Santa Clara Valley
Urban Runoff
Pollution Prevention Program

Water Utility Operation and Maintenance Discharge Model Pollution Prevention Plan (WUDPPP)

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Water Utility Operation and Maintenance Discharge Pollution Prevention Plan

II. INTRODUCTION

A. Purpose of Document

This is a guidance document to assist staff of various agencies in the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) with the selection of Best Management Practices (BMPs) designed to reduce water pollution from specific types of discharges associated with water utility operation and maintenance activities. The objective of this document is to provide water utility personnel and service contractors with the knowledge and tools necessary to minimize adverse environmental impacts, from their operation and maintenance activities.

This document is designed to be used by water utility field operations personnel, designers, engineers, supervisors, and trainers. Personnel can use this document as a reference tool to identify which control measure(s) to implement and the method of installation. Designers can use this document to select which control measures specifications should be stipulated in design documents. Supervisors can use this document to identify which discharges require control measures and determine appropriate documentation requirements.

Trainers can use this document as a training tool to inform trainees of the need for pollution prevention measures, how to select BMPs, and how to implement pollution prevention measures. The agency personnel should know and understand the practices contained herein and should use this manual as a guidance and reference document. Agencies that are water purveyors may want to review their current inventory of discharge types and develop standard operating procedures for each type of discharge, using the BMPs and approaches described in this document.

The Water Utility Operation and Maintenance Discharge Pollution Prevention Plan (WUDPPP) is also designed for use by contractors who provide operation and maintenance services which may cause discharges from a water utility facility. Contractors and subcontractors conducting work on behalf of a Municipal Regional Permit (MRP) co-permittee that is a water purveyor must also comply with the State Drinking Water System Discharges to Waters of the U.S. General Permit (Order WQ 2014-0194-DWQ). The implementation of BMPs is a regulatory requirement and important for protecting water quality in local streams and San Francisco Bay. The application of the pollution control measures should be part of any water utility discharge activity. Field operations staff should work to coordinate pollution prevention activities in a way that also ensures a safe and adequate water supply of acceptable quality to the public or other suppliers.

The State Drinking Water System Discharges to Waters of the U.S. General Permit (Order WQ 2014-0194-DWQ) (State DWS General Permit) contains specific monitoring and reporting requirements that apply to potable water discharges from the co-permittee water utility operation and maintenance activities to the extent a co-permittee is a water purveyor and applied for coverage under the State DWS General Permit by filing a Notice of Intent (NOI) application. These specific requirements for potable water discharges are incorporated throughout the guidance document as appropriate. This guidance document is not intended to address discharges which are regulated by another NPDES Permit.

B. Scope

The WUDPPP guidance document applies to discharges resulting from the operation and maintenance of water supply systems. Water supply systems covered under this WUDPPP guidance document extend from a utility's source of supply to its customers' points of connection and includes treated and untreated potable water supply systems, reclaimed (recycled) water supply systems, raw water systems, and nonpotable water. Discharges associated with construction activities and wastewater treatment systems, or discharges regulated under a specific NPDES Permit are not intended to be covered under this WUDPPP. Additionally, this guidance document is not intended to replace or supersede other documents such as standard operating procedures, land development BMPs, facility Storm Water Management Plans, Spill Control and Countermeasures Plans, etc.

C. Definitions and Abbreviations

In order to provide a clear understanding of the terms used in this document, the following definitions are provided:

- BMP – Best Management Practices. Activities or procedures to prevent/reduce the introduction of pollutants to receiving waters. A BMP may identify specific control measures which can be used to control pollutants.
- Control Measure -- A control measure is a procedure, physical feature, or activity aimed at preventing pollutants from entering a receiving water or from being deposited where they may enter a receiving water.
- Co-permittee -- A SCVURPPP member agency regulated by the MRP (i.e., NPDES Permit Order No. R2-2009-0074) issued by the San Francisco Bay RWQCB. These agencies include: the Cities of Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, Sunnyvale; the County of Santa Clara; and the Santa Clara Valley Water District (Water District). The agencies that own water utilities include: the Cities of Milpitas, Mountain View, Palo Alto, Santa Clara, Sunnyvale, San Jose, and the Water District.
- NPDES Permit -- National Pollutant Discharge Elimination System Permit. In California, this is a combined federal/state regulatory mechanism implemented by the State Water Resources Control Board and Regional Water Quality Control Boards to control point source discharges to surface waters.
- The Permit or the MRP -- NPDES Permit No. CAS612008 (also known as the Municipal Regional Permit).
- Performance Standard – A document that defines the level of implementation that the co-permittees must attain to demonstrate that their activities reduce pollutants in stormwater to the maximum extent practicable, and that is used to measure the effectiveness of such activities.
- Raw water – For the purposes of this document, raw water is untreated process water that is hydraulically conveyed to a water treatment plant. With that in mind water utility field operation personnel, designers, engineers, supervisors, and trainers only need to refer to one document either when planning for a water utility discharge operation or when responding to an emergency or unplanned water utility discharge operation.

- Receiving Waters -- Navigable surface waters which are under the jurisdiction of the Regional Water Quality Control Boards. This guidance document is appropriate for use in the parts of Santa Clara County that drain to San Francisco Bay and intended to be appropriate to address those that drain to Monterey Bay (under the jurisdiction of the Central Coast Regional Water Quality Control).
- SCVURPPP – Santa Clara Valley Urban Runoff Pollution Prevention Program. A program of the co-permittees listed above that have formally agreed to coordinate efforts and cost-effectively implement the NPDES municipal stormwater permit issued to those same entities.
- Source Water -- The water being discharged from the utilities' operation.
- Water District—Santa Clara Valley Water District

The following abbreviations are used in this document:

- BMP – Best Management Practice
- DWS – Drinking Water System
- EPA – United States Environmental Protection Agency
- MEP – Maximum Extent Practicable
- MRP – Municipal Regional Stormwater NPDES Permit
- NPDES – National Pollutant Discharge Elimination System
- NOI – Notice of Intent
- RWQCB or Water Board – Regional Water Quality Control Board
- NTU – Nephelometric Turbidity Unit
- SCVURPPP – Santa Clara Valley Urban Runoff Pollution Prevention Program
- WUDPPP – Water Utility Operation and Maintenance Pollution Prevention Plan
- mg/l – milligrams per liter
- SWRCB or State Board – State Water Resources Control Board

D. Document Structure

This document is structured in six separate sections as follows:

1. Introduction -- The introduction section provides information on the purpose, scope, definitions used, and structure of the document.
2. Background -- This section provides summary information on how the WUDPPP document was prepared, impacts from water utility discharges on the environment, regulatory requirements, discharges of concern, and potential impacts pollutants may have on the environment.
3. BMP Selection -- Describes the method for selecting the BMPs.
4. Reporting and Record Keeping -- Describes the reporting and record keeping procedures for the utility.
5. Revising and Refining -- Describes the method for revising the WUDPPP manual.
6. Appendices -- There are four appendices as follows:
   a. Appendix A – Best Management Practices
   b. Appendix B -- Pollution Control Measures
   c. Appendix C – Conditionally Exempt Discharge Report (Draft 2010)

d. Appendix D – State Drinking Water System Discharges to Waters of the U.S. General Permit (Order WQ 2014-0194-DWQ)

III. BACKGROUND

A. Development of the WUDPPP

This document was first developed in June 1998 to comply with the Municipal NPDES Storm Water Discharge Permit issued to the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) co-permittees in August 1995 (Permit). That Permit required that co-permittees develop and implement a water utility operation and maintenance performance standard for municipalities which own and operate water utilities (Performance Standard). A water utility task group made up of the affected co-permittees was formed in January 1996 to develop a model Performance Standard for the operation and maintenance discharge activities of water utilities. The model Performance Standard was submitted to the RWQCB on June 26, 1996.

The Performance Standard had four components which applied to each municipal water utility in SCVURPPP:

1. Inventory of discharges from operation and maintenance activities every 3 years.
2. Implement pollution control measures identified in the WUDPPP.
3. Conduct annual training of water utility personnel and service contractors.
4. Evaluate the effectiveness of the WUDPPP annually.

The task group formed to prepare the Performance Standard continued with development of tools to facilitate the consistent implementation of the Performance Standard, including a model inventory of water utility operation and maintenance discharge activities and four criteria to define discharges that are a concern due to their potential to convey pollutants to receiving waters. The criteria included: (1) the potential for erosion, (2) concentration of chlorine residual, (3) turbidity of the source water, and (4) addition of chemicals. The task group then prepared the WUDPPP document containing the BMPs to implement for reducing, if not eliminating, pollutants from being discharged to the receiving water, based on existing practices and on the knowledge and experience of the task group.

The SCVURPPP Permit was reissued several times since this document was originally developed. The MRP adopted by the RWQCB in October 2009 (Order No. R2-2009-0074) had specific monitoring, reporting, notification and BMP requirements for potable water discharges to the storm drain systems that applied to co-permittees that are water purveyors in Provision C.15.b.iii. The WUDPPP document was updated in 2010 to include the specific MRP requirements that applied to planned, unplanned and emergency potable water discharges.

In July 2012 the WUDPPP was revised to reflect a new conditionally exempt category “Low Impact Planned Potable Water Release”. This new category was proposed as part of the co-permittees annual updates in the SCVURPPP FY 11-12 Annual Report according to MRP Provision C.15.b.viii.(3).

In November 2015 the reissued MRP (Order No. R2-2015-0049) no longer contained any requirements for water utility planned or unplanned potable water discharges. Upon adoption of the reissued MRP the SCVURPPP co-permittees applied for coverage under the State Drinking Water System Discharges to Waters of the U.S. General Permit (Order WQ 2014-0194-DWQ) (State DWS General Permit).

B. Regulatory Requirements

This section briefly describes the regulatory requirements applicable to water utility discharge and state regulatory mandates and guidance for urban runoff pollution prevention and control.

Clean Water Act: The Federal Clean Water Act was amended in 1987 to require that urban runoff discharges from municipal separate storm sewer systems, such as those operated by the Santa Clara Valley municipalities and the Santa Clara Valley Water District, obtain coverage under a nationwide surface water permit program called the NPDES. The U.S. EPA delegated to the State of California, and specifically to the local San Francisco Bay RWQCB, the authority to adopt and enforce these permits in the Bay Area.

The Federal Clean Water Act's 1987 amendments require municipalities to effectively prohibit non-storm water discharges to municipal separate storm sewer systems and to implement controls to reduce pollutants in storm water to the maximum extent practicable. This WUDPPP focuses on complying with these two essential requirements consistent with their treatment under the MRP.

The AWWA *Guidelines for the Development of Your Best Management Practices (BMP) Manual for Drinking Water System Releases* (2005) states “EPA considers drinking water system releases to pose a minimal threat to the environment”. These are generally allowed as non-stormwater releases pursuant to 40 CFR 122.26(d)(2)(iv)(B)(1):

> …this program description shall address all types of illicit discharges, however the following category of non-storm water discharges or flows shall be addressed where such discharges are identified by the municipality as sources of pollutants to waters of the United States: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)) to separate storm sewers, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water (program descriptions shall address discharges or flows from fire fighting only where such discharges or flows are identified as significant sources of pollutants to waters of the United States);”

Provisions of the Program’s NPDES Permit: SCVURPPP’s NPDES Permit was initially adopted in 1990 (CAS029718). The permit specified the requirements for the discharge of urban runoff from municipal separate storm sewer systems throughout the Santa Clara Valley to creeks and streams tributary to South San Francisco Bay. The NPDES permit, which was reissued and amended several times since then (in 1992, 1995, 1999, 2001 and 2005), required that the SCVURPPP co-permittees implement their Urban Runoff Management Plan (URMPs) and Performance Standards to reduce pollutants in stormwater discharges to the maximum extent practicable (MEP). The NPDES permit specified that the URMP is to include performance standards for eight program areas including water utility operation and maintenance.

The SCVURPPP NPDES permit was superseded by the MRP. The MRP authorizes and regulates discharges of certain non-stormwater to surface water bodies, which included water utility discharges. The MRP categorizes some non-stormwater discharges as exempted or conditionally exempted based on their potential to impact receiving water quality. MRP Provision C.15 describes this tiered categorization of non-stormwater discharges.

MRP Provision C.15.b.iii. pertained specifically to conditionally exempt discharges of planned, unplanned and emergency discharges from the potable water system of co-permittees that are water purveyors. This provision no longer refered to URMPs or Performance Standards but contained the specific control measures required to exempt the discharges from Discharge Prohibition A.1 including requirements for BMPs, notification, monitoring and reporting.

In FY11-12 the AHTG analyzed their planned potable water release data and, consistent with MRP provisions C15.b.vii and viii(3),developed a new category entitled "Low Impact Planned Potable Water Release." This request was submitted to the Regional Water Board in the SCVURPPP FY11-12 Program Annual Report (September 15, 2012).

In November 2015 the reissued MRP (Order No. R2-2015-0049) no longer contained any requirements for water utility planned or unplanned potable water discharges.

State General Permit: The State adopted the NPDES Permit for Drinking Water System Discharges to Waters of the U.S. General Permit (Order WQ 2014-0194-DWQ) on November 18, 2014. The permit was effective on February 26, 2015. When the SCVURPPP co-permittee's DWS discharges were no longer covered under the MRP they filed for coverage under the State DWS General Permit, as appropriate.

C. Characteristics of Water Utility Discharge

There were 41 discharge activities identified by the participating utilities in the original survey conducted in 1998. The updated inventory list of potential discharge activities is almost the same as the previous list. However, the number of discharge activities that routinely occur[1] is less than twenty. Below is a list of discharges identified by at least three agencies:

- Hydrant flushing
- Fire flow testing
- Main line breaks
- Service line breaks
- Reservoir tank cleaning/draining
- Sheared hydrants
- Meter testing in the field
- Blow offs
- Water quality sampling
- Flowing artesian wells
- Well sampling
- Well rehabilitation/maintenance
- Well first flush to waste cycle at startup

The entire list of discharge activities is presented in Table 1. The updated inventory list also excludes discharges from the previous list that are addressed by different provisions or permits. For example, previously on the list were facility landscape irrigation, excavation dewatering and pumping out sumps, vaults, etc. for maintenance.

Water quality characteristics can be found in each water utility's annual water quality report available on the agencies' websites. These reports provide both the raw and treated water quality characteristics. As an example, the pH, turbidity and chlorine residual concentrations for potable water sources are presented in Table 4 at the end of this document. The pH for all

[1] Activities previously reported in Annual Reports or during initial data collection efforts by the AHTG.

sources of water ranges from 7.3 to 9.2; turbidity ranges from 0.04 NTU to 2.2 NTU; and total chlorine residual ranges from 0.98 mg/L to 3.1 mg/l. These ranges can be expected in the operation and maintenance discharges from water utility operations.

D. Discharges of Concern

1. Types of Discharges

This section describes the types of discharges covered by the WUDPPP. These discharges vary widely with regard to volume, duration, and frequency, and can be planned or unplanned/emergency. Planned discharges typically result from required routine operation and maintenance activities that can be scheduled in advance. Emergency discharges are due to sudden unexpected occurrence involving a clear and imminent danger demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services, including the provision of drinking water supplies in accordance with applicable drinking water statutes and regulations[2]. Emergency discharges may be either controlled or uncontrolled. Controlled discharges have identified flow paths, such as a reservoir overflow pipe. Uncontrolled discharges have flow paths that are based on water system hydraulics and are not necessarily chosen or preferred by the water utility operators. An example of an uncontrolled discharge is a sheared hydrant, where flow may discharge to nearby landscaping or to the street and gutter.

The emergency discharges discussed in this document do not include discharges related to fire fighting. Emergency discharges related to fire fighting are discussed in the Conditional Exempt Discharge (CED) Report (Appendix C).

2. Potential Pollutants in Each Type of Discharge

a. Treated water. The disinfection chemical in potable water is currently considered a pollutant of concern when discharged into receiving waters. This chemical is typically chlorine or chloramine. The San Francisco Public Utilities Commission (SFPUC) began using chloramine, a combination of chlorine and ammonia, as a distribution system disinfectant in February 2004. The Water District has been using chloramines since the 1980's. Other commonly used chemicals are: coagulants (to aid the flocculation process); zinc orthophosphate (to minimize pipe corrosion); caustic solution (for pH adjustment); ammonia (combines with chlorine to provide disinfection); and fluoride (to prevent tooth decay). For the purposes of this plan, these other chemicals are not considered pollutants of concern due to their concentration levels and known impacts to the environment.

b. Raw water. Copper sulfate is added by the State Department of Water Resources to some of the raw water supplied to the Santa Clara Valley Water District (District) during summer months. The copper sulfate is added to control algae growth. The Metals Control Measures Plan (Woodward-Clyde Consultants and EOA, Inc for SCVURPPP February 12, 1997) noted that, over a 2-year period, copper was added a total of 18 days to the two major surface water supplies. Thus, the raw water copper volume discharged by a water utility is believed to be insignificant and copper is not considered to be a pollutant of concern for the purposes of this plan.

[2] This definition is from State DWS General Permit Attachment A Definitions.

c. Groundwater. Groundwater contains naturally occurring dissolved solids such as calcium, magnesium, iron, manganese, chromium and strontium ions. Chlorine, added for disinfection, may be present. Chlorine is the only chemical found in groundwater that is considered to be a potential pollutant. The common dissolved solids have not been identified as "metals of concern" for the purposes of this plan.

d. Recycled water. Recycled water contains disinfection chemicals and slightly higher concentrations of dissolved solids, ammonia, and nitrites than treated potable water. Again, chlorine is the only chemical in recycled water considered to be a potential pollutant of concern for the purposes of this plan.

3. Approximate Duration of Each Type of Discharge

The duration of the different types of discharges varies significantly. The following discharges typically last for 30 minutes or less: hydrant flushing, fire flow testing, meter testing, backflow device testing, interconnection valve exercising, blow offs, water quality sampling, vault/sump dewatering and start-up/sampling. The following discharges typically last 30 minutes to 6 hours: mainline breaks, service line breaks, and sheared hydrants. The following discharges typically last greater than 6 hours: reservoir cleaning, reservoir draining and water line draining for the purposes of repairing valves and other components as part of an ongoing maintenance and management program.

Controlling the duration, or volume, of a potable water release may be a best management practice to keep the release from being a discharge to the receiving water body.

4. Structural and Nonstructural Control Measures to Reduce Pollutants in Discharges

Structural controls typically consist of permanent processes or flow paths, such as a reservoir overflow drain that is plumbed to a sanitary sewer system. Structural controls are typically found at treatment plants, reservoirs, and pump stations. It is not practical for most of the water system discharge points, such as fire hydrants, to have structural controls. A nonstructural control measure requires operators to take actions with the discharge. Examples include: application of hydrant diffusers, hoses, catch basin filters, etc. Nonstructural controls are commonly identified in the BMPs.

E. Potential Impact to the Environment

There are four potential sources of pollutants in water utility operation and maintenance discharges that may adversely impact the environment: erosion of soil caused by the discharge volume or rate, residual chlorine levels in the discharged water, turbidity as part of the source water and chemical additives other than chlorine. The appropriate use of BMPs reduces or eliminates the effects of these potential sources of pollution to a receiving water.

1. Erosion

High volume or high velocity discharges may cause erosion of the soils near the point of the discharge, in the stream bed or at some other point in the flow path, resulting in sediment loading to the habitat of the receiving waters. Sediment deposited in streams due to upstream erosion can have adverse impacts to various species including reduction of water quality and reduction of stream function, such as the compromising of interstitial spaces in channel bottoms. Water utility discharges typically drain to four types of surfaces: bare soil, vegetated areas,

storm drain systems, and paved surfaces, in descending order of erosion potential. The BMPs in this manual were designed to address discharges to all these types of surfaces.

