0.05	0.08	0.02	0.24	0.01
Fe, tr	mg/L	63	63	100%	0.05	55	4.86	10.56	0.64	23.60	0.02
Hg, tr	mg/L	63	2	3%	<0.001	0.003					0.001
K	mg/L	61	61	100%	2	33	8	5	8	15	1
Mg	mg/L	62	62	100%	2	40	16	9	14	34	1
Mn, tr	mg/L	63	53	84%	0.004	1.4	0.17	0.30	0.05	0.66	0.01
Na	mg/L	62	62	100%	3	97	39	26	38	83	1
Pb, tr	mg/L	63	21	33%	0.004	0.19	0.03	0.04	0.004	0.13	0.01
Se, tr	mg/L	62	4	6%	<0.005	0.026					0.005
Zn, tr	mg/L	62	58	94%	0.004	2.70	0.25	0.47	0.05	1.09	0.01
<i>Nutrients</i>											
P-Ortho	mg/L	62	39	63%	0.017	17.00	0.48	2.15	0.08	0.95	0.05
NH ₄ -N*	mg/L	62	44	71%	0.052	7.5	0.8	1.4	0.3	3.2	0.1
NO ₂ -N	mg/L	62	25	40%	0.042	1.4	0.2	0.3	0.04	1.2	0.1
NO ₃ -N*	mg/L	62	55	89%	0.089	29.0	3.9	6.7	1.3	21.0	0.1
N-Total	mg/L	62	62	100%	0.3	82	9.3	12.9	4.3	29.9	0.2
P-Total	mg/L	57	51	89%	0.05	4.90	0.72	0.95	0.41	2.06	0.05
TKN	mg/L	62	60	97%	0.17	52	5.2	8.3	2.7	15.0	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	55	0	0%							10
Acenaphthylene*	mg/L	55	0	0%							10
Acenaphthene*	mg/L	55	0	0%							10
Anthracene*	mg/L	55	0	0%							10
Benzo(a)anthracene*	mg/L	55	0	0%							10
Benzo(a)pyrene*	mg/L	55	0	0%							10
Benzo(b)fluoranthene*	mg/L	55	0	0%							10
Benzo(ghi)perylene*	mg/L	55	0	0%							10
Benzo(k)fluoranthene*	mg/L	55	0	0%							10
Chrysene*	mg/L	55	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	55	0	0%							10
Fluoranthene*	mg/L	55	0	0%							10
Fluorene*	mg/L	55	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	55	0	0%							10
Naphthalene*	mg/L	55	0	0%							10
Phenanthrene*	mg/L	55	0	0%							10
Pyrene*	mg/L	55	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 1 (Dry Weather)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	7	6	86%	5	34	15	10	13	30	1
Cl	mg/L	7	7	100%	14	230	63.7	76.5	40.0	184.1	1
CO ₃	mg/L	7	7	100%	6	36	17	10	15	32	3
COD*	mg/L	7	7	100%	40	160	107	39	120	151	5
EC*	mmho/cm	7	7	100%	610	1100	727	173	650	1001	0.1
F	mg/L	7	7	100%	0.5	1	0.69	0.23	0.60	1.00	0.1
HCO ₃	mg/L	7	7	100%	110	220	168	39	170	218	3
O&G	mg/L	7	5	71%	0.511	8	2	3	2	7	1
OH	mg/L	7	0	0%							3
pH	units	7	7	100%	8.6	8.9	8.8	0.1	8.9	8.9	NA
SO ₄ *	mg/L	7	7	100%	57	190	111.0	50.8	99.0	181.0	0.5
TDS*	mg/L	7	7	100%	435	770	541	113	510	713	5
Total Alkalinity as CaCO ₃	mg/L	7	7	100%	125	200	166	31	170	200	3
Total Hardness as CaCO ₃	mg/L	7	7	100%	207	304	250	35	258	294	3
TSS	mg/L	7	7	100%	11	145	39	48	20	115	5
<i>Metals</i>											
Ag, tr	mg/L	7	0	0%							0.01
As, tr	mg/L	7	1	14%	<0.01	0.04					0.01
B, tr	mg/L	7	4	57%	0.06	0.2	0.1	0.05	0.1	0.17	0.1
Ba, tr	mg/L	7	1	14%	<0.1	0.07					0.1
Ca	mg/L	7	7	100%	61	98	76	12	74	93	1
Cd, tr	mg/L	7	0	0%							0.01
Cr, tr	mg/L	7	0	0%							0.02
Cu, tr	mg/L	7	7	100%	0.01	0.05	0.03	0.01	0.03	0.05	0.01
Fe, tr	mg/L	7	7	100%	0.08	4	0.85	1.40	0.33	3.02	0.02
Hg, tr	mg/L	7	0	0%							0.001
K	mg/L	7	7	100%	6	16	11	4	10	16	1
Mg	mg/L	7	7	100%	9	18	14	3	14	18	1
Mn, tr	mg/L	7	4	57%	0.003	0.07	0.02	0.02	0.01	0.06	0.01
Na	mg/L	7	7	100%	29	86	53	22	50	83	1
Pb, tr	mg/L	7	0	0%							0.01
Se, tr	mg/L	7	0	0%							0.005
Zn, tr	mg/L	7	7	100%	0.01	0.31	0.07	0.11	0.05	0.24	0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	7	5	71%	0.09	0.6	0.3	0.2	0.3	0.6	0.1
NO ₂ -N	mg/L	7	1	14%	<0.1	0.1					0.1
NO ₃ -N*	mg/L	7	7	100%	0.3	1.6	1.0	0.5	1.0	1.5	0.1
N-Total	mg/L	7	7	100%	2.5	6.8	4.3	1.4	4.2	6.3	0.2
P-Ortho	mg/L	7	2	29%	<0.05	0.08					0.05
P-Total	mg/L	6	5	83%	0.05	0.24	0.15	0.08	0.15	0.24	0.05
TKN	mg/L	7	7	100%	2.2	5.6	3.3	1.1	3.1	5.0	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	7	0	0%							10
Acenaphthylene	mg/L	7	0	0%							10
Acenaphthene	mg/L	7	0	0%							10
Anthracene	mg/L	7	0	0%							10
Benzo(a)anthracene	mg/L	7	0	0%							10
Benzo(a)pyrene	mg/L	7	0	0%							10
Benzo(b)fluoranthene	mg/L	7	0	0%							10
Benzo(ghi)perylene	mg/L	7	0	0%							10
Benzo(k)fluoranthene	mg/L	7	0	0%							10
Chrysene	mg/L	7	0	0%							10
Dibenzo(a,h)anthracene	mg/L	7	0	0%							10
Fluoranthene	mg/L	7	0	0%							10
Fluorene	mg/L	7	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	7	0	0%							10
Naphthalene	mg/L	7	0	0%							10
Phenanthrene	mg/L	7	0	0%							10
Pyrene	mg/L	7	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 2 (Dry Weather)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	8	8	100%	7	25	15	5	15	23	1
Cl	mg/L	8	8	100%	23	73	50.0	16.7	45.5	72.3	1
CO ₃	mg/L	8	8	100%	12	39	30	9	33	38	3
COD*	mg/L	8	8	100%	45	125	89	26	94	122	5
EC*	mmho/cm	8	8	100%	410	600	515	59	505	590	0.1
F	mg/L	8	8	100%	0.3	0.9	0.45	0.19	0.40	0.76	0.1
HCO ₃	mg/L	8	8	100%	88	159	120	21	116	151	3
O&G	mg/L	8	4	50%	0.56	4	2	1	1	4	1
OH	mg/L	8	0	0%							3
pH	units	8	8	100%	9	9.5	9.2	0.2	9.3	9.5	NA
SO ₄ *	mg/L	8	8	100%	36	61	48.8	8.8	49.0	59.6	0.5
TDS*	mg/L	8	8	100%	310	400	366	27	370	393	5
Total Alkalinity as CaCO ₃	mg/L	8	8	100%	133	160	149	9	150	159	3
Total Hardness as CaCO ₃	mg/L	8	8	100%	140	184	158	15	153	179	3
TSS	mg/L	8	8	100%	10	80	38	25	32	77	5
<i>Metals</i>											
Ag, tr	mg/L	8	0	0%							0.01
As, tr	mg/L	8	1	13%	<0.01	0.01					0.01
B, tr	mg/L	8	6	75%	0.07	0.3	0.16	0.08	0.15	0.27	0.1
Ba, tr	mg/L	8	2	25%	<0.1	0.1					0.1
Ca	mg/L	8	8	100%	42	52	48	4	49	52	1
Cd, tr	mg/L	8	0	0%							0.01
Cr, tr	mg/L	8	0	0%							0.02
Cu, tr	mg/L	8	8	100%	0.02	0.07	0.03	0.02	0.03	0.06	0.01
Fe, tr	mg/L	8	8	100%	0.17	3.6	0.97	1.09	0.68	2.66	0.02
Hg, tr	mg/L	8	0	0%							0.001
K	mg/L	8	8	100%	6	8	7	1	8	8	1
Mg	mg/L	8	8	100%	7	13	10	2	11	13	1
Mn, tr	mg/L	8	7	88%	0.008	0.06	0.02	0.02	0.02	0.05	0.01
Na	mg/L	8	8	100%	36	55	46	7	46	55	1
Pb, tr	mg/L	8	0	0%							0.01
Se, tr	mg/L	8	1	13%	<0.005	0.026					0.005
Zn, tr	mg/L	8	8	100%	0.02	0.07	0.04	0.02	0.03	0.06	0.01
<i>Nutrients</i>											
P-Ortho	mg/L	8	5	63%	0.06	0.15	0.08	0.03	0.07	0.13	0.05
NH ₄ -N*	mg/L	8	6	75%	0.1	0.6	0.3	0.2	0.2	0.5	0.1
NO ₂ -N	mg/L	8	1	13%	<0.1	0.1					0.1
NO ₃ -N*	mg/L	8	7	88%	0.081	0.9	0.4	0.3	0.4	0.8	0.1
N-Total	mg/L	8	8	100%	1.2	6.3	3.3	1.5	3.2	5.5	0.2
P-Total	mg/L	7	7	100%	0.15	0.55	0.34	0.14	0.28	0.53	0.05
TKN	mg/L	8	8	100%	0.9	5.4	2.9	1.3	2.7	4.8	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	7	0	0%							10
Acenaphthylene	mg/L	7	0	0%							10
Acenaphthene	mg/L	7	0	0%							10
Anthracene	mg/L	7	0	0%							10
Benzo(a)anthracene	mg/L	7	0	0%							10
Benzo(a)pyrene	mg/L	7	0	0%							10
Benzo(b)fluoranthene	mg/L	7	0	0%							10
Benzo(ghi)perylene	mg/L	7	0	0%							10
Benzo(k)fluoranthene	mg/L	7	0	0%							10
Chrysene	mg/L	7	0	0%							10
Dibenzo(a,h)anthracene	mg/L	7	0	0%							10
Fluoranthene	mg/L	7	0	0%							10
Fluorene	mg/L	7	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	7	0	0%							10
Naphthalene	mg/L	7	0	0%							10
Phenanthrene	mg/L	7	0	0%							10
Pyrene	mg/L	7	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 3 (Dry Weather)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	8	8	100%	6	22	14	5	15	21	1
Cl	mg/L	8	8	100%	86	130	100.8	14.3	96.5	123.0	1
CO ₃	mg/L	8	8	100%	3	42	24	13	27	40	3
COD*	mg/L	8	8	100%	20	115	68	32	60	110	5
EC*	mmho/cm	8	8	100%	670	1310	864	209	850	1181	0.1
F	mg/L	8	8	100%	0.3	0.4	0.34	0.052	0.30	0.40	0.1
HCO ₃	mg/L	8	8	100%	73	223	118	48	108	190	3
O&G	mg/L	8	1	13%	<1	3					1
OH	mg/L	8	0	0%							3
pH	units	8	8	100%	8.5	9.3	9.1	0.2	9.1	9.3	NA
SO ₄ *	mg/L	8	8	100%	56	190	88.1	42.6	73.5	155.0	0.5
TDS*	mg/L	8	8	100%	420	875	578	150	588	800	5
Total Alkalinity as CaCO ₃	mg/L	8	8	100%	110	198	136	29	133	181	3
