

## Storm Water Management Program Plan

Permittee: City of Cedar Hills

Permit Number: UTR090000

Location of MS4: Lat 40 25' 06" Lon 111 45" 06"

Submitted with this permit is the following:

- A map of the MS4 location
- Information Regarding the overall quality concerns, priorities, and measureable goals specific to the Permittee that were considered in the development and/or revisions to the SWMP document
- A description of the program elements that will be implemented in each of the six minimum control measures
- A description of any modifications to ordinances or long-term/ongoing processes implemented in accordance with the previous MS4 general permit for each of the six minimum control measures
- A description of how the Permittee intends to meet the requirements Permit as described in Part 4.0 by either referencing existing program areas that already meet the Permit requirements or a description and relevant measurable goals that include, as appropriate, the year by which the Permittee will achieve required actions, including interim milestones.
- If applicable indication of joint submittal of Co-Permittees and the associated responsibility in meeting requirements of the SWMP

### Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations"

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Date



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**CEDAR HILLS**

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# **STORM WATER MANAGEMENT PROGRAM**

**Adopted by the Cedar Hills City Council on August 3, 2004**  
*Updated on November 9, 2010*

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**Supplemental guides are available for implementation and documentation of the Storm Water Management Plan.**

- Supplemental Guide to Storm Water Management for Contractors
- Supplemental Guide to Storm Water Management for Public Works
- IDDE Program
- Documentation
- City Ordinances
- State/City Permits
- Maps/Map Book
- Storm Water Coalition

**Contact the City of Cedar Hills to obtain these guides.  
801-785-9668 or [www.cedarhills.org](http://www.cedarhills.org)**

# PART 1

## INTRODUCTION

### A. STORM WATER PHASE II OVERVIEW

The Environmental Protection Agency (EPA) published the Storm Water Phase II Rule on December 8, 1999. The Utah Department of Environmental Quality acts as the administrator of the program for the EPA in the State of Utah. To comply with the requirements of the Phase II Rule, municipalities must obtain an “Authorization to Discharge Municipal Storm Water Under the Utah Pollutant Discharge Elimination System (UPDES)” from the State of Utah.

The Storm Water Phase II Rule requires municipalities in urbanized areas to develop and implement a Storm Water Management Program (SWMP). The SWMP is the most substantial part of the UPDES Permit.

The SWMP must address six minimum control measures:

1. Public education and outreach on storm water impacts
2. Public involvement/participation
3. Illicit discharge detection and elimination
4. Construction site storm water runoff control
5. Post-construction storm water management in new development and redevelopment
6. Pollution prevention/good housekeeping for municipal operations

Municipalities must develop best management practices (BMPs) to address the requirements of each of these six minimum control measures. They must also establish measurable goals for the BMPs. Municipalities must conduct a review of the effectiveness of the SWMP, and submit a corresponding report to the State annually. The SWMP must be updated every 5 years.

## **B. OVERVIEW OF STORM WATER MANAGEMENT PROGRAM**

The Cedar Hills Storm Water Management Program (SWMP) consists of the following:

### **Part 1 Introduction**

### **Part 2 BMPs Performed by Cedar Hills City**

This contains the BMPs that will be performed by Cedar Hills Staff to address the requirements of the minimum control measures of the Phase II Rule

### **Part 3 Storm Water Technical Manual**

This contains technical requirements for land development and construction activities.

### **Part 4 Construction and Post Construction Best Management Practices**

This contains the BMP fact sheets that would be used during and after land development and construction activities.

### **APPENDIX A: SUPPLEMENTAL GUIDE TO STORM WATER MANAGEMENT FOR CONTRACTORS**

### **APPENDIX B: SUPPLEMENTAL GUIDE TO STORM WATER MANAGEMENT FOR PUBLIC WORKS**

### **APPENDIX C: IDDE PROGRAM**

### **APPENDIX D: DOCUMENTATION**

### **APPENDIX E: CITY ORDINANCES**

### **APPENDIX F: STATE/CITY PERMITS**

### **APPENDIX G: MAPS/MAP BOOK**

### **APPENDIX H: STORM WATER COALITION**

## **C. DESCRIPTION OF CEDAR HILLS CITY**

Cedar Hills is built upon an alluvial fan or bench, created thousands of years ago when it was a shoreline of Lake Bonneville. Early settlers referred to the area as “the Bench.” Because of the growth of cedar trees, the area was later referred to as Cedar Hills. Cedar Hills was established as a community in 1977 and the current population is about 9,808 residents.

Cedar Hills is bordered by the Wasatch Mountains on the east, by Highland City on the north and west, and on the south by Pleasant Grove. It is approximately 2.7 square miles in size with the Murdock Canal and the Salt Lake Aqueduct traversing across the city.

Land in Cedar Hills is almost all residential with few large tracts of developable land remaining. There are two (2) elementary schools, seven (7) church buildings an 18-hole golf course and a small partially occupied tract of land set aside for commercial development. Use of the land for agricultural purposes is almost nonexistent. Residential lot sizes in Cedar Hills have a large span of sizes, with average lot sizes being around 10,000 square feet.

Cedar Hills operates their own culinary, sewer, and pressurized irrigation systems throughout the City. Nearly all development in Cedar Hills is connected to the sanitary sewer system, which discharges to the Timpanogos Special Service District located in American Fork.

Cedar Hills’ storm drainage system consists of curbed streets, piped and open conveyance, sumps and open retention basins. The storm water drains through percolation and evaporation.

The land in Cedar Hills slopes steeply at the foothills on the east side, and gradually flattens to slopes less than 5% on the western portion of the city. While there are no long term precipitation measuring stations in Cedar Hills, Cedar Hills likely averages around 20 inches of precipitation annually at the foot of the Wasatch Mountains.

Soils in Cedar Hills vary considerably. The westerly soils are mostly sands, silts, and gravels. Soils on the east side of the city include clays and gravel. Soils at the foot of the Wasatch Mountains consist of alluvial deposits.

## **D. AREAS OF STORM WATER QUALITY CONCERN IN CEDAR HILLS**

In the process of developing the Cedar Hills Storm Water Management Program (SWMP), the Steering Group identified the following as the primary areas of storm water quality concern:

- A. Sediment entering the storm drainage system from construction sites.
- B. There are some areas where discharges to Manila Ditch are unregulated, both in terms of quality and quantity.
- C. Materials on existing street surfaces are washed into the storm drainage system (soil, debris, road salt).
- D. There are 4 culinary water wells in town, two of which are at greater risk of surface water contamination. There are two Cedar Hills wells, one near 9980 North 4500 West, one near 10405 N Cottonwood Drive, and two Manila Water Company wells in the area of 4150 West Cedar Hills Drive. The Cedar Hills wells are deeper and protected from surface water by several impervious layers. The Manila Water Company wells are shallower, and may be more susceptible to surface water contamination.

The following was added in 2010:

- E. 1) The City operates and maintains a municipal storm drainage system that consists of collectors, piped and open conveyance, detention basins and sumps (class v injection wells). With these assets, the City has some unique challenges as it addresses its storm drainage system. Most of the city is located on highly permeable sands and gravels that comprise “the bench.”
- 2) The City has taken advantage of the highly permeable soils for management of storm drainage and relies heavily upon sumps for storm drainage disposal.
- 3) There are currently more than 50 sumps within the City, most of which are located on public property. Runoff is directed into these sumps, which discharge directly to the underlying soils. Even though the use of sumps is an acceptable method of runoff disposal, untreated storm drainage runoff can potentially reach the underlying groundwater aquifer, which supplies the culinary water to a number of the communities in Northern Utah County.
- F. The City has determined that at this time no storm water discharge is contributing to a 303(d) listed waterbody.

