Annual Report

Phase I Stormwater Permit Annual Report

Prepared by

Colorado Department of Transportation

October 1, 2004

Contents

Section Page

Listing of Tables

Listing of Figure

Appendices

Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
BMPs	Best Management Practices
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System
ECAT	Erosion Control Advisory Team
ECS	Erosion Control Supervisor
FAQs	Frequently Asked Questions
FHWA	Federal Highway Administration
FRCP	Facility Runoff Control Plan
FY	Fiscal Year
IGA	Intergovernmental Agreement
MMS	Maintenance Management System
MS4	Municipal Separate Storm Sewer System
MSDS	Material Safety Data Sheets
NPDES	National Pollutant Discharge Elimination System
RECAT	Regional ECAT
SWMP	Stormwater Management Plan
TMDL	Total Maximum Daily Load
USFWS	U.S. Fish & Wildlife Service

Introduction

This Annual Report is being submitted in compliance with Part I.F. of the Colorado Discharge Permit System (CDPS) Permit No. COS-000005. This report covers the period from July 1, 2003, through June 30, 2004, for the Phase I permitted areas. The Phase I permitted areas include the cities of Denver, Lakewood, Aurora, and Colorado Springs as shown in Figure I-1. These cities are located within CDOT Regions 1, 2, and 6. The entire regions are not part of the Phase I area, but rather only those portions within the incorporated boundaries of the Phase I cities.

The report is arranged to correspond to the Annual Report elements listed in Part I.F. of the permit, and is divided into the following sections:

- Section 1.0 – Status of the Components of the Stormwater Management Program (Part I.F.1)
- Section 2.0 – Proposed Changes to the Stormwater Management Program (Part I.F.2)
- Section 3.0 – Revisions to Assessment of Controls and Fiscal Analysis (Part I.F.3)
- Section 4.0 – Summary of Monitoring Data (Part I.F.4)
- Section 5.0 – Summary of Educational Activities (Part I.F.5)
- Section 6.0 – Annual Expenditures and Budgets (Part I.F.6)
- Section 7.0 – Summary of Enforcement Actions and Inspections (Part I.F.7)
- Section 8.0 – Report on Wet-Weather Monitoring Program (Part I.F.8)

Each section includes a reference to the permit language and an explanation of the program status.

In addition to the implementation of the individual programs, CDOT has taken some broader umbrella initiatives to ensure better compliance with CDOT's Stormwater Management Programs and the MS4 permit. During FY 2004, CDOT allocated budget to hire a new full time employee to support the Water Quality Program and the Stormwater Management Programs. It is anticipated that the new employee will be hired in October or November of 2004. Additionally, CDOT, in conjunction with the Federal Highway Administration, annually selects potential areas within CDOT for a Quality Assurance Review (QAR). During FY 2004, CDOT and FHWA selected the Stormwater and permitting programs to be reviewed during FY 2005. The QAR entails the formation of a QAR team consisting of CDOT headquarter and regional staff and a member of the FH WA. The QAR consists of interviews and program or project reviews from which recommendations for better compliance or performance can be made.

Phase II MS4 Permit

The Colorado Department of Transportation (CDOT) submitted an application for the CDPS Phase II Municipal Separate Storm Sewer System (MS4) Permit to the Colorado Department of Public Health and Environment (CDPHE) on March 9, 2003. CDPHE has not yet issued to CDOT a permit or amendment to cover the Phase II areas. During fiscal year (FY) 2004, CDOT has been working closely with CDPHE on the drafting of a new CDPS permit. It is anticipated the revised permit will be finalized in FY 2005.

Although CDOT has not been issued a Phase II permit, initiatives have been made to begin developing and implementing Phase II programs. One such initiative is the performance of training and outreach activities to CDOT Regions to be impacted by the Phase II permit. These activities are occurring within the training and educational activities summarized later in this report.

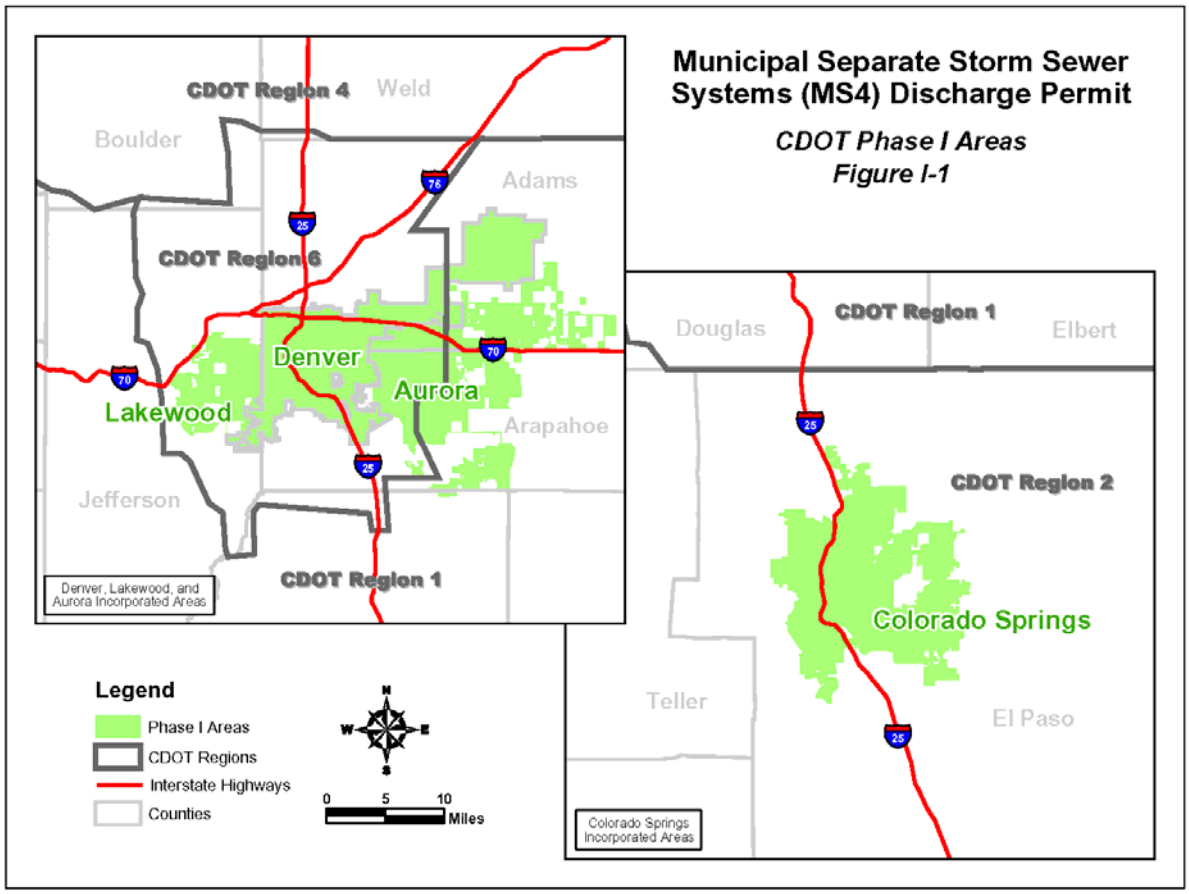

FIGURE I-1
CDOT Phase I Areas

SECTION 1.0

Status of the Components of the Stormwater Management Program (Part I.F.1)

Part I.F.1 states, "The implementation status of each [of] the components of the Stormwater Management Programs that are established as permit conditions (status of compliance with any schedules established under this permit shall be included in this section) and shall include specific quantitative measures where possible;"

The Stormwater Management Program for the Colorado Department of Transportation (CDOT), Part I.B.1 of CDOT's permit, consists of eight different programs, which will be discussed separately in this section. The eight programs that fall under the Stormwater Management Program are as follows:

- 1.1 Maintenance of Structural Controls (Part I.B.1.a)
- 1.2 New Development and Redevelopment Planning Program (Part I.B.1.b)
- 1.3 Public Street Maintenance Program (Part I.B.1.c)
- 1.4 Herbicide, Pesticide, and Fertilizer Program (Part I.B.1.d)
- 1.5 Illicit Discharge Program (Part I.B.1.e)
- 1.6 Industrial Facilities Program (Part I.B.1.f)
- 1.7 Construction Sites Program (Part I.B.1.g)
- 1.8 Facility Runoff Control Program (Part I.B.1.h)

1.1 Maintenance of Structural Controls (Part I.B.1.a)

CDOT's Maintenance of Structural Controls Program provides for the maintenance of structural best management practices (BMPs). These include, but are not limited to, detention facilities, open channels, and storm sewer inlets. These devices are maintained in a manner that allows them to function as designed without excess buildup of sediment, trash, or debris.

CDOT uses the Maintenance Management System (MMS) to track maintenance activities performed on the structural controls as well as public street maintenance. The MMS uses specified codes for tracking maintenance activities including mowing, trash removal, ditch maintenance, and drainage structure cleaning. The system is currently structured to track these maintenance activities by milepost marker locations and not by specified structures such as inlets and detention facilities. CDOT has recently updated the programming of the MMS and will be evaluating whether to incorporate specified codes for structural controls is a cost effective means to track maintenance activities required by the MS4 permit. Other options for tracking maintenance activities will also be identified and considered. Improved tracking measures should result in better compliance with permit provisions.

Table 1-1 presents a summary of activities that have occurred during the reporting period.

TABLE 1-1
Maintenance of Structural Controls (Part I.B.1.a)

Facility	Total Number of Units[1]	Maintenance Activity[2]	Quantity[3]
Detention, Retention, Constructed Wetland, and Water Quality Ponds	6	Trash removal Mowing	250 pounds 108 acres
Grass Swales	2	Trash removal Mowing	100 pounds[4] 130 acres[4]
Storm Sewer Inlets	28 locations	Clean drainage structure	NA[5]
Other	1 location	Clean drainage structure Trash removal Mowing	NA[5]

[1] The total number of ponds, length of channel, number of outlets, area, etc.
[2] The type of maintenance activity performed. This could include mowing, cleaning, flushing, repairing, etc.
[3] Quantity refers to the amount of debris, trash, sediment, etc. removed from the structural controls.
[4] The grass swales and water quality pond are located within the same mile-post area; the trash removal and mowing quantities provided are for both facilities combined.
[5] Cleaning and repairing structures, such as inlets, are tracked by the number of inlets that received maintenance. Quantities of trash or debris removed are not tracked specifically for these structures.

NA=not available

An initial inventory of permanent structural controls has been submitted to the Division. The following types of structural controls related to stormwater quality are included in this inventory:

- Stormwater detention ponds
- Stormwater retention ponds
- Wet ponds
- Constructed wetlands
- Sand infiltration systems
- Stormceptors or similar devices
- Major open channels

Appendix A of this Annual Report contains a list of all controls maintained during fiscal year (FY) 2004. Although no new controls were added to the inventory in FY 2004, CDOT has projects in the planning stages which are considering new controls. These projects have not yet gone to construction, at which point any new controls will be added to the inventory.