Total Hardness as CaCO ₃	mg/L	8	8	100%	130	263	196	53	207	258	3
TSS	mg/L	8	8	100%	20	65	37	14	36	58	5
<i>Metals</i>											
Ag, tr	mg/L	8	0	0%							0.01
As, tr	mg/L	8	0	0%							0.01
B, tr	mg/L	8	8	100%	0.2	0.4	0.29	0.06	0.30	0.37	0.1
Ba, tr	mg/L	8	1	13%	<0.1	0.02					0.1
Ca	mg/L	8	8	100%	39	132	64	30	57	111	1
Cd, tr	mg/L	8	0	0%							0.01
Cr, tr	mg/L	8	0	0%							0.02
Cu, tr	mg/L	8	2	25%	<0.01	0.01					0.01
Fe, tr	mg/L	8	8	100%	0.05	0.48	0.21	0.15	0.16	0.45	0.02
Hg, tr	mg/L	8	0	0%							0.001
K	mg/L	8	8	100%	9	13	12	1	12	13	1
Mg	mg/L	8	8	100%	8	34	17	9	18	29	1
Mn, tr	mg/L	8	2	25%	<0.01	0.01					0.01
Na	mg/L	8	8	100%	76	91	81	5	80	88	1
Pb, tr	mg/L	8	0	0%							0.01
Se, tr	mg/L	8	1	13%	<0.005	0.006					0.005
Zn, tr	mg/L	8	8	100%	0.03	0.06	0.04	0.01	0.04	0.057	0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	8	8	100%	0.2	1.2	0.6	0.3	0.7	1.0	0.1
NO ₂ -N	mg/L	8	7	88%	0.2	0.8	0.5	0.2	0.6	0.8	0.1
NO ₃ -N*	mg/L	8	8	100%	7.7	28.0	16.3	7.8	16.0	26.6	0.1
N-Total	mg/L	8	8	100%	11	30	20.4	7.0	20.0	29.3	0.2
P-Ortho	mg/L	8	8	100%	0.51	1.40	0.85	0.28	0.83	1.26	0.05
P-Total	mg/L	7	7	100%	0.93	1.90	1.33	0.39	1.20	1.87	0.05
TKN	mg/L	8	8	100%	1.6	6.9	3.7	1.6	3.5	6.1	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	7	0	0%							10
Acenaphthylene*	mg/L	7	0	0%							10
Acenaphthene*	mg/L	7	0	0%							10
Anthracene*	mg/L	7	0	0%							10
Benzo(a)anthracene*	mg/L	7	0	0%							10
Benzo(a)pyrene*	mg/L	7	0	0%							10
Benzo(b)fluoranthene*	mg/L	7	0	0%							10
Benzo(ghi)perylene*	mg/L	7	0	0%							10
Benzo(k)fluoranthene*	mg/L	7	0	0%							10
Chrysene*	mg/L	7	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	7	0	0%							10
Fluoranthene*	mg/L	7	0	0%							10
Fluorene*	mg/L	7	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	7	0	0%							10
Naphthalene*	mg/L	7	0	0%							10
Phenanthrene*	mg/L	7	0	0%							10
Pyrene*	mg/L	7	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 4 (Dry Weather)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	5	5	100%	9	100	33	38	18	85	1
Cl	mg/L	5	5	100%	11	25	17.4	6.1	17.0	24.4	1
CO ₃	mg/L	5	0	0%							3
COD*	mg/L	5	5	100%	73	300	150	97	100	279	5
EC*	mmho/cm	5	5	100%	400	530	456	56	470	520	0.1
F	mg/L	5	5	100%	0.3	0.5	0.36	0.089	0.30	0.48	0.1
HCO ₃	mg/L	5	5	100%	186	240	216	21	214	238	3
O&G	mg/L	3	3	100%	1	13	6	6	4	12	1
OH	mg/L	5	0	0%							3
pH	units	5	5	100%	7.7	8.4	8.1	0.3	8.1	8.4	NA
SO ₄ *	mg/L	5	5	100%	18	40	24.8	8.8	21.0	36.8	0.5
TDS*	mg/L	4	4	100%	260	370	313	51	310	366	5
Total Alkalinity as CaCO ₃	mg/L	5	5	100%	153	190	176	15	175	190	3
Total Hardness as CaCO ₃	mg/L	5	5	100%	163	200	183	14	183	198	3
TSS	mg/L	4	4	100%	19	175	116	67	135	170	5
<i>Metals</i>											
Ag, tr	mg/L	5	0	0%							0.01
As, tr	mg/L	5	0	0%							0.01
B, tr	mg/L	5	1	20%	<0.1	0.2					0.1
Ba, tr	mg/L	5	2	40%	<0.1	0.1					0.1
Ca	mg/L	5	5	100%	55	61	59	2	59	61	1
Cd, tr	mg/L	5	0	0%							0.01
Cr, tr	mg/L	5	1	20%	<0.02	0.02					0.02
Cu, tr	mg/L	5	5	100%	0.02	0.10	0.05	0.03	0.04	0.09	0.01
Fe, tr	mg/L	5	5	100%	0.89	7.4	2.98	2.57	2.50	6.44	0.02
Hg, tr	mg/L	5	0	0%							0.001
K	mg/L	5	5	100%	4	7	6	1	6	7	1
Mg	mg/L	5	5	100%	6	12	9	2	9	12	1
Mn, tr	mg/L	5	5	100%	0.11	0.52	0.30	0.15	0.27	0.48	0.01
Na	mg/L	5	5	100%	15	47	30	13	28	45	1
Pb, tr	mg/L	5	4	80%	0.006	0.03	0.02	0.01	0.01	0.03	0.01
Se, tr	mg/L	5	0	0%							0.005
Zn, tr	mg/L	5	5	100%	0.10	0.57	0.23	0.19	0.16	0.49	0.01
<i>Nutrients</i>											
P-Ortho	mg/L	5	5	100%	0.05	0.59	0.20	0.22	0.11	0.51	0.05
NH ₄ -N*	mg/L	5	4	80%	0.1	0.4	0.2	0.1	0.2	0.4	0.1
NO ₂ -N	mg/L	5	1	20%	<0.1	0.2					0.1
NO ₃ -N*	mg/L	5	5	100%	1.5	7.3	3.9	2.3	4.1	6.8	0.1
N-Total	mg/L	5	5	100%	6.4	13	8.6	2.6	7.7	12.1	0.2
P-Total	mg/L	5	5	100%	0.15	0.75	0.48	0.24	0.55	0.73	0.05
TKN	mg/L	5	5	100%	1.1	11.0	4.5	4.0	2.8	9.9	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	3	0	0%							10
Acenaphthylene*	mg/L	3	0	0%							10
Acenaphthene*	mg/L	3	0	0%							10
Anthracene*	mg/L	3	0	0%							10
Benzo(a)anthracene*	mg/L	3	0	0%							10
Benzo(a)pyrene*	mg/L	3	0	0%							10
Benzo(b)fluoranthene*	mg/L	3	0	0%							10
Benzo(ghi)perylene*	mg/L	3	0	0%							10
Benzo(k)fluoranthene*	mg/L	3	0	0%							10
Chrysene*	mg/L	3	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	3	0	0%							10
Fluoranthene*	mg/L	3	0	0%							10
Fluorene*	mg/L	3	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	3	0	0%							10
Naphthalene*	mg/L	3	0	0%							10
Phenanthrene*	mg/L	3	0	0%							10
Pyrene*	mg/L	3	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 5 (Dry Weather)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	24	24	100%	8	270	63	60	41	144	1
Cl	mg/L	23	23	100%	2	97	33.3	24.8	36.0	72.1	1
CO ₃	mg/L	23	0	0%							3
COD*	mg/L	24	24	100%	36	2000	393	463	238	1342	5
EC*	mmho/cm	24	24	100%	57	1360	551	340	570	1064	0.1
F	mg/L	23	23	100%	0.1	8.6	0.82	1.72	0.50	0.99	0.1
HCO ₃	mg/L	23	23	100%	27	290	146	83	130	248	3
O&G	mg/L	25	20	80%	1	46	13	11	10	28	1
OH	mg/L	23	0	0%							3
pH	units	24	24	100%	6.7	8.2	7.4	0.6	7.4	8.2	NA
SO ₄ *	mg/L	23	23	100%	5	290	105.0	76.7	120.0	226.0	0.5
TDS*	mg/L	24	24	100%	58	1510	445	316	455	947	5
Total Alkalinity as CaCO ₃	mg/L	23	23	100%	23	240	118	67	110	208	3
Total Hardness as CaCO ₃	mg/L	23	23	100%	39	670	254	178	277	627	3
TSS	mg/L	24	24	100%	6	2140	484	656	143	1903	5
<i>Metals</i>											
Ag, tr	mg/L	24	0	0%							0.01
As, tr	mg/L	24	2	8%	<0.01	0.01					0.01
B, tr	mg/L	23	18	78%	0.06	4.4	0.4	0.9	0.2	0.8	0.1
Ba, tr	mg/L	24	12	50%	0.07	0.5	0.19	0.16	0.08	0.50	0.1
Ca	mg/L	23	23	100%	11	200	78	55	89	197	1
Cd, tr	mg/L	23	3	13%	<0.01	0.02					0.01
Cr, tr	mg/L	24	9	38%	0.008	0.1	0.02	0.03	0.01	0.09	0.02
Cu, tr	mg/L	24	24	100%	0.01	0.35	0.09	0.11	0.04	0.33	0.01
Fe, tr	mg/L	24	24	100%	0.2	55	11.3	15.1	5.8	46.8	0.02
Hg, tr	mg/L	24	2	8%	<0.001	0.003					0.001
K	mg/L	22	22	100%	2	33	9	6	9	17	1
Mg	mg/L	23	23	100%	2	40	14	10	14	38	1
Mn, tr	mg/L	24	24	100%	0.01	1.4	0.3	0.4	0.2	1.3	0.01
Na	mg/L	23	23	100%	3	97	35	24	36	78	1
Pb, tr	mg/L	24	17	71%	0.01	0.19	0.06	0.06	0.04	0.17	0.01
Se, tr	mg/L	23	2	9%	<0.005	0.006					0.005
Zn, tr	mg/L	24	23	96%	0.02	2.70	0.56	0.65	0.31	1.60	0.01
<i>Nutrients</i>											
P-Ortho	mg/L	23	18	78%	0.03	17.00	0.91	3.51	0.15	0.54	0.05
NH ₄ -N*	mg/L	23	19	83%	0.09	7.5	1.7	2.1	0.6	6.1	0.1
NO ₂ -N	mg/L	23	15	65%	0.055	1.4	0.4	0.4	0.2	1.3	0.1
NO ₃ -N*	mg/L	23	22	96%	0.24	29.0	3.4	5.9	2.1	8.1	0.1
N-Total	mg/L	23	23	100%	1.4	82	13.4	17.9	7.5	40.0	0.2
P-Total	mg/L	22	22	100%	0.24	4.90	1.16	1.28	0.60	4.39	0.05
TKN	mg/L	23	23	100%	0.5	52	9.6	12.3	5.9	32.7	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	8	0	0%							10
Acenaphthylene*	mg/L	8	0	0%							10
Acenaphthene*	mg/L	8	0	0%							10
Anthracene*	mg/L	8	0	0%							10
Benzo(a)anthracene*	mg/L	8	0	0%							10
Benzo(a)pyrene*	mg/L	8	0	0%							10
Benzo(b)fluoranthene*	mg/L	8	0	0%							10
Benzo(ghi)perylene*	mg/L	8	0	0%							10
Benzo(k)fluoranthene*	mg/L	8	0	0%							10
Chrysene*	mg/L	8	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	8	0	0%							10
Fluoranthene*	mg/L	8	0	0%							10
Fluorene*	mg/L	8	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	8	0	0%							10
Naphthalene*	mg/L	8	0	0%							10
Phenanthrene*	mg/L	8	0	0%							10
Pyrene*	mg/L	8	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 6 (Dry Weather)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	4	1	25%	<5	6					1
Cl	mg/L	4	4	100%	6	17	9.3	5.3	7.0	15.7	1
CO ₃	mg/L	4	2	50%	<3	6					3
