

Goodlettsville Public Works
Storm Water Quality
Standard Operating Procedures

Revised October 4, 2016

Municipal Facilities

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Preface

The purpose of this Standard Operating Procedure Manual is to help educate and instruct employees on ways to reduce stormwater pollution and help prevent it in the future.

Topics covered range from good housekeeping to material management practices and vehicle maintenance to street sweeping and several items in between. Within each topic, sections such as a brief overall description of the SOP followed by an approved approach, application, procedures, maintenance, requirements, limitations and additional information may be covered.

Good Housekeepingⁱ

Promote efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials such as fertilizer, pesticides, cleaning solutions, paint products, automotive products, chemicals, etc.).

Purchase only the amount of material that will be needed for use. In most cases, this will result in cost savings in both purchasing and disposal. Be aware of new products that may do the same job with less environmental risk and for less or the equivalent cost.

Good housekeeping is performing activities in a manner which keeps potential pollutants from either draining into or being transported offsite by managing pollutant sources and modifying construction activities. Dispose of waste materials in designated areas and in designated containers away from rainfall and stormwater runoff.

Keep work sites clean and orderly. Remove debris in a timely manner. Dispose of or recycle wash water, sweepings and sediments properly.

We have an MSDS binder on hand that's located between the back break rooms which displays each manufacturer's chemical composition of the materials we use, proper usage instructions and how to dispose of them properly.

Train all employees who may handle or come in contact with hazardous materials and hold them accountable to upholding the BMPs. Have access to spill cleanup materials available as much as possible.

Maintenance is on-going as improvements are continually being made.

Hazardous Materials Storageⁱⁱ

Description

Prevent or reduce the discharge of pollutants to stormwater from material delivery and storage by minimizing the storage of hazardous materials on-site, storing materials in a designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

Approach

The following materials are commonly stored at the Public Works facility:

- # Sand and salt
- # Pesticides and herbicides
- # Fertilizers
- # Detergents
- # Petroleum products
- # Acids, lime, glues, paints, solvents, etc.

Storage of these materials on-site can pose various degrees of the following risks:

- # Stormwater pollution
- # Injury to workers or visitors
- # Groundwater pollution
- # Soil contamination

The following steps should be taken to minimize your risk:

- # Designated areas for material delivery and storage are found throughout the complex.
- # Refer to the MSDS binder to follow manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- # Keep your inventory to 'as needed' levels as much as possible.
- # Minimize hazardous materials stored on-site and handle hazardous materials as infrequently as possible.
- # Do not store chemicals, drums, or bagged materials directly on the ground unless otherwise contained.
- # Keep chemicals in their original containers, and keep them well labeled. If other containers are used then be sure they are well marked and can be adequately sealed and stored in an appropriate place. Refer to MSDS binder for alternate labeling options.
- # Employees trained in emergency spill cleanup procedures should be present when dangerous materials or liquid chemicals are unloaded.
- # Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions.
- # Contain and clean up any spill immediately.
- # Keep storage area clean and organized.
- # During safety inspections, check for improper storage, labeling and corrosion of material containers.

Maintenance

- # Keep an ample supply of spill cleanup materials near the storage area.
- # Inspect storage areas before and after rainfall events, and at least weekly during other times.

Material Management Practicesⁱⁱⁱ

Description

Prevent or reduce the discharge of pollutants to stormwater system or natural streams using effective management of waste materials. Education and training employees & subcontractors; proper material use; source reduction; tracking waste generation and disposal; proper material storage, recycling, preventing stormwater contact and runoff from waste management areas and good waste disposal procedures.

Solid Waste Management

*Designate waste storage areas that are away from storm drain inlets, stormwater facilities or watercourses. Provide waste containers in areas where employees congregate for breaks and lunch.

*Watertight dumpsters are preferred for use and should be requested from trash-hauling contractors. Inspect dumpsters for leaks or open drain valves; repair any dumpster that is not watertight. Leave drain valve in the closed position. Do not hose out dumpsters on the project site. Let the trash-hauling contractor take care of dumpster cleaning.

*Arrange for regular waste collection before containers overflow. Provide adequate number of covered containers to keep rain out and prevent loss of waste during heavy winds.