1.2 New Development and Redevelopment Planning Program (Part I.B.1.b)

CDOT's program submittal requirements for the New Development and Redevelopment Planning Program includes the following major elements:

- Review of new development/redevelopment for stormwater BMPs
- Conduct training to sustain the implementation of the Program

- Update of the Draft 1995 *Drainage Design Manual* related to stormwater quality
- Update of the *Erosion Control and Stormwater Quality Guide*
- Identification of sensitive waters within the permitted municipalities
- Identification of special requirements for potential discharges to sensitive waters

The status of each of these elements will be discussed individually.

Review of New Development and Redevelopment for BMPs (Part I.B.1.b.1)

Plan Review

CDOT has developed and is implementing a program for incorporating water quality elements into new highway projects and significant highway modifications. The program includes a definition of significant highway modifications and redevelopment, addresses the approach to be used for sensitive waters, and contains changes to the *Drainage Design Manual* and the *Erosion Control and Stormwater Quality Guide.*

The program was submitted to CDPHE on January 15, 2003. CDPHE provided comments on the program April 17, 2003, of which CDOT's response to the comments were submitted August 29, 2003. The program's implementation status is shown below in Table 1-2.

TABLE 1-2
New Development and Redevelopment Implementation Schedule (Part I.B.1.b.1)

Program Component	Implementation Date[1]
Incorporate material in Appendix I of program submittal into the CDOT *Drainage Design Manual*	Completed
Incorporate material in Appendix II of program submittal into the CDOT *Erosion Control and Stormwater Quality Guide*	Completed
Training activities to disseminate program to CDOT regional offices	Ongoing (See discussion under "Training.")

[1] Implementation date is based on CDPHE's final approval date of program.

Within the permit areas, three projects have started into the program review process since CDPHE approval. These projects are listed in Table 1-3, as well as where they are in the project development process. The project development process entails numerous steps that must be followed for a project to move from a concept, through planning, into design, and finally construction. These steps take a significant amount of time. The program review ranges from ensuring that permanent water quality is a consideration at a conceptual stage, to reviewing water quality BMP designs as the project nears construction. There are two major milestones in the review process, the Field Inspection Review (FIR) and the Final Office Review (FOR). Projects at the FIR stage of review are considered 60% designed. At this stage, the design can be changed to include (or exclude) design features such as permanent BMPs. Projects that have gone through the FOR are considered to be "final design," and will more than likely be the design used for construction. In future Annual Reports, only projects that are at the FIR or FOR stage will be reported as having had a plan review, and only for projects that have completed the FOR will the permanent BMPs be identified.

TABLE 1-3
Projects Reviewed and Project Development Phase

Project Name	Project Development Phase	Permanent BMPs Included in the Plans
I70/SH58 Improvement Project	Moving toward Final Office Review	Water quality ponds, vegetated swales and buffers
Valley Highway Project (I-25 Improvements in Denver, north of T-REX)	Conceptual Design	Still in conceptual design phase, types of BMPs has not been finalized
I-25 Improvement Project in Colorado Springs	Conceptual Design (design/build project)	Still in conceptual design phase, types of BMPs has not been finalized

Training

The program is envisioned to be a living program that evolves over time and incorporates lessons learned and improvements in technology and understanding. Training on the program is anticipated to be an ongoing activity as well. As unique project situations arise, personnel change, and the program improves, training will be part of the process to incorporate these changes. Specific training opportunities are discussed below.

A training binder on the program was prepared to serve as a training and work tool for the CDOT staff who must implement the requirements of the program. The binder included information on the CDOT program requirements, contact information, and reference material. These binders were distributed to the CDOT regions.

The three projects in Table 1-3 had training activities related to the program. Training occurred on the program requirements and on the design alternatives to meet those requirements for the I70/SH58 project, the Valley Highway project (I-25 improvements in Denver, north of T-REX), and the I-25 Improvements in Colorado Springs. Each of these three projects is still in the project development process and has not yet gone to the construction phase.

Training material and instruction was presented as part of the program at the CDOT Hydraulic Engineers Conference, held in Castle Rock December 17th and 18th, 2003. Appendix B includes the agenda and material presented at the Hydraulic Engineers Conference. Training and case studies were also a strong focus of the Winter Conference. Refer to Section 5 of this report for more depth on the conference and Appendix H for a sampling of the presentation material.

Additionally, a training binder covering the special requirements and implementation steps was produced and distributed to the CDOT Regional Environmental and Planning Managers. The special requirements are discussed in greater detail below.

Update of the Draft 1995 *Drainage Design Manual* Related to Stormwater Quality (Part I.B.1.b.2)

The submitted program became a chapter in CDOT's *Drainage Design Manual* in October 2003, while the BMP application guidelines became a chapter in CDOT's *Erosion Control and Stormwater Quality Guide* in September 2003.

In addition, CDOT has updated other chapters in the *Drainage Design Manual* unrelated to stormwater quality. Significant effort and resources have been brought to bear on review of the proposed changes and production of the revised manual. The approach to updating the manual was to use the yet-to-be-released American Association of State Highway and Transportation Officials (AASHTO) *Model Drainage Manual* as a base document upon which to build the revisions to CDOT's manual. The program chapters related to stormwater quality will be disseminated throughout CDOT along with the distribution of the updated Drainage Design Manual. Reproduction of 500 copies of the Drainage Design Manual was completed and will be distributed during FY 2005. The schedule for updating the manual is shown in Table 1-4.

TABLE 1-4
Update of 1995 *Drainage Design Manual* Schedule (Part I.B.1.b.1)

Schedule Item	Status[1]	Completion Date
Finish *Drainage Design Manual* chapters related to New Development Program requirements	Complete	October 2003
Develop remaining *Drainage Design Manual* chapters	Complete	June 2004

[1] Status is the work done to date, if any.

Update of the *Erosion Control and Stormwater Quality Guide* (Part I.B.1.b.3)

In FY 2002, CDOT updated the sections of the *Erosion Control and Stormwater Quality Guide* addressing temporary BMPs for construction. These sections were printed and distributed in October 2002. The updated *Erosion Control and Stormwater Quality Guide and Pocketbook* are key tools that have been incorporated into the Erosion Control Supervisor's training course. The *Erosion Control and Stormwater Quality Guide* is available on CDOT's Water Quality web-site and also through the CDOT Bid Plans office.

CDOT has completed the process of developing a chapter in the *Erosion Control and Stormwater Quality Guide* to include the application guidelines and general design criteria for permanent BMPs. This chapter was submitted to CDPHE on January 15, 2003, as Appendix II of the New Development and Redevelopment Program submittal. This chapter was reproduced and distributed to CDOT staff in September 2003.

Identification of Sensitive Waters within the Permitted Municipalities (Part I.B.1.b.4)

No changes or updates have been made to the list of identified sensitive waters since the original list was submitted to CDPHE in July 2001.

Identification of Special Requirements for Potential Discharges to Sensitive Waters (Part I.B.1.b.5)

CDOT proposed a procedure for addressing special requirements related to potential discharges into sensitive water in the program submittal of January 15, 2003. CDPHE had

comments on this portion of the program. CDOT revised and resubmitted the procedure to CDPHE. CDOT has prepared a special requirements packet for CDOT staff to use as a tool in understanding and implementing the special requirement procedures. As a pilot case, the Valley Highway project has incorporated the special requirements procedure into the conceptual plan and is investigating inclusion of strategies such as water quality signs and pet waste pick-up bags.

1.3 Public Street Maintenance Program (Part I.B.1.c)

The following elements of CDOT's Public Street Maintenance Program may impact stormwater quality:

- Snow and ice management
- Salt and sand storage
- Magnesium chloride or other chemical deicer application practices
- Sweeping leaf litter and debris
- Sweeping sanded streets
- Disposal of sweeper waste

CDOT's Public Street Maintenance Program has been summarized in previous Annual Reports and has not changed during FY 2004. The current program is being implemented to effectively controls discharges into the stormwater system. Table 1-5 provides street sweeping and material usage data for the permitted areas in Regions 1, 2 and 6.

TABLE 1-5
Street Maintenance and Material Usage (Part 1.B.1.c)

Sweeping Miles	Region 1	Region 2	Region 6	Total Miles Swept
Sweeping Miles				
Material Usage	**Region 1**	**Region 2**	**Region 6**	**Total Material Used**
Abrasive Material (ton)			0	
Salt/Sand Mixture (ton)			10,969	
Liquid Deicer (gallon)	**Not all data for this table are available at time of printing.**		1,734,038	
Solid Deicer (ton)			12,361	
Sand/Slicer Mixture			0	
Caliber® M1000 Deicer (gallon)			799,877	
Liquid Deicer Special (gallon)			0	

1.4 Herbicide, Pesticide, and Fertilizer Program (Part I.B.1.d)

CDOT's Herbicide, Pesticide, and Fertilizer Program is being implemented as summarized in previous Annual Reports. The current program effectively controls discharges into the stormwater system. Key components of the program include the following:

- Herbicide use along roadways is minimized.
- Herbicide application is performed during dry-weather periods to the extent possible using methods to limit overspray.
- CDOT educates staff on the proper use, application, and disposal of herbicides, pesticides, and fertilizers.
- Applicators are certified as required by the Colorado Department of Agriculture.

All CDOT applicators are state-certified as required by the Colorado Department of Agriculture and licensed to apply restricted-use pesticides. In order to maintain certification and licensing, CDOT applicators must attend ongoing training. CDOT's herbicide and pesticide training is an existing, ongoing practice that is utilized on an as-needed basis.

CDOT provides yearly training for all maintenance employees statewide at the Camp George West facility. This training is not specific to herbicide, pesticide, or fertilizer use, but does include discussion on the proper application of herbicides and pesticides. CDOT has also began informing and training CDOT employees on general environmental ethic and stewardship principles that touch on the subject of herbicide and pesticide use. In addition, CDOT also provides other training on the application of herbicides and pesticides on an as-needed basis for certification and licensing purposes. Region 1 has two certified applicators who participated in two training sessions in FY 2004, the Colorado Weed Management Association (CWMA) Annual Conference and the CWMA Weed Training School. Both of these training events offer re-certification credits. Region 6 has one qualified supervisor and two certified applicators, all three participated in two training sessions during FY 2004, the CWMA Weed Training School and the 2003 Pesticide Application Workshop. Region 2 does not have any certified applicators and contracts out all application activities to the counties and private contractors.

1.5 Illicit Discharge Program (Part I.B.1.e)

CDOT's Illicit Discharges Program may be divided into the following elements, which are discussed in the paragraphs below:

- Prevention of Illicit Discharges and Improper Disposal of materials
- Ongoing Field Screening
- Investigation of Suspected Illicit Discharges
- Procedures to Prevent, Contain, and Respond to Spills
- Educational Activities to Promote Public Reporting of Illicit Discharges and Improper Disposal
- Educational Activities to Promote Proper Management and Disposal of Toxic Materials

Prevention of Illicit Discharges and Improper Disposal (Part I.B.1.e.1)

CDOT is implementing an ongoing program to detect and remove illicit discharges and improperly disposed materials to its storm sewer system. As part of this program, CDOT

has modified its procedure for issuing utility permits to confirm that no non-stormwater discharges are connected into the CDOT storm sewer system. During 2004, there were no known inspections performed by CDOT of connections made to CDOT's storm sewer system. One inspection was made by the Water Quality Program Manager of the Aggregate Industries operations for TREX, where stormwater discharges sheet flowed over land into CDOT right-of-way.