COD*	mg/L	4	2	50%	<10	35					5
EC*	mmho/cm	4	4	100%	540	680	588	63	565	664	0.1
F	mg/L	4	4	100%	0.2	0.3	0.25	0.058	0.25	0.30	0.1
HCO ₃	mg/L	4	4	100%	293	342	319	21	320	340	3
O&G	mg/L	4	2	50%	<1	385					1
OH	mg/L	4	0	0%							3
pH	units	4	4	100%	8.2	8.5	8.4	0.1	8.4	8.5	NA
SO ₄ *	mg/L	4	4	100%	26	88	51.8	26.1	46.5	82.2	0.5
TDS*	mg/L	4	4	100%	330	415	374	36	375	411	5
Total Alkalinity as CaCO ₃	mg/L	4	4	100%	260	280	270	12	270	280	3
Total Hardness as CaCO ₃	mg/L	4	4	100%	300	369	321	32	307	360	3
TSS	mg/L	4	3	75%	5	20	11	6	10	19	5
<i>Metals</i>											
Ag, tr	mg/L	4	0	0%							0.01
As, tr	mg/L	4	0	0%							0.01
B, tr	mg/L	4	0	0%							0.1
Ba, tr	mg/L	4	1	25%	<0.1	0.05					0.1
Ca	mg/L	4	4	100%	72	91	79	9	76	89	1
Cd, tr	mg/L	4	0	0%							0.01
Cr, tr	mg/L	4	0	0%							0.02
Cu, tr	mg/L	4	0	0%							0.01
Fe, tr	mg/L	4	4	100%	0.21	0.3	0.25	0.04	0.24	0.29	0.02
Hg, tr	mg/L	4	0	0%							0.001
K	mg/L	4	4	100%	3	3	3	0	3	3	1
Mg	mg/L	4	4	100%	27	34	30	3	29	33	1
Mn, tr	mg/L	4	4	100%	0.05	0.21	0.11	0.07	0.09	0.20	0.01
Na	mg/L	4	4	100%	6	13	8	3	7	12	1
Pb, tr	mg/L	4	0	0%							0.01
Se, tr	mg/L	4	0	0%							0.005
Zn, tr	mg/L	4	2	50%	<0.01	0.03					0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	4	1	25%	<1	0.2					0.1
NO ₂ -N	mg/L	4	0	0%							0.1
NO ₃ -N*	mg/L	4	2	50%	<0.1	0.4					0.1
N-Total	mg/L	4	4	100%	0.4	1.2	0.7	0.4	0.6	1.1	0.2
P-Ortho	mg/L	4	1	25%	<0.05	0.05					0.05
P-Total	mg/L	3	2	67%	<0.05	0.10					0.05
TKN	mg/L	4	3	75%	<0.1	0.8	0.4	0.4	0.5	0.8	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	5	0	0%							10
Acenaphthylene	mg/L	5	0	0%							10
Acenaphthene	mg/L	5	0	0%							10
Anthracene	mg/L	5	0	0%							10
Benzo(a)anthracene	mg/L	5	0	0%							10
Benzo(a)pyrene	mg/L	5	0	0%							10
Benzo(b)fluoranthene	mg/L	5	0	0%							10
Benzo(ghi)perylene	mg/L	5	0	0%							10
Benzo(k)fluoranthene	mg/L	5	0	0%							10
Chrysene	mg/L	5	0	0%							10
Dibenzo(a,h)anthracene	mg/L	5	0	0%							10
Fluoranthene	mg/L	5	0	0%							10
Fluorene	mg/L	5	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	5	0	0%							10
Naphthalene	mg/L	5	0	0%							10
Phenanthrene	mg/L	5	0	0%							10
Pyrene	mg/L	5	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 7 (Dry Weather)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	7	3	43%	4	9	5	2	4	8	1
Cl	mg/L	7	7	100%	4	14	7.9	3.5	7.0	12.8	1
CO ₃	mg/L	7	5	71%	1.34	15	6	6	3	15	3
COD*	mg/L	7	5	71%	7	30	16	8	15	27	5
EC*	mmho/cm	7	7	100%	500	620	553	48	550	617	0.1
F	mg/L	7	7	100%	0.3	0.4	0.31	0.04	0.30	0.37	0.1
HCO ₃	mg/L	7	7	100%	260	336	306	26	305	336	3
O&G	mg/L	7	6	86%	0.4	395	203	191	310	389	1
OH	mg/L	7	0	0%							3
pH	units	7	7	100%	8.2	8.5	8.4	0.1	8.5	8.5	NA
SO ₄ *	mg/L	7	7	100%	18	63	38.7	16.0	36.0	60.9	0.5
TDS*	mg/L	7	7	100%	310	395	349	35	340	391	5
Total Alkalinity as CaCO ₃	mg/L	7	7	100%	240	275	261	14	260	275	3
Total Hardness as CaCO ₃	mg/L	7	7	100%	250	329	287	27	287	322	3
TSS	mg/L	7	5	71%	5	60	22	20	16	53	5
<i>Metals</i>											
Ag, tr	mg/L	7	0	0%							0.01
As, tr	mg/L	7	0	0%							0.01
B, tr	mg/L	7	0	0%							0.1
Ba, tr	mg/L	7	1	14%	<0.1	0.05					0.1
Ca	mg/L	7	7	100%	58	74	67	5	67	74	1
Cd, tr	mg/L	7	0	0%							0.01
Cr, tr	mg/L	7	0	0%							0.02
Cu, tr	mg/L	7	0	0%							0.01
Fe, tr	mg/L	7	7	100%	0.2	1.9	0.5	0.6	0.3	1.5	0.02
Hg, tr	mg/L	7	0	0%							0.001
K	mg/L	7	7	100%	3	4	3	1	3	4	1
Mg	mg/L	7	7	100%	24	35	28	4	27	35	1
Mn, tr	mg/L	7	7	100%	0.01	0.11	0.04	0.03	0.03	0.09	0.01
Na	mg/L	7	7	100%	3	14	10	4	11	14	1
Pb, tr	mg/L	7	0	0%							0.01
Se, tr	mg/L	7	0	0%							0.005
Zn, tr	mg/L	7	5	71%	0.01	0.04	0.02	0.01	0.02	0.04	0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	7	1	14%	<1	0.2					0.1
NO ₂ -N	mg/L	7	0	0%							0.1
NO ₃ -N*	mg/L	7	4	57%	0.13	0.7	0.3	0.2	0.2	0.6	0.1
N-Total	mg/L	7	7	100%	0.3	1.1	0.7	0.3	0.7	1.0	0.2
P-Ortho	mg/L	7	0	0%							0.05
P-Total	mg/L	7	3	43%	0.02	0.15	0.05	0.05	0.02	0.12	0.05
TKN	mg/L	7	6	86%	0.15	0.8	0.5	0.3	0.4	0.8	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	7	0	0%							10
Acenaphthylene	mg/L	7	0	0%							10
Acenaphthene	mg/L	7	0	0%							10
Anthracene	mg/L	7	0	0%							10
Benzo(a)anthracene	mg/L	7	0	0%							10
Benzo(a)pyrene	mg/L	7	0	0%							10
Benzo(b)fluoranthene	mg/L	7	0	0%							10
Benzo(ghi)perylene	mg/L	7	0	0%							10
Benzo(k)fluoranthene	mg/L	7	0	0%							10
Chrysene	mg/L	7	0	0%							10
Dibenzo(a,h)anthracene	mg/L	7	0	0%							10
Fluoranthene	mg/L	7	0	0%							10
Fluorene	mg/L	7	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	7	0	0%							10
Naphthalene	mg/L	7	0	0%							10
Phenanthrene	mg/L	7	0	0%							10
Pyrene	mg/L	7	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Summary Statistics (Sites 1-7, Main Program, WW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	146	134	92%	4.04	660	26	56	16	61	1
Cl*	mg/L	148	147	99%	0.43	150	14.1	19.8	8.0	47.6	0.5
CO ₃ *	mg/L	148	15	10%	<3	143					2
COD*	mg/L	148	146	99%	8.41	1720	152	190	95	443	5
EC*	mmho/cm	147	147	100%	40	1590	284	245	190	704	0.1
F	mg/L	148	143	97%	0.08	1	0.25	0.13	0.20	0.50	0.1
HCO ₃ *	mg/L	145	145	100%	12	589	100	98	55	318	2
O&G	mg/L	11	10	91%	1.4	18	7	5	6	16	1
OH*	mg/L	148	0	0%							2
pH	units	148	148	100%	6.4	9.2	7.6	0.5	7.5	8.4	NA
SO ₂ *	mg/L	148	148	100%	2	180	28.5	30.9	17.0	80.7	0.5
TDS*	mg/L	146	146	100%	25	1070	203	165	150	469	5
Total Alkalinity as CaCO ₃ *	mg/L	146	146	100%	13	483	84	83	49	268	2
Total Hardness as CaCO ₃ *	mg/L	148	148	100%	17	489	132	115	79	357	2
TSS	mg/L	148	148	100%	5	2950	240	320	150	750	5
<i>Metals</i>											
Ag, tr	mg/L	148	0	0%							0.01
As, tr	mg/L	148	2	1%	<0.01	0.01					0.01
B, tr	mg/L	147	24	16%	<0.1	0.6					0.1
Ba, tr	mg/L	148	76	51%	0.03	0.6	0.096	0.086	0.055	0.20	0.1
Ca	mg/L	148	148	100%	5	150	35	30	24	93	1
Cd, tr	mg/L	142	7	5%	<0.01	0.02					0.01
Cr, tr	mg/L	148	24	16%	<0.02	0.08					0.02
Cu, tr	mg/L	148	125	84%	0.006	0.27	0.03	0.04	0.02	0.10	0.01
Fe, tr	mg/L	148	148	100%	0.18	73	7.56	9.40	4.50	28.25	0.02
Hg, tr	mg/L	148	7	5%	<0.001	0.006					0.001
K	mg/L	148	146	99%	0.88	138	7	12	5	14	1
Mg	mg/L	148	148	100%	1	46	11	10	5	31	1
Mn, tr	mg/L	148	147	99%	0.0114	2.4	0.23	0.26	0.15	0.60	0.01
Na	mg/L	148	147	99%	0.96	86	13	14	9	40	1
Pb, tr	mg/L	147	101	69%	0.005	0.13	0.02	0.02	0.01	0.06	0.01
Se, tr	mg/L	142	3	2%	<0.005	0.015					0.005
Zn, tr	mg/L	148	148	100%	0.01	1.30	0.21	0.21	0.15	0.56	0.01
<i>Nutrients</i>											
P-Total	mg/L	147	112	76%	0.02	62.00	0.68	5.13	0.13	0.77	0.05
NH ₄ -N*	mg/L	148	126	85%	0.1	26	1.2	2.3	0.7	3.2	0.1
NO ₂ -N	mg/L	148	60	41%	0.03	2.0	0.1	0.3	0.03	0.4	0.1
NO ₃ -N*	mg/L	148	142	96%	0.1	30.0	2.3	3.6	1.0	8.5	0.1
N-Total	mg/L	148	148	100%	0.3	97	7.0	10.9	3.7	20.0	0.2
TKN	mg/L	148	147	99%	0.1	92	4.7	9.3	2.6	14.7	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	5	0	0%							10
Acenaphthylene*	mg/L	5	0	0%							10
Acenaphthene*	mg/L	5	0	0%							10
Anthracene*	mg/L	5	0	0%							10
Benzo(a)anthracene*	mg/L	5	0	0%							10
Benzo(a)pyrene*	mg/L	5	0	0%							10
Benzo(b)fluoranthene*	mg/L	5	0	0%							10
Benzo(ghi)perylene*	mg/L	5	0	0%							10
Benzo(k)fluoranthene*	mg/L	5	0	0%							10
Chrysene*	mg/L	5	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	5	0	0%							10
Fluoranthene*	mg/L	5	0	0%							10
Fluorene*	mg/L	5	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	5	0	0%							10
Naphthalene*	mg/L	5	0	0%							10
Phenanthrene*	mg/L	5	0	0%							10
Pyrene*	mg/L	5	0	0%							10