## **E. RESPONSIBLE PARTIES**

**Organization:** The program will outline an organizational structure that delineates the lines of authority and responsibilities of individuals responsible for the Plan. It will also define how the City will fund the operations associated with this plan.

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### **NOTICE of UNDERSTANDING**

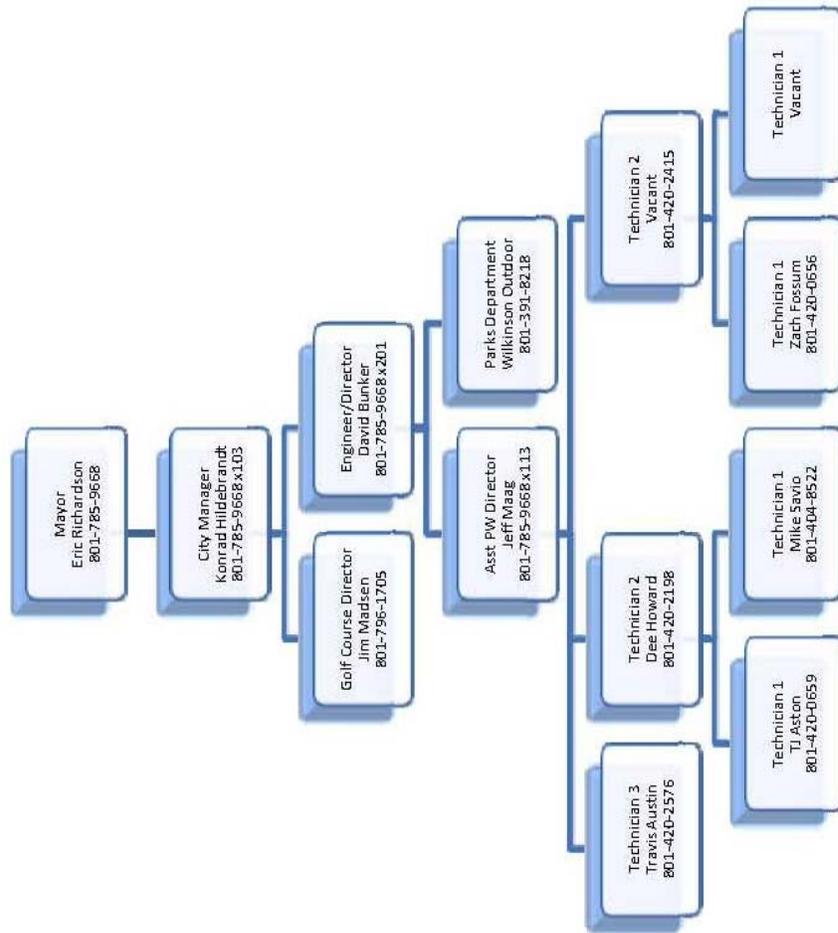
Let it be known that the City of Cedar Hills understands and agrees that storm water issues are real and require attention on an administrative level. However, the City of Cedar Hills insists that this attention should be provided with fore thought and planning at each specific area of jurisdiction. Furthermore, the City of Cedar Hills cannot acknowledge that the generic requirements issued by the State of Utah Department of Environmental Quality Division of Water Quality, MS4 General UPDES Permit correctly address the specific nature of this community. By mandating excessive requirements and not funding the implementation of those requirements places a tremendous and unfair financial burden on the citizens of the City of Cedar Hills.

The State of Utah should provide funding to conduct mandated programs.

While the City of Cedar Hills is not in agreement with the Division of Water Qualities methods; the City of Cedar Hills will continue to make a good faith effort to meet the requirements set forth in the MS4 UPDES Permit.

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# City of Cedar Hills Public Works Department Organization



See next page for complete duties & responsibilities for each position

## Duties and Responsibilities

- Mayor: The role of the Mayor is to listen, understand, and represent the interests of the City through legislation and policy via the City Council
- City Manager: Liaison with City Council and Public Works
- Engineer/Public Works Director: Liaison with administration and Public Works; General coordination and administrator of the Storm Water Management Plan (SWMP); Storm drain mapping; Plan review
- Assistant PW Director: Oversee SWMP program specifics and work with department heads; Responsible for shared facilities and general work areas including: equipment wash area, salt/materials storage areas, storm drain system maintenance, general BMP maintenance; Coordinate with Engineer/Public Works Director; Reporting; Tracking/documentation of activities and actions; Site inspections/compliance
- Technician 3: Water department maintenance work area; Training water department personnel, Chemical storage in work area; Water department equipment operation/maintenance; Site inspections/compliance
- Parks Department: Contractor responsible to coordinate with Public Works staff and parks personnel; Pesticide, herbicide, and fertilizer (PHF) program; Mowing program
- Golf Course Director: Coordinate with golf course grounds staff and Public Works; Pesticide, herbicide, and fertilizer (PHF) program; Chemical and fertilizer storage in work area; Course equipment operation/maintenance; Mowing program
- Technician 2: Oversee duty assignments and supervision of water, sewer, and pressurized irrigation projects; Water department maintenance work area; Training water department personnel, Chemical storage in work area; Water department equipment operation/maintenance. Oversee duty assignments and supervision of parks/trails, streets, and storm water management; Streets department equipment operation/maintenance; Training department personnel; Chemicals storage in work area; Snow plowing/Street Sweeping program; Salt/Materials stockpile areas
- Technician 1: Perform various duties with a specific focus on fleet/vehicle maintenance, street and sidewalk projects, and gathering speed/traffic data. Perform various duties with a specific focus on signage, parks/trails, and weed abatement. Perform various duties with a specific focus on meter maintenance, lateral inspections, pumps/prv maintenance, and facility/building inspections. Perform various duties with a specific focus on Blue Stakes, capital projects, events, and storm water maintenance/management.

# **PART 2**

## **BMPs PERFORMED BY CEDAR HILLS CITY**

### **A. INTRODUCTION**

PART 2, BMPs PERFORMED BY CEDAR HILLS CITY contains those BMPs that will be performed by Cedar Hills City employees to address the six minimum control measures of the Phase II Rule.

All of the best management practices contained in PART 2, BMPs PERFORMED BY CEDAR HILLS CITY apply to activities of Cedar Hills City as opposed to the activities of those in the private sector.

Some of the best management practices in the Public Education and Outreach Practices will include participation with the Utah County Storm Water Coalition. See APPENDIX H, UTAH COUNTY STORM WATER COALITION.

### **B. BEST MANAGEMENT PRACTICES**

The charts on the following pages contain the BMPs that will be performed by Cedar Hills City employees. The charts also include justification for each BMP, measurable goals for each BMP, the planned schedule of meeting the goals, and resource requirements associated with each BMP. Note that for best management practices that are already established practices in Cedar Hills, the measurable goal consists of continuing the practice, and the implementation schedule simply indicates that the BMP is “ongoing”.

## **MCM #1**

### **Public Education and Outreach on Storm Water Impacts**

This Minimum Control Measure will provide education materials to residents, businesses, institutions, commercial facilities, MS4 facilities, and developers/contractors. The objective for MCM #1 is to enlist cooperation from the above groups in reducing sediment, nutrients and illicit discharges.

Various methods may be used over the course of the SWMP.

Examples of these methods:

- Materials will be distributed with City's billing & newsletter.
- Information will be provided on the City's web site.  
(This information must cover the subjects as per Section 4.2.1)
- We will participate with the Utah County Storm Water Coalition. The coalition provides information at the County Fair, training seminars, student education programs and others.