This program was submitted to CDPHE on January 15, 2003, and CDPHE approved the program with comments on May 22, 2003. Table 1-6 provides the schedule and status of the program components for the Prevention of Illicit Discharges and Improper Disposal.

TABLE 1-6
Prevention of Illicit Discharges and Improper Disposal Schedule (Part I.B.1.e.1)

Program Component	Implementation Date	Status
Finalize changes to the Utility and Access permit applications	May 22, 2004	Completed
Notify utility permit applicants of prohibition of non-stormwater discharges	November 22, 2003	Ongoing
Implement control measures to minimize impacts from street wash water associated with construction activities	November 22, 2003	Ongoing

In 2003, CDOT began implementation of control measures to minimize impacts from street wash water associated with construction activities. These measures aim to prevent the tracking of construction materials onto the roadway and the contamination of stormwater. These control measures also address proper disposal of street sweeping residuals. Street wash water associated with construction activities is a potential source of improper disposal of materials into a municipal storm sewer system. During FY 2004, CDOT developed a brochure providing guidance on BMPs to be used for washing street. This brochure is provided in Appendix D.

CDOT's *Erosion Control and Stormwater Quality Guide* provides a detailed listing of Best Management Practices (BMPs) for construction sites, as well as their appropriate application, operation and maintenance. The *Erosion Control and Stormwater Quality Guide* describes in detail the BMPs for prevention of vehicle tracking of construction materials offsite, and for proper street sweeping and vacuuming (GP-7). The street sweeping BMP requires that CDOT staff properly dispose of any sweeper wastes at an approved dumpsite in conformance with the CDOT Standard Specifications. Section 107.25 (b) (11) specifically addresses the proper handling of pollutant by-products of highway construction and their disposal.

Ongoing Field Screening (Part I.B.1.e.2)

CDOT has developed an ongoing system of field screening of the MS4 outfalls to detect illicit discharges, illegal dumping, and illicit connections. Included in the program are the criteria to be used to evaluate outfalls for potential screening and screening frequency, and the mechanisms for identifying additional storm sewer outfalls. The ongoing field screening program was submitted to CDPHE on January 15, 2003, as part of the Illicit Discharge

Program. Table 1-7 provides the implementation schedule and status for the components of the Ongoing Field Screening Program.

TABLE 1-7
Ongoing Field Screening Schedule (Part 1.B.1.e.2)

Program Component	Implementation Date	Status
Develop database for tracking field screening data	November 22, 2004	Will be developed in FY 2005
Train personnel conducting field screening	November 22, 2003	Dry weather screening of priority outfalls has been contracted out to trained consultants
Commence field screening	May 22, 2004	Begin in FY 2005

Inventory of Outfall System

No additional outfalls have been included in the inventory during the 2003-2004 reporting year.

Priority Areas

CDOT has identified the priority areas to receive ongoing screening based on their high potential for illicit discharges due to industrial or dense commercial land use, or whether the receiving waters are considered to be a sensitive water. In the fall of 2001, CDOT verified the locations of the outfalls that discharge in these priority areas. The list of priority outfalls was submitted in the 2002 Annual Report.

Dry-Weather Outfall Screening

CDOT was required to implement its ongoing dry weather screening program of priority outfalls beginning May 22, 2004. However, due to the end of fiscal year budgetary and program constraints no priority outfalls were screened during the period of May 22, 2004 through June 30, 2004. CDOT plans to begin the field screening in FY 2005 as shown in the schedule provided in Table 1-8. The objective will be to screen all of the priority outfalls and to make evaluations on those outfalls that require continued periodic screening into the following fiscal year.

TABLE 1-8
Dry-Weather Screening Implementation Schedule for FY 2005 (Part 1.B.1.e.2)

Timeframe	Activity
Fall 2004	Screen 50% of the priority outfalls
Spring 2005	Screen remaining 50% of the priority outfalls
Ongoing	Follow-up on outfalls with dry weather flows or are suspected of having an illicit discharge and to follow up on complaints

Investigation of Suspected Illicit Discharges (Part I.B.1.e.3)

CDOT's program to investigate suspected illicit discharges was submitted to CDPHE on January 15, 2003. The program was developed within CDOT's existing authorities and specifies standard investigation procedures to identify, report, and follow up on the source of the illicit discharge or illegal connection to CDOT's storm sewer system. Unresolved illicit discharges will be forwarded to the Water Quality Control Division for further action.

In FY 2004, there were no known reports of possible illicit discharges that were reported to CDOT.

Procedures to Prevent, Contain, and Respond to Spills (Part I.B.1.e.4)

CDOT is implementing its ongoing program to prevent, contain, and respond to spills attributable to CDOT. The State Patrol is typically the first agency to respond to spills caused by others on the highway. These spills are only handled by CDOT if no responsible party has been identified. Procedures to prevent, contain, and respond to spills are provided in CDOT's *Guide to Hazardous Spill Response on State Highways*.

During the period of July 1, 2003, through June 30, 2004, seven spills were identified on CDOT property based on the information provided by CDPHE. None of the spills were attributable to CDOT nor did any of the spilled material enter a storm sewer.

Educational Activities to Promote Public Reporting of Illicit Discharges and Improper Disposal (Part I.B.1.e.5)

The Illicit Discharge Program bulletin developed in FY 2002 remains posted on CDOT's web site along with the Illicit Discharge Hotline number. During FY 2004, approximately 20 of the Illicit Discharge posters were laminated and sent to the Maintenance Sections in Regions 1, 2 and 6 to be posted on bulletin boards at CDOT rest stops.

In cooperation with Altitude Training Associates, CDOT has participated in the development of a stormwater management training program for maintenance personnel, which includes a module on illicit discharges. Approximately 100 CDOT employees have taken this training, which was also presented at the Winter Conference in March 2004.

Additionally, a training module is being given at CDOT's Maintenance Training Academy that includes an overview of the MS4 requirements including illicit discharges. Also part of the curriculum at the Maintenance Training Academy, is a module on CDOT's environmental ethic and stewardship principles as noted in CDOT's Environmental Stewardship Guide. The training is provided for all maintenance personnel and new hires.

Educational Activities to Promote Proper Management and Disposal of Toxic Materials (Part I.B.1.e.6)

The Illicit Discharge Program bulletin cited above included information on the types of materials that should not be discharged into an MS4. This information is posted on CDOT's web site, and the bulletin is provided upon request to CDOT offices.

An initial evaluation of the possibility of a "Hazardous Waste Roundup" indicated that CDOT already implements a similar program on a regional basis. CDOT is implementing a

variety of programs to effectively keep hazardous and other wastes properly managed and contained, ranging from maintenance facilities to highway corridors and public places. Many of these programs have been in existence for awhile, such as the Adopt-A-Highway program, highway spill remediation process, hazardous waste roundups at Region 1, managed waste disposal and recycling at each yard, and internal hazardous waste tracking and handling as required by Colorado Hazardous Waste Regulations. Other programs are in the initial stages of implementation, including: training, brochures and posters for employee and public awareness of drug lab wastes, tracking of potential drug lab waste chemicals used by employees, and illicit discharge into drains; the new contract for contracted Adopt-A-Highway activities on high-profile highway corridors; legislation pertaining to human wastes and uncovered loads; and a planned program for hazardous waste collections along the roadsides. CDOT is continuing to effectively tackle this complicated issue, as existing programs continue, and new programs begin. At this time, CDOT does not intend to pursue a "Hazardous Waste Roundup."

1.6 Industrial Facilities Program (Part I.B.1.f)

CDOT has began implementing its program to track industries discharging stormwater into the CDOT storm sewer system. As part of this program, CDOT has developed procedures for the Regional Access and Utility Permitting groups to forward permit applications for facilities requesting to discharge to CDOT's system or right of way to the Water Quality Program Manager at CDOT headquarters. The Water Quality Program Manager maintains an inventory of all new facilities and those witnessed to be connected to CDOT's system. Reports of industrial facilities will be forwarded to CDPHE in its Annual Report.

During FY2005, only one industrial facility was known to be identified in the MS4 permitted area. Aggregate Industries has a ready mix concrete plant located at Santa Fe and Mississippi in Denver, which supports the TREX construction project. This facility has a stormwater permit for light industry (COR-0100000). Stormwater sheet flows off this facility and into CDOT's storm sewer or right-of-way.

To facilitate the implementation of the program, CDOT provides an Environmental Clearances Information Summary (ECIS) to all Utility, Special Use, or Access Permit applicants. The ECIS provides information about the general prohibition against those types of discharges that are not allowed and the potential need to obtain a Colorado Discharge Permit System (CDPS) permit. The ECIS has been posted on the Environmental, Access Permit, and Utility Permit websites.

Additionally, CDOT has developed a draft brochure to be distributed to industrial and commercial entities that summarizes the types of discharges that are prohibited from entering CDOT's storm sewer system. It is anticipated that this draft brochure will be finalized and distributed during FY 2005. See Appendix H for a copy of the draft brochure.

CDOT has taken measures to educate CDOT permit staff on the requirements of the Industrial Facilities Program. As part of this, CDOT distributed a fact sheet to permitting staff that defines the types of industrial facilities for which they should be aware of for the program. The Industrial Facilities Program was also a topic at the CDOT Statewide Utility

Personnel 2003 Annual Meeting, where an educational session was provided to the permitting staff.

The modified Highway Utility Accommodation Code (Code) has not yet been adopted as a formal state rule. It is anticipated that the Code will be posted for public comment during FY2005. If the Code does not go to rulemaking, then it assumes the form of an operational manual. The conditions in the operational manual will be enforced as contractual condition of a utility permit.

1.7 Construction Sites Program (Part I.B.1.g)

CDOT is currently implementing its ongoing program to reduce the discharge of pollutants from its construction sites as described in previous Annual Reports. Program elements reported on in this Annual Report include the following items:

- Site inspection and enforcement procedures
- Training for construction site operators

Site Inspection and Enforcement Procedures

CDOT has been performing Regional ECAT (RECAT) inspections since July 1, 2001, using consultant assistance. Since that time, some regions have started performing these inspections without assistance. CDOT formed RECAT teams for Regions 1, 2, and 6 as of July 1, 2002, but CDOT headquarters is still providing RECAT assistance to Regions 3, 4, and 5. CDOT developed a *RECAT Handbook* for internal use, which provides information, procedures, and tools (forms) for performing RECAT inspections. The handbook is currently being printed for distribution.

CDOT's MS4 permit requires 60 RECAT inspections to be performed per fiscal year. As shown in Table 1-9 and listed in Appendix F, a total of 57 RECAT inspections were officially completed in FY 2004. CDOT has performed additional inspections that were not formally documented.

TABLE 1-9
Summary of RECAT Inspections Performed in FY 2004 (Part I.B.1.g)

Region	Number of Inspections
Region 1	10
Region 2	9
Region 3	2
Region 4	6
Region 5	7
Region 6	10
T-REX	13
Total Inspections	**57**

Training for Construction Site Operators

CDOT has co-sponsored an erosion control course entitled "Stormwater Management During Construction," which is offered at Red Rocks Community College. Seventeen CDOT employees attended this course during FY 2004, along with representatives from various contractors, counties, cities, design firms, etc.