Notes:

(a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.

(b) Constituents with an asterisk (*) had more than one DL

(c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 1: WW Main Program

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	23	21	91%	4	61	19	18	11	60	1
Cl*	mg/L	23	22	96%	0.626	10	3.8	2.9	3.0	9.9	0.5
CO ₃ *	mg/L	23	0	0%							2
COD*	mg/L	23	23	100%	30	537	100	121	56	368	5
EC*	mmho/cm	23	23	100%	40	370	122	79	96	277	0.1
F	mg/L	23	20	87%	0.1	0.4	0.22	0.079	0.20	0.30	0.1
HCO ₃ *	mg/L	23	23	100%	15	113	39	23	34	83	2
O&G	mg/L	2	2	100%	3	6	5	2	5	6	1
OH*	mg/L	23	0	0%							2
pH	units	23	23	100%	6.4	8.2	7.3	0.4	7.3	7.9	NA
SO ₄ *	mg/L	23	23	100%	2	47	10.3	9.6	7.3	21.9	0.5
TDS*	mg/L	23	23	100%	30	330	99	69	83	219	5
Total Alkalinity as CaCO ₃ *	mg/L	23	23	100%	13	93	33	19	28	69	2
Total Hardness as CaCO ₃ *	mg/L	23	23	100%	17	256	58	55	43	171	2
TSS	mg/L	23	23	100%	45	790	193	194	105	635	5
<i>Metals</i>											
Ag, tr	mg/L	23	0	0%							0.01
As, tr	mg/L	23	1	4%	<0.01	0.01					0.01
B, tr	mg/L	23	2	9%	<0.1	0.1					0.1
Ba, tr	mg/L	23	11	48%	0.03	0.3	0.09	0.07	0.05	0.20	0.1
Ca	mg/L	23	23	100%	5	74	16	16	11	49	1
Cd, tr	mg/L	23	1	4%	<0.01	0.01					0.01
Cr, tr	mg/L	23	5	22%	0.022	0.04	0.024	0.005	0.022	0.03	0.02
Cu, tr	mg/L	23	22	96%	0.004	0.16	0.03	0.04	0.02	0.13	0.01
Fe, tr	mg/L	23	23	100%	1.9	30	7.53	7.62	4.40	19.90	0.02
Hg, tr	mg/L	23	1	4%	<0.001	0.004					0.001
K	mg/L	23	22	96%	1	12	4	3	3	11	1
Mg	mg/L	23	23	100%	1	17	4	4	3	13	1
Mn, tr	mg/L	23	23	100%	0.04	0.49	0.15	0.14	0.08	0.47	0.01
Na	mg/L	23	22	96%	1	19	6	4	5	14	1
Pb, tr	mg/L	23	16	70%	0.005	0.06	0.02	0.01	0.01	0.05	0.01
Se, tr	mg/L	23	0	0%							0.005
Zn, tr	mg/L	23	23	100%	0.06	0.68	0.17	0.15	0.13	0.52	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	23	20	87%	0.04	0.50	0.14	0.10	0.12	0.25	0.05
NH ₄ -N*	mg/L	23	23	100%	0.2	3.6	0.9	0.8	0.6	2.2	0.1
NO ₂ -N	mg/L	23	7	30%	0.026	0.6	0.09	0.1	0.03	0.3	0.1
NO ₃ -N*	mg/L	23	23	100%	0.3	7.3	1.9	1.8	1.3	6.0	0.1
N-Total	mg/L	23	23	100%	1.1	23	5.9	6.0	3.7	20.6	0.2
P-Total	mg/L	23	23	100%	0.18	2.50	0.57	0.54	0.39	1.71	0.05
TKN	mg/L	23	23	100%	0.6	17	3.7	4.1	2.5	13.5	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	1	0	0%							10
Acenaphthylene*	mg/L	1	0	0%							10
Acenaphthene*	mg/L	1	0	0%							10
Anthracene*	mg/L	1	0	0%							10
Benzo(a)anthracene*	mg/L	1	0	0%							10
Benzo(a)pyrene*	mg/L	1	0	0%							10
Benzo(b)fluoranthene*	mg/L	1	0	0%							10
Benzo(ghi)perylene*	mg/L	1	0	0%							10
Benzo(k)fluoranthene*	mg/L	1	0	0%							10
Chrysene*	mg/L	1	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	1	0	0%							10
Fluoranthene*	mg/L	1	0	0%							10
Fluorene*	mg/L	1	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	1	0	0%							10
Naphthalene*	mg/L	1	0	0%							10
Phenanthrene*	mg/L	1	0	0%							10
Pyrene*	mg/L	1	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 2: WW Main Program

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	23	23	100%	6	90	27	21	21	69	1
Cl*	mg/L	23	23	100%	2	40	7.3	8.6	4.0	21.9	0.5
CO ₃ *	mg/L	23	0	0%							2
COD*	mg/L	23	23	100%	15	640	174	143	130	419	5
EC*	mmho/cm	23	23	100%	56	480	157	112	120	437	0.1
F	mg/L	23	22	96%	0.072	1	0.26	0.19	0.20	0.40	0.1
HCO ₃ *	mg/L	23	23	100%	18	120	46	27	40	108	2
O&G	mg/L	2	1	50%	<1	4					1
OH*	mg/L	23	0	0%							2
pH	units	23	23	100%	6.7	8.2	7.3	0.3	7.3	7.7	NA
SO ₄ *	mg/L	23	23	100%	3	55	11.4	12.4	6.3	37.7	0.5
TDS*	mg/L	23	23	100%	25	440	117	100	80	311	5
Total Alkalinity as CaCO ₃ *	mg/L	23	23	100%	15	95	38	22	33	89	2
Total Hardness as CaCO ₃ *	mg/L	23	23	100%	21	340	64	66	46	128	2
TSS	mg/L	23	23	100%	20	1500	278	311	205	775	5
<i>Metals</i>											
Ag, tr	mg/L	23	0	0%							0.01
As, tr	mg/L	23	0	0%							0.01
B, tr	mg/L	22	4	18%	<0.1	0.4					0.1
Ba, tr	mg/L	23	11	48%	0.03	0.6	0.10	0.12	0.05	0.19	0.1
Ca	mg/L	23	23	100%	6	91	17	18	11	35	1
Cd, tr	mg/L	22	0	0%							0.01
Cr, tr	mg/L	23	2	9%	<0.02	0.08					0.02
Cu, tr	mg/L	23	22	96%	0.008	0.27	0.05	0.05	0.03	0.10	0.01
Fe, tr	mg/L	23	23	100%	0.81	46	7.79	9.08	5.40	14.00	0.02
Hg, tr	mg/L	23	1	4%	<0.001	0.001					0.001
K	mg/L	23	23	100%	1	22	5	4	5	10	1
Mg	mg/L	23	23	100%	1	27	5	5	3	10	1
Mn, tr	mg/L	23	23	100%	0.02	0.99	0.17	0.19	0.13	0.33	0.01
Na	mg/L	23	23	100%	3	37	10	8	8	29	1
Pb, tr	mg/L	23	19	82%	0.005	0.09	0.02	0.02	0.01	0.05	0.01
Se, tr	mg/L	22	1	5%	<0.005	0.007					0.005
Zn, tr	mg/L	23	23	100%	0.06	1.30	0.26	0.26	0.20	0.57	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	23	20	87%	0.04	0.74	0.19	0.17	0.15	0.52	0.05
NH ₄ -N*	mg/L	23	23	100%	0.3	4.2	1.5	0.9	1.3	2.4	0.1
NO ₂ -N	mg/L	23	15	65%	0.052	1.0	0.2	0.2	0.1	0.4	0.1
NO ₃ -N*	mg/L	23	23	100%	0.4	12.0	2.1	2.6	1.2	5.8	0.1
N-Total	mg/L	23	23	100%	1.2	65	9.0	13.0	5.1	16.9	0.2
P-Total	mg/L	23	23	100%	0.07	4.10	0.83	0.85	0.66	1.69	0.05
TKN	mg/L	23	23	100%	0.8	52.0	6.4	10.3	4.0	10.9	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	1	0	0%							10
Acenaphthylene*	mg/L	1	0	0%							10
Acenaphthene*	mg/L	1	0	0%							10
Anthracene*	mg/L	1	0	0%							10
Benzo(a)anthracene*	mg/L	1	0	0%							10
Benzo(a)pyrene*	mg/L	1	0	0%							10
Benzo(b)fluoranthene*	mg/L	1	0	0%							10
Benzo(ghi)perylene*	mg/L	1	0	0%							10
Benzo(k)fluoranthene*	mg/L	1	0	0%							10
Chrysene*	mg/L	1	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	1	0	0%							10
Fluoranthene*	mg/L	1	0	0%							10
Fluorene*	mg/L	1	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	1	0	0%							10
Naphthalene*	mg/L	1	0	0%							10
Phenanthrene*	mg/L	1	0	0%							10
Pyrene*	mg/L	1	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 3: WW Main Program

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	22	21	95%	3	660	52	137	16	68	1
Cl*	mg/L	23	23	100%	8	150	40.0	34.4	31.0	114.1	0.5
CO ₃ *	mg/L	22	1	5%	<3	143					2
COD*	mg/L	23	22	96%	20	1720	229	355	100	560	5
EC*	mmho/cm	23	23	100%	120	1590	443	351	350	1199	0.1
F	mg/L	23	23	100%	0.1	0.5	0.23	0.11	0.20	0.40	0.1
HCO ₃ *	mg/L	21	21	100%	40	589	107	116	76	190	2
O&G	mg/L	2	2	100%	2	4	3	1	3	4	1
OH*	mg/L	22	0	0%							2
pH	units	23	23	100%	6.8	8.2	7.5	0.3	7.4	8.1	NA
SO ₄ *	mg/L	23	23	100%	7	170	41.0	36.7	25.0	96.2	0.5
TDS*	mg/L	22	22	100%	86	1070	298	221	249	651	5
Total Alkalinity as CaCO ₃ *	mg/L	22	22	100%	33	483	90	92	66	148	2
Total Hardness as CaCO ₃ *	mg/L	23	23	100%	53	428	145	101	120	352	2
TSS	mg/L	23	23	100%	15	1050	262	278	200	885	5
<i>Metals</i>											
Ag, tr	mg/L	23	0	0%							0.01
As, tr	mg/L	23	0	0%							0.01
B, tr	mg/L	23	11	48%	0.055	0.4	0.12	0.10	0.06	0.30	0.1
Ba, tr	mg/L	23	12	52%	0.03	0.5	0.10	0.12	0.04	0.38	0.1
Ca	mg/L	23	23	100%	12	106	40	26	34	98	1
Cd, tr	mg/L	22	1	5%	<0.01	0.020					0.01
Cr, tr	mg/L	23	4	17%	<0.02	0.08					0.02
Cu, tr	mg/L	23	21	91%	0.005	0.20	0.04	0.05	0.02	0.15	0.01
Fe, tr	mg/L	23	23	100%	0.36	32	6.97	8.39	4.20	29.00	0.02
Hg, tr	mg/L	23	2	9%	<0.001	0.006					0.001
K	mg/L	23	22	96%	1.76	138	15	28	8	27	1
Mg	mg/L	23	23	100%	4.2	39	11	8	8	25	1
Mn, tr	mg/L	23	23	100%	0.02	0.8	0.17	0.20	0.12	0.56	0.01
Na	mg/L	23	23	100%	9	86	32	21	25	77	1
Pb, tr	mg/L	23	12	52%	0.003	0.13	0.02	0.03	0.01	0.06	0.01
Se, tr	mg/L	22	2	9%	<0.005	0.015					0.005
Zn, tr	mg/L	23	23	100%	0.03	1.30	0.24	0.29	0.15	0.73	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	23	22	96%	0.11	7.20	0.90	1.42	0.59	1.49	0.05
NH ₄ -N*	mg/L	23	23	100%	0.5	26	2.5	5.2	1.1	4.0	0.1
NO ₂ -N	mg/L	23	9	39%	0.04	0.9	0.1	0.2	0.0	0.3	0.1
NO ₃ -N*	mg/L	23	23	100%	1.2	30.0	6.7	6.1	4.4	14.7	0.1
N-Total	mg/L	23	23	100%	2.4	97	15.3	19.1	11.0	30.7	0.2
P-Total	mg/L	23	23	100%	0.37	13.00	1.79	2.64	1.00	4.83	0.05
TKN	mg/L	23	23	100%	1.1	92.0	9.9	18.8	4.4	24.4	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	1	0	0%							10
Acenaphthylene*	mg/L	1	0	0%							10
Acenaphthene*	mg/L	1	0	0%							10
Anthracene*	mg/L	1	0	0%							10
Benzo(a)anthracene*	mg/L	1	0	0%							10
Benzo(a)pyrene*	mg/L	1	0	0%							10
Benzo(b)fluoranthene*	mg/L	1	0	0%							10
Benzo(ghi)perylene*	mg/L	1	0	0%							10
Benzo(k)fluoranthene*	mg/L	1	0	0%							10
Chrysene*	mg/L	1	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	1	0	0%							10
Fluoranthene*	mg/L	1	0	0%							10
Fluorene*	mg/L	1	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	1	0	0%							10
Naphthalene*	mg/L	1	0	0%							10
Phenanthrene*	mg/L	1	0	0%							10
Pyrene*	mg/L	1	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 4: WW Main Program