To measure the success of this MCM:

- Tracking will be completed for the number and type of information distributed.
- A monitoring program will be created to identify the number of overland overflows, from residential and commercial properties irrigation water, which enter the storm drains.

Best Management Practice:

**MINIMUM CONTROL MEASURE #1 PUBLIC EDUCATION AND OUTREACH ON STORM WATER IMPACTS**

Part 2 - 2

<b>Best Management Practice</b>	<b>Justification</b>	<b>Measurable Goal</b>	<b>Implementation Schedule</b>	<b>Resource Requirements</b>
A. Distribute educational materials in utility bill mailings and post on City website. Include specific information for the different target groups.	Educational materials promote public awareness of storm water issues.	Include materials in mailing two times per year.	Ongoing	Employee time and mailing, equipment costs
B. Distribute water conservation information, with utility billings during summer months.	Reducing excess runoff from landscaped areas may reduce the carry of lawn chemicals, nutrients and sediments to the storm drainage system	Include materials in mailing two times per year	Ongoing	Included in existing newsletter costs
C. Enact graduated culinary water rates to encourage conservation	Reducing excess runoff from landscaped areas may reduce the carry of lawn chemicals, nutrients and sediments to the storm drainage system	Adopt ordinance containing graduated culinary water rates	Ongoing	Complete
D. Participate with the Utah County Storm water Coalition.	The Utah County Storm Water Management Program contains BMPs in behalf of the City	Document the information and results from coalition activities.	Ongoing	\$1060 annual fee and employee time
E. Document overland overflowing of irrigation water on residential and commercial properties	Data will indicate public awareness of storm water issues	Complete inspection two times per year	2011	Employee time and equipment costs

## **MCM #2**

### **Public Involvement / Participation**

This Minimum Control Measure will provide opportunities for the public to participate in and have input to the SWMP. The objective for MCM #2 is to have multiple perspectives and create personal ownership through involvement.

- The City uses an elected City Council governing body. This Council has direct input to the SWMP. They receive and relay suggestions or concerns from citizens and act as the Advisory Committee.
- The City sponsors community cleanup and maintenance opportunities.
- City participation with the County Storm Water Coalition brings multiple jurisdictional communications and provides new or updated information.

To measure the success of this MCM:

- Document the suggestions / concerns from City Council.
- Keep records of date and locations of Annual Clean-Up Projects.

Best Management Practice:

**MINIMUM CONTROL MEASURE #2: PUBLIC PARTICIPATION/INVOLVEMENT**

<b>Best Management Practice</b>	<b>Justification</b>	<b>Measurable Goal</b>	<b>Implementation Schedule</b>	<b>Resource Requirements</b>
A. Assist Advisory Committee to implement the SWMP	This provides an opportunity for public involvement and input on the SWMP	Annual Review	Ongoing	Employee time and equipment costs
B. Review SWMP in a public meeting at the time of adoption	This facilitates public involvement in the SWMP	Adopt SWMP in a properly advertised public meeting	November 2010	Employee time and equipment costs
C. Sponsor storm drain inlet decal marking	Marking the inlets will increase public awareness of storm water contamination potential	Document who sets the decals and the number of decals set	August 2004; ongoing thereafter	Cost of decals
D. Sponsor community clean-up and other service opportunities	During clean-up projects, volunteers collect and dispose of debris that might otherwise enter the storm water system	Sponsor at least one time per year. Document date and locations	May 2003; annually thereafter	Included in General Fund budget
F. Participate with the Utah County Storm water Coalition.	The Utah County Storm Water Management Program developed by the Utah County Storm Water Coalition contains BMPs in behalf of the City	Document the information and results from coalition activities.	Ongoing	Included in MCM #1, BMP D

### **MCM #3**

#### **Illicit Discharge Detection and Elimination (IDDE)**

This Minimum Control Measure will provide information and training to manage unauthorized discharges to the storm water system. The objective for MCM #3 is to eradicate illicit discharges to the storm water system through ordinance, education and enforcement.

Methods used include:

- The City, by ordinance, prohibits dumping of specified materials in the storm water system (7-3A-3)
- Continued mapping of the storm water system for management purposes
- Complete regular inspections
- Provide educational materials to employees, residents, and businesses. (MCM #1)

To measure the success of this MCM:

- Complete documentation of inspections and illicit discharge notices.
- Review documentation and evaluate changes.

Best Management Practice:

**MINIMUM CONTROL MEASURE #3: ILLICIT DICHARGE DETECTION AND ELIMINATION**

<b>Best Management Practice</b>	<b>Justification</b>	<b>Measurable Goal</b>	<b>Implementation Schedule</b>	<b>Resource Requirements</b>
A. Map the Storm Drainage System	Mapping a system is essential to effectively managing it	Review annually	Ongoing	Employee time and material/equipment costs
B. Develop an ordinance regulating storm drainage	An ordinance gives legislative authority to require that the quantity and quality of storm water discharge be regulated	Review annually	Ongoing	Employee time and material/equipment costs
C. Inspect high priority outfalls during dry weather periods to identify non-storm water discharges	Inspections of outfalls when there should be no discharge may help identify illicit discharges	Document annual inspection of outfalls	Ongoing	Employee time and material/ equipment costs
D. Inspect the storm drainage system	Inspections of the system may help identify materials that should not be present in the system, after which their source may be identified	Document annual inspection of storm drainage system	August 2004; annually thereafter Ongoing	Employee time and equipment costs
E. Provide sanitary sewer to areas having septic systems and connect them to the sanitary sewer	Eliminating septic systems may result in reducing pollution resulting from failure of the septic systems.	Construct sewer improvements per capital improvement plan	Ongoing	As per budgeted projects in capital improvement plan
F. Provide educational material explaining the harmful effects of illicit discharges	Awareness of the serious impacts of illicit discharges may reduce illicit discharges	Document violations and note changes, review annually	2011	Included with MCM #1 BMP A

## **MCM #4**

### **Construction Site Storm Water Runoff Control**

This Minimum Control Measure will reduce Storm Water pollution by managing construction site run-off prevention methods. The objective for MCM #4 is to control potential construction site pollution in a manner that will restrict it from entering the storm water system.

Methods used include:

- Create City storm water regulations providing requirements for construction and methods of enforcement.
- Provide developers and contractors with required and suggested BMPs.
- Complete regular construction site inspections and post construction inspections.
- Review construction SWMP during pre-construction meeting.

To measure the success of this MCM:

- Document the number of compliance inspections and violation notices issued each year.

Best Management Practice:

**MINIMUM CONTROL MEASURE #4: CONSTRUCTION SITE RUNOFF CONTROL**

<b>Best Management Practice</b>	<b>Justification</b>	<b>Measurable Goal</b>	<b>Implementation Schedule</b>	<b>Resource Requirements</b>
A. Develop an ordinance regulating construction site storm drainage	An ordinance gives legislative authority to require that storm water discharge be regulated	Adopt ordinance regulating construction site storm drainage	Ongoing	Included in MCM #3, BMP B
B. Develop drainage design guidelines	These will contain the technical part of the storm water regulations	Publish drainage design guideline document	March 2004 – September 2004	40 hours of city employee time
C. Develop a set of standard BMPs	Standardized BMPs for use during and after construction will facilitate implementation	Add BMPs to construction standards document	Ongoing	Complete
D. Require that land developers adequately address storm water quality in their development plans	Planning adequate measures to mitigate storm water pollution during the land development should reduce pollution	Add Construction Site Storm Water Management Plan to submittal requirements	Ongoing	Included in MCM #4, BMP B
E. Review Construction Site Storm Water Management Plan with contractors during preconstruction meeting	This encourages contractors to implement and maintain the required BMPs	Record and file minutes of preconstruction meetings	In place Ongoing	Included in current practice
F. Inspect construction sites to verify that storm water pollution prevention measures are adequate	Inspection is often necessary to achieve successful storm water pollution prevention	Conduct annual training meeting with inspectors	Ongoing	Employee time and material/equipment costs
G. Conduct inspection of developments to verify streets and storm drainage facilities are clean before final acceptance	This encourages developers to maintain good pollution prevention measures and requires them to clean up any problems that have occurred	Adopt ordinance allowing the City to hold bond money until streets and storm drainage facilities are clean	Ongoing	Employee time and material/ equipment costs

## **MCM #5**

### **Post Construction Runoff Control**

This Minimum Control Measure will reduce storm water pollution through management and enforcement of post construction BMP commitments.