CDOT requires that an employee for the contractor serve as the site Erosion Control Supervisor (ECS). This person must have satisfactorily completed a CDOT-authorized training program, such as the Stormwater Management During Construction course. Upon completion of the program, the individual will receive an ECS certification card.

Due to increased demand for the ECS certification, additional Stormwater Management During Construction courses are being offered through Red Rocks Community College and Altitude Training Associates, as well as a refresher course for this training. In FY 2004, two refresher training courses were offered through Altitude Training Associates. One was held in the City of Grand Junction on May 19, 2004, and another was held in the City of Denver on June 9, 2004. Fifteen CDOT employees attended the refresher training.

Other training courses associated with construction activities have occurred throughout the fiscal year. RECAT training and information sessions were included at the Winter Conference and a Construction Task Force has been developed under CDOT's Environmental Stewardship program to propose recommendations for improving CDOT's roles and responsibilities for construction related activities. A complete list of the training courses is provided in Appendix F.

In addition to the Stormwater Management During Construction course and other training courses, CDOT has published a RECAT Rally bulletin highlighting successful BMP applications used at CDOT construction sites and updating RECAT members of new program materials. These bulletins have been distributed internally to RECAT members.

Table 1-10 summarizes the training activities related to construction activities performed during FY 2004.

TABLE 1-10
Summary of Construction Program Training Activities (Part I.B.1.g)

Activity	Number/Description
RECAT Rally	~ 30 distributed to RECAT members
Erosion Control and Stormwater Quality Guide	520 distributed
Erosion Control and Stormwater Quality Pocketbook	~1500 distributed
Staff Training	
□ Stormwater Management During Construction Course, Red Rocks Community College	17 CDOT employees
□ Stormwater Management During Construction Refresher Course	15 CDOT employees
□ Winter Conference, January 2003 (includes various topics related to stormwater quality and construction)	180 attendees

1.8 Facility Runoff Control Program (Part I.B.1.h)

CDOT has completed developing Facility Runoff Control Plans (FRCP) for its facilities that fall under the requirements of the Phase I permit. FRCPs were developed for the following types of facilities:

- Vehicle maintenance facilities
- Asphalt and concrete batch plants
- Solid-waste transfer stations
- Exposed stockpiles of materials
- Sites used for snow dumps and/or temporary storage of sweeper tailings or other waste piles

CDOT has developed and implemented FRCPs for all of the facilities that fall under the requirements of CDOT's Phase I permit. Table 1-11 lists all the facilities that were designated under CDOT's Phase I permit. FRCPs were developed for each major and minor facility, and those plans will be maintained at each facility and the regional office. Minor facilities were grouped together by category. Of the Phase I facilities, there were only two minor facilities that were grouped together under one FRCP.

TABLE 1-11
List of Major and Minor Facilities (Part I.B.1.h)

Facility Name	CDOT Region	Address	Designation
Region 1 – Aurora	1	18500 East Colfax, Aurora	Major
Colorado Springs	2	2025 Commercial Boulevard, Colorado Springs	Major[1]
Cherry Creek	6	3320 South Parker Road, Aurora	Major
Region 6 – Aurora	6	18800 East Colfax, Aurora	Major
Denver-Atlantic	6	5640 East Atlantic Place, Denver	Major
Denver-Havana	6	4375 Havana Street, Denver	Major
Denver-Park	6	3601 Park Avenue West, Denver	Minor
Denver-West 11th	6	2300 West 11th Avenue, Denver	Minor

[1] The Colorado Springs facility is in actuality a "minor" facility. However, it is currently designated as a "major" facility since it constitutes the only facility in Region 2. This designation is subject to change when Region 2 acquires other facilities located within either the Phase I or Phase II permit areas.

Each facility is inspected at least once annually, in accordance with the permit. Table 1-12 lists the facilities and the status of their plans, conformity to completed plans, and the implementation date of the plans. The Denver-Park and Denver-West 11th facilities did not receive inspections in time to be submitted in this report. These facilities began implementing their plans in January 15, 2004, and therefore an inspection is not yet warranted. Both of these facilities will be inspected during the 2005 fiscal year.

TABLE 1-12
Annual Report on Overall Conformity with Runoff Control Plans (Part I.B.1.h)

Facility Name	Implementation Date of Plan	Date of Inspection	Conformity to Plan?[1]	Implementation Date of the Plan
Cherry Creek	Complete	September 23, 2004	Yes	January 15, 2002
Region 1 – Aurora	Complete	September 27, 2004	Partially	January 15, 2003
Colorado Springs	Complete	June 22, 2004	Yes	June 30, 2003
Region 6 – Aurora	Complete	August 31, 2004	Yes	January 15, 2003
Denver-Atlantic	Complete	September 1, 2004	Yes	January 15, 2003
Denver-Havana	Complete	June 16, 2004	Yes	June 30, 2003
Denver-Park	Complete	NA	NA	January 15, 2004
Denver-West 11th	Complete	NA	NA	January 15, 2004

[1] Conformity to plan could be "yes," "partial," or "no." If "partial" or "no," then an explanation should be added under "comments."

NA – not applicable because facility was not yet covered for a year. Inspection to be performed in FY 2005.

The Region 1 - Aurora facility is a large facility with many issues that were identified during the development of the FRCP. In the past year, the facility has take many measures to be in compliance with the FRCP and has come a long way in controlling the runoff from this facility. Two significant measures taken include the construction of secondary containment for their magnesium chloride tanks and the construction of a sand/salt shed. Construction on these are not yet complete, but are expected to be in use before winter operations commence. Additionally, the facility has applied gravel to a large portion of the dirt areas of the facility and has implemented sediment controls at all inlets to minimize the sediment from leaving the facility. The facility still needs to address containment of some stockpiles on site and storage of miscellaneous materials in order to be in compliance with the FRCP. Overall, the facility has take enormous strides to become compliant with the FRCP and is continuing to take actions for better compliance.

SECTION 2.0

Proposed Changes to the Stormwater Management Program (Part I.F.2)

Part I.F.2 states, "Proposed changes to the Stormwater Management Programs that are established as permit conditions, including an update on areas added to the MS4 due to annexation or other legal means;"

CDOT's Stormwater Management Program consists of eight different programs as follows:

-
- 1.1 Maintenance of Structural Controls (Part I.B.1.a)
- 1.2 New Development and Redevelopment Planning Program (Part I.B.1.b)
- 1.3 Public Street Maintenance Program (Part I.B.1.c)
- 1.4 Herbicide, Pesticide, and Fertilizer Program (Part I.B.1.d)
- 1.5 Illicit Discharge Program (Part I.B.1.e)
- 1.6 Industrial Facilities Program (Part I.B.1.f)
- 1.7 Construction Sites Program (Part I.B.1.g)
- 1.8 Facility Runoff Control Program (Part I.B.1.h)

2.1 Changes to the Stormwater Management Program

No changes in the Stormwater Management Program that have been established as permit conditions were made during FY 2004.

2.2 Update on Areas Added to the MS4

No areas have been added to the MS4 due to annexation or other legal means, and none is expected in the future.

SECTION 3.0

Revisions to Assessment of Controls and Fiscal Analysis (Part I.F.3)

Part I.F.3 states, "Revisions, if necessary, to the assessments of controls and the fiscal analysis reported in the permit application under 6.5.3(3)(b)(v) and (vi);"

Part 6.5.3(3)(b)(v) states, "Assessment of Controls Estimated. Reductions in loadings of pollutants from discharges of municipal storm sewer constituents from municipal storm sewer systems expected as the result of the municipal stormwater quality management program. The assessment shall also identify known impacts of stormwater controls on groundwater."

Part 6.5.3(3)(b)(vi) states, "Fiscal Analysis. For each fiscal year to be covered by the permit, fiscal analysis of the necessary capital and operation and maintenance expenditures necessary to accomplish the activities of the programs under 6.5.3(3)(b)(iii) and (iv). Such analysis shall include a description of the source of funds that are proposed to meet the necessary expenditures, including legal restrictions on the use of such funds."

No revision to the "Assessment of Controls" or the "Fiscal Analysis" are needed at this time due to the lack of sufficient monitoring data. The budget for compliance with the permit is included in Section 6.0 of this report.

SECTION 4.0

Summary of Monitoring Data (Part I.F.4)

Part I.F.4 states, "A summary of the data, including actual monitoring data, that is accumulated throughout the reporting year;"

Several monitoring and reporting requirements are included with the permit. Dry-weather screening and results from wet-weather sampling are provided in this section. Additional data may be found in the completed forms attached to this report.

4.1 Dry-Weather Screening

As part of the Stormwater Management Program, CDOT has developed a program to detect illicit connections and improper discharges to the MS4 as part of the Illicit Discharge Program. Part I.B.1.e of the permit discusses the requirements of the Illicit Discharges Program, which include ongoing screening for illicit discharges, illegal dumping, and illicit connections.

During FY 2004, CDOT did not perform any routine dry-weather screening of any priority outfalls. Priority outfalls will be screened during FY 2005 according to the schedule provided in Section 1, Table 1-8. No known complaints were received regarding possible illicit discharges, therefore, not compliant driven monitoring was performed.

4.2 Wet-Weather Sampling

As part of CDOT's Wet-Weather Monitoring Program, CDOT conducted site-specific evaluations of temporary BMPs. Wet-Weather monitoring data from this evaluation are included in Appendix A of the CDOT Year Four Report on Wet Weather Monitoring Program.

CDOT has commenced gathering baseline data in preparation for the installation of the StormFilter™ system. Grab samples were collected in mid June 2004 during a runoff event and analyzed for a broad range of parameters of potential concern. Sample collection took place upstream of the culvert draining the 4-acre parking lot. Additional stormwater sampling may be conducted at the site during the fall of 2004 or spring of 2005. Results are included in Appendix I.

Additional water quality data is available in the CDOT Year Four Report on the Wet Weather Monitoring Program for the following studies: Data Summary Report 2002, Hoop Creek Water Quality Monitoring, US40 Berthoud Pass East – Appendix C; and Data Evalation Report Interstate 70 Storm Event/Snowmelt Water Quality Monitoring, 2001 – Appendix D.
It is anticipated that wet-weather monitoring of the StormFilter™ system will begin in FY 2005, and CDOT will actively share monitoring data from all components of its program.

SECTION 5.0

Summary of Educational Activities (Part I.F.5)

Part I.F.5 states, "Summary of educational activities;"

CDOT's educational activities are listed under the respective Stormwater Management Programs. Please see Section 2.0 for additional information.

During FY 2004, CDOT carried out several actions to increase awareness and understanding of its MS4 stormwater quality programs. These educational and outreach actions are outlined below.

5.1 Posters, Bulletins, Newsletters, Flyers, Etc.

Bulletins

CDOT wrote and distributed bulletins on topics relating to the MS4 program and water quality. Copies of these bulletins are included in Appendix H.