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	20	19	95%	5	39	19	11	16	38	1
Cl*	mg/L	20	20	100%	1	8	3.6	2.0	3.0	8.0	0.5
CO ₃ *	mg/L	20	4	20%	1.68	9	3	2	2	9	2
COD*	mg/L	20	20	100%	28	230	118	65	97	221	5
EC*	mmho/cm	20	20	100%	66	200	123	40	115	191	0.1
F	mg/L	20	20	100%	0.1	0.5	0.30	0.10	0.30	0.50	0.1
HCO ₃ *	mg/L	20	20	100%	12	85	43	16	42	63	2
O&G	mg/L	3	3	100%	8	18	13	5	13	18	1
OH*	mg/L	20	0	0%							2
pH	units	20	20	100%	6.9	9.2	7.9	0.6	7.9	9.0	NA
SO ₄ *	mg/L	20	20	100%	5	24	10.8	5.8	8.7	21.2	0.5
TDS*	mg/L	20	20	100%	50	220	103	44	91	173	5
Total Alkalinity as CaCO ₃ *	mg/L	20	20	100%	20	70	39	14	35	66	2
Total Hardness as CaCO ₃ *	mg/L	20	20	100%	37	97	63	21	65	93	2
TSS	mg/L	20	20	100%	40	290	150	72	150	281	5
<i>Metals</i>											
Ag, tr	mg/L	20	0	0%							0.01
As, tr	mg/L	20	0	0%							0.01
B, tr	mg/L	20	1	5%	<0.1	0.1					0.1
Ba, tr	mg/L	20	8	40%	0.05	0.12	0.07	0.02	0.06	0.10	0.1
Ca	mg/L	20	20	100%	11	29	19	6	20	28	1
Cd, tr	mg/L	19	0	0%							0.01
Cr, tr	mg/L	20	3	15%	<0.02	0.03					0.02
Cu, tr	mg/L	20	20	100%	0.02	0.07	0.03	0.01	0.03	0.06	0.01
Fe, tr	mg/L	20	20	100%	1.3	8.9	4.60	2.23	4.25	7.86	0.02
Hg, tr	mg/L	20	0	0%							0.001
K	mg/L	20	20	100%	1	6	3	1	3	5	1
Mg	mg/L	20	20	100%	1	6	4	1	4	6	1
Mn, tr	mg/L	20	20	100%	0.07	0.52	0.27	0.13	0.28	0.45	0.01
Na	mg/L	20	20	100%	2	9	5	2	5	9	1
Pb, tr	mg/L	20	19	95%	0.009	0.06	0.03	0.01	0.03	0.05	0.01
Se, tr	mg/L	19	0	0%							0.005
Zn, tr	mg/L	20	20	100%	0.06	0.38	0.19	0.08	0.19	0.34	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	20	19	95%	0.05	0.32	0.16	0.08	0.15	0.32	0.05
NH ₄ -N*	mg/L	20	20	100%	0.3	3.4	1.1	0.7	0.8	2.1	0.1
NO ₂ -N	mg/L	20	14	70%	0.044	2.0	0.3	0.4	0.2	0.5	0.1
NO ₃ -N*	mg/L	20	20	100%	0.3	3.8	1.0	0.9	0.8	2.7	0.1
N-Total	mg/L	20	20	100%	1.3	10	4.0	2.8	3.1	9.9	0.2
P-Total	mg/L	20	20	100%	0.20	1.00	0.47	0.24	0.44	0.93	0.05
TKN	mg/L	20	20	100%	0.7	6.2	2.7	1.8	2.2	6.1	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	1	0	0%							10
Acenaphthylene*	mg/L	1	0	0%							10
Acenaphthene*	mg/L	1	0	0%							10
Anthracene*	mg/L	1	0	0%							10
Benzo(a)anthracene*	mg/L	1	0	0%							10
Benzo(a)pyrene*	mg/L	1	0	0%							10
Benzo(b)fluoranthene*	mg/L	1	0	0%							10
Benzo(ghi)perylene*	mg/L	1	0	0%							10
Benzo(k)fluoranthene*	mg/L	1	0	0%							10
Chrysene*	mg/L	1	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	1	0	0%							10
Fluoranthene*	mg/L	1	0	0%							10
Fluorene*	mg/L	1	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	1	0	0%							10
Naphthalene*	mg/L	1	0	0%							10
Phenanthrene*	mg/L	1	0	0%							10
Pyrene*	mg/L	1	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 5: WW Main Program

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	21	21	100%	9	96	34	21	33	62	1
Cl*	mg/L	22	22	100%	2	67	13.7	15.5	9.0	42.7	0.5
CO ₃ *	mg/L	21	0	0%							2
COD*	mg/L	22	22	100%	30	902	229	209	180	694	5
EC*	mmho/cm	22	22	100%	52	900	260	223	185	783	0.1
F	mg/L	22	22	100%	0.1	0.8	0.33	0.17	0.30	0.60	0.1
HCO ₃ *	mg/L	21	21	100%	24	200	62	42	50	156	2
O&G	mg/L	2	2	100%	8	13	11	4	11	13	1
OH*	mg/L	21	0	0%							2
pH	units	22	22	100%	6.8	7.9	7.3	0.4	7.2	7.8	NA
SO ₄ *	mg/L	22	22	100%	4.4	180	38.6	47.6	22.5	148.5	0.5
TDS*	mg/L	21	21	100%	49	801	216	206	150	670	5
Total Alkalinity as CaCO ₃ *	mg/L	21	21	100%	20	170	52	35	45	128	2
Total Hardness as CaCO ₃ *	mg/L	22	22	100%	27	460	108	110	74	341	2
TSS	mg/L	22	22	100%	10	610	228	184	170	596	5
<i>Metals</i>											
Ag, tr	mg/L	22	0	0%							0.01
As, tr	mg/L	22	1	5%	<0.01	0.01					0.01
B, tr	mg/L	22	5	23%	0.03	0.60	0.1	0.2	0.03	0.59	0.1
Ba, tr	mg/L	22	12	55%	0.04	0.2	0.09	0.06	0.05	0.20	0.1
Ca	mg/L	22	22	100%	9	150	34	35	23	105	1
Cd, tr	mg/L	21	2	10%	<0.01	0.01					0.01
Cr, tr	mg/L	22	5	23%	0.01	0.04	0.014	0.009	0.010	0.03	0.02
Cu, tr	mg/L	22	21	95%	0.007	0.17	0.05	0.05	0.04	0.17	0.01
Fe, tr	mg/L	22	22	100%	0.58	25	6.26	6.26	3.75	18.85	0.02
Hg, tr	mg/L	22	2	9%							0.001
K	mg/L	22	22	100%	2	18	5	4	4	15	1
Mg	mg/L	22	22	100%	1	19	6	5	4	18	1
Mn, tr	mg/L	22	22	100%	0.02	0.57	0.18	0.16	0.13	0.52	0.01
Na	mg/L	22	22	100%	2	54	15	14	11	51	1
Pb, tr	mg/L	22	20	91%	0.006	0.08	0.03	0.02	0.02	0.07	0.01
Se, tr	mg/L	21	0	0%							0.005
Zn, tr	mg/L	22	22	100%	0.06	1.20	0.36	0.28	0.26	0.98	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	21	18	86%	0.02	62.00	3.13	13.49	0.18	0.60	0.05
NH ₄ -N*	mg/L	22	22	100%	0.3	4.8	1.5	1.3	1.3	4.7	0.1
NO ₂ -N	mg/L	22	14	64%	0.035	1.6	0.2	0.4	0.1	0.8	0.1
NO ₃ -N*	mg/L	22	22	100%	0.4	14.0	2.6	3.6	1.5	11.6	0.1
N-Total	mg/L	22	22	100%	1.2	36	8.6	9.4	5.3	34.0	0.2
P-Total	mg/L	22	22	100%	0.15	2.60	0.78	0.66	0.61	2.53	0.05
TKN	mg/L	22	22	100%	0.1	25.0	6.0	6.2	4.1	20.4	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	1	0	0%							10
Acenaphthylene*	mg/L	1	0	0%							10
Acenaphthene*	mg/L	1	0	0%							10
Anthracene*	mg/L	1	0	0%							10
Benzo(a)anthracene*	mg/L	1	0	0%							10
Benzo(a)pyrene*	mg/L	1	0	0%							10
Benzo(b)fluoranthene*	mg/L	1	0	0%							10
Benzo(ghi)perylene*	mg/L	1	0	0%							10
Benzo(k)fluoranthene*	mg/L	1	0	0%							10
Chrysene*	mg/L	1	0	0%							10
Dibenzo(a,h)anthracene*	mg/L	1	0	0%							10
Fluoranthene*	mg/L	1	0	0%							10
Fluorene*	mg/L	1	0	0%							10
Indeno(1,2,3-cd)pyrene*	mg/L	1	0	0%							10
Naphthalene*	mg/L	1	0	0%							10
Phenanthrene*	mg/L	1	0	0%							10
Pyrene*	mg/L	1	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 6: WW Main Program

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	18	17	94%	5	60	19	13	16	38	1
Cl*	mg/L	19	19	100%	2.9	43	16.3	11.8	13.0	35.8	0.5
CO ₃ * ²⁻	mg/L	20	1	5%	<3	2.8					2
COD*	mg/L	19	19	100%	20	450	124	107	100	333	5
EC*	mmho/cm	19	19	100%	71	750	438	191	450	714	0.1
F	mg/L	19	18	95%	0.08	0.3	0.20	0.083	0.20	0.30	0.1
HCO ₃ * ⁻	mg/L	19	19	100%	49	340	191	90	210	322	2
O&G	mg/L	0									1
OH*	mg/L	20	0	0%							2
pH	units	19	19	100%	6.7	8.4	8.0	0.4	8.1	8.3	NA
SO ₄ * ²⁻	mg/L	19	19	100%	4.9	100	46.9	23.5	47.0	82.9	0.5
TDS*	mg/L	19	19	100%	100	470	300	113	310	461	5
Total Alkalinity as CaCO ₃ * ²⁻	mg/L	19	19	100%	40	280	159	72	170	262	2
Total Hardness as CaCO ₃ * ²⁻	mg/L	19	19	100%	61	489	253	104	260	382	2
TSS	mg/L	19	19	100%	10	2950	359	654	160	817	5
<i>Metals</i>											
Ag, tr	mg/L	19	0	0%							0.01
As, tr	mg/L	19	0	0%							0.01
B, tr	mg/L	19	1	5%	<0.1	0.1					0.1
Ba, tr	mg/L	19	13	68%	0.07	0.5	0.14	0.10	0.10	0.23	0.1
Ca	mg/L	19	19	100%	17	119	63	25	63	95	1
Cd, tr	mg/L	18	2	11%	<0.01	0.02					0.01
Cr, tr	mg/L	19	3	16%	<0.02	0.05					0.02
Cu, tr	mg/L	19	11	58%	0.006	0.05	0.01	0.01	0.01	0.03	0.01
Fe, tr	mg/L	19	19	100%	0.24	73	12.65	17.48	6.30	35.20	0.02
Hg, tr	mg/L	19	1	5%	<0.001	0.001					0.001
K	mg/L	19	19	100%	3	19	7	4	6	12	1
Mg	mg/L	19	19	100%	4.5	46	23	10	23	35	1
Mn, tr	mg/L	19	19	100%	0.03	2.4	0.44	0.53	0.23	1.02	0.01
Na	mg/L	19	19	100%	1.5	28	12	7	10	24	1
Pb, tr	mg/L	19	10	53%	0.005	0.06	0.02	0.01	0.01	0.03	0.01
Se, tr	mg/L	18	0	0%							0.005
Zn, tr	mg/L	19	19	100%	0.01	0.41	0.11	0.09	0.09	0.23	0.01
<i>Nutrients</i>											
P-Ortho*	mg/L	19	7	37%	0.01	0.45	0.06	0.10	0.01	0.19	0.05
NH ₄ -N*	mg/L	19	7	37%	0.05	0.3	0.1	0.1	0.0	0.3	0.1
NO ₂ -N	mg/L	19	1	5%	<0.1	0.2					0.1
NO ₃ -N*	mg/L	19	15	79%	0.13	1.3	0.4	0.3	0.4	0.8	0.1
N-Total	mg/L	19	19	100%	0.3	7.2	2.1	1.6	1.8	4.2	0.2
P-Total	mg/L	19	19	100%	0.08	3.80	0.68	0.82	0.53	1.46	0.05
TKN	mg/L	18	18	100%	0.17	7	1.7	1.6	1.3	3.6	0.1
<i>Organics</i>											
2-Chloronaphthalene*	mg/L	0									10
Acenaphthylene*	mg/L	0									10
Acenaphthene*	mg/L	0									10
Anthracene*	mg/L	0									10
Benzo(a)anthracene*	mg/L	0									10
Benzo(a)pyrene*	mg/L	0									10
Benzo(b)fluoranthene*	mg/L	0									10
Benzo(ghi)perylene*	mg/L	0									10
Benzo(k)fluoranthene*	mg/L	0									10
Chrysene*	mg/L	0									10
Dibenzo(a,h)anthracene*	mg/L	0									10
Fluoranthene*	mg/L	0									10
Fluorene*	mg/L	0									10
Indeno(1,2,3-cd)pyrene*	mg/L	0									10
Naphthalene*	mg/L	0									10
Phenanthrene*	mg/L	0									10
Pyrene*	mg/L	0									10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 7: WW Main Program