2. Chlorine and Chloramine

Chlorine is a primary disinfecting component of treated water. Chloramine is another disinfecting component of treated water that is being used in the Bay Area. Chlorine and chloramine have adverse impacts on fish and wildlife. Total chlorine residuals[3] typically range from 0 mg/l in raw and groundwater to 2.0 mg/l in treated water. Recycled water chlorine residuals typically range from about 1 mg/l to approximately 5 mg/l. During maintenance activities pipes or equipment may need to be dissinfected before being put into service. This water, when flushed, is considered superchlorinated and is typically about 4 mg/l. Chlorine or chloramine may kill aquatic organisms by contact over a specific length of time. By killing these organisms, the food chain is interrupted thereby having an adverse impact on higher level aquatic life and other wildlife.

3. Turbidity

High turbidity in the discharge water is very uncommon but could be a concern if a pipeline is compromised under ground. Depending on groundwater well characteristics, turbidity may be high in wells that have been out of production for some time. Other sources of turbidity may include materials accumulated in pipes and reservoirs lines that have been out of service for a period of time. The materials in question can be sands, pipe corrosion by-products, and other particulates that may be released during a discharge operation, and conveyed to receiving waters.

4. Chemical Additives

Chemical additives can have an adverse impact on the environment due to their potential for bioaccumulating in fish and wildlife. Though it is highly unlikely, chemical additives may be introduced into the discharged water as contaminants from instruments and other equipment in vaults, pump stations or other sources. Also additions of copper sulfate, biocides, and herbicides along some canals may be the source of some chemical contaminants. For example, copper sulfate additions to control algae may release the metallic element copper to the environment.

To minimize the potential for pollutants to enter into the water systems, water utilities typically use food grade oils and lubricants on their instruments, controls, and other components found in vaults and elsewhere within the system. In addition, water utilities are also bound by existing rules and regulations to ensure the preservation of water quality being supplied to the end user. These regulations do identify what, if any, concentrations of chemicals are acceptable in the water supply. Compliance with applicable environmental and hazardous materials laws and regulations is also a means for preventing chemical additives or pollutants from ending up in a water discharge from typical operations and maintenance activities.

IV. BMP SELECTION

BMPs are designed to reduce, if not eliminate, pollutants from water utility operations and maintenance discharge activities. BMPs use a common sense approach to pollutant control.

[3] Note, field instruments measure chlorine residual not chloramine residual.

BMPs are implemented depending upon the field conditions and characteristics of the discharge. Additionally, permanent modifications may eliminate the need for implementing certain BMPs.

Water utility operation and maintenance BMPs fall into seven categories based on the pollutant of concern or the type of discharge event. The seven categories are as follows:

1. **Erosion Potential** -- Addresses soil erosion caused by the force of the discharged water.
2. **Chlorine Residual** -- Addresses the chlorine concentration in treated, recycled, and superchlorinated water systems.
3. **Turbidity of Source Water** -- Addresses the sediments (i.e., sands, pipe corrosion by-products, etc.) in the water system.
4. **Chemical Additives** -- Addresses special treatment situations where chemicals are added in concentrations above that used for standard water treatment operation.
5. **Emergency Discharges** -- Addresses emergency discharges necessary to protect public health and property (e.g., line break, sheared hydrant). Emergency Discharges are also discharges related to natural or manmade disasters. These do not include emergency discharges related to fire fighting[4].
6. **Monitoring, Reporting and Notification** – Addresses State DWS General Permit requirements for planned discharges of potable water supply systems.

The BMPs were developed to be used as building blocks. This allows flexibility in applying multiple BMPs under varying field conditions and pollutants. For example, a large volume reservoir draining operation may require both an erosion control BMP (e.g., EC1) and a turbidity control BMP (e.g., SC1*).* Discharges which are of an emergency nature may require immediate implementation of the emergency discharge BMP (i.e., ED1). In emergency situations, additional BMPs (e.g., erosion control, turbidity control, etc.) may be implemented depending on the situation and resources available.

The selection of the BMP for a particular application can be based on either 1) the discharge activity (i.e., reservoir draining, fire hydrant flushing) or 2) the characteristics of the discharge (i.e., source water, erosion potential, turbidity. etc.). These methods, referred to as the Activity Method and Characteristics Method, are further described below. The State DWS General Permit requires permittees to implement appropriate BMPs for dechlorination and erosion and sediment control for planned and emergency potable water discharges but allows flexibility for field personnel to determine the appropriate BMPs.

The Activity Method:

1. Identify the source water to be discharged (i.e., treated, raw, groundwater, or recycled).
2. Identify the discharge activity listed in Table 1: BMP Selection Table -- Discharge Activity Method.
3. From Table 1, identify the appropriate BMP, if any, to be implemented for the discharge activity.

[4] Emergency discharges related to fire fighting activities are discussed in the Conditionally Exempt Discharge (CED) Report in Appendix C.

4. Implement the BMP, where appropriate, as described in Appendix A.

The Characteristic Method:

1. Identify the following characteristics of the discharge
    a. The source of the water (i.e., treated, raw, groundwater, or recycled).
    b. Quantity of the water to be discharged, the flow rate and the duration.
    c. Point of discharge (i.e., discharge to paved surface, storm drain, vegetated surface, or bare soil). Also it is beneficial to identify the receiving water such as a creek, stream or river and the nearest cross street to the discharge.
    d. If chemicals have been added in addition to normal water treatment process chemicals (i.e., copper sulfate, biocides, etc.).
2. Identify the appropriate BMP(s) listed in Table 2: BMP Selection Table –Discharge Characteristics Method (i.e., erosion control, chlorine, turbidity control, and/or chemical additives).
3. Implement the BMP as described in Appendix A.

Appendix A provides detailed descriptions of the suggested BMPs and Appendix B provides associated pollution control measures. These BMPs provide general guidance on methods to control pollutants from entering the receiving water. It is important to understand that these BMPs may not fit every situation encountered in the field and may have to be modified to specific field conditions. In modifying the BMP or control measures, the intent of reducing pollutants must be preserved. Additionally, it is not the intent of the BMPs to ensure removal of all the pollutants but to reduce the pollutant loading to the maximum extent practicable by implementing pollutant control practices defined by the BMP.

The BMP GP1 details the State General Permit requirements for monitoring, reporting and notification of planned drinking water system discharges to the storm drain system or receiving water. These regulatory requirements must be followed in all applicable situations. The State General Permit also includes effluent limitations for discharges. Exceedence of the effluent limitations will result in a violation and potential fine. Monitoring is not required for all discharges and the effluent limitation is only applicable for specific discharges. These applicable discharges are provided below and further detail on the requirements are in GP1.

State General Permit Required Monitoring

	Parameter	Frequency
Planned Discharge Monitoring		
Superchlorinated discharges	• Volume • Chlorine residual • Turbidity (visual) • pH	<u>< 20 minutes (1 sample)</u> 1 sample during first 10 min <u>20-60 minutes (2 samples)</u> 1st sample during first 10 min; 2nd sample during last 10 min <u>> 60 minutes (3 samples)</u> 1st sample during first 10 min; 2nd sample during next 50 min; 3rd sample during last 10 min
Large volume discharges <u>></u> 325,850 gallons	• Volume • Chlorine residual • Turbidity (visual)	
Well development and rehabilitation	• Volume • Turbidity (NTU)	
One location annually that represents the same general water source, same water treatment and same type of implemented BMPs	• Volume • Chlorine residual • Turbidity (visual)	
Receiving Water Monitoring		
All direct, planned discharges that do not comply with BMP implementation requirements or effluent limits; and discharge potentially causes or contributes to an adverse effect or impact to beneficial uses	• Digital photos • Observed effects	Visually monitor point of confluence of discharge and receiving water immediately after becoming aware

State General Permit Limits and Action Levels

Discharge Type	Permit Limits/Action Levels
Superchlorinated discharges	Chlorine Residual Effluent Limit = 0.019 mg/L Chlorine Residual Compliance Limit = 0.1 mg/L
Planned discharge directly into or within 300 ft of receiving water	
Groundwater well development or rehabilitation	Turbidity Action Level = 100 NTU

V. REPORTING AND RECORD KEEPING

Reporting and record keeping are important elements of implementing an effective water utility discharge pollution prevention program. Developing and maintaining proper records provides:

1) documentation to verify actions taken;
2) effective methods for providing clear directions;
3) historical information for the evaluation of the program's effectiveness; and
4) opportunities for facilitating on-going program implementation through use of consistent forms, transmittal documents and memorandums.

The State DWS General Permit contains specific reporting and recordkeeping requirements for planned potable water discharges. These requirements have been integrated into the four areas of documentation described below: inventory, training, implementation and modification.

A. Inventory of Discharges

Co-permittees have been documenting the inventory of their water utility discharges for over ten years. Co-permittees should continue to use their current methods and format for updating the inventory of water utility discharges.

Planned potable water discharges are summarized in each Annual Report to the State Water Board. Non-compliance monitoring results must also be reported in the Annual Report. The example annual reporting format is included in the checklists and BMP GP1.

B. Training

Training should be documented on attendance sheets for the training. The information on the attendance sheets should include: attendee's name, agency affiliation (if multiple agencies are attending), date of training, and description or title of the training.

C. Implementation

Documenting the implementation of the WUDPPP may vary depending on the utility's operation. The purposes for documenting the implementation are to provide information to evaluate the effectiveness of the WUDPPP, provide verification that the program elements have been completed, and complete annual reports required by the State DWS General Permit. Implementation may be documented through standard operating procedures or field data collected (e.g. the State DWS General Permit requires water utility agencies to log the BMPs implemented for planned potable water discharges).

D. Program Modifications

Effectiveness of the WUDPPP will be evaluated in three arenas. Feedback will be solicited during training sessions, and at AHTG meetings. Revisions may be made to the WUDPPP in the future to improve the practicability (i.e., better pollutant removal, easier to implement, cheaper materials, etc.) of the existing BMPs or include new BMPs.

Tables

TABLE 1. BMP SELECTION TABLE:
Discharge Activity Method

Discharge Activity	Erosion Control	Chlorine and Chloramine Control	Turbidity BMP	Chemical Additives BMPs	Emergency Actions BMPs	Monitoring & Reporting BMPs
I. TREATED WATER						
Hydrant flushing	EC1	CD1	SC1	—	—	GP1
Fire flow testing	EC1	CD1	SC1	—	—	GP1
Main line breaks	EC1	CD1	SC1	—	ED1	GP1
Service line breaks	EC1	CD1	—	—	ED1	GP1
Reservoir tank cleaning/draining	EC1	CD1	SC1	CA1	—	GP1
Sheared hydrants	EC1	CD1	SC1	—	ED1	
Meter testing in the field	—	CD1	SC1	—	—	GP1
Blow offs	EC1	CD1	SC1	—	—	GP1
Water quality sampling	—	CD1	SC1	CA1	—	GP1
Backflow/ maintenance testing	—	CD1	SC1	—	—	GP1
Pump station operation discharge	—	CD1	SC1	—	—	GP1
Mainline cleaning (pigging)	—	CD1	SC1	—	—	GP1
Pressure release valve blow offs	EC1	CD1	SC1	—	—	GP1
Air release valve blow offs	—	CD1	SC1	—	—	GP1
WTP filter bank inspection	EC1	CD1	SC1	—	—	GP1
WTP filter turbidity meter	EC1	CD1	SC1	—	—	GP1
WTP chlorine analyzer	—	CD1	SC1	—	—	—
Pumping out sumps, vaults, etc., for maintenance	EC1	CD1	SC1	CA1	—	—
Chlorinated water treatment plant overflows	—	CD1	—	—	ED1	—
II. RAW (UNTREATED) WATER						
In-stream recharge program	—	—	SC1	CA1	—	—
Off-stream recharge program	EC1	—	SC1	CA1	—	—
Pipeline modification or maintenance	EC1	—	SC1	—	—	—
Meter testing facility	EC1	—	SC1	—	—	—
Percolation ponds maintenance activities	EC1	—	SC1	CA1	ED1	—
Reservoir discharges	EC1	—	SC1	CA1	—	—
Canal operations	EC1	—	SC1	—	—	—
Flows from riparian habitats or wetlands	EC1	—	SC1	—	—	—
Diverted stream flows	EC1	—	SC1	—	—	—
Springs	EC1	—	SC1	—	—	—
III. GROUNDWATER						

Discharge Activity	Erosion Control	Chlorine and Chloramine Control	Turbidity BMP	Chemical Additives BMPs	Emergency Actions BMPs	Monitoring & Reporting BMPs
Flowing artesian wells	EC1	—	SC1	—	ED1	GP1
Abandoned artesian wells	EC1	—	SC1	—	—	—
Well Sampling	EC1	—	SC1	—	—	GP1
Well rehabilitation/maintenance	EC1	—	SC1	—	—	GP1
Well “first-flush-to-waste” cycle at startup	EC1	—	SC1	—	—	GP1
Well chlorination (disinfection) and flushing	EC1	CD1	SC1	CA1	—	GP1
Well destruction	EC1	—	SC1	CA1	—	GP1
Meter testing in the field	EC1	—	SC1	—	—	GP1
Uncontaminated groundwater infiltration (i.e., instream/offstream recharge program)	EC1	—	—	—	—	—
IV. RECYCLED (RECLAIMED) WATER						
Main line breaks	EC1	CD1	SC1	—	ED1	—
Service line breaks	EC1	CD1	SC1	—	ED1	—
Reservoir (tank) overflow	EC1	CD1	SC1	—	ED1	—
Meter testing/maintenance in the field	EC1	CD1	SC1	—	—	—
Backflow testing	EC1	CD1	SC1	—	—	—
Mainline cleaning (pigging)	EC1	CD1	SC1	—	—	—
Pump station operation discharges	EC1	CD1	SC1	—	—	—
Air release valve blowoffs	EC1	CD1	SC1	—	—	—

TABLE 2. BMP SELECTION TABLE:
Discharge Characteristic Method

Discharge Characteristic		Best Management Practices (BMP)
Source or Type of Discharged Water		
	Treated	CD-1 & GP-1
	Recycled	CD-1
	Ground	SC-1
	Raw	n/a
Superchlorinated Water		
	Treated or Recycled	CD-1
Erosion Potential		
	Erosion Protection	EC-1
Turbidity		
	Treated	SC-1 & GP-1
	Recycled	SC-1
	Ground	SC-1
	Raw	SC-1
Chemical Additives		
	Raw	CA-1
	Treated	CA-1
Emergency Discharges		ED-1

TABLE 3. LIST OF BMPs

EC-1	Erosion Control (EC)
CD-1	Chlorine Discharge (CD)
SC-1	Sediment/Turbidity Control (SC)
CA-1	Chemical Additives (CA):
ED-1	Emergency Discharges (ED):
GP-1	State DWS General Permit Monitoring and Reporting Requirements for Potable Water Discharges

Table 4. Water Quality Data for Potable Water

Potable Water Source		pH (standard units)	Turbidity (NTU)	Chlorine Residual (mg/L)
Penitencia Water Treatment Plant Effluent				
	minimum	7.4	0.05	1.3
	average	7.5	0.07	2.4
	maximum	7.7	1.29	2.7
Rinconada Water Treatment Plant Effluent				
	minimum	7.4	0.05	1.3
	average	7.6	0.07	2.3
	maximum	7.8	0.25	2.9
Santa Teresa Water Treatment Plant Effluent				
	minimum	7.3	0.04	1.3
	average	7.5	0.06	2.3
	maximum	7.8	0.53	2.7
City of Sunnyvale				
	minimum	7.5	0.10	ND
	average	7.7	0.55	1.89
	maximum	7.8	2.20	3.10
SFPUC				
	minimum	8.5	0.06	1.16
	average	8.8	0.15	2.14
	maximum	9.2	0.30	3.10
San Jose Water Company				
	minimum			
	average			0.98
	maximum		0.09 – 0.12	

Notes:
1. SCVWD data from 2009 Annual Water Quality report. All other data from 2008 Annual Water Quality reports.

EXAMPLE CHECKLISTS and FORMS

Planned Discharges Checklist
Planned Discharge Field Form
Emergency Discharge Checklist
Emergency Discharge Field Form
Annual Report Format

PLANNED DISCHARGE ACTIVITIES CHECKLIST
For Water Utility Operation and Maintenance

❑ CIRCLE THE NUMBER NEXT TO THE DISCHARGE ACTIVITY:

I. TREATED WATER	12. Exercising interconnection valves	**II. RAW (UNTREATED) WATER**	33. Well destruction
1. Hydrant Flushing	13. Blow offs	23. Instream recharge program	**IV. RECYCLED (Reclaimed) WATER**
2. Fire flow testing	14. Pressure release valve blow offs	24. Off-stream recharge program	34. Main line breaks
3. Main line breaks	15. Air release valve blow offs	25. Pipeline modifications or maintenance	35. Service line breaks
4. Service line breaks	16. Water quality sampling	26. Meter testing facility	36. Reservoir (tank) cleaning
5. Reservoir (tank) cleaning		27. Percolation ponds maintenance activities	37. Meter testing in the field
6. Reservoir (tank) draining	18. Water treatment plant (WTP) filter bank inspection	**III. GROUNDWATER**	38. Backflow testing
7. Sheared hydrants	19. WTP filter turbidity meter	28. Artesian wells	39. Mainline cleaning (pigging)
8. Meter testing in the field	20. WTP chlorine analyzers	29. Well sampling	40. Pump station operation discharges
9. Backflow testing	21. Elect. generator cooling water	30. Well rehabilitation/ maintenance	41. Blow offs
10. Pump station operation discharges	22. Pumping out sumps, vaults, etc., for repair and/or maintenance purposes	31. Well "first-flush-to-waste" cycle at startup	42. Air release valve blow offs
11. Mainline cleaning (pigging)		32. Well chlorination (disinfection) and flushing	

❑ ASSESS THE QUANTITY AND QUALITY OF THE WATER BEING DISCHARGED AND DESCRIBE THE FLOW PATH:

DISCHARGE QUANTITY (SHOW UNITS IN BRACKETS)	**WATER QUALITY**	**RECEIVING SURFACE/SYSTEM**
☐ Flow Rate (Q): _____( )	Chlorine in water:	The water will be discharged to:
☐ Duration (T): _____( )	☐ is **less than or equal to** typical drinking water levels (~ 1.5 mg/l).	☐ Paved surface
☐ Volume (V = Q x T):	☐ is **higher** than typical drinking water levels (~ 1.5 mg/l).	☐ Vegetated surface
_____( )	Turbidity of source water is likely to be:	☐ Bare soil
	☐ **less** ☐ **greater** than 50 NTU.	☐ Creek
	The discharge water	☐ Sanitary Sewer
	☐ **IS** ☐ **IS NOT** suspected to contain chemicals not typically used in water treatment.	☐ Storm drain:

❑ IDENTIFY THE DISCHARGE OPTION TO BE USED FOR THIS ACTIVITY:

☐ Reuse water
☐ Dust control ☐ Irrigation ☐ Construction compaction ☐ Other: _____
☐ Discharge to the sanitary sewers (control measure **CM-A**)
☐ Discharge to the storm drain system or a creek using applicable control measures as described below

❑ DETERMINE IF EROSION CONTROL BEST MANAGEMENT PRACTICES (BMPS) ARE NECESSARY:

☐ No Erosion Control BMP is necessary because discharge:
☐ is very small ☐ is of very low velocity ☐ is to a contained area ☐ is directed onto a paved or vegetated surface
☐ Erosion Control BMP EC1 is required (see control measure section below)

❑ DETERMINE IF CHLORINATED DISCHARGE BMPS ARE NECESSARY:

Chlorine residual in water:
☐ IS NOT higher then General Permit compliance limit (0.1 mg/L). No BMP required
☐ IS higher than General Permit compliance limit (0.1 mg/l). **BMP CD1** is used.