The objective for MCM #5 is to maintain BMP control of potential post-construction runoff pollution that could enter the storm water system.

Methods used include:

- Continue inspections and enforcement of the required and/or approved BMPs.
- Maintain ordinance regulating post construction run-off control.

To measure the success of this MCM:

- Annually review the number of inspection reports and citations issued.
- Review dry/wet sampling plan.

Best Management Practice:

**MINIMUM CONTROL MEASURE #5: POST CONSTRUCTION RUNOFF CONTROL**

<b>Best Management Practice</b>	<b>Justification</b>	<b>Measurable Goal</b>	<b>Implementation Schedule</b>	<b>Resource Requirements</b>
A. Develop and maintain an ordinance regulating post construction site storm drainage	An ordinance gives legislative authority to require that storm water discharge be regulated	Adopt ordinance regulating post construction site storm drainage	Ongoing	Included in MCM #3, BMP B
B. Develop a set of standard BMPs	Standardized BMPs for use during and after construction will facilitate their implementation	Add BMPs to construction standards document	Ongoing	Employee time and material/equipment costs
C. Require that land developers/site owners create commercial/PUD operation and maintenance plans adequately addressing storm water runoff concerns	Requiring that site owners adequately address storm water quality should reduce pollution	Add commercial/PUD operation and maintenance plans to development submittal requirements	Ongoing	Included in MCM #4, BMP B
D. Inspect installation of post construction BMPs	Inspection is often necessary to achieve successful storm water pollution prevention	Conduct annual training meeting with inspectors	Ongoing	1. Paid by land developers 2. Included in MCM #4, BMP F
E. Conduct annual inspection of post construction sites	Inspection of post construction BMPs may be necessary to achieve continued storm water pollution prevention	1. During durability period, contract inspections with inspection firm 2. After durability period, document	Ongoing	Employee time and material/equipment costs

<b>Best Management Practice</b>	<b>Justification</b>	<b>Measurable Goal</b>	<b>Implementation Schedule</b>	<b>Resource Requirements</b>
		inspections		
F. Adopt narrower street cross section and encourage other LID techniques	A narrower street cross section should reduce runoff	Add narrower street cross section to construction standards	Ongoing	Complete
G. Develop a plan to retrofit sites that are adversely impacting water quality	New materials and/or methods may help reduce storm water pollution	retrofit plan evaluation completed	2015	Employee time and material/equipment costs

## **MCM #6**

### **Pollution Prevention/Good Housekeeping**

This Minimum Control Measure will reduce storm water pollution through employee training and SOP use. The objective of MCM #6 is to prevent storm water pollution at municipal operations.

Methods used include:

- Identify “High Priority” facilities.
- Provide ongoing development of SOPs.
- The continued education and training of employees.
- Complete documentation and evaluation of the regular inspections.
- Have a regularly scheduled street sweeping program.

To measure the success of this MCM:

- Review and evaluate inspection reports for changes in the number of deficiencies.

Best Management Practice:

**MINIMUM CONTROL MEASURE #6: POLLUTION PREVENTION/GOOD HOUSEKEEPING**

<b>Best Management Practice</b>	<b>Justification</b>	<b>Measurable Goal</b>	<b>Implementation Schedule</b>	<b>Resource Requirements</b>
A. Sweep streets	Cleaning materials from street surfaces keeps it out of the storm drainage system	Sweep all streets semi-annually	Ongoing	\$10,000, funded by storm drain utility fee
B. Inspect City owned facilities as required.(see 4.2.6.6)	Inspections of the facilities may help identify materials that should not be present	Review reports for number of deficiencies and evaluate.	Ongoing	Employee time and material/equipment costs
C. Review storm drainage related procedures (SOPs) with Public Works Staff	Training should result in better storm water pollution prevention by public employees	Discuss procedures in annual training meeting	Ongoing	Employee time and material/ equipment costs
D. Appropriately dispose of municipal vehicle waste	Contracting with a company specializing in waste disposal should keep vehicle waste out of the storm drainage system	Maintain outsourced disposal for vehicle waste	October 2004; annually thereafter	Employee time and material/equipment cost hours of city employee time/year
E. Submit annual report to the Utah Department of Environmental Quality	Annual report is requirement of permit	Submit report	October 2004; annually thereafter	Employee time and material/equipment cost hours of city employee time/year

## **C. CONCLUSION**

Cedar Hills City will measure progress towards each of the goals outlined in MCM #1 - 6. The BMPs contained in this chapter, in conjunction with the Construction Site and Post Construction Site BMPs found in Part 4 and the BMPs performed by the Utah County Storm Water Coalition satisfy all of the six minimum control measures established by the Storm Water Phase II Rule.

APPENDIX D, FORMS FOR REPORTING PROGRESS, contains forms for recording and reporting progress toward measurable goals. These forms can be used to compile the annual report to the State.

## **D. GRAPHICAL SUMMARY OF BMP IMPLEMENTATION SCHEDULE**

The following pages contain a graphical summary of the implementation schedules of all of the city-performed best management practices. It illustrates the order of implementation of all of the BMPs, and shows when each must be implemented.



# **PART 3**

## **STORM WATER TECHNICAL MANUAL**

### **A. INTRODUCTION**

The Storm Water Technical Manual contains requirements for land development and construction activities, as well as design criteria and guidelines for those performing such activities. It includes best management practices applicable to development and construction activities. It also includes the plan submittal requirements. However, it is recognized that not all technology or methods have been addressed in the Storm Water Technical Manual. It is possible to use alternative methods but they must be approved by the City Engineer. It is encouraged that methods employing Low Impact Development (LID) be considered. The City Engineer has authority to modify the requirements of the Storm Water Technical Manual as needed to accomplish reasonable and effective storm water pollution prevention objectives.

### **B. REQUIREMENTS FOR PROPOSED DEVELOPMENTS**

#### **1. Incorporate best management practices (BMPs) into development design to limit quantity of runoff and preserve quality of runoff**

Storm water best management practices (BMPs) must be considered throughout the development process. PART 4, CONSTRUCTION AND POST CONSTRUCTION BEST MANAGEMENT PRACTICES of the Cedar Hills Storm Water Management Program contains fact sheets for BMPs whose use Cedar Hills City encourages. Section F.8, Storm Water Quality Criteria of this Storm Water Technical Manual identifies BMPs that are required on all Construction Site Storm Water Management Plans.

#### **2. Prepare Construction Site Storm Water Management Plan**

A Construction Site Storm Water Management Plan must be prepared and submitted with the development plans for approval. This requirement applies to all developments (except construction of a single family house, with associated on-site improvements). See section G of this chapter, CONSTRUCTION SITE STORM WATER MANAGEMENT PLAN CONTENTS for the required contents of the plan.