*Make sure toxic liquid waste (used oils, solvents, paints, etc.) and chemicals (acids, pesticides, etc.) are not placed or poured into dumpsters. Inspect dumpsters daily for hazardous materials that need to be disposed in a different manner. These need to go to either Metro HHW or Sumner County Resource Authority (based on their requirements. We do not have authorization from the State to accept HHW).

*Salvage or recycle any useful material.

Hazardous Waste Management

*Use the entire product before disposing of the container. If the product is wet or moist, allow container to dry prior to disposal. Do not remove the original product label as it contains important safety and disposal information. MSDS information should be consulted for each product that is stored or handled. Employees should be made aware of the safety information.

*Use appropriate containment devices where the potential for spills exists. Keep hazardous waste in appropriate containers and under cover. Place hazardous waste containers in secondary containment. Do not allow hazardous materials to accumulate on the ground.

*Keep hazardous and non-hazardous waste separate. Store hazardous materials and wastes in covered containers.

*Do not mix wastes as this can cause unforeseen chemical reactions.

*Refer to MSDS book and the HCP (Hazardous Communication Plan) when handling, storing and using hazardous materials.

*Check waste management areas for spills and leaks.

Maintenance

- # Arrange for regular solid waste collection, disposal and recycling on regular basis.
- # Inspect waste areas frequently to ensure runoff is not occurring. If so, clean up immediately.
- # An updated inventory of hazardous materials on site is located within the MSDS binder.

Pump Stations^{iv}

Description

It is important to keep our pumping stations operating at their best capacity as much as possible. Our goal is to prevent failures of our pumping stations that can cause spills and overflows.

Approach and Maintenance

- # Perform scheduled maintenance to maximize the reliability and life expectancy of all equipment.
- # Prioritize repairs based on the nature and severity of the problem.
- # CarteGraph contains a corrective work order system to address problems with equipment identified by operations and maintenance staff.
- # Maintain a spare part inventory to reduce equipment repair time.
- # Track and schedule routing maintenance.
- # Refer to CMOM Manual for procedures.

Spill Prevention and Response^v

Description

Prevent or reduce the discharge of pollutants to stormwater from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

Approach

The following steps will help reduce the stormwater impacts of leaks and spills:

Define “Significant Spill”

- # Different materials pollute in different amounts. Make sure that each employee knows what a “significant spill” is for each material they use, and what is the appropriate response for “significant” and “insignificant” spills. A significant spill should be defined after review of the Materials Safety Data Sheet or other descriptive documentation that presents the contents and proper handling procedures.

General Measures

- # Hazardous materials and wastes should be stored correctly and in covered containers.
- # Place a stockpile of spill cleanup materials where they are accessible.
- # Annual employee training occurs and covers topics on spill prevention, cleanup procedures and on potential dangers to humans and the environment from spills and leaks.

Cleanup

- # Clean up leaks and spills immediately.
- # On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.
- # Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly.
 - # Minor spills typically involve small quantities of oil, gasoline, paint,
 - # Use absorbent materials on small spills rather than hosing down or burying the spill.
 - # Remove the absorbent materials promptly and dispose of properly.
 - # If unable to manage the spill, contact the Fire Department and they will assist with the clean up and/or contact an appropriate company to handle the clean up.
 1. For spills of state reportable quantities or into a water body notify the TDEC general hotline – environmental assistance at 1-888-891-8332 (TDEC).
 2. For spills of federal reportable quantities or into a water body notify the National Response Center at (800) 424-8802.
 3. Notification should first be made by telephone and followed up with a written report.
- # Keep ample supplies of spill control and cleanup materials on-site, near storage, unloading, and maintenance areas.

Top Soil^{vi}

Description

Topsoil should be preserved and used to enhance the final site stabilization with vegetative cover. This is to be done in support of temporary or permanent seeding in conjunction with erosion source control practices such as silt fencing and mulching. This technique is applicable to all types of areas where earth-disturbing activities expose subsoil layers that are poorly suited to supporting vegetation growth. Topsoil is generally not placed on areas that are steeper than 3:1 or which are not adequately graded and compacted.