PLANNED DISCHARGE ACTIVITIES CHECKLIST (Continued)
For Water Utility Operation and Maintenance
SANTA CLARA VALLEY URBAN RUNOFF POLLUTION PREVENTION PROGRAM

☐ DETERMINE IF SEDIMENT/TURBIDITY CONTROLS ARE NECESSARY:

☐ BMP SC1 is used because the discharge is:
☐ V ≤ 50,000 gal. AND is from ☐ hydrant flushing ☐ fire flow testing ☐ main line break, or ☐ blow off

☐ DETERMINE IF ADDITIONAL BMPS FOR CHEMICAL ADDITIVES ARE NECESSARY:

☐ Chemical additives BMPs are NOT needed because the discharge water is NOT suspected to contain chemicals not typically used in water treatment.
☐ Chemicals additives BMPs are needed because the discharge water is suspected to contain chemicals not typically used in water treatment. BMP CA 1 is used

☐ IDENTIFY THE CONTROL MEASURES TO BE USED:

Check all of the control measures that apply:

☐ CM-A: Discharge to Sanitary Sewers
☐ CM-B: Vegetated Filtration
☐ CM-C: Check Dam Filter
☐ CM-D: On-Line Filter System
☐ CM-F: Silt Fence Culvert Inlet Protection
☐ CM-G: Surface Protection—Armoring
☐ CM-H: Surface Protection—Flow Diversion
☐ CM-E: Storm Drain Inlet Protection
☐ CM-E1: Block & Gravel Drop Inlet Sediment Filter
☐ CM-E2: Block & Gravel Curb Inlet Sediment Filter
☐ CM-E3: Gravel Bag Barrier
☐ CM-E4: Gravel & Mesh Drop Inlet Sediment Filter
☐ CM-E5: Gravel & Mesh Curb Inlet Sediment Filter
☐ CM-E6: Silt Fence Field Inlet Protection

☐ Other (describe):

☐ BRIEF STAFF ON THE BMP, THE SELECTED DISCHARGE OPTIONS, BMPS AND CONTROL MEASURES.

☐ PROCEED WITH NECESSARY NOTIFICATIONS: ☐ Not Applicable

☐ (name and organization): _____ _____ (am/pm)
☐ (name and organization): _____ _____ (am/pm)
☐ (name and organization): _____ _____ (am/pm)

☐ INSTALL CONTROL MEASURES, IF APPLICABLE.

☐ INSPECT THE FLOW PATH (to the storm drain or creek) AND REMOVE POTENTIAL POLLUTANTS (i.e. sediment, leafy debris, trash, etc.).

☐ CARRY OUT THE DISCHARGE ACTIVITY IN ACCORDANCE WITH STANDARD OPERATING PROCEDURES.

☐ Time Begun: _____ ☐ Time Ended: _____ ☐ Estimated actual discharge rate: _____
☐ Determine if monitoring is required

☐ CLOSE THE OPERATION:

☐ Remove the control measure(s);
☐ Inspect flow path for erosion damage and/or sediment deposition;
☐ Inspect the receiving stream, if practicable, for erosion damage or sediment deposition; and
☐ Cleanup:
☐ Remove and dispose of collected sediments; ☐ Remove all materials used in discharge operation.

State Drinking Water System Discharges General Permit
Planned Discharge to Storm Drain/Receiving Water FIELD FORM **Date:** _____

Site/ Location	Discharge Type	Distance to Receiving Waterbody (direct, ≤ 300 ft, >300 ft)	*not required*		Estimated Volume (gallons)	Implemented BMPs & Corrective Actions[1]	*Is Monitoring Required?*			
			Duration (minutes)	Estimated Flow Rate (gpm)			Superchlorinated	≥ 325,850 gallons	Groundwater Well Develop./ Rehab	Annual Rep. Monitoring Location

[1]Corrective Actions should be taken if monitoring indicates:

- Turbidity ≥ 100 NTU
- Chlorine Residual ≥ 0.1 mg/L

State Drinking Water System Discharges General Permit
Planned Discharge to Storm Drain/Receiving Water Monitoring Results FIELD FORM **Date:** _____

Site/ Location	Reason for Sampling (Event or Annual Representative)	Time		*Discharge ≥ 325,850 gal Annual Rep Monitoring*		*GW Well Dev/Rehab*	If Chlorine Residual ≥ 0.1 mg/L check if False Positive and record possible cause if False Positive
				Superchlorinated Discharge			
			pH	Chlorine Residual (mg/L)	Visual Turbidity (Low/Med/High)	Measured Turbidity (NTU)	

Sampling Frequency:

Discharge Event	Total # Samples	Timing	Discharge Event	Total # Samples	Timing	Discharge Event	Total # Samples	Timing
< 20 minutes	1	1 sample during first 10 min	20 – 60 minutes	2	1st sample during first 10 min; 2nd sample during last 10 min	> 60 minutes	3	1st sample during first 10 min; 2nd sample during next 50 min; 3rd sample during last 10 min

State Drinking Water System Discharges General Permit
Planned Discharge to Beneficial Reuse FIELD FORM

Site/ Location	Discharge Type	Beneficial Reuse	Date of Discharge	*not required*		Estimated Volume (gallons)
				Duration (minutes)	Estimated Flow Rate (gpm)	

Types of Beneficial Reuse: groundwater recharge, irrigation, augment existing water supply, direct or indirect discharge to stormwater capture basin, LID feature or groundwater recharge system, water trucks

EMERGENCY DISCHARGE ACTIVITIES CHECKLIST
(Use with BMP ED-1)
For Water Utility Operation and Maintenance
SANTA CLARA VALLEY URBAN RUNOFF POLLUTION PREVENTION PROGRAM

APPLICABILITY:
- ☐ Water main breaks
- ☐ Sheared hydrants
- ☐ Equipment malfunction (describe): _____
- ☐ Operator error (describe): _____
- ☐ Others (describe): _____

PROCEDURE:
- ☐ Do not interfere with immediate emergency response operations or impact public health and safety
- ☐ Stop the discharge as soon as possible
- ☐ Inspect flow path for potential pollutants (i.e. leafy debris, sediment, trash, etc.)
- ☐ Remove potential pollutants from the flow path and properly dispose
- ☐ If the repairs or corrective actions will cause additional discharge of water, then:
- ☐ INSTALL BMP CONTROL MEASURE
  - ☐ Erosion Protection (EC 1)
  - ☐ Sediment Control:
    - ☐ Discharge to Sanitary (CM-A)
    - ☐ Vegetation Filtration (CM-B)
    - ☐ Flow Path Check Filters (CM-C)
    - ☐ On-Line Filter System (CM-D)
    - ☐ Storm Drain Inlet Protection (CM-E)
      - ☐ Block and Gravel Drop Inlet Filter (CM-E1)
      - ☐ Block and Gravel Curb Inlet Filter (CM-E2)
      - ☐ Gravel Bag Barrier (CM-E3)
      - ☐ Gravel and Mesh Drop Inlet Sediment Filter (CM-E4)
      - ☐ Gravel and Mesh Curb Inlet Sediment Filter (CM-E5)
      - ☐ Silt Fence Drop Inlet Protection (CM-E6)
    - ☐ Silt Fence Culvert Inlet Protection (CM-F)
  - ☐ Dechlorination (CD 1)

    Method: _____
- ☐ RECORD DISCHARGE OPERATION:
  - ☐ Time Began: _____ ☐ Time Ended: _____
  - ☐ Estimated Discharge Rate: _____ gpm or cfs
  - ☐ Estimated Volume Discharged: _____ gallons
- ☐ CLOSE OPERATION: ☐ Remove Sediment ☐ Removed Control Measures ☐ Inspected Receiving Stream
- ☐ NOTIFICATIONS(required for emergency discharges that adversely effect or impact beneficial uses):
  - ☐ Who: _____ ☐ When: _____ (am/pm)
  - ☐ Who: _____ ☐ When: _____ (am/pm)
  - ☐ Who: _____ ☐ When: _____ (am/pm)

DOCUMENTATION: _____ Date: _____
(Name of Person Completing Form)

EMERGENCY DISCHARGE ACTIVITIES CHECKLIST
(Use with BMP ED-1)
For Water Utility Operation and Maintenance
SANTA CLARA VALLEY URBAN RUNOFF POLLUTION PREVENTION PROGRAM

Emergency Discharges of the Drinking Water System

Site/ Location	Discharge Type	Receiving Waterbody	Date of Discharge	Discharge Duration (military time)	Estimated Volume (gallons)	Estimated Flow Rate (gpm)	Implemented BMPs & Corrective Actions	Time of Discharge Discover	Time of Field Staff Arrival

Notes:

Example Annual Report Format (due March 1st)

Annual Discharge Volume Monitoring (January – December)

Number of direct discharges to a water of the U.S. that is > 50,000 gpd: _____

Estimated total volume discharged to surface water: _____

Estimated total volume of discharge water directed to a reuse or beneficial use: _____

Representative Monitoring Locations

Attached is the NOI site schematic with labeled representative monitoring locations (Table E-4 (a)) and the portions of the system the locations represent (Table E-4 (b)). These locations represent the following portions of the system:

Location	**System Description**

Changes in the representative monitoring locations that occurred during the year are as follows (Table E-4 (c)):

Non-Compliant Monitoring Results

Site/ Location	Discharge Type	Distance to Receiving Waterbody	Estimated Volume (gallons)	Date & Time	Chlorine Residual (mg/L)	pH	Visual Turbidity	Implemented BMPs & Corrective Actions

APPENDIX A
Best Management Practices

WATER UTILITY BEST MANAGEMENT PRACTICE EC1

EROSION CONTROL

I. INTRODUCTION

The purpose of this BMP is to minimize, if not eliminate, soil erosion from discharges of water during water utility operations. Water system discharges may cause erosion, resulting in sediment loading to storm drains, channels and creeks. The objective of this BMP is to prevent erosion from occurring and eliminate the need to capture and manage sediments resulting from erosion.

Very small and/or very low velocity discharges, discharges to contained areas without release points, or discharges to flat areas that will not cause erosion problems, do not require the use of pollution control measures beyond inspecting and cleaning the flow path for pollutants and debris. These types of discharges include but are not limited to:

- Meter testing in the field
- Backflow prevention devices
- Pressure release valve blowoffs
- Water quality sampling
- Discharges to protected areas adequately designed to receive the discharge such as paved surfaces, storm drains
- Instream recharge program
- Mainline cleaning
- Air release blow off valves
- Reservoir tank overflow
- WTP chlorine analyzer

Larger discharges, discharges with high velocities, or discharges to steep slopes will likely require the implementation of erosion control measures. These types of discharges include, but are not limited to:

- Hydrant flushing
- Main line breaks
- Reservoir tank draining
- Blow offs
- Meter testing facility
- Well sampling
- Well flushing operations
- Well “first-flush-to-waste” cycle
- Well rehabilitation/maintenance
- Pipeline modifications or maintenance
- Fire flow testing
- Reservoir tank cleaning
- Sheared hydrants
- Service line breaks
- WTP filter turbidimeter
- Artesian wells
- Well destruction
- WTP filter bank inspection
- Exercising interconnection valves
- Trench dewatering of drinking water during planned repairs

Erosion control measures can be either temporary or permanent. This BMP addresses temporary erosion control measures. Utilities may elect to install permanent control measures to eliminate the need for implementation of temporary measures for each discharge event. Permanent control measures may reduce overall operation and maintenance costs by eliminating the work necessary to install temporary measures. Permanent control measures may also provide better protection of the environment by providing better erosion control.

This document presents: 1) the advantage and limitations of the BMP; 2) operating procedures for implementation of the BMP; 3) pollution control measures; 4) monitoring and evaluation of the effectiveness of the BMP; and 5) references for additional BMP information.

II. ADVANTAGES AND LIMITATIONS

This BMP is designed to be used in conjunction with other BMPs which are designed to control turbidity, chlorine and chemical additives, as shown in Table 1. It is assumed in the application of this BMP that other pollution control measures are effectively applied in accordance with the criteria established to identify the need for their use. It is not intended to provide BMPs for construction dewatering operations, wastewater treatment operations, or other discharges not associated with the operation of a water supply utility.

III. OPERATING PROCEDURES

A. Assess the site conditions and the characteristics of the discharge.

   1. Evaluate if the discharge will be of such a velocity or quantity that it may cause erosion.

   2. Check the condition of the site to determine if the flow path of the discharged water will be to a paved surface, storm drain, vegetated surface, or bare soil.

B. Determine if erosion control measures are necessary.

   1. Identify alternatives for discharging the water. Are there opportunities to reuse the water for dust control, irrigation, construction compaction, etc.

   2. Identify opportunities to change the discharge characteristics. Utilize opportunities to implement measures to dissipate the energy so that erosion will not occur. Check for opportunities for directing the discharge to areas that will minimize erosion (e.g., paved surfaces).

   3. Consideration should be made for additional sediment capture BMPs (see CM-B, CM-C, CM-E or CM-F) to provide additional protection where there is a high potential for erosion.

   4. For discharges to paved streets, ensure that control devices fit properly for receiving system (i.e. curb inlet, drop inlet, culvert, creek, etc.).

C. Inspect the discharge pathway.

   1. Determine the flow path.

   2. Identify if any debris or pollutants are in the flow path.

   3. Clear/cleanup the flow path. Use broom to sweep gutters clean of debris and remove loose material.

4. Check nearest storm drain to make sure it is not clogged. If it is clogged, contact appropriate agency.

5. Locate areas with exposed sediment or lack of vegetation that may be especially susceptible to erosion. Redirect flow when possible and use additional control measures as necessary to protect bare soil.

D. Identify other BMPs for chlorine, turbidity, or chemical additives as necessary.

E. Brief the field staff on the control measure

1. For routine (i.e., daily or weekly) operations briefing(s) may be incorporated into the annual training. Tailgate meetings should be used for periodic refresher training.

2. Operations that are not routine (i.e., quarterly or annual) or substantial in nature (e.g., reservoir cleaning) a pre-activity meeting should be conducted to inform the operational staff of:

a. The potential pollutants (i.e., sediments);

b. The discharge point and receiving water;

c. The control measure to be used;

d. The method to install the control measure(s);

e. The method to monitor the control measure(s).

F. Install the necessary erosion control measures as described in “Pollution Control Measures”·

1. Identify the applicable control measure for discharging to vegetated surfaces or bare soil.

2. The applicable control measure for discharging to storm drains or paved surfaces is to inspect the flow path and remove any debris or pollutants.

G. Proceed to discharge in accordance with standard operating procedures.

H. Monitor the control measures to determine if they are operating correctly and effectively providing erosion protection. The method to perform the monitoring is described in Section V.

I. Close operation

1. Inspect the flow path for erosion damage or sediment deposition.

2. Inspect the receiving water, if practicable, for erosion damage or sediment deposition.

3. Clean up.

    a. Remove and dispose of any sediment collected;

    b. Remove the control measure(s);

    c. Remove all materials used in the discharge operation.

IV. POLLUTION CONTROL MEASURES

The pollution control measures presented here primarily focus on discharges to vegetated surfaces and bare soil. The pollution control measures for discharges to paved surfaces or storm drain are incorporated in the operation procedures consisting of the inspection and removal of pollutants which may be washed into channels, creeks or rivers.

A. Consider the following criteria when selecting the appropriate control measure:

1. Suitability of the area for discharge

2. Receiving system (i.e., curb inlet, drop inlet, culvert, creek, etc.)

3. Length of time BMP is to be in-place (i.e., hours, days, weeks, etc.)

4. Ease of installation

5. Ease of operation

B. The control measures identified in this BMP are:

1. Surface protection

    a. Armoring (CM-G)
    b. Flow diversion (CM-H)

2. Energy dissipation:

    a. Filter bags (CM-D)
    b. Check dams (CM-C)

V. MONITORING AND EVALUATION

Monitoring must be conducted to ensure that the discharge activity is properly controlled to minimize erosion and sediment problems. Visual monitoring should occur just prior to the start of the discharge to make sure the necessary control measures are in place. Subsequently, the control measures should be checked regularly for correct placement, clogging or failure. Monitoring frequency will depend on the nature of the discharge and the physical layout of the site. Site and discharge conditions which have a high potential for erosion should receive more frequent monitoring than those with lesser erosion potential.

If the monitoring indicates that there is a problem with the effectiveness of the control measure or additional control measures need to be implemented, then the discharge operation should be suspended until additional measures are implemented.

If the discharge is a planned DWS discharge and enters the storm drain system, receiving water or is put to beneficial reuse additional monitoring requirements (BMP GP1) apply.

VII. REFERENCES

American Water Works Association Best Management Practices (BMP) Manual for Drinking Water System Releases, CA-NV AWWA, 2005 and 2014.

East Bay Municipal Utility District Water Main Discharges FMP Manual, 1994

Manual of Standards of Erosion and Sediment Control Measures. Association of Bay Area Governments. Second Edition. May 1995.

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Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998 and January 2011.

WATER UTILITY BEST MANAGEMENT PRACTICE CD1

CHLORINATED DISCHARGE BMP (INCLUDING WATER THAT HAS BEEN TREATED WITH CHLORAMINES)

I. INTRODUCTION

This Best Management Practice is intended to control chlorine in discharges of potable water, recycled water or chlorinated groundwater. **The application of this BMP is secondary to any actions necessary to maintain acceptable water supply quality and quantity.** The following represent discharges likely to require this BMP:

- Hydrant flushing
- Blow offs
- Backflow testing
- Mainline cleaning (pigging)
- Pressure release valve blow offs
- Water quality sampling
- WTP filter turbidimeter
- Electric generator cooling water
- Mainline breaks
- Sheared hydrants
- Trench dewatering of drinking water during planned repairs
- Fire flow testing
- Meter testing in the field
- Water supply pump station operation discharge
- Exercising interconnection valves
- Air release valve blow offs
- Chlorine analyzer
- Pumping out sumps, vaults, etc. for maintenance
- Reservoir tank cleaning
- Water treatment plant filter bank inspection
- Pipeline modifications or maintenance

This document provides water utility operators with a method to control water utility discharges with chlorine concentrations typical of potable water, superchlorinated water, recycled water and groundwater. This BMP does not apply to non-chlorinated groundwater or raw water discharges.

II. ADVANTAGES AND LIMITATIONS

This BMP is designed to be used in conjunction with other BMPs which are designed to control turbidity, chlorine, and chemical additives, as shown in Table 1. It is assumed in the application of this BMP that other pollution control measures are effectively applied in accordance with the criteria established to identify the need for their use. It is not intended to provide BMPs for construction dewatering operations, wastewater treatment operations, or other discharges not associated with the operation of a water supply utility.

III. OPERATING PROCEDURES

These procedures are for planned discharge events. BMP procedures for emergency discharges are presented in BMP ED1. This BMP may be applied under emergency conditions if there are available personnel and time which will not hinder the response actions; however, the first priority for emergency discharges is to stop the flow of water and/or protect the public health, safety and property.

A. Assess if the chlorine level is within the typical operating range.

1. Identify the source water (treated water, recycled water, chlorinated groundwater, disinfection water (i.e., superchlorinated))

2. Determine the volume of water to be discharged. Volume is calculated from flow rate and duration of discharge. Sample calculations and references are provided in Section V of this BMP.

3. Determine the chlorine concentration in the water to be discharged.

B. Identify a suitable discharge option in the following order of preference:

1. Reuse of the water in
    a. Dust suppression
    b. Irrigation
    c. Construction compaction

2. Discharging to landscape with no overflow to the storm drain system (applicable for low volume discharges).

3. Discharging to the sanitary sewer system (see Control Measure CM-A).

4. Discharging to the storm drain system or to a creek using applicable pollution control measures.

C. Identify applicable control measures listed in Section IV. Control measures include:

1. Surface aeration (applicable if very low chlorine residual levels)

2. Chemical neutralization of chlorine

D. Check if other BMPs should be implemented for erosion, turbidity of source water, or chemical additives. See Table 1 for additional BMPs and implement as necessary.