**3. Provide financial guarantee that improvements contained in the Construction Site Storm Water Management Plan will be installed and maintained**

Financial guarantee must be posted with Cedar Hills City prior to beginning construction. In the case of a subdivision of land, this will be included in the bond that is required for the cost of the subdivision improvements. In the case of site improvements, rather than a financial guarantee, non-monetary methods of enforcement already in place in Cedar Hills City (business licenses, utility services, building and occupancy permits) are available to encourage compliance with the improvements contained in the approved Construction Site Storm Water Management Plan.

At the time of development, the developer shall provide an estimate of the cost of the required improvements. The City will review the estimate and establish the dollar amount of the financial guarantee.

**4. Prepare Post Construction Storm Water Management Plan**

A Post Construction Storm Water Management Plan must be prepared and submitted with the development plans for approval. This requirement applies to all developments in which private improvements are constructed (other than construction of a single family house, with associated on-site improvements). See section H of this chapter, POST CONSTRUCTION STORM WATER MANAGEMENT PLAN CONTENTS for the required contents of the plan.

**5. Obtain UPDES Permit (all sites having land disturbance area equal to or greater than 1 acre)**

Developments having a disturbed area of 1 acre or more require a UPDES Storm Water General Permit for Construction activities from the Division of Water Quality of the Department of Environmental Quality of the State of Utah.

Obtaining the permit requires preparation of a Storm Water Pollution Prevention Plan (we would expect that the Construction Site Storm Water Management Plan previously described would suffice) and a Notice of Intent. The permit form is available on the Internet in PDF format at <https://secure.utah.gov/stormwater/main.html>. The developer must submit a copy of the Notice of Intent and proof of fee payment to the City before the site plan will be considered finalized.

Note that when a development of over 1 acre in size is phased, the permit is required for each phase, even if each phase is less than 1 acre in size.

## **C. REQUIREMENTS FOR CONSTRUCTION ACTIVITIES (OTHER THAN THOSE ASSOCIATED WITH INDIVIDUAL RESIDENTIAL STRUCTURES)**

### **1. Provide instruction to construction site operators regarding the Construction Site Storm Water Management Plan**

Prior to beginning work, developers and contractors must provide appropriate instruction to on-site construction supervisors and operators, regarding the requirements of the Construction Site Storm Water Management Plan. A copy of the approved plan must be present at the construction site.

### **2. Following Construction Site Storm Water Management Plan**

The improvements shown in the approved Construction Site Storm Water Management Plan must be constructed as indicated in the plan. The appropriate activities outlined in the Construction Site Storm Water Management Plan must be performed prior to any other construction activities on the site. Cedar Hills City encourages modifications to the plan when needed to improve storm water management in light of site conditions. However, variations from the plan that reduce or eliminate elements of the plan must only be done with the approval of the Cedar Hills City Public Works Representative or City Engineer.

### **3. Monitor effectiveness of the elements included in the Construction Site Storm Water Management Plan, and make improvements as necessary to achieve the plan objectives.**

After initial implementation of the improvements outlined in the approved Construction Site Storm Water Management Plan, rainfall activity will provide opportunity to observe the effectiveness of the storm water management improvements. Those responsible for construction activities must monitor the in-place storm water management improvements to assess their effectiveness; they must then make adjustments to the improvements as needed to accomplish effective storm water management.

### **4. Provide verification that improvements were constructed as approved**

Following implementation of the improvements contained in the Construction Site Storm Water Management Plan, the preparer of the plan shall provide Cedar Hills City with a statement as to the condition of the improvements contained in the plan. The statement shall be made on a copy of the Construction Site Storm Water Management Plan document, and shall be signed.

If the improvements were constructed as approved, it shall include language verifying such. If the improvements were not constructed as approved, it shall state the differences, the reason for the differences, and provide an opinion as to the adequacy of the constructed improvements. This statement must be provided to Cedar Hills City at the time record drawings are submitted (in the case of public improvements) or prior to issuance of an occupancy permit (in the case of private site improvements)

## **D. REQUIREMENTS FOR CONSTRUCTION ACTIVITIES ASSOCIATED WITH INDIVIDUAL RESIDENTIAL STRUCTURES**

### **1. Construction Site Storm Water Management Plan**

While the Public Works Representative or City Engineer may require that a Construction Site Storm Water Management Plan be created on individual residential lots in special circumstances, generally no lot-specific plan is required.

### **2. Sediment Control on Small Construction Sites**

The BMP fact sheet for Sediment Control on Small Construction Sites (SCSCS) is to be included as a part of the building permit. This BMP applies to construction and landscaping activities associated with individual residential structures, and shall be followed.

### **3. Owner or operator shall make adjustments to practices as needed to prevent storm water pollution**

Sediment that is left in the street or on adjacent lots is evidence of inadequate sediment control. Where storm water pollution prevention measures are inadequate, or are not being properly followed, the Public Works Representative or City Engineer may refuse to perform inspections or shut down work on the project.

## **E. REQUIREMENTS FOR EXISTING DEVELOPMENTS**

### **1. Following approved Post Construction Storm Water Management Plan**

The owners of existing developments are responsible to maintain improvements and observe practices that were part of an approved Post Construction Storm Water Management Plan. Failure to adhere to the plan may result in failure of the City to renew business licenses, fines or other action as prescribed by Cedar Hills City Code.

### **2. Operator or owner makes adjustments to practices or improvements when necessary to achieve Post Construction Storm Water Management Plan objectives**

Cedar Hills City encourages adjustments to the plan that enhance effective storm water management. However, significant reduction of practices contained in the plan is to be accomplished through formal modification of the plan and resubmission to the City Engineer for approval.

## **F. STORM WATER PERFORMANCE CRITERIA AND DESIGN GUIDELINES**

The following storm drainage criteria and design guidelines apply to all storm drainage plans in Cedar Hills and shall be used in storm drainage calculations. The City Engineer has authority to modify the criteria and guidelines as needed to meet changing or unusual needs or conditions.

### **1. Contents of drainage system plan**

- A. The drainage plan shall include an analysis of potential drainage problems, along with a proposal indicating how the surface water will be disposed of. Detention basins may be required to alleviate the impact on existing drainage facilities. Said plan shall also include the projected quantity of waters anticipated for a ten-year storm (piping), 100-year storm (detention facilities), and 100-year storm (retention facilities). All drainage facilities shall be installed in conformance with approved City drainage plans.
- B. The development shall include all necessary storm drainage appurtenances including collection boxes/basins, culverts, drain pipes, detention/retention basins, erosion control, energy dissipation structures, and drainage channels. In order to insure the safety of the occupants of a subdivision, the City may require the developer to cover or fence culverts, basins, and canals, at the discretion of the City Planning Commission and Council.

### **2. Design storm frequency**

- A. Drainage facilities other than detention and retention facilities shall be adequate for a design ten-year storm
- B. Flood control facilities shall be designed for a 50-year storm
- C. Drainage basins (detention or retention) shall be designed for a 100-year storm (of all durations)

### **3. Drainage basin design**

- A. Drainage basins shall be designed to have a minimum of one foot of freeboard, 3:1 slope (max.), and grass covering with a sprinkling system unless otherwise approved.
- B. Detention basins shall be designed with a maximum discharge rate of 0.2 cfs/acre, or as otherwise dictated by the City Engineer.
- C. All drainage basins shall include a spillway adequate to assure that minimum damage occurs as a result of basin overflow.
- D. All drainage basin calculations shall be compiled in the form of a report, and shall be stamped by a professional engineer, licensed in the State of Utah.