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
Conventional											
BOD*	mg/L	18	12	67%	5	24	10	5	9	20	1
Cl*	mg/L	18	18	100%	4	26	13.0	5.8	13.0	23.5	0.5
CO ₃ *	mg/L	19	9	47%	2	30	8	9	2	27	2
COD*	mg/L	17	17	100%	8	270	68	62	60	168	5
EC*	mmho/cm	17	17	100%	200	720	506	184	600	712	0.1
F	mg/L	18	18	100%	0.1	0.3	0.24	0.08	0.30	0.30	0.1
HCO ₃ *	mg/L	18	18	100%	110	350	245	81	269	335	2
O&G	mg/L	0									1
OH*	mg/L	19	0	0%							2
pH	units	18	18	100%	6.9	8.5	8.2	0.3	8.3	8.4	NA
SO ₄ *	mg/L	18	18	100%	11	86	45.6	23.3	48.0	80.9	0.5
TDS*	mg/L	18	18	100%	130	500	326	108	335	458	5
Total Alkalinity as CaCO ₃ *	mg/L	18	18	100%	93	320	213	74	224	295	2
Total Hardness as CaCO ₃ *	mg/L	18	18	100%	100	400	273	83	280	392	2
TSS	mg/L	18	18	100%	5	960	207	275	120	782	5
Metals											
Ag, tr	mg/L	18	0	0%							0.01
As, tr	mg/L	18	0	0%							0.01
B, tr	mg/L	18	0	0%							0.1
Ba, tr	mg/L	18	9	50%	0.07	0.2	0.10	0.047	0.073	0.20	0.1
Ca	mg/L	18	18	100%	26	97	67	21	72	96	1
Cd, tr	mg/L	17	1	6%	<0.01	0.01					0.01
Cr, tr	mg/L	18	2	11%	<0.02	0.03					0.02
Cu, tr	mg/L	18	8	44%	0.005	0.03	0.01	0.008	0.005	0.030	0.01
Fe, tr	mg/L	18	18	100%	0.18	32	7.58	8.50	5.95	25.20	0.02
Hg, tr	mg/L	18	0	0%							0.001
K	mg/L	18	18	100%	3	12	6	2	5	11	1
Mg	mg/L	18	18	100%	9.2	38	25	8	25	37	1
Mn, tr	mg/L	18	17	94%	0.013	0.96	0.25	0.25	0.22	0.70	0.01
Na	mg/L	18	18	100%	5	22	12	4	12	19	1
Pb, tr	mg/L	18	5	28%	0.003	0.04	0.008	0.01	0.003	0.032	0.01
Se, tr	mg/L	17	0	0%							0.005
Zn, tr	mg/L	18	18	100%	0.02	0.26	0.10	0.06	0.09	0.23	0.01
Nutrients											
P-Ortho*	mg/L	18	6	33%	0.005	0.78	0.08	0.19	0.005	0.33	0.05
NH ₄ -N*	mg/L	18	8	44%	0.07	0.2	0.1	0.1	0.1	0.2	0.1
NO ₂ -N	mg/L	18	0	0%	<0.1	-0.1					0.1
NO ₃ -N*	mg/L	18	16	89%	0.3	1.7	0.7	0.4	0.7	1.3	0.1
N-Total	mg/L	18	18	100%	0.8	4.1	1.9	1.0	1.8	3.8	0.2
P-Total	mg/L	18	16	89%	0.05	1.20	0.30	0.31	0.21	1.02	0.05
TKN	mg/L	18	18	100%	0.3	3.5	1.2	0.8	1.0	2.9	0.1
Organics											
2-Chloronaphthalene*	mg/L	0									10
Acenaphthylene*	mg/L	0									10
Acenaphthene*	mg/L	0									10
Anthracene*	mg/L	0									10
Benzo(a)anthracene*	mg/L	0									10
Benzo(a)pyrene*	mg/L	0									10
Benzo(b)fluoranthene*	mg/L	0									10
Benzo(ghi)perylene*	mg/L	0									10
Benzo(k)fluoranthene*	mg/L	0									10
Chrysene*	mg/L	0									10
Dibenzo(a,h)anthracene*	mg/L	0									10
Fluoranthene*	mg/L	0									10
Fluorene*	mg/L	0									10
Indeno(1,2,3-cd)pyrene*	mg/L	0									10
Naphthalene*	mg/L	0									10
Phenanthrene*	mg/L	0									10
Pyrene*	mg/L	0									10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Summary Statistics (Sites 8-10, Receiving Water, DW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	18	4	22%	3.57	15	5	3	4	9	1
Cl	mg/L	18	18	100%	3	100	34.6	38.8	11.0	94.9	1
CO ₃	mg/L	18	7	39%	1.206	12	3	3	1	9	3
COD*	mg/L	18	9	50%	5.14	30	12	9	8	30	5
EC*	mmho/cm	18	18	100%	200	970	503	296	405	962	0.1
F	mg/L	18	18	100%	0.3	1.3	0.62	0.24	0.60	0.96	0.1
HCO ₃	mg/L	18	18	100%	98	250	168	59	160	250	3
O&G	mg/L	18	15	83%	1	615	220	228	160	598	1
OH	mg/L	18	0	0%							3
pH	units	18	18	100%	7.9	8.5	8.2	0.2	8.3	8.4	NA
SO ₄ *	mg/L	18	18	100%	11	110	55.1	41.2	47.0	110.0	0.5
TDS*	mg/L	18	18	100%	120	615	336	194	260	598	5
Total Alkalinity as CaCO ₃	mg/L	18	18	100%	83	218	142	51	130	211	3
Total Hardness as CaCO ₃	mg/L	18	18	100%	69	293	165	89	135	282	3
TSS	mg/L	18	12	67%	1.086	390	32	90	6	104	5
<i>Metals</i>											
Ag, tr	mg/L	18	0	0%							0.01
As, tr	mg/L	18	1	6%	<0.01	0.007					0.01
B, tr	mg/L	18	9	50%	0.08	0.3	0.2	0.1	0.09	0.3	0.1
Ba, tr	mg/L	18	2	11%	<0.1	0.2					0.1
Ca	mg/L	18	18	100%	21	87	48	26	40	84	1
Cd, tr	mg/L	18	0	0%							0.01
Cr, tr	mg/L	18	0	0%							0.02
Cu, tr	mg/L	18	1	6%	<0.01	0.02					0.01
Fe, tr	mg/L	18	18	100%	0.02	18	1.31	4.19	0.18	4.40	0.02
Hg, tr	mg/L	18	0	0%							0.001
K	mg/L	18	18	100%	1	11	5	4	2	10	1
Mg	mg/L	18	18	100%	4	23	11	6	9	19	1
Mn, tr	mg/L	18	10	56%	0.003	0.4	0.04	0.09	0.01	0.12	0.01
Na	mg/L	18	18	100%	10	90	41	31	26	90	1
Pb, tr	mg/L	18	1	6%	<0.01	0.04					0.01
Se, tr	mg/L	18	0	0%							0.005
Zn, tr	mg/L	18	8	44%	0.0050	0.06	0.01	0.01	0.005	0.03	0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	18	9	50%	0.07	0.2	0.1	0.04	0.1	0.2	0.1
NO ₂ -N	mg/L	18	0	0%							0.1
NO ₃ -N*	mg/L	18	16	89%	0.061	10.0	3.3	3.8	0.7	10.0	0.1
N-Total	mg/L	18	18	100%	0.3	11	3.5	3.9	1.2	10.2	0.2
P-Ortho	mg/L	18	6	33%	0.53	1.30	0.68	0.25	0.53	1.13	0.05
P-Total	mg/L	18	7	39%	0.55	1.40	0.74	0.28	0.55	1.23	0.05
TKN	mg/L	18	15	83%	0.16	1.5	0.6	0.4	0.5	1.3	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	18	0	0%							10
Acenaphthylene	mg/L	18	0	0%							10
Acenaphthene	mg/L	18	0	0%							10
Anthracene	mg/L	18	0	0%							10
Benzo(a)anthracene	mg/L	18	0	0%							10
Benzo(a)pyrene	mg/L	18	0	0%							10
Benzo(b)fluoranthene	mg/L	18	0	0%							10
Benzo(ghi)perylene	mg/L	18	0	0%							10
Benzo(k)fluoranthene	mg/L	18	0	0%							10
Chrysene	mg/L	18	0	0%							10
Dibenzo(a,h)anthracene	mg/L	18	0	0%							10
Fluoranthene	mg/L	18	0	0%							10
Fluorene	mg/L	18	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	18	0	0%							10
Naphthalene	mg/L	18	0	0%							10
Phenanthrene	mg/L	18	0	0%							10
Pyrene	mg/L	18	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 8 (Receiving Water, DW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	6	1	17%	<5	15					1
Cl	mg/L	6	6	100%	66	100	86.8	12.3	91.0	98.5	1
CO ₃	mg/L	6	4	67%	2.33	9	5	3	5	9	3
COD*	mg/L	6	2	33%	<10	30					5
EC*	mmho/cm	6	6	100%	730	970	882	87	885	968	0.1
F	mg/L	6	6	100%	0.6	0.6	0.60	0.00	0.60	0.60	0.1
HCO ₃	mg/L	6	6	100%	214	250	238	14	244	250	3
O&G	mg/L	6	5	83%	1	615	363	285	483	610	1
OH	mg/L	6	0	0%							3
pH	units	6	6	100%	8.1	8.5	8.3	0.2	8.3	8.5	NA
SO ₄ *	mg/L	6	6	100%	81	110	96.7	12.9	98.5	110.0	0.5
TDS*	mg/L	6	6	100%	480	615	556	59	580	610	5
Total Alkalinity as CaCO ₃	mg/L	6	6	100%	185	218	204	14	210	216	3
Total Hardness as CaCO ₃	mg/L	6	6	100%	250	293	269	17	271	290	3
TSS	mg/L	6	6	100%	10	54	24	16	21	47	5
<i>Metals</i>											
Ag, tr	mg/L	6	0	0%							0.01
As, tr	mg/L	6	1	17%	<0.01	0.007					0.01
B, tr	mg/L	6	6	100%	0.3	0.3	0.3	0	0.3	0.3	0.1
Ba, tr	mg/L	6	1	17%	<0.1	0.07					0.1
Ca	mg/L	6	6	100%	74	87	81	5	82	86	1
Cd, tr	mg/L	6	0	0%							0.01
Cr, tr	mg/L	6	0	0%							0.02
Cu, tr	mg/L	6	0	0%							0.01
Fe, tr	mg/L	6	6	100%	0.21	2	0.67	0.67	0.41	1.68	0.02
Hg, tr	mg/L	6	0	0%							0.001
K	mg/L	6	6	100%	7	11	9	1	10	11	1
Mg	mg/L	6	6	100%	15	18	16	1	16	18	1
Mn, tr	mg/L	6	6	100%	0.02	0.07	0.03	0.02	0.02	0.06	0.01
Na	mg/L	6	6	100%	61	90	81	11	83	90	1
Pb, tr	mg/L	6	1	17%	<0.01	0.04					0.01
Se, tr	mg/L	6	0	0%							0.005
Zn, tr	mg/L	6	6	100%	0.01	0.03	0.02	0.006	0.02	0.03	0.01
<i>Nutrients</i>											
P-Ortho	mg/L	6	6	100%	0.71	1.30	0.99	0.21	1.00	1.25	0.05
NH ₄ -N*	mg/L	6	3	50%	0.07	0.2	0.11	0.05	0.10	0.18	0.1
NO ₂ -N	mg/L	6	0	0%							0.1
NO ₃ -N*	mg/L	6	6	100%	6.9	10.0	8.1	1.5	7.4	10.0	0.1
N-Total	mg/L	6	6	100%	7.5	11	8.7	1.4	8.1	10.8	0.2
P-Total	mg/L	6	6	100%	0.90	1.40	1.10	0.18	1.05	1.35	0.05
TKN	mg/L	6	6	100%	0.2	1.0	0.6	0.3	0.6	1.0	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	6	0	0%							10
Acenaphthylene	mg/L	6	0	0%							10
Acenaphthene	mg/L	6	0	0%							10
Anthracene	mg/L	6	0	0%							10
Benzo(a)anthracene	mg/L	6	0	0%							10
Benzo(a)pyrene	mg/L	6	0	0%							10
Benzo(b)fluoranthene	mg/L	6	0	0%							10
Benzo(ghi)perylene	mg/L	6	0	0%							10
Benzo(k)fluoranthene	mg/L	6	0	0%							10
Chrysene	mg/L	6	0	0%							10
Dibenzo(a,h)anthracene	mg/L	6	0	0%							10
Fluoranthene	mg/L	6	0	0%							10
Fluorene	mg/L	6	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	6	0	0%							10
Naphthalene	mg/L	6	0	0%							10
Phenanthrene	mg/L	6	0	0%							10
Pyrene	mg/L	6	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 9 (Receiving Water, DW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	6	1	17%	<5	8					1
Cl	mg/L	6	6	100%	9	13	10.5	1.5	10.5	12.5	1
CO ₃	mg/L	6	1	17%	<3	3					3
COD*	mg/L	6	2	33%	<10	25					5
EC*	mmho/cm	6	6	100%	230	430	307	82	285	418	0.1
F	mg/L	6	6	100%	0.4	0.9	0.63	0.19	0.60	0.88	0.1
HCO ₃	mg/L	6	6	100%	110	160	131	24	124	160	3
O&G	mg/L	6	5	83%	1	250	136	107	175	240	1
OH	mg/L	6	0	0%							3
pH	units	6	6	100%	7.9	8.4	8.2	0.2	8.2	8.4	NA
SO ₄ *	mg/L	6	6	100%	11	56	27.0	17.2	21.5	51.5	0.5
TDS*	mg/L	6	6	100%	170	270	208	43	195	265	5
Total Alkalinity as CaCO ₃	mg/L	6	6	100%	90	130	109	19	107	130	3
Total Hardness as CaCO ₃	mg/L	6	6	100%	78	150	106	29	99	145	3
TSS	mg/L	6	2	33%	<5	8					5
<i>Metals</i>											
Ag, tr	mg/L	6	0	0%							0.01
As, tr	mg/L	6	0	0%							0.01
B, tr	mg/L	6	2	33%	<0.1	0.1					0.1
Ba, tr	mg/L	6	0	0%							0.1
Ca	mg/L	6	6	100%	23	43	31	8	29	41	1
Cd, tr	mg/L	6	0	0%							0.01
Cr, tr	mg/L	6	0	0%							0.02
Cu, tr	mg/L	6	0	0%							0.01
Fe, tr	mg/L	6	6	100%	0.02	0.50	0.12	0.19	0.05	0.40	0.02
Hg, tr	mg/L	6	0	0%							0.001
K	mg/L	6	6	100%	1	2	2	0	2	2	1
Mg	mg/L	6	6	100%	5	10	7	2	7	10	1
Mn, tr	mg/L	6	0	0%							0.01
Na	mg/L	6	6	100%	14	27	20	5	19	26	1
Pb, tr	mg/L	6	0	0%							0.01
Se, tr	mg/L	6	0	0%							0.005
Zn, tr	mg/L	6	0	0%							0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	6	3	50%	0.07	0.2	0.11	0.05	0.10	0.18	0.1
NO ₂ -N	mg/L	6	0	0%							0.1
NO ₃ -N*	mg/L	6	5	83%	0.29	0.8	0.5	0.2	0.5	0.8	0.1
N-Total	mg/L	6	6	100%	0.3	1.2	0.8	0.4	0.8	1.2	0.2
P-Ortho	mg/L	6	0	0%							0.05
P-Total	mg/L	6	0	0%							0.05
TKN	mg/L	6	4	67%	0.18	0.7	0.4	0.2	0.3	0.7	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	6	0	0%							10
Acenaphthylene	mg/L	6	0	0%							10
Acenaphthene	mg/L	6	0	0%							10
Anthracene	mg/L	6	0	0%							10
Benzo(a)anthracene	mg/L	6	0	0%							10
Benzo(a)pyrene	mg/L	6	0	0%							10
Benzo(b)fluoranthene	mg/L	6	0	0%							10
Benzo(ghi)perylene	mg/L	6	0	0%							10
Benzo(k)fluoranthene	mg/L	6	0	0%							10
Chrysene	mg/L	6	0	0%							10
Dibenzo(a,h)anthracene	mg/L	6	0	0%							10
Fluoranthene	mg/L	6	0	0%							10
Fluorene	mg/L	6	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	6	0	0%							10
Naphthalene	mg/L	6	0	0%							10
Phenanthrene	mg/L	6	0	0%							10
Pyrene	mg/L	6	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Site 10 (Receiving Water, DW)