BMP of the Month - TREX *August 2003*

This bulletin announces the great improvements TREX has made to prevent erosion and control sediment. It also features innovative BMPs that could be used in the field such as the Dandy Pop and the use of redundant BMPs.

Industrial Facility Brochure *June 2004*

CDOT drafted a brochure addressing allowable and non-allowable discharges from various industrial facilities. Examples for various types of industries/businesses were provided. The brochure outlined contact information for facilities to call to inquire as to permits that may be needed. It also listed the hotline number for reporting illicit discharges. A copy of this draft brochure is included in the Appendix H.

RECAT Rally *August 2003*

Two RECAT Rallies were distributed during FY 2004. The Rallies provided brief overviews on past RECAT inspection team efforts, introduced information on the web site and communicated goals for FY04 pertaining to cross-region mentors, follow-up visits and involving maintenance staff.

CDOT's Environmental Programs Brochure

CDOT continued it printing and display of the "CDOT & the Environment" brochure. The brochure covers the various environmental programs of CDOT, including its Water Quality Programs and the focus on storm sewer discharge. The brochure is available through the CDOT headquarters office, the Empire Park offices, and CDOT offices in some other regions.

Posters

During 2004, CDOT continued its efforts to distribute educational materials to forewarn the public against illicit discharges and water pollution. These activities related to the distribution of a laminated poster with information on illicit discharges and the CDOT hotline to receive reports of illicit discharges. Posters were sent to Maintenance Superintendents in the various Phase I regions requesting that they be put on display at CDOT rest-stop restrooms/information kiosks. Representatives of CDOT Environmental staff checked with CDOT Public Relations to get any needed clearance for putting up these poster in these public places. Letters and calls were made to the Maintenance contacts to reinforce the request for posting these items. Additionally, a few entities around the state called the CDOT office and requested a copy of the poster, including a representative of the Town of Telluride.

Additional copies of the poster were framed and given a Plexiglas front. This format is suitable for an office setting, and CDOT will be contacting a variety of agencies to offer/ request the poster be displayed at these other sites.

Public Announcements

CDOT has a department-wide email broadcast called "Public Announcements." The broadcast is made monthly, covering a wide array of topics. During FY04, CDOT posted various stormwater and MS4 program topics on the Public Announcements page which was available for review by all employees. The topics and dates of these postings are listed below, and the text of these fact sheets are included in the Appendix H.

Date	Topic
2/20 & 2/27/2004	Storm Sewer Discharge Permit, Section 402 CWA (MS4 Fact Sheet)
3/12/2004	Phase I - MS 4 Permit Programs Summary
3/19/2004	Construction Sites Stormwater Management Program
4/2/2004	Illicit Discharges Stormwater Management Program
4/2/2004	Industrial Facilities Stormwater Management Program
4/1 & 4/5/2004	Water Quality Impacts & NEPA
4/9/2004	Industrial Facilities
4/9/2004	Water Quality Program
5/7/2004	Maintenance Facility Runoff Control Plans
6/4/2004	Poster: Illegal Dumping into CDOT's Storm Sewer

Electronic Newsletter

CDOT staff wrote six issues of an electronic newsletter called "The Interface" which was disseminated via the CDOT web site. Articles pertaining to storm water quality included

the MS4 Annual Report for FY 2003 (Dec 2003) and an article on Region 3 and Region 1 Sediment Control Structures.

5.2 MS4 Educational and Training Workshops

Erosion Control Supervisor (ECS) Training for Construction Site Operators

CDOT's MS4 Program requires that the contractor designate an employee to serve as the site Erosion Control Supervisor (ECS) and that the ECS satisfactorily completed a CDOT-authorized training program on erosion control. To this end, CDOT continues to co-sponsor an 8-hour erosion control course entitled "Stormwater Management During Construction" and to promote attendance by CDOT staff and others. The class covers legal requirements, erosion and sedimentation, best management practices and structural and non-structural controls.

ECS Refresher Course

As a joint effort with Altitude Training, CDOT also offered an one day Erosion Control Supervisor Refresher Class called "Controlling Construction Site Erosion and Sedimentation." The class provides a review of BMP installation requirements, an update of regulations and review of new or current products and materials. During FY 2004, two refresher course sessions were held and 15 CDOT employees attended the course, along with others. See Appendix F for course description and agenda.

CDOT Stormwater Management for Maintenance Personnel

In conjunction with Altitude Training Associates, CDOT developed an 8-hour stormwater management training course for maintenance personnel. This course was designed to comply with the Phase II regulatory requirements under the Pollution Prevention and Good Housekeeping control measure to provide employee training on pollution prevention techniques, erosion control for maintenance activities, and the impacts of improper disposal and illegal discharges. During FY 2004, three sessions of this course were held, and approximately 100 CDOT employees attended this course.

CDOT Maintenance Training Academy

CDOT offered its Maintenance Training Academy approximately 23 times throughout the year to CDOT maintenance personnel, and to new hires. The class covered various environmental and stormwater aspects of maintenance duties, including:

- Landscaping
- Drainage
- Meth Lab
- De-Icer & Water Quality Considerations

For new CDOT hires, an "Environmental" class was offered which covered water quality issues along with other environmental topics. CDOT will continue to provide training modules at the Maintenance Training Academy that focus on MS4 requirements during FY 2005. Additional topics have also been incorporated into the training program such as the

Environmental Stewardship Guide, which educates on CDOT's environmental ethic and stewardship principles, and on the roles and responsibilities of CDOT's employees.

Winter Conference

As in prior years, in 2004 CDOT again planned and organized an educational conference, with the theme and title; "Water Quality and Road Ecology: Environmental Stewardship Makes Good Sense." This well attended conference drew speakers from other states, FHWA, Urban Drainage, Cherry Creek Water Basin Authority, the City of Greenwood Village, consulting engineering companies and CDOT. Participants came from CDOT, other federal, state and local agencies, and consultants who work on CDOT projects. The conference also included displays from about 12 vendors showcasing products and services which enhance water quality and the environment.

The conference was held from March 2 through March 4, 2004 at a Denver area hotel, and drew about 180 attendees.

The conference Agenda and copies of the conference sessions pertaining to water quality are attached in Appendix H.

The following sessions specifically addressed CDOT's MS4 Program:

- CDOT MS4 Permits for Maintenance Facilities and Stormwater
- T-REX – Stormwater Management
- Water Quality Best Management Practices- Top 10
- Proprietary BMPs
- The Storm Filter Vault
- CDOT, NEPA and Water Quality
- CDOT, NEPA and the Driscoll Analysis (stormwater modeling)
- MS4 Training for CDOT Maintenance Personnel; activities relevant to proper disposal of materials and illicit discharges
- Permanent Stormwater BMPs- Urban Drainage Manual Volume 3
- Permanent BMPs- the Communication Problem
- Permanent Stormwater BMP Retrofit Projects
- Cherry Creek Reservoir Basin & Permanent Stormwater BMPs
- Stormwater Detention & Economic Development
- Turkey Creek /Berthoud Pass Permanent BMPs
- CDOT Permanent BMP Program Panel Discussion
- CDOT NEPA & Water Quality Panel Discussion

Environmental Stewardship Guide Training

In March 2003, CDOT published their Environmental Stewardship Guide (Guide). The Guide documents CDOT's environmental ethic and stewardship principles. It describes the process by which social, economic, environmental, and engineering considerations are integrated in all aspects of transportation decision-making, including policy development, systems and project development, and the design, construction, and maintenance and operations of the system. The intent of the training is to make sure CDOT employees are environmentally conscientious performing their work. The Guide and associated training

identifies roles and responsibilities of CDOT employees and the process by which environmental considerations are integrated. Future updates to the Guide during FY 2005 will focus on maintenance and operations, as well as on construction. Task forces were developed during FY 2004 to begin evaluating these two areas and providing recommendations for better compliance within CDOT's existing programs. Stormwater and water quality initiatives within CDOT play prominent roles within these two areas in meeting the objectives of the Environmental Stewardship Guide. Training has been provided at the Winter Conference and recently has been part of the Maintenance Academy Training, in addition to other training venues. See Appendix H for presentation material regarding the Environmental Stewardship Guide.

Hydraulic Engineering Conference

CDOT sponsored a two day conference for its staff and others, relating to hydraulics. The conference was held on December 17-18, 2003. Among the presentations were two topics especially pertinent to CDOT's MS4 Programs and stormwater permit. See Appendix B for conference agenda and relevant presentations.

- New Development & Redevelopment presented by CDOT's Environmental Branch
- CDOT Drainage Design Manual Update presented by CDOT consultants working on the CDOT MS4 Programs.

Methamphetamine Lab Awareness Training

CDOT provided methamphetamine lab awareness training to various CDOT audiences. Methamphetamine lab awareness is relevant to stormwater quality because of the potential of illicit disposal of hazardous and dangerous wastes. Additionally, when CDOT employees are in the field performing components of its Stormwater Management Programs (outfall screening, maintenance of structural controls and public street maintenance) they may be exposed to these harmful and dangerous wastes. For these reasons, CDOT is providing training at the Maintenance Training Academy on how to identify and properly deal with this type of illicit dumping. Additionally, this training was also given at the 2004 Winter Conference.

5.3 Outreach and Partnering Activities

CDOT staff promoted an awareness of various MS4 educational issues and its programs by way of distributing manuals, pocket guides or other handouts, or meeting with representatives of the other groups. These efforts included:

- December 2003 - Met and shared materials with Colorado Water Protection Project of the Colorado League of Women Voters. Sent the League materials to CDOT regions
- February 2004 - Exchanged information with Wyoming DOT
- 2004 – Participated in a presentation and discussion on "Cooperative MS4 Implementation" with consultants and others
- May 11, 2004 - Citizen Working Group for Northwest Corridor NEPA /EIS ; presentation on Water Quality BMPs

- Provided copies of CDOT water quality materials to Town of Telluride representative, including Erosion Control and Stormwater Quality Pocketbook, Illicit discharge poster, the Illicit Discharge Bulletin , and info on CDOT MS4 Program and the Clean water Act
- Provided copies of the CDOT Erosion Control and Stormwater Quality Pocketbooks to:
  - All attendees of the Erosion Control Supervisor Course held at Red Rocks Community College,
  - other state DOT entities, including Arizona, Mississippi, New Jersey,
  - National Association of Home Builders,
  - Larimer County, El Paso County and Larimer County (Colorado)
  - consultants PBSJ (Colorado) and Paradign Engineering (Texas)
- Approximately 500 CDOT Erosion Control and Stormwater Quality Pocketbooks were sold to Wal-Mart. As part of their settlement for stormwater violations, Wal-Mart was required to obtain and use CDOT's Erosion Control and Stormwater Quality Pocketbooks as guidance for construction activities.
- November 10, 2003 - presentation to the Colorado Water Quality Control Commission on to share and discuss the various components of CDOT's Water Quality Programs and an overview of specific CDOT projects pertaining to structural and non-structural BMPS. The presentation also covered several funding and grant possibilities that CDOT may explore for these efforts.
- November 24, 2004 - presentation to the Water Quality Forum to share the types of BMPs being implemented on recent CDOT projects of environmental interest (Berthoud Pass, Straight Creek and Black Gore Creek).