#### 4. Drainage system design

- A. Maximum design capacity is 3.0 cfs for a standard bicycle safe 18” x 36” inlet grate.
- B. All surface drainage piping shall have a minimum diameter of 15-inches.
- C. All subsurface drainage piping shall have a minimum diameter of 8-inches.
- D. Manholes shall be installed at spacing no greater than 400 feet and at angle points in drainage and subsurface drainage piping.
- E. Minimum pipe slopes shall be the same as required by the Utah State Division of Health for sanitary sewers.
- F. Piping, testing, etc., shall comply with specific requirements as defined in the section of the specifications covering storm drainage requirements unless otherwise approved by the City Engineer.

#### 5. Pretreatment facilities

- A. In areas where the highest water level in the ground is no closer than eight (8) feet to the ground surface and percolation rates are high, pre-treatment sumps may be used to dispose of surface waters.
- B. All pre-treatment manhole and storm water sumps shall be constructed to comply with applicable City Standards, and as indicated within standard drawing no. 506.
- C. All design data including percolation tests, etc., must be submitted with the drainage plan.
- D. For single lots or small areas, the above may be waived so that sumps can be installed or drainage directed on to private property with a drainage easement.

#### 6. Storm water encroachment onto streets

Allowable use of streets for the initial storm water runoff in terms of pavement encroachment is as follows:

<u>Street Classification</u>	<u>Maximum Encroachment</u>
Rural	No curb over-topping. Flow may spread to crown of street.
Local	No curb over-topping. Flow may spread to crown of street.
Minor Collector	No curb over-topping. Flow spread must leave at least one lane in each direction free of water.
Major Collector	No curb over-topping. Flow spread must leave at least one lane in each direction free of water.

## 7. Intensity-Duration-Frequency (IDF) Curve

The Intensity Duration Frequency (IDF) curve shown below shall be used for storm drainage calculations in Cedar Hills City.

### Design Rainfall Depths (Inches) for the Given Duration

<b>Duration</b>	<b>10 Year</b>	<b>25 Year</b>	<b>50 Year</b>	<b>100 Year</b>
5 min	0.20	0.23	0.26	0.29
10 min	0.31	0.36	0.41	0.45
15 min	0.39	0.46	0.52	0.58
30 min	0.55	0.63	0.72	0.80
60 min	0.69	0.80	0.91	1.01
2 hours	0.84	0.98	1.11	1.24
3 hours	0.98	1.16	1.31	1.46
6 hours	1.33	1.59	1.80	2.00
12 hours	1.64	1.98	2.24	2.49
24 hours	1.97	2.38	2.69	2.99

### Design Rainfall Intensities (inches per hour) for the Given Duration

<b>Duration</b>	<b>10 Year</b>	<b>25 Year</b>	<b>50 Year</b>	<b>100 Year</b>
5 min	2.40	2.76	3.12	3.48
10 min	1.86	2.16	2.46	2.70
15 min	1.56	1.84	2.08	2.32
30 min	1.10	1.26	1.44	1.60
60 min	0.69	0.80	0.91	1.01
2 hours	0.42	0.49	0.56	0.62
3 hours	0.33	0.39	0.44	0.49
6 hours	0.22	0.27	0.30	0.33
12 hours	0.14	0.17	0.19	0.21
24 hours	0.08	0.10	0.11	0.12

**8. Storm water quality criteria**

A. Storm Water Treatment

Prior to discharging storm water; collected water must be treated in an attempt to prevent illicit discharges of sediment, oils, floatables and other pollutants.

B. Use of Best Management Practices

Cedar Hills City encourages the use of the BMP fact sheets included in PART 4, CONSTRUCTION AND POST CONSTRUCTION BEST MANAGEMENT PRACTICES. **The following BMPs are required to be a part of all Construction Site Storm Water Management Plans:**

* BMP Inspection & Maintenance	BMPIM
* Concrete Waste Management	CWM
* Dust Controls	DC
* Grading Practices	GP
* Portable Toilets	PT

There is no list of BMPs that is required on all Post Construction Storm Water Management Plans.

In addition to the required BMPs listed above, other BMPs from PART 4 that apply to a given development should be used. Cedar Hills City also encourages the use of practices in addition to those contained in the Cedar Hills Storm Water Management Program that may be suitable for a given development. Engineering judgment must be used in selecting BMPs for a given development.

C. Prohibited Practices

The following practices are specifically prohibited:

- Soil or construction materials may not be piled in streets
- Soil bridges over curb and gutter may not be constructed

## **G. CONSTRUCTION SITE STORM WATER MANAGEMENT PLAN CONTENTS**

### **1. Purpose of the Construction Site Storm Water Management Plan**

The purpose of the Construction Storm Water Management Plan is to control storm water runoff and reduce pollutants in storm water runoff during construction by accomplishing the following:

- A. Controlling soil erosion
- B. Controlling discharge of sediment into storm drainage facilities or off-site
- C. Prevent illicit discharges into on-site soils, into storm drainage facilities or off-site
- D. Prevent uncontrolled discharge of storm water to adjacent property
- E. Controlling construction waste
- F. Controlling dust

### **2. Contents of the Construction Site Storm Water Management Plan**

The Construction Storm Water Management Plan is to be submitted with the site plans or improvement plans, and is to contain at least the following elements:

- A. Existing and proposed contours as shown on the grading plan
- B. Existing and proposed storm drainage improvements (Minimum design for a 24hr., 2year event. See Design Standards 2.7.6A8, Intensity-Duration Curve)
- C. Best management practices to accomplish the purpose of the plan--show the following for each BMP specified, as applicable:
  - i. Location and extent of specified BMP
  - ii. Timing of implementation, possibly in terms of planting season or number of days following commencement of grading
  - iii. Duration of implementation
  - iv. Any information in addition to or different from that shown on the BMP fact sheet as necessary to employ the BMP on the site
- D. BMP Fact sheets or other descriptive material for all specified BMPs
- E. Proposed re-vegetation—show the following:
  - i. Location and type of re-vegetation proposed
  - ii. Timing of re-vegetation, possibly in terms of planting season or number of days following commencement of grading
- F. Sequencing of construction activities and BMPs
- G. Name, address & telephone number of individual who has responsibility for implementation and maintenance of the plan.

## **H. POST CONSTRUCTION STORM WATER MANAGEMENT PLAN CONTENTS**

### **1. Purpose of the Post Construction Storm Water Management Plan**

The purpose of the Post Construction Storm Water Management Plan is to control storm water runoff and reduce pollutants in storm water runoff after construction is complete and the developed site is in operation. This is achieved by accomplishing the following:

- A. Controlling soil erosion
- B. Controlling discharge of sediment into storm drainage facilities or off-site
- C. Preventing illicit discharges into on-site soils, into storm drainage facilities or off-site

### **2. Contents of the Post Construction Storm Water Management Plan**

The Post Construction Storm Water Management Plan is to be submitted with the site plans or improvement plans. It shall be contained on a plan sheet of its own, rather than being a part of another plan sheet, and is to contain at least the following:

- A. The site plan, including vicinity map, proposed contours, permanent storm drainage features, and landscaping.
- B. Best management practices to accomplish the purpose of the plan. Examples of appropriate BMPs may include those addressing operation and maintenance of storm drainage quality control facilities, operation and maintenance of storm water discharge control facilities, maintenance of landscaping, good housekeeping practices, etc.
- C. Show the following for each BMP specified:
  - i. Location and extent of specified BMPs, as appropriate
  - ii. Detailed schedule of execution for each specified BMP, in terms of starting time, duration, frequency, etc., as appropriate
  - iii. Any information in addition to or different from that shown on the BMP fact sheets as necessary to employ the BMPs on the site
- D. BMP fact sheets or other descriptive material for all specified BMPs. BMP fact sheets that are part of the Post Construction Storm Water Management Plan are to be on a separate sheet from those BMP fact sheets associated with the Construction Site Storm Water Management Plan.