E. Inspect the discharge pathway

1. determine the flow path

2. identify any debris or pollutants in the flow path

3. clear/cleanup the flow path

F. Proceed with the discharge activity in accordance with standard operating procedures.

G. Monitor the discharge water for unusual levels of chlorine as described in Section VI.

H. Close operation.

1. Inspect the flow path for erosion damage or sediment deposition

2. Inspect the receiving water, if practicable, for erosion damage or sediment deposition

3. Cleanup

IV. POLLUTION CONTROL MEASURES

A. Discharge to sanitary sewer system – see Control Measure CM-A.

B. Surface aeration (this assumes that the initial chlorine residual is sufficiently low that the chlorine residual compliance limit of 0.1 mg/L will be met before it enters the receiving water).

1. Identify a flow path that will provide a minimum of 300 feet of surface flow before entering a receiving stream.

2. Cover all inlets or diversionary structures that may provide alternate flow paths for the discharged water. Storm drain inlets may be blocked with sandbags and plastic.

3. Inspect the flow path for debris, pollutants and erosion potential.

4. Remove debris and pollutants. Provide erosion protection (see Erosion Control BMP-EC1).

C. Chemical neutralization of chlorine

1. Decide on dechlorination control devices. The following materials and equipment can be used, either alone or in combination for dechlorination[5]:
   a. Dechlorination agents available[6],[7] (use personal protective equipment when handling chemicals)
      - Sodium sulfite tablets
      - Sodium thiosulfate
      - Sodium bisulfite
      - Ascorbic acid (Vitamin C)
      - Sulfur dioxide (may reduce pH of water significantly[8])
      - Alternate dechlorination solutions
   b. Types of dechlorination equipment available:
      - Dechlor mat (3’ x 4’)
      - Dechlor strip (6” x 36”))
      - Diffuser (a variety of sizes may be necessary depending on application)
      - Titration systems

[5] At the writing of this document the DWS General Permit compliance limit is 0.1 mg/L chlorine residual.
[6] Be advised that the use of some chemicals to reduce chlorine residual may result in negative impacts to other parameters (e.g. pH).
[7] Use of tablets or other solids may cause particulates to be discharged that may then need to be addressed.
[8] AWWA Guidance Manual for the Disposal of Chlorinated Water (December 2000)

- Chlorine colorimeter and reagent

c. Choose proper PPE equipment according to equipment and agent

2. Apply appropriate amounts of neutralization chemical to the water prior to discharge into the storm drain. The following table from AWWA C652 indicates the pounds of chemical required to neutralize different volumes of chlorinated water.

Amount of Neutralization Chemical Required to Neutralize 100,000 Gallons of Chlorinated Water

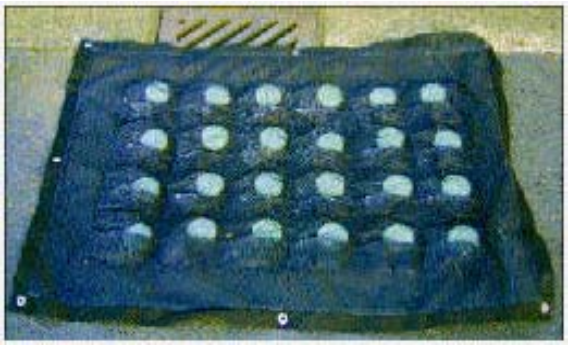
Neutralization Chemical	Initial Chlorine Residual			
	1.0 mg/l	2.0 mg/l	10 mg/l	20 mg/l
Sulfur Dioxide (SO_2)	0.8 lbs	1.7 lbs	8.3 lbs	41.7 lbs
Sodium Bisulfite ($NaHSO_2$)	1.2 lbs	2.5 lbs	12.5 lbs	62.6 lbs
Sodium Sulfite (Na_2SO_3)	1.4 lbs	2.9 lbs	14.6 lbs	73 lbs
Sodium Thiosulfiate (NaS_2O_3-$5H_2O$)	1.2 lbs	2.4 lbs	12 lbs	60 lbs

Example 1: To neutralize 3,132 gallons having a chlorine residual of 2.0 mg/l with sodium bisulfate, first locate chlorine residual equal to 2.0 mg/l at the top line of the chart and move down that column to the line marked sodium bisulfite. The table shows that 2.5 lbs of chemical is needed per 100,000 gallons of water. Second, to calculate the amount of sodium bisulfate needed for the 3,132 gallons of water, perform the following calculation:

Amount of sodium bisulfite needed = [(3,132 gal.) x (2.5 lbs)] / (100,000 gal)
= 0.078 lbs sodium bisulfite

3. Procedure for using Dechlor mat or strip (commonly used for unplanned discharges, hydrant flushing or small volume discharges)
   a. Fill pockets of dechlor mat or strip with dechlor tablets.
      i. Put one tablet in each pocket of the mat or strip. If the pocket contains a partially used tablet, add another tablet only if there is room.
   b. Place dechlor mat or strip mat in flow path.
      i. Place the dechlor mat or strip across (perpendicular to) the flow path downstream of sediment control devices (e.g. pea gravel bags).
      ii. If the flow path is wider than the dechlor mat or dechlor strip, or there is more than one flow path (flow is spreading out in more than one direction), use additional mats to ensure all water from the source is crossing a mat.
      iii. If the flow is deep (more than 1" above the top of the dechlor mat) and/or the flow rate is very high (>300 gpm), a second mat should be placed downstream of the first mat to ensure adequate dechlorination.
   c. Monitor mat or strip.
      i. Check the dechlor mat periodically to ensure some tablet remains in each pocket and that all flow is crossing at least one mat.

d. Clean up
   i. When the discharge is complete, move the dechlor mat(s) or strip(s) to the storm drain(s) the discharge was entering, and place it on the upstream side of the grate.
   ii. Clean the flow path to remove any tablet residual.
   iii. Retrieve the dechlor mat or strip and store it in its secondary container on the field vehicle.



Dechlor mat from Pollardwater.com

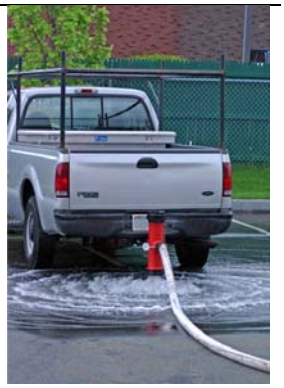
4. Procedure for using a diffuser (commonly used for hydrant flushing or planned small or medium volume discharges)
   a. Fill diffuser chamber or mesh pockets with tablets.
      i. If using a flow diffuser outfitted with a cylindrical tablet chamber, fill the chamber with tablets.
      ii. If the chamber is partially filled with partially used tablets, add as many new tablets as will fit while still allowing the cap to be screwed back on.
      iii. If using a flow diffuser with a dechlor mat attached to the face of the diffuser, put one tablet in each pocket and close the snap on each pocket.
      iv. If a pocket contains a partially-used tablet, only add another tablet if there is room.
   b. Install diffuser on hydrant, fire hose or blowoff
      i. Screw the diffuser to the hydrant, fire hose or blowoff.
   c. Check downstream chlorine residual
   d. Monitor tablets
      i. Check the supply of tablets in the tablet chamber or mesh pockets periodically to ensure that there is tablet remaining throughout the discharge.

"Little jimmy" diffuser from SCVWD

5. Procedure for using liquid reagents (commonly used for hydrant flushing or larger volume discharges)
   a. Prepare sodium thiosulfate solution
      i. A 10% sodium thiosulfate solution can be prepared by mixing 6.0 lbs of dry sodium thiosulfate in 5.0 gallons of water. When preparing the solution, be sure to use proper personal protection equipment.
   b. Secure the area
      i. Put on safety vest and hardhat. Place flooded signs and cones around work area.
      ii. The solution needs to be added to the water stream at the start of flushing and until flow has stopped.
   c. Place solution in the discharge flow.
      i. Install a liquid dechlorination system. For example the "Bazooka" (c.a. turner) or a Mazzei pipeline. Some units attach to trucks, e.g. the Hydro Hitch.
      ii. Attach chlorine line to bucket and then add to the system.
   d. Check chlorine residual
      i. After adding sodium thiosulfate solution at the appropriate application rate, test the water for chlorine residual 10 feet downstream to allow sufficient contact time. If residual is greater than 0.05 mg/l, adjust application rate.
   e. Clean up
      i. Patrol the area for any debris or equipment that requires removal.


Mazzei Pipeline (usabluebook.com)


Bazooka (usabluebook.com)


Hydro Hitch (hydrohitch.com)

6. Procedures for large volume planned discharges
   a. Types of equipment commonly used for large volume planned discharges (e.g. line disinfection or reservoir tank cleaning) include titration station, treatment trailer, ProMinent Beta dechlor metering system or Baker tank.
   b. Refer to the operating procedures for the specific equipment being utilized or water supply system location. This type of equipment generally requires specific procedures for hookup, feed rate and valve(s) position.
   c.

7. Disposal of Tablet and Reagent Waste
   a. Shelf life of tablets
      i. Tablets have a relatively long shelf life unless exposed to high temperatures (>85^{o}F). At higher temperatures, tablets may crumble. During the summer months, crews may need to place enough tablets for daily use in coolers for storage on trucks at the beginning of each work day. Supply buckets stored in the yard must be kept in a cool location.
   b. Disposal of powdered tablet waste
      i. As long as tablets are in large enough pieces to be retained within the mesh dechlor mat, diffuser chamber or diffuser mesh pockets, they can be used for dechlorination per the recommended procedures. Small amounts of powdery or granular tablet waste from tablet supply buckets or secondary containers should be mixed with water and discharged to the sanitary sewer via a utility sink.
      ii. For disposal of contaminated tablets see MSDS guidance on proper disposal methods or consult with your Environmental Compliance Coordinator.
   c. Disposal of unused DPD reagent.
      i. Empty DPD reagent dispensers may be disposed of in the trash. DPD reagent dispensers that can no longer be used but still contain reagent (i.e., the reagent powder has become solidified) should be stored in hazardous waste storage areas for pick up by hazardous waste disposal contractors.

V. SAMPLE FIELD CALCULATIONS

A. Identify flow rate or discharge. The following table may be used:

TABLE TO BE INSERTED BY EACH AGENCY FOR THEIR DISTRIBUTION SYSTEM

B. Estimate duration of discharge in minutes.

C. Calculate volume using this formula:

Volume = flow rate x duration

D. Flow rate for different size ports or water pipes can be calculated as follows:

Refer to systems operation manual
Flow rate of 8 inch pipe fully flowing: - *TO BE INSERTED BY EACH AGENCY FOR THEIR DISTRIBUTION SYSTEM*

VI. MONITORING AND EVALUATION

A. Initially and as needed, verify if flow path is clear and that the discharge is not causing any flooding.

B. Initially and as needed, verify that discharge to the sanitary sewer is not interfering with the normal operation of the sanitary sewer. Discharge to the sanitary sewer system may require approval of the sanitary sewer agency before discharge can occur.

C. Initially and as needed, verify that any neutralization is successful..

D. If the discharge is from a potable water supply, owned and operated by a co-permittee, that enters the storm drain system, additional monitoring requirements (BMP GP-1) apply.

VII. REFERENCES

American Water Works Association C652 Disinfection of Water Storage Facilities, January 1992, replaced August 2002.

American Water Works Association Guidelines for the Development of Your Best Management Practices (BMP) Manual for Drinking Water System Releases, CA-NV AWWA, 2005.

Nguyen, Phyllip H. WPL Disinfection Plan 2010 Santa Clara Valley Water District Memorandum, Revised December 2009.

Water Utility Discharge Pollution Prevention Plan Guidance Manual prepared for the Santa Clara Valley Water District by URS Corporation, October 19, 2001.

Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

WATER UTILITY BEST MANAGEMENT PRACTICE SC1

SEDIMENT/TURBIDITY CONTROL

I. INTRODUCTION

The purpose of this BMP is to control sediment and turbidity in discharges from water utility operation and maintenance activities where the source is treated water, raw water, or groundwater.

This document presents:

1) the advantage and disadvantages of the BMP;
2) operating procedures for implementation of the BMP;
3) pollution control measures;
4) monitoring and evaluation of the effectiveness of the BMP; and
5) references for additional BMP information.

II. ADVANTAGES AND LIMITATIONS

This BMP is designed to be used in conjunction with other BMPs which are designed to control erosion, chlorine and chemical additives, as shown in Table 1. It is assumed in the application of this BMP that other pollution control measures are effectively applied in accordance with the criteria established to identify the need for their use. It is not intended to provide BMPs for construction dewatering operations, wastewater treatment operations, or other discharges not associated with the operation of a water supply utility.

It is recognized that there will be some circumstances in which steep topography and/or high flow rates will preclude effective sediment removal using any of the current technologies; however, BMPs must be implemented to the Maximum Extent Practicable (MEP).

III. OPERATING PROCEDURES

A. Identify a suitable discharge option in the following order of preference:

1. Reuse of the water in:
   a. Dust suppression
   b. Irrigation
   c. Construction compaction

2. Discharging to the sanitary sewer system (see Control Measure CM-A)

3. Discharging to the storm drain system or to a creek using applicable pollution control measures.

B. Inspect the discharge pathway

1. Determine the flow path

2. Identify any debris or pollutants in the flow path

3. Clear/cleanup the flow path. Use broom to sweep gutters clean of debris and remove loose material.

4. Check nearest storm drain to make sure it is not clogged. If it is clogged contact the appropriate agency.

C. Select/Design appropriate pollution control measure

1. Assess if the turbidity level is less than 50 NTU. If the water in normal operations typically do not have turbidities which exceed 50 NTU sediment control measures are not required. (Note pollution control measures implemented for erosion control BMP are also applicable as turbidity control measures.)

2. Consideration should be given to the following criteria when selecting the appropriate control measure:
   a. Suitability of area for discharge (vegetated surface, chlorinated treatment requirements, etc.)
   b. Receiving system (i.e. curb inlet, drop inlet, culvert, creek, etc.)
   c. Length of time BMP is to be in place (i.e. hours, days, weeks, permanent, etc.)
   d. Ease of installation
   e. Ease of operation
   f. Ease of removal

3. Pollution control measures are identified in Section IV.

D. Check if other BMPs should be implemented for erosion control, chlorine residual, or chemical additives. See Table 1 for additional BMPs and implement as necessary.

E. Brief the field staff on the control measure

1. For routine (i.e., daily or weekly) operations briefing(s) may be incorporated into the annual training. Tailgate meetings maybe used for periodic refresher training.

2. For operations that are not routine (i.e., quarterly or annual) or are substantial in nature (e.g., reservoir cleaning), pre-activity meeting should be conducted to inform the operational staff of:
   a. The potential pollutants (i.e., sediments)
   b. The discharge point and receiving water
   c. The control measure to be used
   d. The method to install the control measure(s)
   e. The method to monitor the control measure(s)

F. Implement the control measure

1. Obtain the necessary equipment

2. Set up traffic control and protect private property if necessary

3. Install the control measure

G. Start the discharge.

H. Verify the effectiveness of the control measure by monitoring as described in Section V.

I. Close operation

1. Inspect the flow path for erosion damage or sediment deposition.

2. Inspect the receiving stream, if practicable, for erosion damage or sediment deposition.

3. Cleanup:
   a. Remove the sediment captured in the control measure
   b. Remove the control measure
   c. Inspect the working area for residual pollutant left from the operation.

IV. POLLUTION CONTROL MEASURES

A. The control measure identified for this BMP are (see Appendix B):

1. Discharges to Sanitary Sewer Systems (CM-A)

2. Flow Path – Vegetation Filtration (CM-B)

3. Flow Path – Check Dam Filters (CM-C)

4. On-line Filter System: (CM-D)

5. Storm Drain Inlet Protection (CM-E)
   a. Block and Gravel Drop Inlet Sediment Filter (CM-E1)
   b. Block and Gravel Curb Inlet Sediment Filter (CM-E2)
   c. Gravel Bag Barrier (CM-E3)
   d. Gravel and Mesh Drop Inlet Sediment Filter (CM-E4)
   e. Gravel and Mesh Curb Inlet Sediment Filter (CM-E5)
   f. Silt Fence Drop Inlet Protection (CM-E6)

6. Silt Fence Culvert Inlet Protection (CM-F)

V. MONITORING AND EVALUATION

Monitoring must be conducted to ensure that the control measure is effective. Monitoring is accomplished through visual observation of the discharged water and control measure.

Visual observation should be conducted concurrently when the discharge is commenced. Immediate monitoring should include observation of:

- The discharge water immediately downstream of the control measures to evaluate if the control measure is reducing the turbidity.
- The control measure to determine if sediments are accumulating on the control measures. If sediments are accumulating at a rapid rate, monitoring should be continued to ensure that the control measure does not cause the discharged water to overtop or cause flooding of an area.

Periodic monitoring should be conducted during the operation to ensure that the control measures continue to be effective and that there are no operational problems (e.g., flooding of an area). The frequency of the periodic monitoring will be dependent on the flow rate of the discharge and the turbidity of the source water.

If the discharge is from a potable water supply owned and operated by a co-permittee that enters the storm drain system additional monitoring requirements (BMP GP-1) may apply.

VII. REFERENCES

American Water Works Association Guidelines for the Development of Your Best Management Practices (BMP) Manual for Drinking Water System Releases, CA-NV AWWA, 2005.

Manual of Standards of Erosion and Sediment Control Measures. Association of Bay Area Governments. Second Edition. May 1995.

Virginia Erosion and Sediment Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, Richmond, VA. Third Edition. 1992.

Water Utility Discharge Pollution Prevention Plan Guidance Manual prepared for the Santa Clara Valley Water District by URS Corporation, October 19, 2001.

Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

WATER UTILITY BEST MANAGEMENT PRACTICE CA-1

DISCHARGES HAVING CHEMICAL ADDITIVES (OTHER THAN CHLORINE OR CHLORAMINE)

I. INTRODUCTION

This Best Management Practice (BMP) is intended to control chemical additives that maybe found in discharge water from water utility operation or maintenance activities. This BMP is applicable to discharges which are greater than 1,000 gallons. The application of this BMP is secondary to any actions necessary to maintain water supply and acceptable quality. The following represent discharges likely to require this BMP.

- Well chlorination (disinfection) and flushing
- In-stream recharge program
- Percolation ponds maintenance activities
- Off-stream recharge program
- Well destruction
- Reservoir tank cleaning

This document presents:

1) the advantages and disadvantages of the BMP;
2) operating procedures for implementation of the BMP;
3) pollution control measures; and
4) monitoring and evaluation of the effectiveness of the BMP.

II. ADVANTAGES AND LIMITATIONS

This BMP is designed to be used in conjunction with other BMPs which are designed to control erosion, turbidity and chlorine, as shown in Table 1. It is assumed in the application of this BMP that other pollution control measures are effectively applied in accordance with the criteria established to identify the need for their use. It is not intended to provide BMPs for construction dewatering operations, wastewater treatment operations, or other discharges not associated with the operation of a water supply utility.

III. OPERATING PROCEDURE

A. If a situation arises where chemical additives are suspected to be in the drinking water it probably means that an emergency or accident of some kind has occurred and the standard operating procedures for responding to treated water emergencies should be implemented.

B. If the situation is not an emergency proceed with the control measures in Section IV.

IV. POLLUTION CONTROL MEASURES

One or a combination of the following measures maybe utilized to manage the discharge activity:

A. If it is a non-emergency situation contact the supervisor or applicable organizational unit to develop appropriate control measures and obtain required permits.

B. Discharge to the sanitary sewer in accordance with Control Measure A (CM-A).

C. Properly dispose of the water.

1. Contain the water with the added chemicals.

2. Transport the water to a disposal site authorized to accept the water.

3. Dispose of the water.

4. Document the operation as necessary.

V. MONITORING AND EVALUATION

A. Initially and as needed, verify that the discharge into sanitary sewer is not interfering with the normal operation of the sanitary sewer.

B. Check to see if other criteria of erosion potential, source water turbidity, or chemical additives require additional BMPs.

VI. REFERENCES

Water Utility Discharge Pollution Prevention Plan Guidance Manual prepared for the Santa Clara Valley Water District by URS Corporation, October 19, 2001.

Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

WATER UTILITY BEST MANAGEMENT PRACTICE ED1

EMERGENCY DISCHARGES

I. INTRODUCTION

The purpose of this BMP is to control sediments from unplanned/emergency discharges from treated water, recycled water, raw water, and maintenance activities. Emergency discharges are non-routine activities and include but are not limited to:

- Water main breaks
- Leaks
- Overflows
- Sheared fire hydrants

These emergency discharges also include emergency discharges as the result of natural or man-made disasters.

This document presents:

1) the advantages and limitations of the BMP;
2) operating procedures for implementation of the BMP pollution control measures;
3) monitoring and evaluation of the effectiveness of the BMP; and
4) references available to the users of the BMP.

II. ADVANTAGES AND LIMITATIONS

This BMP is designed to incorporate erosion, turbidity and chlorine residual control measures in responding to emergency discharges. The implementation of these control measures should not interfere with or delay the repairs or corrective actions undertaken by the utility to stop the discharge.

III. OPERATING PROCEDURE

A. Stop the discharge as quickly as possible. Ensure the health and safety of the public and workers first. Set up traffic control and protect private property if necessary. In the case of a water main break, isolate the main or service prior to any additional excavation needed to repair the main break based on standard procedures.

B. Inspect the flow path of the discharged water.

1. Locate bare soil or exposed areas that may be especially susceptible to erosion. Protect and redirect flow when possible.

2. Remove sediment and debris from the flow path to the extent possible. If there is surface flow and it is not appropriate to isolate the service, remove any sediment and debris that can be removed without causing it to become entrained in the flow.

3. Identify erodible areas which may need to be repaired or protected during subsequent repairs or corrective actions.

4. Identify the potential for pollutants to be washed into the waterway.

C. If repairs or corrective actions will cause additional discharges of water.

1. Select the appropriate BMP for erosion control, chlorine residual, turbidity control and chemical additives.

2. Remove potential pollutants from entering the flow path.

D. Install the appropriate BMP control measures.

1. For discharges to erodible areas, divert the discharged water to protective areas or install erosion control measures (see BMP EC-1).

2. For discharges which have a chlorine residual, see BMP CD-1.

3. For discharges which contain sediments in excess of 50 NTU install the inlet control measures identified in the BMP SC-1.

4. For discharges which may have excess added chemicals, see BMP CA-1.

E. Proceed with repairs or corrective actions.

F. Close operation.

1. Remove sediments which may have been disposed of during the discharge and repair/corrective actions.

2. Remove all control measures.

3. Make repairs to eroded areas, as necessary, to prevent further erosion from rainfall.
   a. Place gravel on eroded areas
   b. Reseed
   c. Install biodegradable soil stabilization blankets

G. Document the discharge event.

1. Complete applicable forms required by your agency.

2. Notify the Water Board[9] no later than 24 hours after becoming aware of any aquatic impacts (e.g., fish kill) or impact to beneficial uses as a result of the unplanned discharge or when the discharge might endanger or compromise

[9] Notification to the State Office of Emergency Services (OES) will include notification to the Regional Water Board.

public health and safety. Within five working days after the notification submit a report documenting the discharge and corrective actions taken.

IV. POLLUTION CONTROL MEASURES

The control measures for discharges from repair activities following emergency discharges include measures to provide erosion protection, control chlorine residuals, sediments and chemical additives. The control measures are identified in the BMP EC-1, CD-1, SC-1 and CA-1.

V. MONITORING AND EVALUATION

Monitoring must be conducted to ensure that, during repairs, water discharged to the waterways is being effectively treated by the implemented control measure(s), if any.

There are no data collection requirements in the General Permit for emergency discharges. However, it is recommended permittees collect some minimum data for the discharges such as location, date, duration and estimated volume. This data will assist permittees to respond to any questions or concerns raised at a later date by the public or regulatory agencies.

VI. REFERENCES

American Water Works Association Guidelines for the Development of Your Best Management Practices (BMP) Manual for Drinking Water System Releases, CA-NV AWWA, 2005.

Manual of Standards of Erosion and Sediment Control Measures. Association of Bay Area Governments. Second Edition. May 1995.

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Virginia Erosion and Sediment Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, Richmond, VA. Third Edition. 1992

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Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

Emergency Discharges of the Drinking Water System

Site/ Location	Discharge Type	Receiving Waterbody	Date of Discharge	Discharge Duration (military time)	Estimated Volume (gallons)	Estimated Flow Rate (gpm)	Implemented BMPs & Corrective Actions	Time of Discharge Discover	Time of Field Staff Arrival

WATER UTILITY BEST MANAGEMENT PRACTICE GP1

MONITORING AND REPORTING GENERAL PERMIT REQUIREMENTS FOR DRINKING WATER SYSTEM DISCHARGES

I. INTRODUCTION

The primary purpose of this BMP is to meet the State Drinking Water System Discharges General Permit (General Permit) (NPDES CAG140001, Order No. 2014-0194-DWQ) requirements for monitoring and reporting planned discharges of potable water to the storm drain system. Planned discharges are routine operation and maintenance activities in the potable water distribution system that can be scheduled in advance. These types of discharges include, but are not limited to:

- Hydrant flushing
- Fire flow testing
- Reservoir tank cleaning/draining
- Meter testing in the field
- Backflow/ maintenance testing
- Pump station operation discharge
- Mainline cleaning (pigging)
- Pressure release valve blow offs
- Blow offs
- Pressure release valve blow offs
- Air release valve blow offs
- Water quality sampling

The requirements apply only to the planned discharges of potable water to the storm drain systems that reach the receiving water or are put to beneficial reuse. The General Permit contains notification, reporting and monitoring requirements.

This document presents: 1) advantages and disadvantages of the BMP; 2) operating procedures for implementation of the BMP; 3) pollution control measures; 4) monitoring and evaluation of the effectiveness of the BMP; and 5) references for additional BMP information.

II. ADVANTAGES AND LIMITATIONS

This BMP is designed to be used in conjunction with other BMPs which are designed to control turbidity, chlorine and chemical additives, as shown in Table 1. It is assumed in the application of this BMP that other pollution control measures are effectively applied in accordance with the criteria established to identify the need for their use. It is not intended to provide BMPs for discharges not associated with the operation of a water utility specifically discharging potable water to the storm drain system.

III. OPERATING PROCEDURES

A. Review planned potable water discharges at least one week in advance.

B. Identify any planned discharges with an expected total volume ≥325,850 gallons. For these discharges:

1. Notify the Water Board staff at least three days in advance. If the discharge is an urgent planned discharge notify the Water Board staff retroactively within 24-hours after the discharge.

2. Notify other interested parties who may be impacted by planned discharges, such as flood control agencies, downstream jurisdictions, and non-governmental organizations such as creek groups.

3. Notification information shall include:
   - Location
   - Type of discharges
   - Receiving waterbody(ies)
   - Date of discharge
   - Estimated volume (gallons)
   - Reason for discharge

C. Assess the site conditions and the characteristics of the discharge. If the discharge is directed to the sanitary sewer the General Permit does not apply. If the discharge is being put to beneficial reuse record the volume only, monitoring is not required. If the discharge is directed to the storm drain system or receiving water follow the procedures below.

1. Implement appropriate BMPs.

2. Determine monitoring location. Monitoring locations should be as far from the implemented BMPs as reasonable and feasible, before the discharge commingles with other water sources. The farther the monitoring location from dechlorination BMPs, the lower residual chlorine results will likely be. However, field conditions will dictate where it is possible, reasonable and feasible to collect samples.

3. Record information available before discharge begins (i.e. location, type of discharge, receiving waterbody(ies) and date of discharge).

D. Proceed to discharge in accordance with standard operating procedures.

E. Monitor the BMPs/control measures to determine if they are operating correctly and effectively. The method to perform the monitoring is described in Section V.

1. Compare monitoring results to applicable compliance limit or action level.
   a. chlorine residual compliance limit ≤ 0.1 mg/L
   b. turbidity action level ≤ 100 NTU

3. Implement corrective actions if monitoring results are above the compliance limit or action level as described below.

Discharge Type	Compliance Limit/ Action Level
Superchlorinated discharges	Chlorine Residual Compliance Limit = 0.1 mg/L
Planned discharge directly into or within 300 feet of receiving water	Chlorine Residual Compliance Limit = 0.1 mg/L
Groundwater well development or rehabilitation	Turbidity Action Level = 100 NTU

F. If the chlorine residual sample is ≥ 0.1 mg/L check if the result is a false positive. Record the cause of the false positive, if applicable.
G. Close operation as appropriate for BMPs implemented.

H. A summary of the volume discharged and non-compliance monitoring data is submitted to the State Water Board by March 1st each year. All other monitoring data are provided to the Water Board upon request.

IV. POLLUTION CONTROL MEASURES

There are no additional control measures beyond those described in the Operating Procedures of this BMP for monitoring, notifying and reporting planned potable water discharges. Control measures for erosion protection, chlorinated discharge, turbidity and chemical additives should be implemented, as appropriate.

V. MONITORING AND EVALUTION

Monitoring must be conducted to ensure that the control measure is effective and to meet General Permit requirements. Monitoring is accomplished through visual observation of the discharged water and control measure. Sampling for chlorine residual, turbidity and pH is conducted for the following types of discharges:

Discharge Type	Parameter
Superchlorinated discharges	• Chlorine residual • Turbidity (visual) • pH
Large volume discharges ≥ 325,850 gallons	• Chlorine residual • Turbidity (visual)
Groundwater well development or rehabilitation	• Turbidity (NTU)
Annual Representative Monitoring	• Chlorine residual • Turbidity (visual)

Visual observation should be conducted when the discharge starts. If the BMPs and control measures are properly installed and functioning correctly begin sampling. The number of samples collected will depend on the duration of the discharge:

Discharge Event	Total # Samples	Timing
< 20 minutes	1	1 sample during first 10 min
20 – 60 minutes	2	1st sample during first 10 min; 2nd sample during last 10 min
> 60 minutes	3	1st sample during first 10 min; 2nd sample during next 50 min; 3rd sample during last 10 min

The sampling location is dependent on field conditions. The sample should be collected after the BMPs but before the discharge commingles with any other discharges in the storm drain system. Chlorine residual concentrations decrease with time and distance from the dechlorination BMP, therefore, the farther from the BMP the sample is taken the more closely the results will reflect the discharge water that reaches the receiving water. However, field conditions may prevent sampling other than directly following BMPs.

Collect a sample in a wide mouth plastic sample container. Measure the chlorine residual, turbidity and pH according to monitoring equipment instructions. Example sampling equipment:

- Turbidimeter: Hach 2100Q; Hach 2100P
- pH: Hach pocket pal; ECO tester PH2; Myron L Co. Tech pro II
- chlorine residual: Hach Pocket colorimeter II
- multiple parameters: Hach DR890 or Hanna HI93414

Implement corrective actions, if necessary, and record the sampling results. Record the volume discharged for all discharge events. Record the discharge volume directed to beneficial reuse.

The above describes the minimum sampling required to meet the General Permit and is not intended to limit operational sampling that may be conducted to verify BMP effectiveness.

The receiving water must be monitored for all direct[10], planned discharges that do not comply with the General Permit BMP implementation requirements or effluent limit and the discharge potentially causes or contributes to an adverse effect or impact to beneficial uses. Monitoring is conducted by making visual observations at the point of confluence of the discharge and receiving water. Document visual monitoring with digital photographs and documentation of observed effects.

VI. ATTACHMENTS

Example Data Collection Form.

[10] A direct discharge is any discharge that enters a water of the U.S. without first traveling via a storm drain or any other constructed conveyance system.

State Drinking Water System Discharges General Permit
Planned Discharge to Storm Drain/Receiving Water FIELD FORM **Date:** _____

Site/ Location	Discharge Type	Distance to Receiving Waterbody (direct, ≤ 300 ft, >300 ft)	*not required*		Estimated Volume (gallons)	Implemented BMPs & Corrective Actions[1]	*Is Monitoring Required?*			
			Duration (minutes)	Estimated Flow Rate (gpm)			Superchlorinated	≥ 325,850 gallons	Groundwater Well Develop./ Rehab	Annual Rep. Monitoring Location

[1]Corrective Actions should be taken if monitoring indicates:
- Turbidity ≥ 100 NTU
- Chlorine Residual ≥ 0.1 mg/L

State Drinking Water System Discharges General Permit
Planned Discharge to Storm Drain/Receiving Water Monitoring Results FIELD FORM **Date: _____**

Site/ Location	Reason for Sampling (Event or Annual Representative)	Time		*Discharge ≥ 325,850 gal Annual Rep Monitoring* *Superchlorinated Discharge*		*GW Well Dev/Rehab*	If Chlorine Residual ≥ 0.1 mg/L check if False Positive and record possible cause if False Positive
			pH	Chlorine Residual (mg/L)	Visual Turbidity (Low/Med/High)	Measured Turbidity (NTU)	

Sampling Frequency:

Discharge Event	Total # Samples	Timing	Discharge Event	Total # Samples	Timing	Discharge Event	Total # Samples	Timing
< 20 minutes	1	1 sample during first 10 min	20 – 60 minutes	2	1st sample during first 10 min; 2nd sample during last 10 min	> 60 minutes	3	1st sample during first 10 min; 2nd sample during next 50 min; 3rd sample during last 10 min

State Drinking Water System Discharges General Permit
Planned Discharge to Beneficial Reuse FIELD FORM

Site/ Location	Discharge Type	Beneficial Reuse	Date of Discharge	*not required*		Estimated Volume (gallons)
				Duration (minutes)	Estimated Flow Rate (gpm)	

Types of Beneficial Reuse: groundwater recharge, irrigation, augment existing water supply, direct or indirect discharge to stormwater capture basin, LID feature or groundwater recharge system, water truck.

APPENDIX B
Pollution Control Measures

- CM-A Discharge to Sanitary Sewer Manhole
- CM-B Flow Path – Vegetation Filtration
- CM-C Flow Path – Check Dam Filters
- CM-D On-Line Filter System
- CM-E Sediment/Turbidity Curb and Drop Inlet Protection:
  - CM-E1 Block and Gravel Drop Inlet Sediment Filter
  - CM-E2 Block and Gravel Curb Inlet Sediment Filter
  - CM-E3 Gravel Bag Barriers
  - CM-E4 Gravel and Mesh Drop Inlet Sediment Filter
  - CM-E5 Gravel and Mesh Curb Inlet Sediment Filter
  - CM-E6 Silt Fence Drop Inlet Protection
- CM-F Silt Fence Culvert Inlet Protection
- CM-G Surface Protection – Armoring
- CM-H Surface Protection – Flow Diversion

CONTROL MEASURE A

DISCHARGE TO SANITARY SEWER SYSTEM

PURPOSE

Discharging to sanitary sewer systems prevents sediments/pollutants from entering local creeks and the bay by removing pollutants in the wastewater treatment processes.

CONDITIONS FOR APPLICATION

Obtain necessary approval from wastewater treatment plant or sanitary sewer agency.

- Obtain approval or permit for a one-time discharge, or
- Obtain approval or permit for annual or ongoing discharge.

Note: Failure to *gain approval from the sanitary* sewer *agencies will require implementation* of *other control measure(s).*

DESIGN CONSIDERATIONS

- Determine the feasibility of implementing this control measure by identifying access to a sanitary manhole near the discharge location.
- Construct discharge system with an air gap between the outlet pipe of the discharge line and the sewerage. If an adequate air gap cannot be maintained at all times to prevent cross contamination, select another control measure.
- Develop an adequate traffic control plan and implement it prior to the discharge operation. Typically, sanitary sewer manholes are located in traffic lanes. Discharging to these manholes will cause a disruption of the vehicular traffic flow.
- Obtain a confined-space entry permit if it is necessary to enter a manhole.

CONSTRUCTION SPECIFICATIONS

- Maintain flow within the limits that are acceptable to the local sanitary sewer agencies.
- Direct the discharge water to the sanitary sewer system by fixed piping, flexible piping, or a system to capture surface flow discharging (e.g., sand bags).
- Install the piping outlet above the manhole at height of at least twice the diameter of the outlet pipe.
- Anchor the piping such that the energy from the discharge water will not cause the piping to thrust out of position.

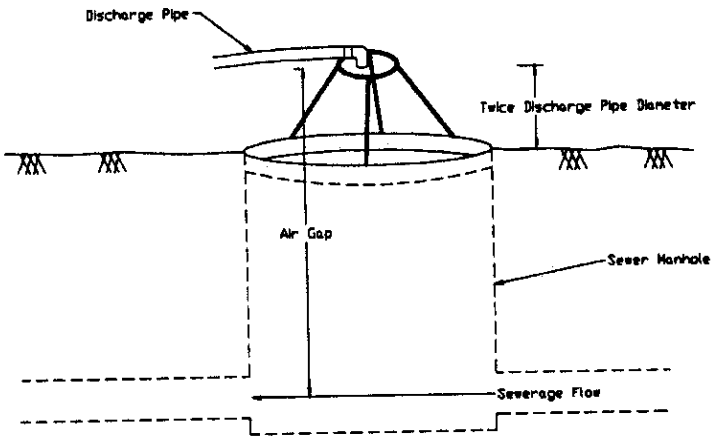
INSPECTION AND MAINTENANCE

Ensure that the Control Measure is working.

- Check for leaks from the piping system.
- Observe the system in operation and make repairs as required to keep the discharge flowing into the sanitary sewer system.
- Ensure that the air gap is maintained at all times.

Notify wastewater treatment plant or sanitary sewer agency that the discharge has ceased.

Discharge to Sanitary Sewer



REFERENCES

Water Utility Discharge Pollution Prevention Plan Guidance Manual prepared for the Santa Clara Valley Water District by URS Corporation, October 19, 2001.

Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

CONTROL MEASURE B

VEGETATION FILTRATION

PURPOSE

Discharges from water utilities operations may contain sediments originating from water systems or from the raw, untreated water. Discharging the water over vegetated surfaces can provide removal of sediments and prevent sediments from entering local creeks and the bay.

CONDITIONS FOR APPLICATION

- Use this control measure where an existing vegetated area can be used to filter the sediments from the discharge water.

- Make sure the vegetated area is of sufficient density to filter the sediments and strong enough so that it will not be uprooted by the discharged water.

DESIGN CONSIDERATIONS

- Ensure that the area to receive the discharge has tight, dense, well-established vegetation similar to a grassy area.

- Control the energy of the discharge or dissipate to prevent erosion of the soil within the vegetated area, and to prevent the destruction and uprooting of the vegetation.

- Adjust the discharge to avoid flooding and excessive runoff.

- Remove debris from the flow path.

CONSTRUCTION SPECIFICATIONS.

- Ensure that at least 50 ft of grassy ground is available between the point of discharge and the location where the water drains into the receiving storm drain system or the creek.

- Surface Armoring (Control Measure J) or other energy dissipation measures must be installed at the point of discharge if the discharge threatens to damage the vegetated area or cause erosion of the soil within that discharge area.

- A vegetated area recently treated with fertilizers or pesticides/herbicides should not be used.

INSPECTION AND MAINTENANCE

Monitor the discharge

- Ensure that there is no discharge of sediments; and

- Ensure that there is no erosion of grassy/vegetated areas.

REFERENCES

Water Utility Discharge Pollution Prevention Plan Guidance Manual prepared for the Santa Clara Valley Water District by URS Corporation, October 19, 2001.

Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

CONTROL MEASURE C

FLOW PATH CHECK FILTERS

PURPOSE

Discharges from water utilities operations may contain sediments originating from water systems or from the raw, untreated water. Discharging the water through flow path filter check dams can provide for removal of sediments and prevent sediments from entering local creeks and the bay.

CONDITIONS FOR APPLICATION

Check filters are applied at a single or multiple locations along discharge flow paths to trap sediments and other pollutants and prevent them from reaching inlet structures or receiving waters.