Graphics on Stakeholders

CDOT produced several graphics for internal and external educational purposes. These graphics illustrate who the various CDOT stakeholders/publics are, and what the avenues for public information and involvement are. These graphics help CDOT management, environmental staff and others to understand who to connect with and how to reach stakeholder groups.

5.4 Water Quality Program Web Site

CDOT's web site continues to provide pages dedicated to CDOT's Water Quality Programs. The site address is www.dot.state.co.us/environmental/enwaterqual
During 2004, the Water Quality Programs web site was updated to provide copies of the CDOT 2004 Winter Conference presentations on water quality and the MS4 Programs, as well as information relevant to Post Construction, particularly the New Development and Redevelopment Stormwater Management Program (Drainage Design Manual), and the Erosion Control Stormwater Quality Guide BMPs (Chapter 6),.

Relevant information on stormwater quality and the MS4 Programs provided from prior years continued to be provided on the web site, including:

- CDOT's Erosion Control and Stormwater Quality Guide

- Tools: Erosion Control Site Inspection Reporting Tool
- Technical Bulletins: Clean Water Act (CWA) Section 404 and Dewatering permits, Illicit Discharge, Erosion Control , and Water Quality
- FAQs (Frequently Asked Questions)
- Forms/Permitting from CDPHE : Construction De-watering Application and State Permitting
- Links to Phase II Regulations, Governmental, and Non-Profit Sites, Erosion Control/Revegetation Sites, Related Sites for Planners and Engineers, and Publications
- Erosion Control Stormwater Quality Guide BMPs (Chapter 6), and Checklist forms for planning, design and justification of BMPs.
- MS4 Discharge Topics and Phase II Area Maps
- Training opportunities and materials

SECTION 6.0

Annual Expenditures and Budgets (Part I.F.6)

Part I.F.6 states, "Annual expenditures for the past reporting year, and budget for the next reporting year;"

Table 6-1 lists the cost of complying with the CDPS stormwater permit in FY 2004, and provides budgeted cost for compliance with the CDPS stormwater permit for FY 2005. The costs and budgets provided are only estimates of CDOT's activities during FY 2004 and planned activities for FY 2005.

TABLE 6-1
Actual and Planned Expenditures

Program	FY 2004 Actual Expenditures	FY 2005 Planned Expenditures	Comments
Program Management and Miscellaneous Items	$ 196,000	$ 207,000	• Includes primary consultant fees • Planned Expenditures include unencumbered budget comprised of available funds through the Water Quality program that have not been earmarked for a particular program • Permit fees
Construction Sites Program	$ 121,000	$ 151,000	• Includes primary consultant fees for RECAT inspections and *RECAT Handbook* • Includes estimated CDOT employee salaries for RECAT inspections • Includes tuition cost for CDOT employees to attend training course • Unbudgeted support is planned for implementation of program in FY 2005; costs for implementing program are unknown at date of printing
Pollution Prevention Program	$ 121,000	$ 158,000	• Includes primary consultant fees for development of Facility Runoff Control Plans and employee training
Herbicide, Pesticide, and Fertilizer Training Program	$ 1,000	$ 1,000	• Only includes cost of sending CDOT employees from Regions 1 and 6 to training classes • Region 2 contracts out all herbicide and pesticide application requiring licensing; therefore, training costs are not applicable • FY 2005 planned expenditures are estimated based on FY 2004 expenditures
Illicit Discharges Program	$ 64,000	$ 71,000	• Includes primary consultant fees for development and implementation of program • Includes efforts to map outfalls for Phase II requirements • Unbudgeted support is planned for implementation of program in FY 2005; costs for implementing program are unknown at date of printing
Industrial Facilities Program	$ 7,000	$ 4,000	• Includes primary consultant fees for development of program • Does not include CDOT employees' salaries for time spent on implementing program • Unbudgeted support is planned for implementation of program in FY 2005; costs for implementing program are unknown at date of printing
Maintenance of Structural Controls Program	Data not available at time of printing	Data not available at time of printing	• No structural controls were identified within the Phase I areas of Region 1

TABLE 6-1
Actual and Planned Expenditures

Program	FY 2004 Actual Expenditures	FY 2005 Planned Expenditures	Comments
New Development and Redevelopment Planning Program	$ 73,000	$ 72,000	• Includes primary consultant fees for development and implementation of program • Does not include CDOT employees' salaries for time spent on developing program
Public Street Maintenance Program	Data not available at time of printing	Data not available at time of printing	•
Wet-Weather Monitoring	$ 103,000	$ 71,000	• Includes primary consultant fees • Does not include CDOT employees' salaries for time spent on program
General Education	$ 102,000	$ 40,000	• Includes primary consultant fees • Does not include full cost of Winter Conference • Does not fully capture CDOT employees' salaries for time spent providing training • Includes printing costs for educational materials, the Erosion Control and Stormwater Quality Guide and pocketbooks • Unbudgeted support is planned for implementation of program in FY 2005; costs for implementing program are unknown at date of printing
Information Management	$ 29,000	$ 56,000	• Includes primary consultant fees • Does not include CDOT IT costs for website development
Total Program Costs	**$ 817,000**	**$ 831,000**	

Notes:

All dollar amounts are rounded to the nearest $1,000.

SECTION 7.0

Summary of Enforcement Actions and Inspections (Part I.F.7)

Part I.F.7 states, "A summary of the number and nature of enforcement actions and inspections;"

7.1 Enforcement Actions

No enforcement actions were taken during FY 2004.

7.2 Inspections

Section 1.0, Status of the Components of the Stormwater Management Program, lists the number of inspections performed under each program. During FY 2004, CDOT conducted a total of 57 RECAT inspections under the Construction Sites Program. The RECAT inspections performed are summarized in Section 1.0, Table 1-10, and a detailed list is provided in Appendix F. There were no scheduled inspections performed for the Illicit Discharge, Industrial Facilities and New Development programs during FY 2004.

SECTION 8.0

Report on Wet-Weather Monitoring Program (Part I.F.8)

Part I.F.8 states, "The wet-weather reporting requirements as listed in Part I.D."

Part I.D.5.a requires the Annual Report to include: 1) a summary of any cooperative efforts; 2) tabulated data generated from the monitoring program and interpretation of the data; 3) summary of the monitoring program work to date, any problems with the protocol or selected sampling locations, and recommendations for any changes to the monitoring program. Furthermore, Part I.D.4.b requires the Annual Report submitted in year four of the permit (submitted by October 1, 2004, covering July 2003 through June 2004), shall include: 1) Items 1 through 3 in Part I.D.5.a; 2) An assessment of the effects of CDOT's wet weather discharges on state waters and an assessment of the change over time; and 3) A proposal for a monitoring program for the next permit term.

As part of the Stormwater Management Program, CDOT developed and implemented a wet-weather monitoring program for the MS4 designed to evaluate wet-weather discharges from highways and their effects on state waters.

The plan was submitted to the state for review and approval, and must include the following minimum requirements:

- Wet-weather conditions, particularly urban stormwater effects on state waters
- A clear statement of program goals
- Components that address the monitoring program goals
- Commitment of resources to the level appropriate for the proposed monitoring plan

CDOT has extensively focused their wet-weather monitoring initiatives throughout Colorado. The following studies are included in the CDOT wet-weather monitoring program: wet-weather sampling of two types of inlet protection devices at the Transportation Expansion Project (TREX); coordination of study agreements for the StormFilter™ system and baseline stormwater sampling of the project site in Lakewood, Colorado; Hoop Creek water quality monitoring on U.S. Highway 40 Berthoud Pass East; storm event/snowmelt water quality monitoring on Interstate 70, and CDOT Region 1: Sand Analysis Study.

CDOT is currently implementing the wet-weather monitoring program as submitted to CDPHE. The schedule is provided in Table 8-1 and has been updated to reflect current progress. The schedule reflects proposed additions and substitutions as stated in a letter to CDPHE dated January 21, 2004. Table 8-2 provides an overview of the existing studies CDOT is implementing or has completed in compliance with the Wet Weather Monitoring Program.

TABLE 8-1
Wet-Weather Monitoring Implementation Schedule, Revised September, 2004

Schedule Item	Status
StormFilter™	
Intergovernmental Agreements	In progress
Design Drawings	Completed
Background Screening	In progress
Installation of StormFilter™ System	Anticipated date no later than April 2005
Site-Specific Monitoring Plan	
First Draft QAPP	Completed
Second Draft QAPP	Completed
Final QAPP	Complete 30 days prior to vault installation
Automatic Sampling Equipment Purchase	Purchased and received
Automatic Sampling Equipment Installation	Within 30 days after vault installation
Field Personnel Training	Within30 days after vault installation
Verification of Automatic Sampling Locations	Within 30 days after vault installation
Field Monitoring	
First-Year Storm Events – Target of 6-8 storms	Anticipated start date 30 days after vault installation
Second-Year Storm Events – Target of 6-8 storms (total for 2 years = 12-16 storms)	Pending installation of StormFilter™
Third-Year Storm Events – Target of 6-8 storms Project Complete (total for 3 years = 18-24 storms)	Pending installation of StormFilter™
Annual Progress Report	
First-Year Monitoring Report	Pending installation of StormFilter™
Second-Year Monitoring Report	Pending installation of StormFilter™
Third-Year Monitoring Report	Pending installation of StormFilter™
*Final Report	Pending installation of StormFilter™
Silt-Saver®	
Site Selection	Completed
Develop Site-Specific Monitoring Plan	Completed
Equipment Installation	Completed
Monitoring	Completed
Final Report	Completed
Dandy Pop	
Site Selection	Completed
Develop Site-Specific Monitoring Plan	Completed
Equipment Installation	Completed
Monitoring	Completed
Report	Completed
Final Report	Completed
CDOT Existing Studies	
CDOT Region 1: Monitoring and Assessment of BMPs on US 285 Widening	Ongoing
CDOT Region 1: US 40 Berthoud Pass East Highway Reconstruction	Ongoing
CDOT Region 1: I-70 Water Quality Baseline Monitoring Program,	Ongoing

TABLE 8-1
Wet-Weather Monitoring Implementation Schedule, Revised September, 2004

Schedule Item	Status
PEIS Baseline Study	
CDOT Region 1: Sand Analysis	Ongoing

*Final Report submittal date is dependent on the renewal requirement for CDOT's CDPS MS4 Permit.

**This study has been substituted with an existing study on Berthoud Pass near Hoop Creek focusing on permanent post-construction BMPS.

The Wet-Weather Monitoring Program is continuing to evolve. However, the availability of state funds and contract scheduling will continually impact the schedule of the program and affect completion dates. Revisions to the deicing and BMP monitoring program were submitted in a letter to CDPHE on January 21, 2004.