- E. The following statement shall prominently appear on all Post Construction Storm Water Management Plans:

The holders of the business license at this site (or owner of the lot if there is no business license) are responsible to perpetually follow this Post Construction Storm Water Management Plan. Failure to follow the plan may result in the City refusing to renew business licenses or take other action against the property owner.

The objectives of the Plan are to:

1. Control soil erosion
2. Control discharge of sediment into storm drainage facilities or off-site
3. Prevent illicit discharges into on-site soils, into storm drainage facilities or offsite

If the objectives of the Plan are not being met, the site operator or owner shall make adjustments to the Plan as needed to accomplish its purposes.

Cedar Hills City encourages adjustments to the plan that enhance effective storm water management. However, significant reduction of practices contained in the plan is to be accomplished through formal modification of the plan and resubmission to the City Engineer.

## **I. PROPOSED CONSTRUCTION AND POST CONSTRUCTION STORM WATER MANAGEMENT PLAN REVIEW PROCEDURES**

The Construction Storm Water Management Plan and Post Construction Storm Water Management Plan will be submitted to Cedar Hills City with the development plans. They will be reviewed along with the development plans, with storm water quantity and quality benefits in mind. The review procedure will be the same as for subdivision improvement plans and site plans.

## **J. CONCLUSION**

Inasmuch as the construction and post construction related best management practices will generally be carried out by those in the private construction industry, they will be implemented as specified in specific construction site and post construction storm water management plans as development occurs. The BMPs found in PART 2, BMPs PERFORMED BY CEDAR HILLS CITY, cover Cedar Hills City's efforts to assure that the plans are followed.

Cedar Hills City's Storm Water Technical Manual satisfies, in part, two of the six minimum control measures established by the Storm Water Phase II Rule: #4: Construction site storm water runoff control, and #5: Post-construction storm water management in new development and redevelopment.

# PART 4 CONSTRUCTION AND POST CONSTRUCTION BEST MANAGEMENT PRACTICES

## A. BMP INDEX

Cedar Hills City encourages the use of the following best management practices on Construction Site Storm Water Management Plans. As established in Section F.8.B of PART 3, STORM WATER TECHNICAL MANUAL, **BMPs with an asterisk are required to be a part of all Construction Site Storm Water Management Plans**

* BMP Inspection & Maintenance	BMPIM
* Concrete Waste Management	CWM
* Dust Controls	DC
* Grading Practices	GP
* Portable Toilets	PT

**The City also encourages the use of BMP's on Post Construction Site Storm Water Management Plans. However, there is no list of BMP's that is required on all Post Construction Storm Water Management Plans.**

**Suggested Potential BMP's (See [www.cedarhills.org](http://www.cedarhills.org) for suggested BMP Fact Sheets)**

Benching	BE
Biofilters	BF
Brush or Rock Filter	BRF
Building Repair, Remodeling & Construction	BRRC
Catch Basin Cleaning	CBC
Conservative Easement	CE
Contaminated or Erodible Surface Areas	CESA
Compaction	CP
Construction Road Stabilization	CR
Construction Sequencing	CS
Diversion Dike	DD
Earth Berm Barrier	EB
Erosion Control Blankets	ECB
Geotextiles and Mats	GM
Grassed Swales	GS
Hydromulching	HM
In-Line Storage	ILS

Infiltration	IN
Inlet Protection – Concrete Block	IPC
Inlet Protection – Excavated	IPE
Inlet Protection – Gravel	IPG
Inlet Protection – Silt Fence or Straw Bale	IPS
Minimize Directly Connected Impervious Areas	MDCIA
Material Storage	MS
Mulching	MU
Outlet Protection	OP
Oil/Water Separators and Water Quality Inlets	OWS
Pest Control	PC
Preservation of Existing Vegetation	PEV
Parking Lot Design	PLD
Parking Lot Sweeping/Vacuuming	PLSV
Rock Check Dams	RCD
Retention/Infiltration Device Maintenance	RIDM
Riprap	RR
Sand Bag Barrier	SBB
Street Cleaning	SC
Stabilized Construction Entrance and Wash Area	SCEWA
Sediment Control on Small Construction Sites	SCSCS
Slope Drain	SD
Storm Drain Flushing	SDF
Silt Fence	SF
Seeding and Planting	SP
Surface Roughening	SR
Sediment Trap	ST
Straw Bale Barrier	STB
Temporary Drains and Swales	TDS
Temporary and Permanent Seeding	TPS
Temporary Stream Crossing	TSC
Vehicle and Equipment Cleaning	VEC
Vehicle and Equipment Fueling	VEF
Vehicle and Equipment Maintenance & Repair	VEMR

## **B. BMP FACT SHEETS**

The following sheets contain required BMP Fact Sheets for use in Cedar Hills.

**BMP: BMP Inspection and Maintenance**

**BMPIM**



**APPLICATIONS**

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

**DESCRIPTION:**

Inspect and maintain all structural BMP's (both existing and new) on a routine basis to remove pollutants from entering storm drain inlets. This includes the establishment of a schedule for inspections and maintenance.

**APPROACH:**

Regular maintenance of all structural BMP's is necessary to ensure their proper functionality.

- Annual inspections.
- Prioritize maintenance to clean, maintain, and repair or replace structures in areas beginning with the highest pollutant loading.
- Clean structural BMP's in high pollutant areas just before the wet season to remove sediments and debris accumulated during the summer and fall.
- Keep accurate logs of what structures were maintained and when they were maintained.
- Record the amount of waste collected.

**LIMITATIONS:**

- Availability of trained staff



**CEDAR HILLS**

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

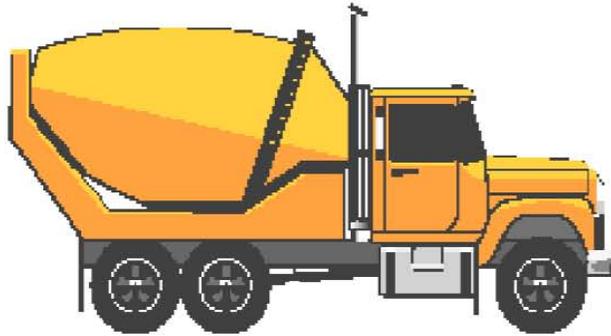
**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Staffing
- Training
- Administrative

- High
- Medium
- Low

## BMP: Concrete Waste Management

CWM



### DESCRIPTION:

Prevent or reduce the discharge of pollutants to storm water from concrete waste by conducting washout off-site, performing on-site washout in a designated area, and training employees and subcontractors.

### APPLICATIONS:

This technique is applicable to all types of sites.

### INSTALLATION/APPLICATION CRITERIA:

- ▶ Store dry and wet materials under cover, away from drainage areas.
- ▶ Avoid mixing excess amounts of fresh concrete or cement on-site.
- ▶ Perform washout of concrete trucks off-site or in designated areas only.
- ▶ Do not wash out concrete trucks into storm drains, open ditches, streets, or streams.
- ▶ Do not allow excess concrete to be dumped on-site, except in designated areas.
- ▶ When washing concrete to remove fine particles and expose the aggregate, avoid creating runoff by draining the water within a bermed or level area. (See Earth Berm Barrier information sheet.)
- ▶ Train employees and subcontractors in proper concrete waste management.

### LIMITATIONS:

- ▶ Off-site washout of concrete wastes may not always be possible.