DESIGN CONSIDERATIONS

Check filters can be constructed with one or a combination of the following: sandbags, socks with sand or other absorbent materials; and dikes made with filter fabrics and gravel or other earth material. Often sand bags filled with pea gravel provide the better combination of sediment capture and energy dissipation.

Consider the slope, erosion potential, and flow rate of the discharge when choosing filter materials and locating filters.

Avoid creating large pools and/or obstructive flow paths.

CONSTRUCTION SPECIFICATIONS

Place sandbags, socks filled with sand or gravel, and/or dikes made of filter fabric and gravel perpendicular to the flow path and curb with the end of the dam (farthest from curb) curving slightly upstream. Often sand bags filled with pea gravel provide the better combination of sediment capture and energy dissipation. Dam height, length, the number of bags used and the interval between dams will vary depending upon site conditions and the resources available.

The following criteria should be used to determine bag placement:

- **Dam Height**: The height of each dam should be slightly less than the height of the curb or other retaining structure that is acting to channel the flow. If it is equal to or higher than the curb, flow will be diverted onto the sidewalk and cause flooding.

- **Dam Length**: The longer the dam, the greater the ponding area and the better the retention of sediment. However, dam length is limited by the number of bags available, vehicular traffic flow considerations and potential for flooding of property. Bags and ponded water should not extend outside of coned areas into traffic lanes or onto private property.

- **Number of Dams and Distance Between Dams**: In general, the greater the number of dam locations between the discharge source and entry into storm drains or receiving waters, the greater the retention of sediment. A minimum of two dams should be used in

all cases. The interval between dams must shorten as the ground surface gradient (slope) increases to maintain equivalent sediment removal rates. The rule of thumb for dam spacing is to place dams at intervals such that the elevation of the top of the downstream dam is equal to the elevation of the bottom of the dam immediately upstream (see drawing below).

Dams should also be installed around drain inlets (DIs) affected by the water flow and a filter used over the DI to help contain sediment flowing into the DI. All impacted DIs should have BMPs implemented within reason. A dam and filter should be built around and over the first DI impacted by the flow.

Line the sandbags, socks and dikes tight to divert the flow at least 2 feet outside of its normal path.

Construct an overflow (low spot) in the check filter. If the flow rate of the discharge is high and considerable amounts of sediment appear to be passing by the filter, construct a series of two or more filters until effective removal of sediment is achieved.

INSPECTION AND MAINTENANCE

- Monitor the discharge for breakthrough of sediments and potential traffic hazards caused by ponded water.
- Add more check dams and implement traffic control as necessary.
- After the discharge is finished, sweep up sediment deposited behind check filters and dispose of properly.

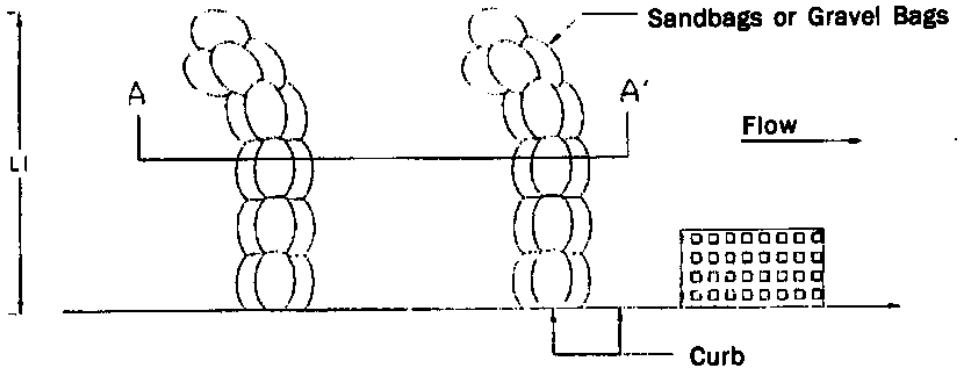
REFERENCE

American Water Works Association Guidelines for the Development of Your Best Management Practices (BMP) Manual for Drinking Water System Releases, CA-NV AWWA, 2005.

Water Utility Discharge Pollution Prevention Plan Guidance Manual prepared for the Santa Clara Valley Water District by URS Corporation, October 19, 2001.

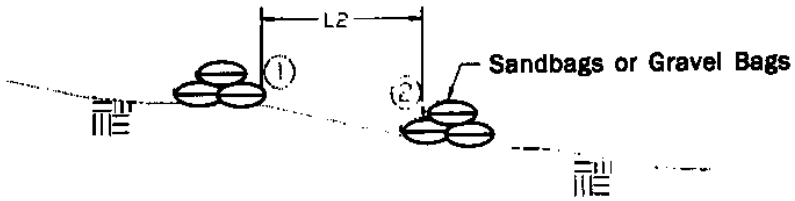
Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

Figure C1.1
Flow Path Check Filters



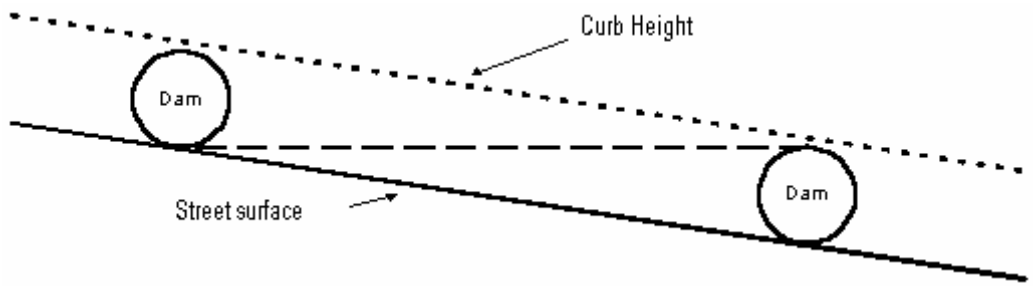
L1 = distance such that top of dam is at elevation of top of curb, or maximum distance to avoid traffic interference, whichever is less

L2 = distance such that points 1 and 2 are of equal elevation



Section A - A

Additional figure below from AWWA Guidelines for the Development of Your Best Management Practices (BMP) Manual for Drinking Water System Releases (CA-NV AWWA 2005)



CONTROL MEASURE D

ON-LINE FILTER SYSTEMS

PURPOSE

To reduce the contents of sediments and impurities in the discharged water when the discharge water is expected to have turbidity greater than approximately 50 NTU. Controlling the turbidity of the discharge water at the source through an on-line filtering device or facility protects the environment by reducing the amount of sediments and pollution that enters storm drain systems and local creeks and rivers.

CONDITIONS FOR APPLICATION

Select and use online filter systems appropriately.

- Use when the discharge is planned and filter assembly can be fitted to the discharge point either permanently or prior to each discharge.
- Use when the turbidity of the discharge water is expected to be greater than 50 NTU
- Use when the discharge rate can be maintained within the operational limits of the on-line filter assembly.

DESIGN CONSIDERATIONS

Choose an on-line filter system capable of removing fine and medium size particulate matter and sediments at the desired discharge flow rate and duration.

CONSTRUCTION SPECIFICATIONS

Follow the instructions for use provided by the designer or manufacturer.

INSPECTION AND MAINTENANCE

Follow the instructions for use provided by the designer or manufacturer.

Inspect the filter during the discharge for clogging and deterioration, and breakthrough of sediment. Replace the filter as necessary.

Maintenance and proper operation are critical for ensuring an adequate and continuous performance of the filter systems.

Dispose of the filter and sediment captured by the filter properly.

REFERENCE

Water Utility Discharge Pollution Prevention Plan Guidance Manual prepared for the Santa Clara Valley Water District by URS Corporation, October 19, 2001.

Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

CONTROL MEASURE E

STORM DRAIN INLET PROTECTION
GENERAL STANDARDS

PURPOSE

Inlet protection devices can be used to intercept and filter sediment, preventing it from entering storm drain systems. Several types of inlet filters can be installed, depending on site conditions and inlets.

Temporary devices constructed around drain inlets using gravel, mesh, and/or concrete blocks may prevent sediment-laden runoff from entering the storm drain system or watercourses. These devices reduce the velocity of runoff, allowing sediment to settle. The gravel can also filter out coarse sediment from runoff.

Inlet covers are used to prevent vegetation, sediment, and debris from being swept or blown into inlets during work activities. Drain inlet covers also keep spills from entering the storm drain.

CONDITIONS FOR APPLICATION

Inlet protection should be used only as a secondary control measure. Always use in conjunction with appropriate source control measures or other treatment control measures. The type of application chosen depends upon inlet types and site conditions.

For all inlet protection, the use of supplemental filter media for coarse sediment loads should be considered.

It is very important that the inlet protection device itself be kept clear and maintained. If the device is allowed to plug up and cause the discharge to be diverted around it, the purpose of inlet protection is defeated.

Many products are available which will serve the same purpose as storm drain inlet protection devices, such as prefabricated filters.

Many types of inlet protection measures are available. This control measure will describe five types: Block and Gravel Drop Inlet Sediment Filter (CM-E1); Block and Gravel Curb Inlet Sediment Filter (CM-E2); Gravel Bag Barrier (CM-E3); Gravel and Mesh Drop Inlet Sediment Filter (CM-E4); Gravel and Mesh Curb Inlet Sediment Filter (CM-E5); and Silt Fence Drop Inlet Protection (CM-E6). The standard given above and the design considerations below are applicable to each of the types of inlet protection. Sample specifications are given separately for each type.

GENERAL DESIGN CONSIDERATIONS

- Use in drainage areas less than one acre. Place where sediment-laden runoff could discharge into a storm drain inlet.

- Construct inlet protection device such that cleaning and disposal of trapped sediment is made easy, while minimizing interference with discharge activities.

- If the inlet protection device could pond water (see table below), install only where ponded water will not contact materials, flood structures, or cause a nuisance.

- Design should include the ability of staff to check (monitor) turbidity concentrations after water flows through the control measure.

- To prevent seepage of sediment-laden runoff into the drain inlet, install drain inlet protection so there are no gaps around the drain inlet.

- Do not place filter fabric over the inlet grate as it can become clogged with sediment and contribute to flooding.

- Completely cover inlet where work activities could result in vegetation, raw materials or sediment being deposited into the inlet, or when a small spill occurs near the inlet. Cover inlets with rubber or polyurethane mats, or plastic sheeting anchored with gravel bags.

Curb or Drop Inlet Protection	**Conditions of Use**
Gravel and Mesh Protection	Drop (paved or earthen surfaces) and curb inlets (paved surfaces). Sheet flow and/or flow rates not exceeding 0.5 cfs. Can withstand vehicle and heavy equipment traffic. Will pond water.
Block and Gravel Protection	Drop (paved or earthen surfaces) and curb inlets (paved surfaces; sturdy, but limited filtration). Heavy concentrated flows greater than 0.5 cfs. Provides emergency overflow and will occasionally pond water. Note that emergency overflows will not have any sediment removed.
Gravel Bag barriers	Drop and curb inlets draining paved surfaces. May also be placed upgradient of inlets on gently sloped paved surfaces. Sheet flow and/or flow rates not exceeding 0.5 cfs. Will pond water around drain inlet. Upgradient barriers have a spillway.
Silt Fence Field Inlet Protection	Drop inlets draining paved or earthen surfaces. Sheet flow and/or flow rates not exceeding 1 cfs, and drainage area slope not exceeding 5%. Will pond water.

GENERAL MAINTENANCE

The likely result of poor operation of these inlet protection devices is water diversion. Maintenance for each protection method will vary somewhat, but two basic procedures should be followed:

- Inspect the structure during the discharge and make repairs as needed.
- All maintenance procedures described for each method apply.

Let ponded water evaporate provided it does not cause a nuisance (e.g. standing water left for more than 72 hours may be a vector control issue in the summer months).

Inspect before anticipated storms and after storms for gaps, clogging of gravel, ruptured gravel bags, and sediment accumulated behind inlet protection. During extended rainfall events inspect at least once every 24 hours.

Carefully remove accumulated sediment when the depth reaches half the height of the inlet protection device. Dispose of sediment properly.

Clean or replace gravel that is clogged with sediment. Do not clean gravel near the inlet.

CONTROL MEASURE E.1

BLOCK AND GRAVEL DROP INLET SEDIMENT FILTER

CONSTRUCTION SPECIFICATIONS

Inlet filtering using gravel and mesh may be used where concentrated flows are expected, and overflow capacity is necessary to prevent excessive ponding around the structure.

Ponding may occur, especially without regular maintenance. This device should not be used under circumstances where overflow may endanger an exposed fill slope. If ponding does occur, be aware of its possible effects on adjacent property, buildings, work spaces, or traffic movement.

On steep slopes runoff may bypass protected inlets and increase flow to succeeding inlets. Overflow to an inlet which is at a low point in a street may also occur. Capacity of this device can increase if the degree of filtration increases.

A stone filtering medium does not slow discharge water flow nearly as well as does filter cloth, so it will not remove finer silt and clay particles effectively. The advantage of stone is that it is less likely to produce ponding than a finer filter such as filter fabric. Aggregate may be also used for debris protection.

- Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so the open ends face outward not upward. Abut the ends of adjacent blocks. (See figures on following pages.)

- Stack blocks to at least 12 inches but not more than 24 inches above the inlet, depending on design requirements.

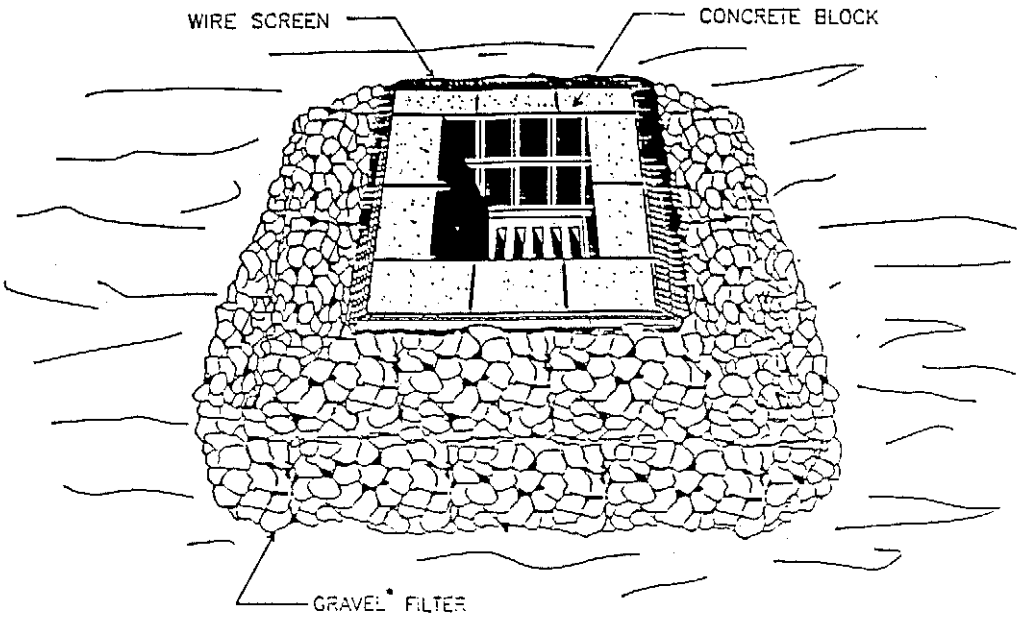
- Place screen mesh with 1/2-inch openings over the outside vertical face of the blocks to keep gravel out of the inlet.

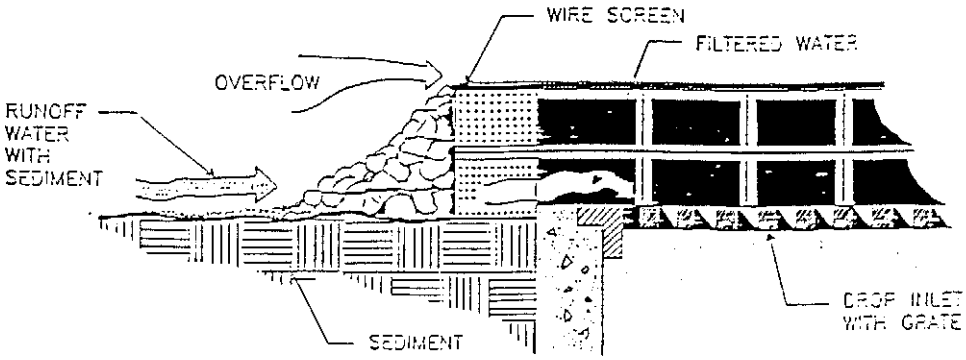
- Place 3/4- to 3-inch washed gravel against the screen mesh to the top of the blocks, on slopes of 2:1 or flatter.

MAINTENANCE

If the effectiveness of the stone filter is reduced due to sediment clogging, the aggregate should be pulled away from the curb or blocks, and cleaned or replaced.

FIGURE E3.1
BLOCK AND GRAVEL DROP INLET SEDIMENT FILTER





SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE AN OVERFLOW CAPACITY IS NECESSARY TO PREVENT EXCESSIVE PONDING AROUND THE STRUCTURE.

* GRAVEL SHALL BE VDOT #3 #357 OR #5 COARSE AGGREGATE

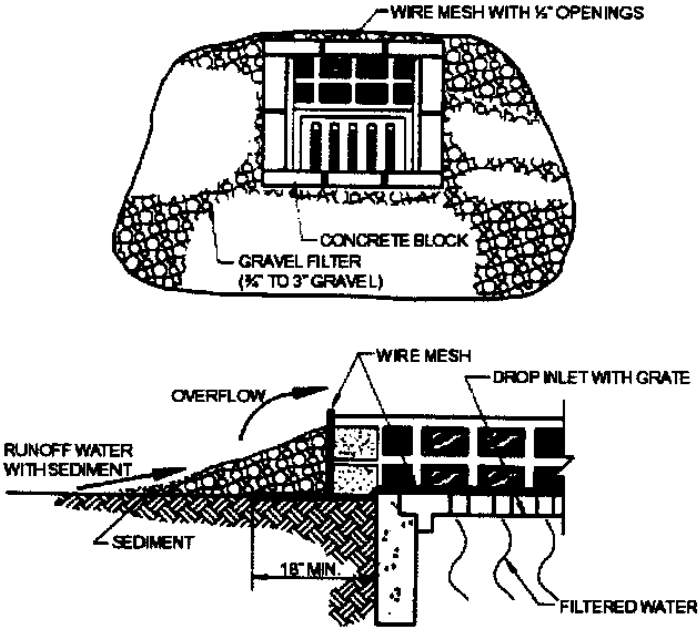


Figure 1a: Block and Gravel Drop Inlet Protection
Source: CA BMP Handbook: Construction p. 5-86

CONTROL MEASURE E.2

BLOCK AND GRAVEL CURB INLET SEDIMENT FILTER

CONSTRUCTION SPECIFICATIONS

Inlet filtering using gravel and wire mesh may be used where concentrated flows are expected, and overflow capacity is necessary to prevent excessive ponding around the structure.

Ponding may occur, especially without regular maintenance. This device should not be used under circumstances where overflow may endanger an exposed fill slope. If ponding does occur, be aware of its possible effects on adjacent property, buildings, work spaces, or traffic movement.

On steep slopes runoff may bypass protected inlets and increase flow to succeeding inlets. Overflow to an inlet which is at a low point in a street may also occur. Capacity of this device can increase if the degree of filtration increases.

A stone filtering medium does not slow discharge water flow nearly as well as does filter cloth, so it will not remove finer silt and clay particles effectively. The advantage of stone is that it is less likely to produce ponding than a finer filter such as filter fabric. Aggregate may be also used for debris protection.

- Place two concrete blocks on their sides abutting the curb at either side of the inlet opening. These are the spacer blocks. (See figures on following pages.)

- Place a 2-inch x 4-inch stud through the outer holes of each spacer block to align the front blocks.

- Place more concrete blocks on their sides across the front of the inlet and abutting the spacer blocks. Do not use mortar.