8.1 StormFilter™

CDOT is cooperatively working with the City of Lakewood and Stormwater Management, Inc. to install the StormFilter™ BMP in Lakewood at the City's maintenance facility. This partnership has been established to provide financial and/or in-kind service contributions for the purchase of the unit and design of the BMP site, installation of the BMP, development of the intergovernmental agreements (IGAs), development of the Statement of Work, formulation of a site-specific monitoring plan, and performance of field sampling. Work on the StormFilter™ project will continue during FY 2005

Although the StormFilter™ BMP has yet to be installed and monitored, a significant amount of work was performed in FY 2004. Partnership design review meetings were held in the fall of 2002 to complete the design plans. The plans were finalized for the StormFilter™ vault installation in Lakewood in January 2003, and the design drawings were modified for the CDOT bid process in February 2003. Coordination to develop and finalize the IGAs also continued during FY 2004. Draft IGAs were developed in April 2003 for each partnership agreement. Since that time, the IGAs have gone through two stages of revisions including revisions by the Attorney General, and they will likely be completed in the fall of 2004. The IGAs will be reviewed a second time by the Attorney General's office before the plans go through the CDOT bid process. It is anticipated that the StormFilter™ vault will be installed by the late spring or early summer of 2005.

Monitoring data are not available at this time for the StormFilter™ vault. It is anticipated that monitoring of the StormFilter™ vault will begin in the spring/summer of 2005, dependent on the installation of the StormFilter™ vault. Preliminary baseline sampling has been completed at the Lakewood monitoring site. This data is summarized Section 4.2 of the Annual Report: Summary of Monitoring Data, Wet-Weather Sampling.

8.2 Silt-Saver® and Dandy Pop

In compliance with the Colorado Department of Transportation (CDOT) Municipal Separate Storm Sewer Permit (MS4), CDOT commenced a program of monitoring two types of inlet

protection devices (IPDs) in August 2003 to fulfill proposed monitoring requirements in CDOT's Wet Weather Monitoring Program (WWMP).

IPDs are temporary inlet control protection devices intended to prevent sediment from entering the storm drain. CDOT, in its WWMP, committed to monitoring a Silt-Saver® (or equivalent) starting in June 2003, as well as another temporary best management practice (BMP) during the summer of 2004.

In mid-June 2003, CDOT identified a suitable monitoring site at the Transportation Expansion Project (TREX) near the interchange of I-25 and I-225 where existing IPDs were installed in the CDOT right-of-way. Near this interchange, 12 CDOT inlets were initially identified with existing installations of either a Silt-Saver® or a Dandy Pop™ IPD. Inlet locations with Silt-Saver® installations include the following:

- Two inlets on the west side of the I-25 and I-225 interchange adjacent to the new flyover ramp
- Southwest corner of the I-25 and County Line Road interchange
- Median of I-225 near Cherry Creek Reservoir
- Southeast side of the I-25 and Hampden Avenue interchange
- Southwest corner of the I-25 and Arapahoe Road interchange

Seven other inlets in the TREX project area currently have a Dandy Pop™ installed for sediment control. These locations are as follows:

- Southeast corner of the I-25 and I-225 interchange (beginning of Gore B)
- North side of the I-225 northbound on-ramp from I-25 northbound at Ulster Street
- South side of the I-225 northbound on-ramp from I-25 northbound at Ulster Street
- Southeast corner of the I-225 and DTC Parkway interchange
- South side of the on-ramp to north-bound I-225 from DTC Parkway
- Southeast corner of the I-225 and Yosemite Street interchange
- Southeast corner of the I-25 and Dry Creek interchange

Two inlets in the TREX project area were sampled in the spring of 2004. One of the sites has a Dandy Pop™ and is located on the southwest corner of the I-25 and Dry Creek Road interchange, while the other site has a Silt Saver® installed for sediment control and is located on the southwest corner of the I-25 and County Line Road interchange. A third site, located on the north side of the I-225 northbound on-ramp from I-25 northbound at Ulster Street, was considered for sampling. Because the site did not receive enough rainfall to create runoff, no samples could be collected.

Three storm events were successfully captured at the Silt-Saver (County Line/I25 SW corner) and the Dandy Pop (Dry Creek/I25 SW corner) sampling sites. Both inflow and outflow samples were taken using grab sampling techniques. Staff waited at the sites to collect samples when runoff began. Sampling continued through the peak of the storm and until the runoff was down to a trickle. Essentially, grab samples were taken at specific time intervals along the hydrograph to capture a snap shot in time of the inflow and outflow TSS concentrations. Storms were distinguished by dry periods of no runoff at the monitoring sites.

The sampling efforts conducted on the two types of inlet protection devices (IPDs) provided sufficient information to reach some basic findings. Unfortunately, the relatively limited sample pool makes any conclusive determinations difficult. However, a number of interesting trends were observed. These are listed below:

Performance Observations based on the Field Observations and Data

1. The field data collected did not lend itself to conclusive interpretation. In fact, some samples actually suggest a degradation of water quality through the IPD. This is obviously impossible since the protective measures cannot, by themselves, introduce additional suspended materials. This suggests anomalous conditions that are unrelated to the function of the device.

2. The nature of construction sites creates a dynamic environment that is inconsistent with a controlled environment that allows testing the performance of the IPD without undue consideration of other factors. Often times, the IPDs would have more than one inflow and outflow point due to the variations in the drainage area, allowing more than one channel of concentrated flow to drain to the IPD. Because the study used one inflow and outflow sampling point for each site, capturing representative samples of the inflow and outflow was challenging.

3. When the inflow and outflow from the device could be sampled in a relatively controlled manner, the sampling protocol produced results that were more consistent with expectations. As evidence, the samples taken the evening of April 9, 2004 both exhibited the uniformity and consistency expected from a more mature scientific sampling effort.

4. Both types of IPDs showed sediment accumulation around the IPD after storm events. This indicates some sediment removal prior to the storm runoff entering the storm drain inlet. Again, this was not necessarily captured by the sampling data because data collection points were often downstream of these accumulations. Nevertheless, this evidence supports the overall contribution of these facilities to improvements in water quality.

Performance Observations Related to Physical Properties of the Inlet Protection Devices

1. Both the Dandy Pop™ and the Silt-Saver® have large filter surface areas. Based on the sizes used on TREX and specification sheets provided by the manufacturers, the filter surface areas are comparable. However, the rigid interior frame of the Silt-Saver® reduces the effective opening area. As a result, the larger available surface area of the Dandy Pop™ may reduce the potential for clogging and allow quicker draining of accumulated runoff at the inlet site. This assumes that the shape and geometry of the Dandy Pop™ is not materially affected. Any alteration or collapse of this device would significantly reduce the effective opening and may result in an opening smaller than that of the Silt-Saver®.

2. The IPDs are durable and appear to be capable of surviving multiple storm events. Most of the IPDs have survived at least two storm events, some as many as 5 storms larger than 0.10 inches. Some maintenance may be necessary, but their durability implies that they are cost-effective to use.

3. The Silt-Saver® was observed to be more suitable for sump conditions due to its rigid frame structure. For example, at one monitoring site, the Silt-Saver® appeared to withstand approximately 10 feet of head. Another survived a side impact from a construction vehicle.

4. The apparent opening size (AOS) of the two devices differs fairly dramatically. The Dandy Pop opening is roughly twice that of the Silt-Saver® (425 µm vs. 212 µm). Under some circumstances, this may not represent a significant degradation of performance. However, on the sites monitored during this study, only about 30 percent of the sediments carried by the inflow exceeded the AOS of the Dandy Pop. As such, under optimum conditions, the removal would be 30 percent. The smaller AOS of the Silt-Saver® might allow as much as 60 percent of the material to be removed.

5. The installation of the two devices differed materially. The Dandy Pop installation method provided a secure fit. During the course of the evaluation the manufacturer modified the attachment mechanism and found that a secure fit could be achieved under almost all conditions. The Silt-Saver® demanded more care in installation. The device needed to be placed on a secure and flat surface and needed to be secured with some weighting device such as a filter bag. Even then, it was often difficult to assure a complete fit. In fact, as mentioned above, it was observed that water flowed under the Silt-Saver® device at the sampling site. This contributed strongly to the variability of the sampling results.

Performance Observations Related to Site Conditions

1. There was ample evidence of sediment removal at the sites monitored. In addition to the accumulation of sediments around the IPD, there was also evidence of sediment accumulations around some of the redundant BMPs through which water leaving the site flowed.

2. As mentioned previously, the installation of the IPD appears to have greatly influenced the effectiveness. Site preparation activities done in advance of installation may have a profound effect on the effectiveness of these facilities to perform up to their capacity. It appears that, in the case of the Silt-Saver®, the site conditions precluded effective installation and therefore the quality of the results.

3. Samples taken the second day of the sampling efforts showed significantly lower concentrations of sediments than on the first day. In fact, samples at both sites showed a drop of almost 50 percent. This supports the assertion that there is a "first flush" even from a construction site. Moreover, it may support the effectiveness of multiple facilities on a site, particularly after an initial "settling in" period occurs.

Conclusions

Both sample sites showed some positive and negative total suspended solids removal efficiencies. Average total suspended solid removal efficiencies for each site were as follows: Silt-Saver (negative 17 percent) and Dandy Pop (3 percent). However, sediment accumulation upstream of the redundant temporary BMPs installed at each monitoring site was an indication that a significant amount of sediment was being removed by the redundant BMPs prior to reaching the IPDs that were being tested.

The IPDs offer performance claims that greatly exceeded their measured performance on these sites. In the case of the Silt-Saver®, it appears that much of the divergence relates to the difficulty in assuring proper installation. The divergence in the performance of the Dandy Pop cannot be as clearly tied to any obvious installation difficulties, however, it performed consistently better during all tests.

CDOT is not convinced that a continued and equally rigorous sampling program will provide tangible, irrefutable evidence of the effectiveness of these facilities. The dynamic nature of construction sites, the inclement conditions during which samples are taken, and the highly variable storm and runoff conditions make the adherence to a rigorous sampling program necessary to provide conclusive evidence almost impossible.

8.3 Swale/Permanent BMP and Turbidity Curtain or Equivalent

CDOT has made significant efforts to identify existing studies to fulfill the requirements of the swale/permanent BMP monitoring. Specifically, CDOT has identified the Berthoud Pass study at Hoop Creek to replace the commitment to monitor a roadside swale in Colorado. This commitment was identified in a letter to CDPHE dated January 21, 2004. Additionally, CDOT has identified the Highway 285/Turkey Creek study to fulfill the commitment to monitor the turbidity curtain. The Highway 285/Turkey Creek is in addition to the Dandy Pop monitoring that has been completed to fulfill the requirements of the Turbidity Curtain. Future cooperative efforts on these BMP evaluation efforts are anticipated. Table 8-2 at the end of this section provides an overview of the existing studies CDOT is implementing in compliance with the Wet Weather Monitoring Program.

Hoop Creek Water Quality Monitoring: US 40 Berthoud Pass East

The Colorado Department of Transportation (CDOT) has been operating and maintaining U.S. Highway 40 over Berthoud Pass since 1940. Berthoud Pass crosses the Continental Divide between the towns of Empire and Fraser, Colorado. Highway re-construction was started in 1999 on the east approach between Berthoud Falls and the summit of Berthoud Pass to improve safety and mobility. Phases 1 and 2 of the project are now completed, with additional phases planned in the future.