Constituent ^(a)	Units	# samples	#detects	% detect	Min ^(c)	Max	Mean	SD	Median	95%tile	Min DL ^(b)
<i>Conventional</i>											
BOD*	mg/L	6	2	33%	<5	6					1
Cl	mg/L	6	6	100%	3	15	6.3	4.7	4.5	13.3	1
CO ₃	mg/L	6	2	33%	<3	12					3
COD*	mg/L	6	5	83%	6	30	14	8	12	26	5
EC*	mmho/cm	6	6	100%	200	530	322	159	235	528	0.1
F	mg/L	6	6	100%	0.3	1.3	0.62	0.40	0.40	1.20	0.1
HCO ₃	mg/L	6	6	100%	98	220	135	47	110	205	3
O&G	mg/L	6	5	83%	1	580	163	214	123	473	1
OH	mg/L	6	0	0%							3
pH	units	6	6	100%	8.2	8.4	8.3	0.1	8.3	8.4	NA
SO ₄ *	mg/L	6	6	100%	12	110	41.5	45.4	13.0	104.8	0.5
TDS*	mg/L	6	6	100%	120	580	243	185	145	520	5
Total Alkalinity as CaCO ₃	mg/L	6	6	100%	83	185	115	39	100	171	3
Total Hardness as CaCO ₃	mg/L	6	6	100%	69	266	119	76	84	235	3
TSS	mg/L	6	4	67%	0	390	68	158	6	294	5
<i>Metals</i>											
Ag, tr	mg/L	6	0	0%							0.01
As, tr	mg/L	6	0	0%							0.01
B, tr	mg/L	6	1	17%	<0.1	0.1					0.1
Ba, tr	mg/L	6	1	17%	<0.1	0.20					0.1
Ca	mg/L	6	6	100%	21	68	34	19	25	62	1
Cd, tr	mg/L	6	0	0%							0.01
Cr, tr	mg/L	6	0	0%							0.02
Cu, tr	mg/L	6	1	17%	<0.01	0.02					0.01
Fe, tr	mg/L	6	6	100%	0.09	18	3.14	7.28	0.14	13.59	0.02
Hg, tr	mg/L	6	0	0%							0.001
K	mg/L	6	6	100%	1	6	3	2	2	5	1
Mg	mg/L	6	6	100%	4	23	8	7	6	19	1
Mn, tr	mg/L	6	4	67%	0.001	0.40	0.07	0.16	0.01	0.31	0.01
Na	mg/L	6	6	100%	10	52	23	18	14	49	1
Pb, tr	mg/L	6	0	0%							0.01
Se, tr	mg/L	6	0	0%							0.005
Zn, tr	mg/L	6	2	33%	<0.01	0.06					0.01
<i>Nutrients</i>											
NH ₄ -N*	mg/L	6	3	50%	<0.4	0.1					0.1
NO ₂ -N	mg/L	6	0	0%							0.1
NO ₃ -N*	mg/L	6	5	83%	0.02	6.0	1.3	2.3	0.3	4.7	0.1
N-Total	mg/L	6	6	100%	0.4	2.2	1.0	0.8	0.5	2.1	0.2
P-Ortho	mg/L	6	0	0%							0.05
P-Total	mg/L	6	1	17%	<0.05	0.65					0.05
TKN	mg/L	6	5	83%	0.13	1.5	0.7	0.6	0.4	1.5	0.1
<i>Organics</i>											
2-Chloronaphthalene	mg/L	6	0	0%							10
Acenaphthylene	mg/L	6	0	0%							10
Acenaphthene	mg/L	6	0	0%							10
Anthracene	mg/L	6	0	0%							10
Benzo(a)anthracene	mg/L	6	0	0%							10
Benzo(a)pyrene	mg/L	6	0	0%							10
Benzo(b)fluoranthene	mg/L	6	0	0%							10
Benzo(ghi)perylene	mg/L	6	0	0%							10
Benzo(k)fluoranthene	mg/L	6	0	0%							10
Chrysene	mg/L	6	0	0%							10
Dibenzo(a,h)anthracene	mg/L	6	0	0%							10
Fluoranthene	mg/L	6	0	0%							10
Fluorene	mg/L	6	0	0%							10
Indeno(1,2,3-cd)pyrene	mg/L	6	0	0%							10
Naphthalene	mg/L	6	0	0%							10
Phenanthrene	mg/L	6	0	0%							10
Pyrene	mg/L	6	0	0%							10

Notes:

- (a) For constituents where ND analysis could not be performed but had detected values, only min and max are reported.
- (b) Constituents with an asterisk (*) had more than one DL
- (c) Shaded values indicated cases where minimum value was statistically derived non-detect value

Appendix E

Mean Annual Loads

Mean Annual Loads (with BMP #1 & BMP #2), by individual drainage area

Drainage Area	Oxygen Demand & Solids (lbs/yr)				Heavy Metals (lbs/yr)			Nutrients (lbs/yr)			
	BOD	COD	TDS	TSS	Cu	Pb	Zn	DP	TP	NO _{2,3}	TKN
101	50,383	275,872	299,613	525,594	81.1	43.7	438	356	1,507	4,633	9,561
102	254,022	1,525,459	1,545,927	2,317,472	410.3	243.6	2,403	1,740	6,976	20,837	45,818
103	58,009	349,689	433,176	618,847	86.8	53.7	516	369	1,675	4,293	9,721
104	22,251	131,790	125,701	196,920	36.8	21.2	213	155	605	1,890	4,094
105	2,302	13,517	12,974	20,658	3.8	2.2	22	16	63	198	425
106	677	5,518	12,059	11,617	0.5	1.1	4	2	25	32	112
201	8,491	47,670	46,665	80,858	14.1	7.6	78	61	243	772	1,612
202	93,283	538,179	558,097	902,445	151.0	85.2	854	656	2,664	8,093	17,217
301	11,320	64,901	62,554	104,467	18.8	10.4	105	80	317	1,005	2,125
302	667	4,124	4,608	6,403	1.0	0.6	6	4	18	49	113
303	26,924	157,991	151,583	241,835	44.5	25.4	255	189	740	2,321	4,988
304	67	510	1,173	1,214	0.0	0.1	0	0	2	2	9
305	10	177	234	72	0.0	0.1	0	0	0	2	7
306	45,429	248,530	312,625	523,296	69.3	38.0	376	305	1,405	3,925	8,211
307	343	4,968	6,752	3,024	0.1	1.6	3	1	14	52	172
308	52,069	288,104	314,264	539,900	83.5	45.3	456	364	1,542	4,664	9,715
309	33,198	193,127	198,731	316,527	53.8	30.9	306	230	936	2,848	6,115
310	2,528	16,778	15,496	18,868	4.2	2.7	26	17	62	182	435
311	6,229	38,332	36,404	52,637	10.3	6.2	61	43	164	504	1,124
312	322,675	1,926,479	1,878,214	2,857,616	523.6	307.4	3,046	2,244	8,918	27,359	59,633
501	67,045	375,326	368,161	641,013	110.9	60.1	611	480	1,921	6,123	12,752
502	3,523	19,508	19,047	33,920	5.8	3.1	32	25	102	327	675
503	4,968	30,198	39,603	55,185	7.2	4.6	43	30	145	349	807
504	94,067	549,384	532,528	855,128	155.1	88.4	886	659	2,599	8,119	17,421
505	5,036	31,315	48,615	63,758	6.6	4.6	41	27	153	296	734
506	27,837	174,896	168,184	223,387	41.1	28.1	251	172	792	2,240	5,252
507	149,126	944,565	760,875	1,011,246	231.0	157.4	1,403	965	4,111	13,187	30,417
601	25,655	164,468	138,008	182,144	42.1	27.0	259	173	652	2,066	4,777
701	30,430	200,647	163,737	201,609	49.2	32.7	312	198	753	2,320	5,569