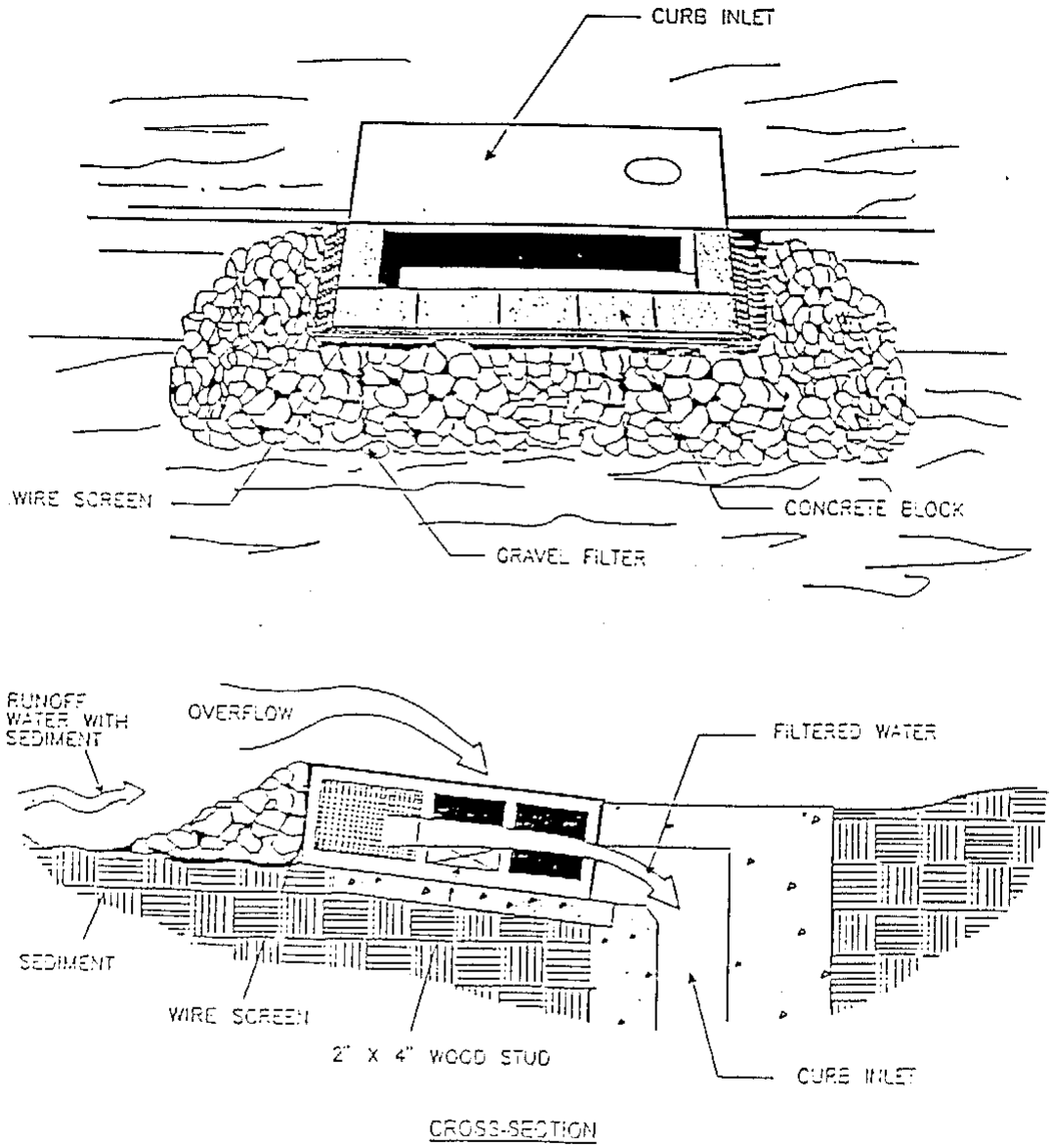
- Place screen mesh with 1/2-inch openings over the outside vertical face of the blocks to keep gravel out of the inlet.

- Place 3/4- to 3-inch washed gravel against the screen mesh to the top of the blocks, on slopes of 2:1 or flatter.

MAINTENANCE

If the effectiveness of the stone filter is reduced due to sediment clogging, the aggregate should be pulled away from the curb or blocks, and cleaned or replaced.

FIGURE E4.1
BLOCK AND GRAVEL CURB INLET SEDIMENT FILTER



Specific Application: This method of inlet protection is applicable at curb inlets where an overflow capability is necessary to prevent excessive ponding in front of the structure. Gravel should be Class 3 permeable material.

Source: Virginia Department of Conservation and Recreation (Ref. No. 3)

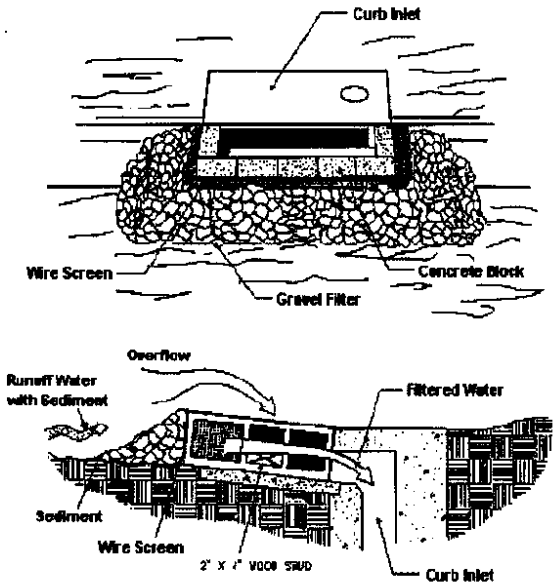


Figure 1b: Block and Gravel Curb Protection
Source: Virginia Erosion and Sediment Control Handbook, Third Edition. Virginia Soil and Water Conservation Commission, Richmond, Virginia.

CONTROL MEASURE E.3

GRAVEL BAG BARRIERS

CONSTRUCTION SPECIFICATIONS

- Use bags made of geotextile fabric, not burlap. Fill bags with washed 3/4-inch rock or 1/4-inch pea gravel.

- Place gravel bags around the perimeter of the drop inlet, packing bags together tightly. For a curb inlet, abut the curb at either side of the inlet opening.

- Provide access for water quality monitoring after the barriers.

- If additional flow retention is required, construct a barrier upgradient of the inlet by placing gravel bags perpendicular to the direction of flow. Overlap the bags and pack them tightly together. Construct each barrier using several layers of bags. Leave one bag on the top row to act as a spillway to prevent flooding. If more than one barrier is used, place barriers at 20-foot intervals.

CONTROL MEASURE E.4

GRAVEL AND MESH DROP INLET SEDIMENT FILTER

CONSTRUCTION SPECIFICATIONS

Inlet filtering using gravel and wire mesh may be used where concentrated flows are expected, and overflow capacity is necessary to prevent excessive ponding around the structure.

Ponding may occur. This device should not be used under circumstances where overflow may endanger an exposed fill slope. If ponding does occur, be aware of its possible effects on adjacent property, buildings, work spaces or traffic movement.

On steep slopes runoff may bypass protected inlets and increase flow to succeeding inlets. Overflow to an inlet which is at a low point in a street may also occur. Capacity of this device can increase if the degree of filtration increases.

A stone filtering medium does not slow discharge water flow nearly as well as does filter cloth, so it will not remove finer silt and clay particles effectively. The advantage of stone is that it is less likely to produce ponding than a finer filter such as filter fabric. Aggregate may be also used for debris protection.

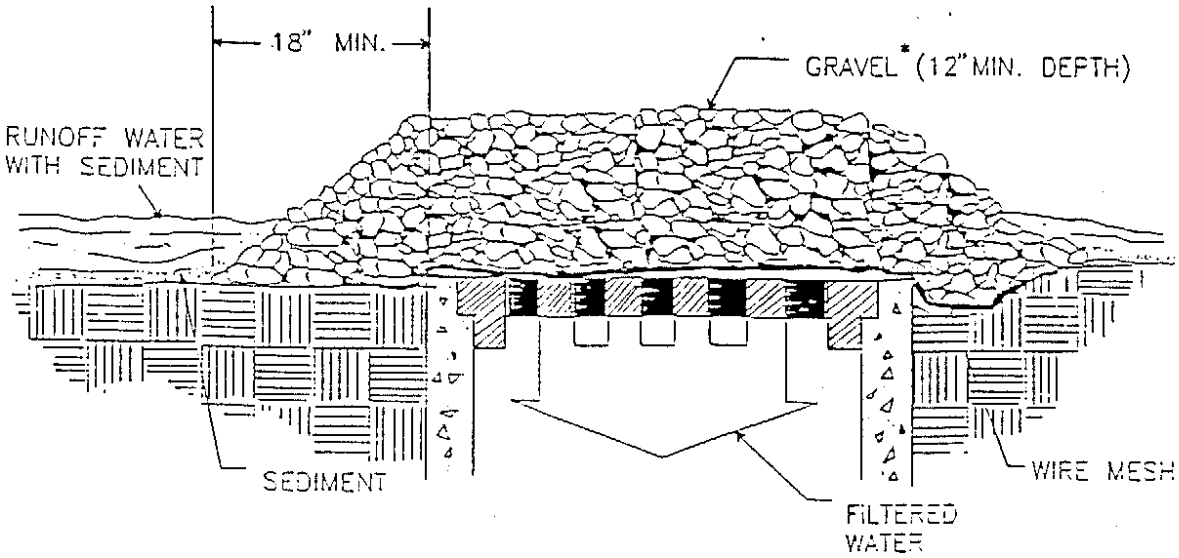
- Place screen mesh over the inlet so the mesh extends a minimum of 12 inches beyond each side of the inlet structure. Use hardware cloth or comparable mesh with 1/2-inch openings. If more than mesh strip is required, overlap the strips.

- Pile 3/4- to 3-inch washed gravel on top of the mesh surrounding the inlet to a minimum depth of 12 inches. Extend the gravel at least 18 inches beyond the inlet on all sides.

MAINTENANCE

If the effectiveness of the stone filter is reduced due to sediment clogging, the aggregate should be pulled away from the curb or blocks, and cleaned or replaced.

FIGURE E2.1
GRAVEL AND WIRE MESH DROP INLET SEDIMENT FILTER



Specific Application: This method of inlet protection is applicable where heavy concentrated flows are expected, but not where ponding around the structure might cause excessive inconvenience or damage to adjacent structures and unprotected areas. Gravel should be Class 3 permeable material.

Source: Virginia Department of Conservation and Recreation [Ref. No. 3]

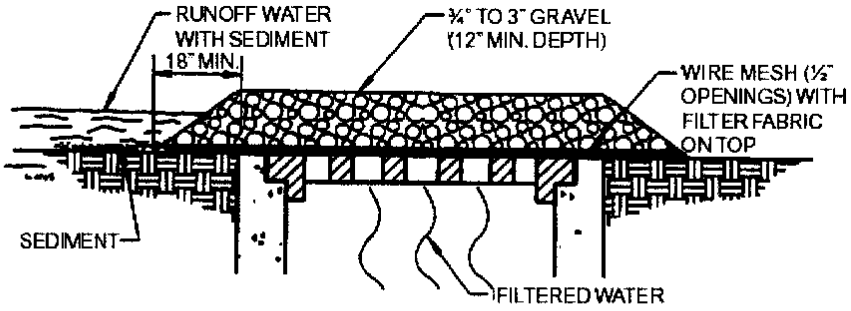


Figure 2a: Gravel and Wire Mesh Drop Inlet Protection
Source: CA BMP Handbook: Construction p. 5-86

CONTROL MEASURE E.5

GRAVEL AND MESH CURB INLET SEDIMENT FILTER

CONSTRUCTION SPECIFICATIONS

Inlet filtering using gravel and wire mesh may be used where concentrated flows are expected, and overflow capacity is necessary to prevent excessive ponding around the structure.

Ponding may occur, especially without regular maintenance. This device should not be used under circumstances where overflow may endanger an exposed fill slope. If ponding does occur, be aware of its possible effects on adjacent property, buildings, work spaces, or traffic movement.

On steep slopes runoff may bypass protected inlets and increase flow to succeeding inlets. Overflow to an inlet which is at a low point in a street may also occur. Capacity of this device can increase if the degree of filtration increases.

A stone filtering medium does not slow discharge water flow nearly as well as does filter cloth, so it will not remove finer silt and clay particles effectively. The advantage of stone is that it is less likely to produce ponding than a finer filter such as filter fabric. Aggregate may be also used for debris protection.

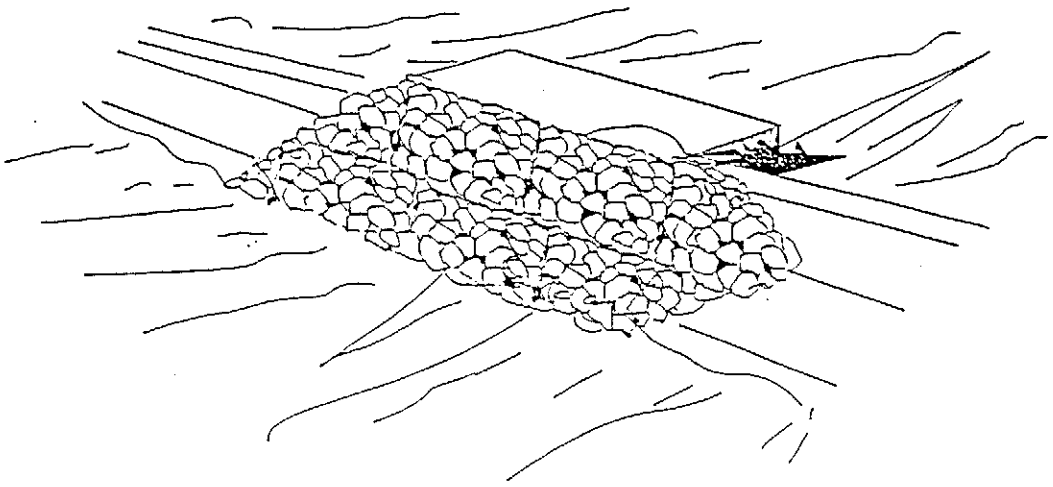
- Place wire mesh over the inlet so the wire extends a minimum of 12 inches beyond each side of the inlet structure. Use hardware cloth or comparable wire mesh with 1/2-inch openings. (See figures on following pages).

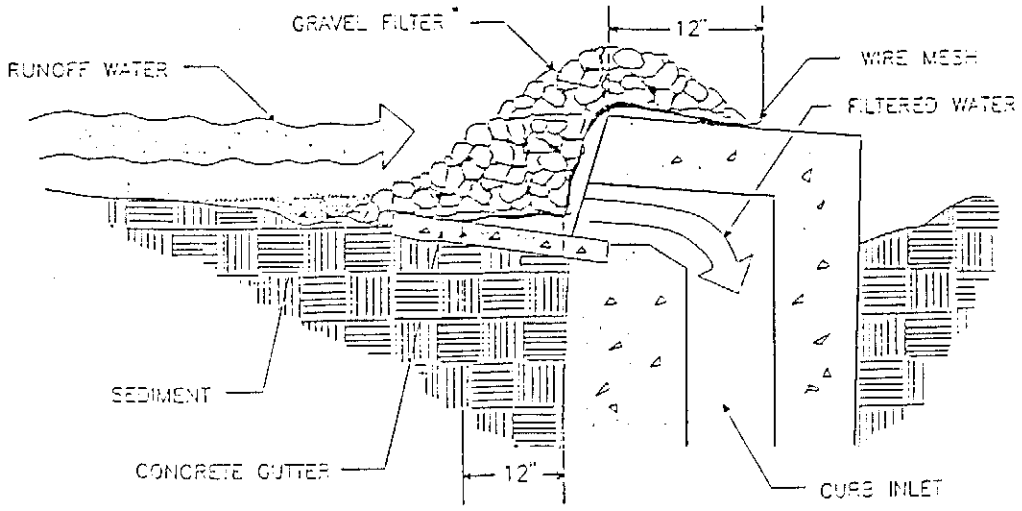
- Pile 3/4- to 3-inch washed gravel against the mesh to anchor it against the gutter and inlet cover and to surround the inlet completely.

MAINTENANCE

If the effectiveness of the stone filter is reduced due to sediment clogging, the aggregate should be pulled away from the curb or blocks, and cleaned or replaced.

FIGURE E5.1
GRAVEL AND WIRE MESH DROP INLET SEDIMENT FILTER





SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE PONDING IN FRONT OF THE STRUCTURE IS NOT LIKELY TO CAUSE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREAS.

* GRAVEL SHALL BE VDOT #1, #57 OR 6 COARSE AGGREGATE

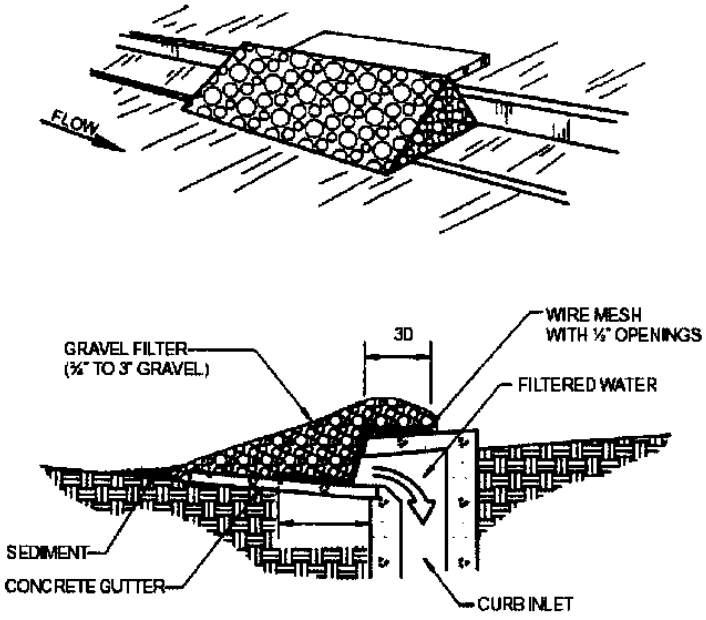


Figure 2b: Gravel and Wire Mesh Curb Inlet Protection
Source: CA BMP Handbook: Construction p. 5-84

CONTROL MEASURE E.6

SILT FENCE FIELD INLET PROTECTION

CONSTRUCTION SPECIFICATIONS

Drop inlet protection using a silt fence is appropriate where the inlet drains a relatively flat area (maximum slope 5%) and where inlet flows are of sheet or overland type with a maximum rate of 1 ft^3/second (449 gpm). This is commonly known as a field inlet. Often this method is maintenance intensive.

This method does not apply for inlets receiving concentrated flows.

An area available for ponding must be established around the structure.

- Space 2x4 inch stakes, at least 3 feet long, evenly around the inlet perimeter, a maximum of 3 feet apart. Drive stakes securely into the ground about 18 inches deep. (See figures on following pages).

- Frame with 2x4 inch wood strips around the crest of the overflow area at a maximum of 1.5 feet above the drop inlet crest to provide stability.

- Place the bottom 12 inches of the fabric in a trench, and backfill with 12 inches of compacted soil.