In response to the Environmental Assessment (EA), a long-term monitoring program has been established to assess basin-wide water quality conditions in the Hoop Creek watershed during and after highway re-construction. The purpose of the water quality study is to assess the effects of stream sedimentation caused by U.S. Highway 40 winter maintenance operations on Berthoud Pass East. Excess sand and salt from these operations is transported in surface runoff into Hoop Creek and its tributaries, increasing contaminant loading and degrading aquatic habitat. This monitoring program incorporates basin-wide ambient water quality sampling stations within the watershed, along with automated storm event/snowmelt water runoff monitoring, to assist in making the following determinations:

- Fulfill the mitigation monitoring commitments in the EA
- Distinguish between sedimentation from highway-related sand/salt runoff and other sources (such as the ski area parking lot and Berthoud Pass Ditch trans-mountain water diversion at the summit)
- Assess potential sedimentation impacts to West Fork Clear Creek

- Provide hydrologic monitoring of the Horseshoe Bend Fen area, pursuant to the 404 permit
- Assess the overall effectiveness of erosion control BMP's during highway construction
- Assess the long-term effectiveness of permanent erosion and sediment control BMP's

The Hoop Creek Water Quality Monitoring Plan (Plan) was developed and implemented by CDOT for the U.S. Highway 40 Berthoud Pass East highway improvement project. This plan guides the implementation of the monitoring program . The program is subject to change as additional data is gathered. Monitoring is conducted and data are reported to assess trends in water quality improvement associated with the installation of permanent structural and non-structural sediment control BMPs. Hoop Creek water quality has been monitored and evaluated by CDOT over the past three years.

Phases 1 and 2 of the U.S. Highway 40 Berthoud Pass East reconstruction project were completed by CDOT in 2002. Baseline water quality data were collected in the Hoop Creek Basin from 1997 through 1999, prior to construction. Data collected from 2000 through 2002 represent the construction phases of the project. Permanent sediment control structures were installed along the highway as part of the reconstruction design. The effectiveness of these permanent BMPs are not yet known, because 2002-2003 was the first winter that these structures have been operational and data are not yet available. A Winter Maintenance Plan has also been developed but is not yet fully implemented by CDOT. The maintenance plan serves as a guidance document for winter and summer maintenance operations as they relate to sediment control from the highway.

Turkey Creek Surface Water Quality Monitoring Program

Turkey Creek is a major tributary of Bear Creek, which eventually flows into the South Platte River. Turkey Creek flows directly into Bear Creek Reservoir, a flood-control, multiple-use impoundment area. U.S. Highway 285 traverses this watershed and has undergone major improvements by CDOT. CDOT has completed all highway-improvement work between the Morrison exit to the east to the Kennedy Gulch intersection to the west. CDOT developed a monitoring program for the Turkey Creek watershed and Kennedy Gulch area in 1999 to assessing the overall effectiveness of best management practices along the U.S. Highway corridor just west of Denver. A final report was developed in March 2004 summarizing the 2003 data results for 12 monitoring sites that are within or border Turkey Creek watershed. The 2003 data focused U.S. 285 highway post-construction evaluation of BMPs on the upper part of the Turkey Creek watershed and the Kennedy Gulch area. Since 1999, in addition to monitoring sites in the Turkey Creek watershed, sampling sites have been included to assess U.S. 285 construction impacts of Kennedy Gulch intersection. In this final report, CDOT has made comparisons between baseline data collected between 1995-1998 by the Denver Regional Council of Governments, and recent data collected between 1999-2003.

The final monitoring results when coupled with data for previous years (1995-2002) have addressed continuing concerns relative to the U.S. 285 highway-related construction impacts. Post-construction monitoring has demonstrated, in large part, that any during-construction adverse impacts have been substantially controlled by effective use of BMPs.

Data collection by the USGS (stream flows near the end-point of the watershed's surface-water discharge) and by the Bear Creek Watershed Association (Bear Creek Reservoir and associated inflows/outflow) will continue to monitor water-quality conditions and possible long-term trends, including that contributed by Turkey Creek inflows. For the 2004 monitoring program, pre-construction sampling surveys and field observations are proposed to be shifted for the U.S. Highway corridor between Foxton Road and Bailey.

Interstate 70 Storm Event/Snowmelt Water Quality Monitoring

The Interstate 70 (I-70) mountain corridor Storm Water/Snowmelt Water Quality Monitoring Program started in September 2000 and was continued in 2001 for selected streams along I-70. The monitoring program is conducted under the direction of CDOT. The I-70 mountain corridor (corridor) extends from the foothills near Denver to Glenwood Springs.

An I-70 Mountain Corridor Programmatic Environmental Impact Statement (PEIS) is presently underway to assess alternatives to improve mobility on I-70 between Golden and Glenwood Springs, Colorado, a distance of approximately 150 miles. This water quality study is being conducted to better understand the influence that operation and maintenance of I-70 may have on receiving stream water quality within the corridor.

The objective of the monitoring program is to provide baseline information on potential water quality effects of suspended sediment, phosphorus, selected metals, and dissolved solids (sodium or magnesium chloride) originating from the road surface and rights-of-way of I-70, on streams within the corridor. The focus of this monitoring effort is to collect water quality information during snowmelt and rainfall runoff conditions. Generally, contaminants associated with I-70 are mobilized and transported to receiving streams under these conditions.

A water quality monitoring plan was developed to guide implementation of the program. This plan, referred to as the Interstate 70 Mountain Corridor Runoff Event Water Quality Monitoring Plan, is subject to change as additional information is gathered. A data report was prepared that summarizes data collected in 2000.

Rainfall and snowmelt runoff monitoring were conducted from March 2001 to October 2001. Diurnal snowmelt conditions were sampled from March through May to assess the effects of I-70 snowmelt runoff on stream water quality resulting from early spring snowmelt events. Rainfall-runoff sampling was conducted from June through October to measure the effects of I-70 rainfall runoff on stream water quality resulting from summer rainstorm events.

It is anticipated that several runoff monitoring seasons similar to 2001 will be required to obtain data to adequately evaluate the affects of I-70 on stream water quality in the mountain corridor. There is insufficient data to make comparisons between watersheds or within specific segments of I-70 at this time.

8.4 Deicing Efforts

Work to refine and implement the Wet-Weather Monitoring Plan continued during FY04. The proposed deicing program was evaluated to incorporate existing CDOT monitoring

activities related to deicing and water quality being conducted by CDOT. The evaluation consisted of preparing a list of ongoing CDOT studies related to deicing impacts, erosion and sediment impacts, and any water quality-related studies that may be appropriate. The summary list was submitted to CDPHE for approval on June 30, 2003, and in the FY 03 CDOT Annual Report. On January 21, 2004, CDOT identified two ongoing de-icing related studies for which it feels meets the commitments to conduct deicing related research. Specifically, CDOT outlined the following two studies: CDOT Anti-icing and Deicing Standard Operating Guide Part I and II developed in March 2003, and CDOT Characterization of Used Traction Sands.

CDOT Characterization of Used Traction Sands

Traction sand is used in large quantities to maintain safety on CDOT roads and highways during the winter. Although magnesium chloride and deicers have reduced the total amount of traction sand needed, volumes still remain large. In an effort to reduce the amount of traction sand that reaches local streams, CDOT has committed significant resources to retrieve and disposal of used traction sand. Before disposal, however, the sand must be analyzed to ensure that it meets Resource Conservation Recovery Act (RCRA) standards for land disposal. To this end, sand sampling and analysis occurred in 1996 and 2002. This study is ongoing and sand sampling is planned to continue through 2007.

Sand analyses focused on whether the sand is "hazardous" by exceeding RCRA limits for specific metals (arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury), is salty (using conductivity), or is high in petroleum products. Grain size analyses were used to determine whether the sand meets size specifications for use as aggregate base course.

In March of 2002, seven composite samples of sand piles for CDOT were sampled and analyzed in order to characterize them. Two samples are from the Clear Creek watershed (I-70, Bakerville to the Eisenhower Tunnel and US 40 from Berthoud Falls to Berthoud Pass), two are from Summit County (I-70, Eisenhower Tunnel to Silverthorne and I-70, Copper Mountain to Vail Pass), one is from Grand County (US 40, from Berthoud Pass to crossing of the Frasier River), and two are from Eagle County (I-70, Vail Pass to East Vail and sand berm on south side of I-70 in East Vail).

8.5 Assessment of Wet Weather Impacts

Many of the wet weather studies discussed in this report are long-term. Sampling efforts conducted at Hoop Creek along U.S. Highway 40 Berthoud Pass East, and storm event/snowmelt water quality monitoring on Interstate 70 showed some preliminary results.

CDOT recognizes that more time is needed to implement studies in order to gather data, which will provide time-trend impacts. All of the studies discussed in this report are dependent on weather and stream conditions making it difficult to complete a study in a short term. Often times an assessment of baseline conditions could take as much as three years. CDOT is dedicated to continuing their wet-weather initiatives to evaluate the impacts of highway runoff on receiving water bodies as well as determining change over

time. No conclusions can be made at this time on the effectiveness of CDOTs stormwater program, particularly the effectiveness of permanent BMPs. This is because the wet weather monitoring program is just starting. Some of the future efforts on the wet-weather monitoring program will provide useful information. For example, data on how well BMPs on U.S. Highway 40 are working after implementation can lead to refinements on CDOT designs as well as result in operational changes related to snow/sand removal. CDOT will continue to assess specific BMP technologies that it can employ in urbanized areas to treat runoff.

8.6 Proposed Wet- Weather Monitoring Program

Due to the extensive time and resources required to perform a study that collects enough data to support an evaluation, CDOT will plan to engage in more collaborative projects. Current plans are to continue to support the efforts currently underway on the following projects: StormFilter System, Lakewood, CO; US 40 Berthoud Pass, Hoop Creek Water Quality Monitoring U.S. 40 Berthoud Pass East; U.S. 285 Monitoring and Assessment of BMPs;; Interstate 70 Storm Event/Snowmelt Water Quality Monitoring; CDOT Region 1 sand analysis study. These efforts will be reviewed during the renewal of CDOT's CDPS Permit.

TABLE 8-2
Current CDOT Environmental- or Water Quality-Related Studies

Name of Water Quality Study	Purpose of Monitoring	Monitoring Periods	CDOT Costs
CDOT Region 1: Monitoring and Assessment of BMPs on US 285 Widening	Monitoring construction-related BMPs to assess construction impacts to Turkey Creek. Monitoring efforts are in response to concerns from the Upper Bear Creek Watershed Association.	1999 – ongoing (Paramalee Gulch to Conifer at Foxton Road).	$65,000 per year.
CDOT Region 1: US 40 Berthoud Pass East Highway Reconstruction	Assess effectiveness of Permanent BMP and to develop effective maintenance plan.	September 2000 – ongoing (during construction and post-construction).	$50,000 per year.
CDOT Region 1: I-70 Water Quality Baseline Monitoring Program, PEIS Baseline Study	Develop baseline information to assess the effects of snowmelt and rainfall runoff from with I-70 on the receiving stream water quality along the I-70 west corridor.	September 2000 – ongoing.	$50,000 per year.
CDOT Region 1: Sand Analysis	CDOT efforts to reduce the amount of traction sand that reaches local streams.	1996, 2002-2003, and 2003-2007. Monitoring between March and May.	Total cost: $20,000.