702	2,244	12,200	8,957	16,266	3.7	2.1	20	16	68	255	520
801	17,351	116,318	106,732	126,367	28.5	19.1	183	113	415	1,206	2,935
802	15,580	97,871	109,077	146,884	24.1	15.4	148	100	421	1,125	2,619
803	21,487	134,195	136,906	188,987	34.4	21.5	209	142	567	1,624	3,720
804	13,365	81,463	92,776	131,940	20.7	12.8	123	87	373	1,014	2,297
805	12,235	71,935	68,315	106,646	19.8	11.6	113	85	345	1,091	2,352
806	129	1,495	2,198	1,410	0.1	0.4	1	0	5	13	44
807	1,597	10,534	12,102	14,836	2.4	1.8	15	10	43	116	278
901	37,751	227,877	225,300	336,287	61.5	36.7	362	258	1,021	3,084	6,807
1001	20,841	120,724	116,602	190,602	34.5	19.4	195	147	579	1,823	3,885
1101	22,587	135,021	176,381	253,085	33.1	20.9	195	141	669	1,684	3,805
1201	7,236	40,488	40,354	70,026	11.9	6.6	65	52	209	669	1,391
1202	72,661	439,405	492,909	715,596	113.4	69.5	669	489	2,056	5,784	12,843
1203	56,492	335,895	485,373	689,261	78.8	50.5	465	340	1,736	4,015	9,170
1204	22,697	130,926	175,707	265,443	33.2	19.8	190	144	691	1,746	3,841
1205	38,580	242,600	439,588	559,699	44.8	35.0	288	190	1,253	2,037	5,321
1206	10,010	60,277	76,505	108,911	14.8	9.2	88	62	290	730	1,662
1207	3,480	27,478	58,287	57,983	2.8	4.9	23	15	128	172	553
1208	120,274	724,631	1,050,618	1,463,068	166.8	109.8	994	724	3,695	8,487	19,542
1301	302,349	1,815,833	2,134,536	3,102,611	463.2	282.7	2,732	1,973	8,633	23,266	52,034
1302	69,073	388,175	477,777	770,266	105.6	59.6	587	460	2,088	5,776	12,298
1401	154,360	982,593	1,085,969	1,433,096	240.3	162.7	1,466	1,013	4,232	11,941	27,539
1501	33,082	241,370	505,904	542,490	29.3	40.3	224	125	1,151	1,400	4,614
1601	103	1,692	3,244	1,235	0.0	0.6	1	0	5	15	52
1602	259	1,934	2,843	2,849	0.3	0.4	2	1	8	18	48
1603	16,916	97,446	110,709	175,031	26.6	15.6	150	115	496	1,449	3,107
1604	791	4,655	5,172	7,905	1.2	0.7	7	5	23	66	144
1605	5,671	32,171	37,380	60,367	8.9	5.1	49	39	169	489	1,039
1606	10,591	60,689	73,206	115,089	16.3	9.8	91	71	319	916	1,961
1607	856	5,088	6,062	9,039	1.3	0.9	7	6	26	82	177
1701	12,840	73,299	85,584	136,384	20.0	11.4	112	87	380	1,080	2,310
1702	8,270	45,113	48,807	86,417	13.4	7.2	72	59	249	778	1,596
1703	11	213	386	111	0.0	0.1	0	0	1	2	7
1704	54,043	332,743	554,796	734,649	68.2	51.4	415	296	1,748	3,558	8,550
1801	7,225	40,511	39,229	62,322	10.7	6.2	59	47	225	680	1,451
1802	6	74	124	57	0.0	0.0	0	0	0	1	2
1803	11,580	77,387	82,147	97,604	15.4	13.1	99	64	347	878	2,216

1901	43,061	264,996	254,623	367,124	70.6	43.2	421	294	1,140	3,481	7,776
1902	102,278	632,540	594,129	850,454	168.7	102.4	1,012	700	2,667	8,149	18,289
1903	19,206	114,959	108,876	167,087	31.8	18.6	185	134	517	1,608	3,511
1904	135,798	783,304	772,926	1,266,408	223.2	125.7	1,261	954	3,808	11,882	25,286
1905	86,463	488,762	523,194	869,618	138.9	77.3	773	600	2,510	7,572	15,988
1906	754	4,225	4,612	7,743	1.2	0.7	7	5	22	67	142
1907	95,243	536,435	562,617	947,742	154.3	85.5	854	667	2,764	8,492	17,839
1908	38	487	961	529	0.0	0.1	0	0	2	4	14
1909	11,477	71,407	57,022	78,721	18.0	12.1	107	76	321	1,069	2,413
1910	24,377	134,382	129,451	224,642	39.3	21.3	213	172	724	2,341	4,855
1911	4,317	28,293	36,394	44,101	5.0	4.4	33	21	139	271	721
2101	209,511	1,213,376	1,212,461	1,963,573	342.8	194.4	1,944	1,464	5,876	18,162	38,805
2102	39,346	225,102	233,148	382,701	63.8	35.8	358	274	1,124	3,431	7,284
2201	323	6,504	12,099	3,036	0.0	2.3	3	0	15	63	213
2301	10,291	64,329	105,963	137,536	13.0	9.8	81	56	327	645	1,584

Mean Annual Loads (with BMP #1 & BMP #2), by land use

Land Use	Oxygen Demand & Solids (lbs/yr)				Heavy Metals (lbs/yr)			Nutrients (lbs/yr)			
	BOD	COD	TDS	TSS	Cu	Pb	Zn	DP	TP	NO _{2,3}	TKN
Vacant	12,438	251,244	432,256	108,064	0	90	99	0	572	2,530	8,520
Low Densit	329,325	2,149,281	5,072,224	6,069,761	254	263	1,951	1,040	11,786	6,843	29,477
High Densit	1,460,356	7,686,084	7,460,350	14,543,915	2,433	1,225	12,732	10,761	43,811	145,136	291,048
Multi-Fami	138,737	730,194	714,365	1,392,652	231	116	1,210	1,022	4,162	13,735	27,544
Mobile Hor	80,053	421,334	411,931	803,057	133	67	698	590	2,402	7,928	15,898
Industrial/C	1,234,180	8,259,512	7,298,643	8,675,746	2,027	1,347	13,019	8,070	29,430	86,852	211,339
Learning In	105,514	555,335	538,404	1,049,615	176	89	920	777	3,165	10,492	21,041
Public Park	5,068	50,460	64,474	56,685	9	4	53	198	394	1,481	2,195
Total:	3,365,671	20,103,444	21,992,648	32,699,495	5,263	3,201	30,682	22,458	95,723	274,997	607,061
l (tons/yr):	1,683	10,052	10,996	16,350	2.63	1.60	15.34	11.2	47.9	137.5	303.5

Appendix F

ANOVA Results

ANOVA Results: P-Values of Site-by-Site Comparison

Sites Compared	<i>First Flush</i>						<i>Main Program</i>					
	Total P	NO ₃ -N	Cu	Zn	TSS	BOD	Total P	NO ₃ -N	Cu	Zn	TSS	BOD
1,2	0.2511	0.2703	0.3856	0.6181	0.9771	0.108	0.3134	0.9303	0.0495	0.056	0.3099	<i>0.0474</i>
1,3	<i>0.0002</i>	<i>0.0007</i>	0.8502	0.906	0.6267	0.0949	<i><0.0001</i>	<i><0.0001</i>	0.5081	0.3756	0.7467	0.0525
1,4	0.1942	0.0545	0.7774	0.8002	0.1498	0.4306	0.7435	<i>0.0205</i>	0.0802	0.2174	0.852	0.5755
1,5	0.1283	0.3042	<i>0.0018</i>	<i>0.0007</i>	<i>0.0461</i>	<i><0.0001</i>	0.2154	0.8765	<i>0.0177</i>	<i>0.0004</i>	0.7149	<i>0.0021</i>
1,6	<i>0.0476</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0002</i>	0.2702	0.1132	0.9322	<i><0.0001</i>	<i>0.0163</i>	0.0518	0.6695	0.6106
1,7	<i><0.0001</i>	<i>0.0067</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0072</i>	<i>0.0007</i>	<i>0.0023</i>	<i>0.002</i>	<i><0.0001</i>	<i>0.0195</i>	0.1246	<i>0.0474</i>
2,3	<i>0.0092</i>	<i>0.0201</i>	0.5031	0.7077	0.6067	0.9349	<i>0.003</i>	<i><0.0001</i>	0.1896	0.3008	0.4879	0.9821
2,4	<i>0.0189</i>	<i>0.0039</i>	0.5954	0.4717	0.1575	<i>0.0226</i>	0.1945	<i>0.0255</i>	0.8817	0.5364	0.2241	0.1735
2,5	0.706	0.9406	<i>0.0226</i>	<i>0.0033</i>	<i>0.0431</i>	<i>0.0073</i>	0.8075	0.8089	0.6605	0.0841	0.5221	0.2425
2,6	<i>0.0021</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	0.2823	<i>0.002</i>	0.2966	<i><0.0001</i>	<i><0.0001</i>	<i>0.0002</i>	0.5889	0.166
2,7	<i><0.0001</i>	<i>0.0002</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0078</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0025</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0136</i>	<i>0.0002</i>
3,4	<i><0.0001</i>	<i><0.0001</i>	0.9181	0.7179	0.0606	<i>0.0196</i>	<i><0.0001</i>	<i><0.0001</i>	0.2636	0.7032	0.6185	0.185
4,5	<i>0.0248</i>	<i>0.0166</i>	<i>0.0037</i>	<i>0.0011</i>	0.1352	<i>0.0101</i>	<i>0.0069</i>	<i><0.0001</i>	0.0834	<i>0.0064</i>	0.9634	0.2387
3,6	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0002</i>	0.1196	<i>0.0017</i>	<i>0.0001</i>	<i><0.0001</i>	<i>0.0026</i>	<i>0.0057</i>	0.9048	0.177
3,7	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0019</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0017</i>	0.0667	<i>0.0002</i>
4,5	<i>0.0072</i>	<i>0.0048</i>	<i>0.008</i>	<i>0.0006</i>	<i>0.0011</i>	<i><0.0001</i>	0.1293	<i>0.0148</i>	0.568	<i>0.0233</i>	0.5913	<i>0.0146</i>
4,6	0.5682	<i>0.0026</i>	<i><0.0001</i>	<i>0.0012</i>	0.7187	0.464	0.8181	<i>0.0002</i>	<i><0.0001</i>	<i>0.0025</i>	0.5546	0.9667
4,7	<i>0.0053</i>	0.4907	<i><0.0001</i>	<i>0.0001</i>	0.2293	<i>0.0123</i>	<i>0.0078</i>	0.396	<i><0.0001</i>	<i>0.0007</i>	0.1888	<i>0.0149</i>
5,6	<i>0.0006</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0028</i>	<i><0.0001</i>	0.2064	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	0.9404	<i>0.0142</i>
5,7	<i><0.0001</i>	<i>0.0003</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i>0.0014</i>	<i><0.0001</i>	<i><0.0001</i>	0.0631	<i><0.0001</i>
6,7	<i>0.0173</i>	<i>0.0161</i>	0.86	0.4792	0.1119	0.0641	0.0045	<i>0.0048</i>	0.0938	0.6809	0.062	<i>0.018</i>

Note: Bold, italic p-values indicate statistical significance given a 95% confidence interval at p=0.05