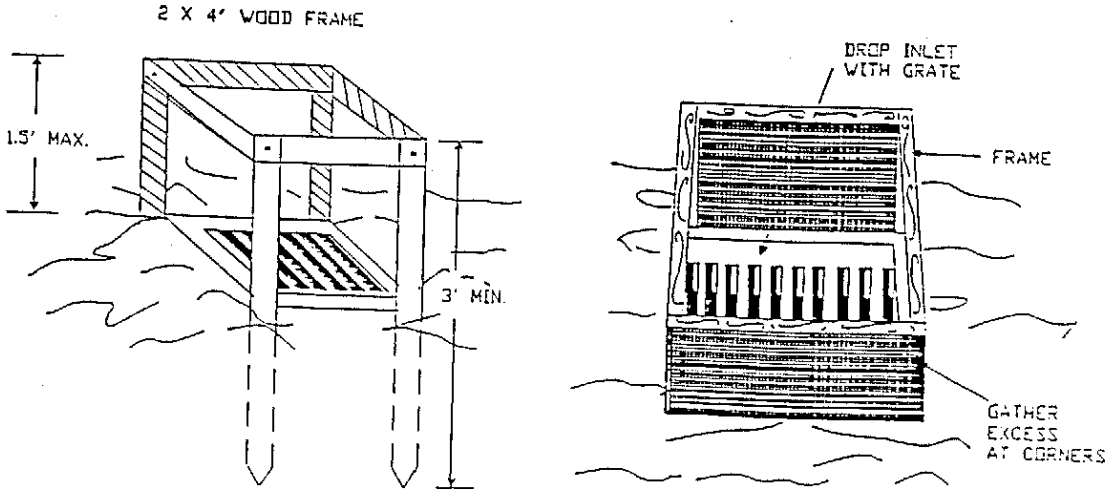
- Securely fasten the fabric to the stakes and frame by staples or wire. Joints must be overlapped to the next stake.

- To prevent bypass flow, it may be necessary to build a temporary dike on the downslope side of the structure.

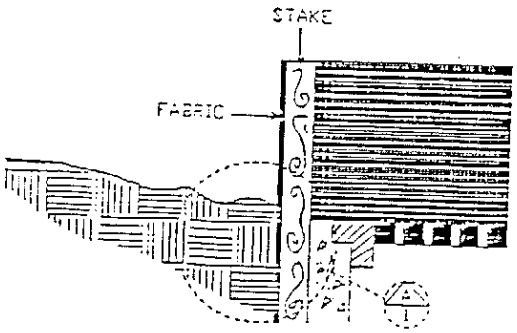
MAINTENANCE

Sediment should be removed when the sediment accumulation reaches one-third of the barrier height or the accumulation is affecting the BMP effectiveness. Repair undercut silt fences.

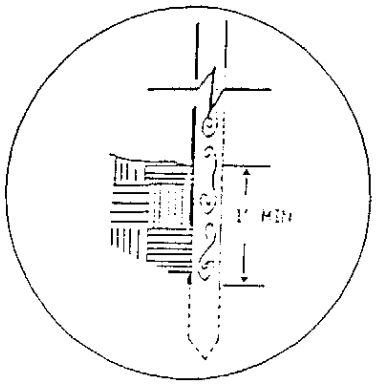
FIGURE E1.1
Silt Fence Drop Inlet Protection



PERSPECTIVE VIEWS



ELEVATION OF STAKE AND FABRIC ORIENTATION



DETAIL A

REFERENCES

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Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

CONTROL MEASURE F

SILT FENCE CULVERT ENTRANCE

PURPOSE

To reduce the flow velocity of runoff, allowing sediment to settle out before the discharge enters a culvert and its drainage system

A silt fence intercepts and detains sediment while decreasing the velocity of sheet flow discharge. Its principal mode of action is to slow the water and allow particles to settle. This is not a preferred method and is only appropriate for very low discharge flows. It can be used where:

- the flow volume does not exceed 1 cfs.
- sheet and rill erosion would occur.
- protection of adjacent property or areas is needed.
- the maximum slope length behind the silt fence is 100 ft (30 m) and the maximum slope gradient is 50% (2:1).
- ponded water will not damage adjacent areas or structures, or create a traffic hazard or other nuisance.

A large silt fence provides an obstacle to allow deposition and detention of transported sediment and debris, and prevent them from entering water bodies, streets, etc.

CONDITIONS FOR APPLICATION

This measure is appropriate wherever a potential exists for sediment to enter storm drains via culverts.

DESIGN CONSIDERATIONS

- Select a woven or non-woven filter fabric made of at least 85% by weight ethylene, propylene, amide, ester, or vinylidene yarn.
- The Equivalent Opening size of the filter fabric (U.S. Standard Sieve) shall be 70-100, and the tensile strength shall be at least 120 lbs (54 kg) if a wire support fence is used and 200 lbs (90 kg) if a wire support fence is not used.
- Posts should be either 4-inch diameter wood or 1.33 pounds per linear foot steel. Posts should be at least 5 feet long. Steel posts should have projections for fastening wire.
- Wire fence reinforcement shall be a minimum of 42 in (1.1 m) tall and a minimum width of 14-gauge. The maximum mesh spacing should be 6 in (15 cm).

- The height of the silt fence should be between 16 in (40 cm) and 36 in (90 cm). The most effective height range is 24 to 36 in (60-90 cm). Shorter fences may be breached during small discharges and require more maintenance.

- If possible, cut the filter fabric from a continuous roll to avoid the use of joints. If joints are necessary, splice the filter fabric only at a support post. Overlap the fabric pieces a minimum of 6 in (15 cm) and secure both ends to the post.

- If a wire mesh support fence is used, install posts at least 3 feet (1 m) apart. Install posts closer together if a support fence is not used. Drive posts into the ground to a depth of at least 1 foot (30 cm).

- Excavate a 4-in (10 cm) deep trench that is at least 4 in (10 cm) wide upslope of the silt fence along the line of posts.

MAINTENANCE

The protection structure should be inspected during the discharge and repairs made as needed. If clogged voids are causing ponding problems which interfere with discharge operations or adjacent property, fabric or aggregate should be replaced or cleaned.

When sediment has accumulated to one-half of the design depth, it should be removed and the impoundment restored to its original dimensions. Removed sediment should be deposited both in a manner and in an area which will keep it from eroding.

Temporary structures should be removed after they have served their useful purpose.

Silt fences and filter barriers should be inspected during and immediately after discharge, and at least daily during prolonged discharges. Any required repairs should be made immediately.

Should the fabric of a silt fence or filter barrier decompose or become ineffective during the time the fence or barrier is still necessary, the fabric should be replaced promptly.

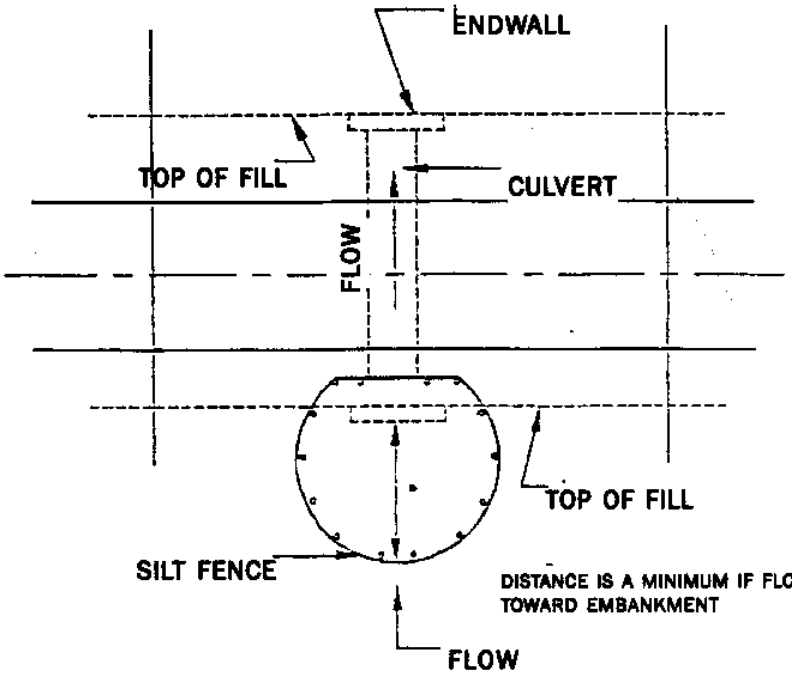
Silt buildups must be removed when bulges develop in the fence regardless of depth of deposition.

REFERENCES

Water Utility Discharge Pollution Prevention Plan Guidance Manual prepared for the Santa Clara Valley Water District by URS Corporation, October 19, 2001.

Water Utility Operation and Maintenance Discharge Pollution Prevention Plan prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program, June 1998.

FIGURE F1.1
SILT FENCE CULVERT INLET PROTECTION



OPTIONAL STONE COMBINATION **

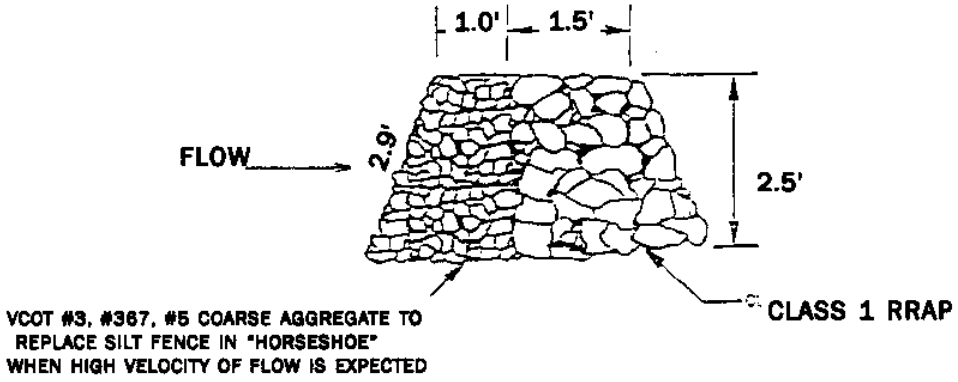
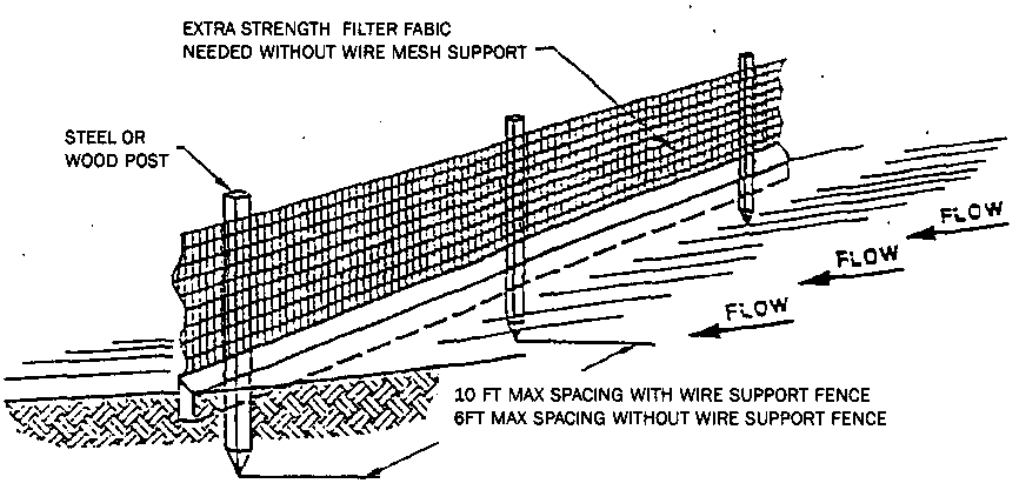
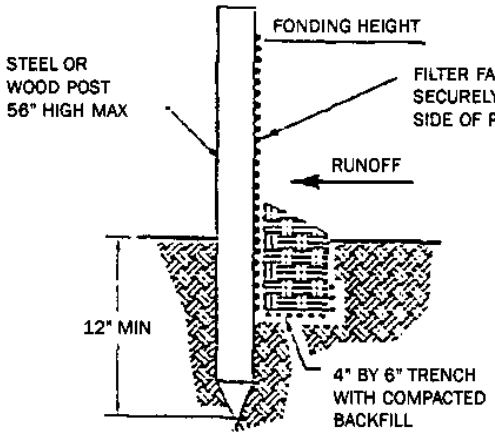
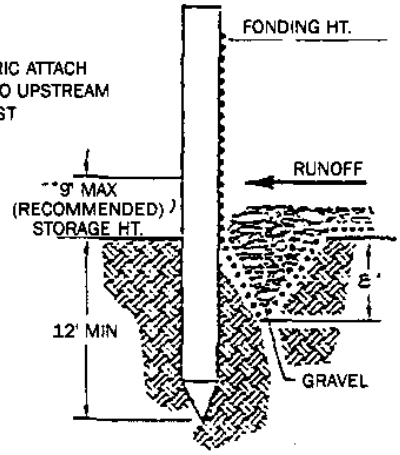


FIGURE F1.2
SILT FENCE CONSTRUCTION





STANDARD DETAIL
TRENCH WITH NATIVE BACKFILL



ALTERNATE DETAIL
TRENCH WITH GRAVEL

CONTROL MEASURE G

SURFACE PROTECTION—ARMORING

PURPOSE

To protect exposed soil and vegetated surfaces from erosion during a water utility discharge by placing protective armor (e.g., plastic sheeting, cloth fabric, gravel bedding) over the erodible surface.

CONDITIONS FOR APPLICATION

Armoring can be used on bare soils or vegetated surfaces where high velocities or high flows may erode the surface. Armoring can be placed on flat or sloped surfaces.

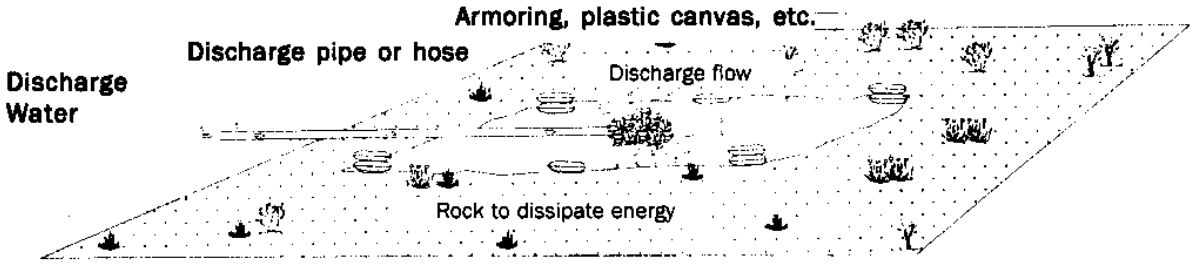
DESIGN CONSIDERATIONS

- Choose a material whose strength is proportionate to the velocities and materials in the discharged water (e.g., sediment). High velocities require stronger materials to prevent failure (i.e. ripping). Discharges with sediments may compromise the integrity of the protective armor by abrasion. Soils with high rock content, or which have sharp objects may cause the protective armor to fail due to rips or punctures.
- Clear the area to be protected of rocks and debris which may puncture the armor.
- Anchor the armor using sandbags, gravel, or stakes along the perimeter.
- Anchor the armor so it can withstand movement of the discharge.
- Account for potential changes in the flow direction of the discharge when laying the armor.
- If there is to be a direct stream of high velocity flow, an energy dissipating device may be necessary to prevent failure of the armor.

MAINTENANCE

- During the discharge, monitor the armor for failure (tearing) and erosion at the edges of the armor.
- If erosion does occur, implement Sediment/Turbidity control measures.
- Remove armor when the discharge is complete.
- Sweep up any sediment deposited in the flow path and dispose of appropriately.

Figure G1.1
Armoring



CONTROL MEASURE H

SURFACE PROTECTION – FLOW DIVERSION

PURPOSE

To protect bare soil and vegetated surfaces from erosion by diverting, channeling or temporarily piping flows. This BMP is to prevent the discharge water from being degraded by preventing erosion as the discharge water travels to a storm drain inlet.

CONDITIONS FOR APPLICATION

There must be a storm drain or paved surface nearby to which the discharged water can be diverted. Armoring or temporary piping can be used on bare soils or vegetated surfaces where high velocities or high flows may erode the surface.

DESIGN CONSIDERATIONS

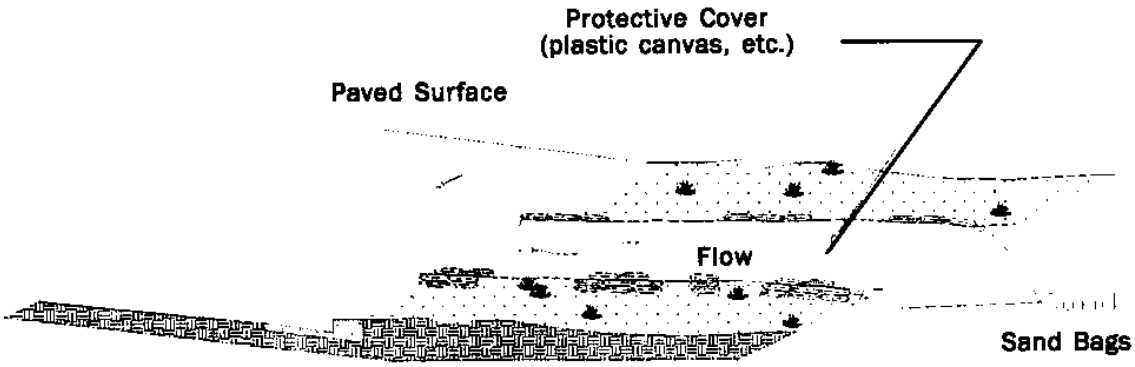
- The flow channel must be aligned to avoid disruption of traffic, or traffic control measures must be used.
- The flow channel must have sufficient slope to allow the discharge to flow to the storm drain or paved surface.
- The flow channel must be designed to handle the anticipated flow rate.
- Protective armor or temporary piping can be used for high velocity discharges or large flow volumes discharges over bare soils or vegetated surfaces. The armor material selected must be able to withstand the flow velocity and movement of the discharge.
- Divert water to a channel using fixed or flexible piping, or another system to capture the flow (e.g., sand bags).
- If armor is used to create a flow channel over the erodible surface, clear the area to be protected of rocks and debris which may puncture the armor.
- Anchor the armor using sandbags, gravel, or stakes along the perimeter.
- If there is to be a direct stream of high velocity flow, an energy dissipating device may be necessary to prevent failure of the armor.

MAINTENANCE

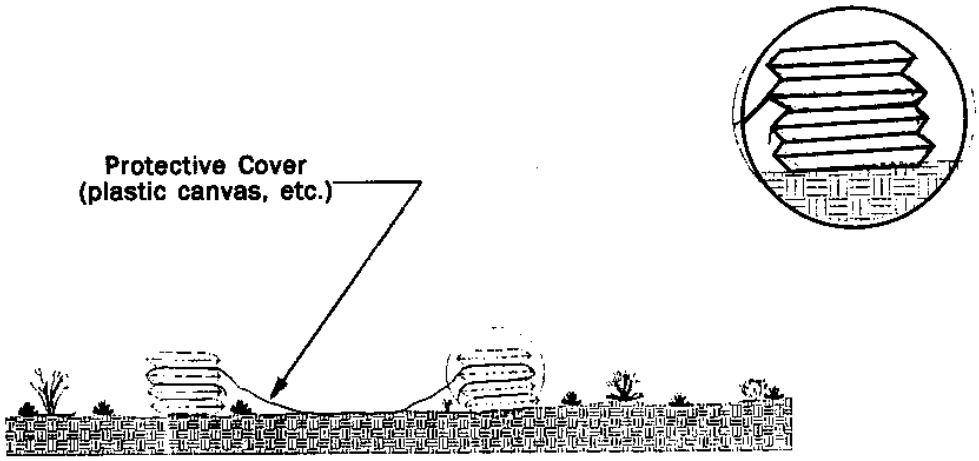
- Inspect the area for flooding resulting from failure of the channel diversion structure or the flow rate exceeding the diversion channel capacity.
- Inspect the channel for erosion along the edges due to overtopping of the channel.
- Monitor the armor for failure (tearing) and erosion at the edges of the armor.

- If erosion does occur along the edges of the channel or armor, implement Sediment/Turbidity control measures.
- Remove armor when the discharge is complete.
- Sweep up any sediment deposited in the flow path and dispose of appropriately.

Figure H1.1



Plan View



Section A-A
Flow Diversion

Appendix C:
Conditionally Exempt Discharges Report

Appendix D:
State Drinking Water System Discharge General Permit

http://www.swrcb.ca.gov/water_issues/programs/npdes/docs/drinkingwater/final_statewide_wqo2014_0194_dwq.pdf