### MAINTENANCE:

- ▶ Inspect subcontractors to ensure that concrete wastes are being properly managed.
- ▶ If using a temporary pit, dispose hardened concrete on a regular basis.

### OBJECTIVES

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion



Adapted from Salt Lake County BMP Fact Sheet

### TARGETED POLLUTANTS

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

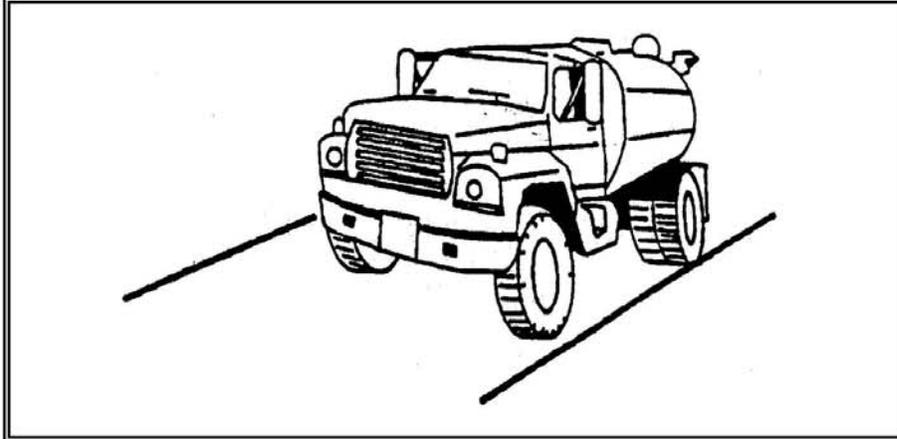
### IMPLEMENTATION REQUIREMENTS

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low

**BMP: Dust Controls**

DC



**DESCRIPTION:**

Dust control measures are used to stabilize soil from wind erosion, and reduce dust by construction activities.

**APPLICATION:**

Dust control is useful in any process area, loading and unloading area, material handling areas, and transfer areas where dust is generated. Street sweeping is limited to areas that are paved.

**INSTALLATION/APPLICATION CRITERIA:**

- ▶ Two kinds of street sweepers are common: brush and vacuum. Vacuum sweepers are more efficient and work best when the area is dry.
- ▶ Mechanical equipment should be operated according to the manufacturers' recommendations and should be inspected regularly.
- ▶ Water may be sprayed on the ground surface to moisten dry soils, making it less susceptible to wind erosion.

**LIMITATIONS:**

- ▶ Street sweeping is labor and equipment intensive and may not be effective for all pollutants.
- ▶ Water sprayed from water trucks must be done at a rate such that the water is absorbed in the soil; if excessive amounts of water are used, it may run off, carrying soil with it.

**MAINTENANCE:**

If excess water results from water spraying, dust-contaminated waters should not be allowed to run off site. Areas may need to be resprayed to keep dust from spreading.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion



Adapted from Salt Lake County BMP Fact Sheet

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High     Medium     Low

**BMP: Grading Practices**

**GP**



**Soils exposed from land grading activities are very vulnerable to erosion**

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

**DESCRIPTION:**

Control soil erosion by minimizing the exposure of bare soil to erosive forces. This is done by

- 1) limiting the amount of land disturbed at one time in preparation for construction
- 2) limiting the amount of time between the disturbance of soil and protection or stabilization of disturbed soils, and
- 3) using grading practices to protect exposed soils susceptible to storm water runoff.

Related practices include construction sequencing, preservation of existing vegetation, erosion control practices and sediment control practices.

**APPROACH:**

- Limit the area of disturbance to those areas requiring grading. This preserves existing vegetation and reduces the vulnerability of soil to erosion.
- Based on erosion potential and sediment control measures on the site, establish what areas are to be graded at one time.
- An undisturbed buffer zone containing vegetation at the lowest elevation of a construction site can reduce the transport of sediment off site.
- Initiate soil protection measures during the course of work to minimize the length of time soil is exposed to erosive forces.
- Conduct work in stages so that construction or soil stabilization occurs promptly after disturbance of soil.
- Establish a schedule governing the stabilization of disturbed slopes, both in terms of passage of time since commencement and completion of disturbance and in terms of planting season.
- Leaving the surface of the disturbed soil graded in a roughened condition (not smooth) can reduce the quantity and velocity of storm water runoff.
- Prevent storm water runoff from running onto steep slopes from above.
- Avoid long, steep cut or fill slopes that allow runoff water of sufficient quantity or velocity to cut into and erode the slope.

**LIMITATIONS:**

- The specific approach to grading on a particular site depends on the conditions of the site and surrounding land; engineering judgment is required to design the approach best suited for each site.

**MAINTENANCE:**

- Practices may need to vary from the approved plan if erosion problems appear when storm water runoff occurs.



**CEDAR HILLS**

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances
- Oil & Grease
- Floatable Materials
- Bacteria & Viruses

- High Impact
- Medium Impact
- Low or Unknown Impact

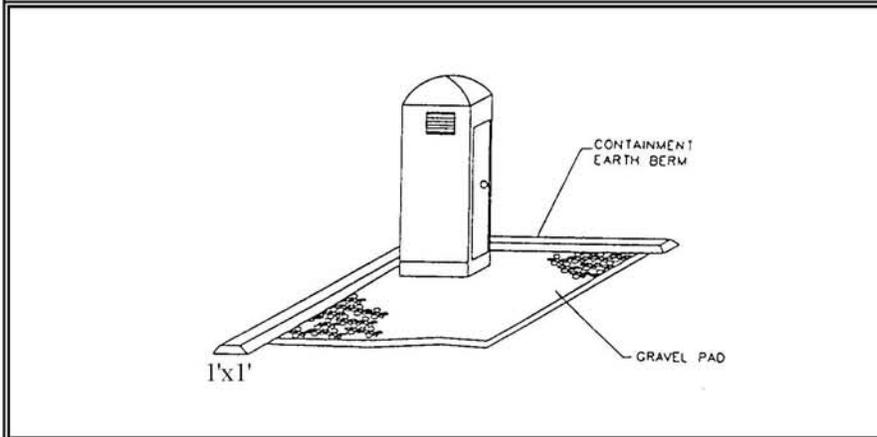
**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

- High
- Medium
- Low

**BMP: Portable Toilets**

**PT**



**DESCRIPTION:**

Temporary on-site sanitary facilities for construction personnel.

**APPLICATION:**

All sites with no permanent sanitary facilities or where permanent facility is too far from activities.

**INSTALLATION/APPLICATION CRITERIA:**

- ▶ Locate portable toilets in convenient locations throughout the site.
- ▶ Prepare level, gravel surface and provide clear access to the toilets for servicing and for on-site personnel.
- ▶ Construct earth berm perimeter (See Earth Berm Barrier Information Sheet), control for spill/protection leak.

**LIMITATIONS:**

No limitations.

**MAINTENANCE:**

- ▶ Portable toilets should be maintained in good working order by licensed service with daily observation for leak detection.
- ▶ Regular waste collection should be arranged with licensed service.
- ▶ All waste should be deposited in sanitary sewer system for treatment with appropriate agency approval.

**OBJECTIVES**

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion



**CEDAR HILLS**

Adapted from Salt Lake County BMP Fact Sheet

**TARGETED POLLUTANTS**

- Sediment
- Nutrients
- Toxic Materials
- Oil & Grease
- Floatable Materials
- Other Waste

- High Impact
- Medium Impact
- Low or Unknown Impact

**IMPLEMENTATION REQUIREMENTS**

- Capital Costs
- O&M Costs
- Maintenance
- Training

High     Medium     Low