Approach

Preservation and reuse of native topsoil helps to improve the success rate of new vegetation. Importing topsoil may be necessary for some areas which do not have fertile soil layers. Typically, a minimum of 4" of stabilized topsoil is needed to support grass vegetation. Trees, shrubs and vines will require a good layer of topsoil in addition to the proper subsurface soils. If the site is excavated down to rock such as sandstone or shale, then 6" – 12" of topsoil is recommended for good plant growth.

Maintenance

- # Inspect areas of newly applied topsoil frequently until vegetation is fully established. Maintain newly-graded topsoil areas and inspect regularly. Restore areas showing wash and settlement to the specified grades with a tolerance of 1" above or below. Finish grading is ordinarily done by hand shovel operations.
- # Topsoil can wash away if erosion control practices are not provided. Place stockpiles in protected areas with silt fences and other controls.
- # Topsoil should not be applied to slopes steeper than 3:1 (H:V) without the use of suitable erosion control matting or geotextiles.

Construction Site Inspection

Construction site inspections are conducted on a routine basis. The minimum requirement is once a month, however, on average, we inspect sites approximately three times a month. Also, sites are inspected immediately following a rain event. All site inspections are documented the City's standard inspection sheet.

Upon arrival to the job site, check the SWPPP to verify self-inspections are being conducted twice a week, 72 hours apart on the site and that the paperwork is current.

Inspect construction entrance to ensure its performing correctly and that sediment is not leaving the site.

Inspect outfalls on property to check for sediment leaving site. Make sure silt fence, check dams, rip-rap, etc. are installed correctly and working effectively according to the construction plans. Digital photos are taken of deficiencies found. These pictures are attached to the reporting paperwork.

Inform contractor or supervisor of any deficiencies found during inspection and communicate corrective actions needed to be in compliance.

Following inspections, a summary report is constructed summarizing each job site's deficiencies for that day. This report is distributed to internal staff via email.

Proper Fueling Procedures^{vii}

Description

Prevent fuel spills and leaks, and reduce their impacts to stormwater by using off-site facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees. This management practice is likely to create a partial reduction in toxic materials and oil and grease.

Approach

- # Fueling vehicles and equipment outdoors or in areas where fuel may spill/leak onto paved surfaces or into drainage pathways can pollute stormwater.
- # Discourage “topping-off” of fuel tanks.
- # Place a stockpile of spill cleanup materials where it will be readily accessible.
- # Use adsorbent materials on small spills rather than hosing down or burying the spill. Remove the adsorbent materials promptly and dispose of properly.
- # Train employees in proper fueling and cleanup procedures.
- # Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts.

Maintenance

- # Keep ample supplies of spill cleanup materials on-site.
- # Pumps are on a routine monthly and annual inspection and maintenance program which is regulated by the State.

Recycling & Drop-Off Center

Hours of operation are Monday through Saturday from 7:30 a.m. until 4:00 p.m. The center is closed on Thanksgiving and Christmas holidays.

Make sure area is free of litter and debris, clean-up as needed on regular basis.

Check residential IDs to verify legitimacy of dumping.

Assist residents with disposal of items as needed.

Keep oil dry and clean-up materials handy to absorb truck leachate and oils. Use as needed.

When containers need to be emptied, contact Waste Management for prompt removal and replacement.

At end of day, make sure all containers are closed. This prevents water from entering dumpsters and keeps debris from blowing out of containers.

Road Salt Application and Storage Procedures^{viii}

Description

The application and storage of deicing materials, most commonly salts such as sodium chloride, can lead to water quality problems for surrounding areas. Salts, gravel, sand and other materials are applied to highways and roads to reduce the amount of ice during winter storm events. Salts lower the melting point of ice, allowing roadways to stay free of ice buildup during cold winters. Sand and gravel increase traction on the road, therefore making travel safer.

Many of the problems associated with contamination of local waterways stem from the improper storage of deicing materials. Salts are very soluble when they come into contact with stormwater. They can migrate into ground water used for public water supplies and contaminate surface waters.

Road salt is the least expensive material for deicing operations; however, once the full social benefits are taken into account, alternative products and better management and application of salts become increasing attractive options.

Approach

- # Cover road salts as to prevent runoff.
- # Minimize spillage when loading trucks during de-icing events.
- # Regulate the amount of salt applied to icy roads. Adjust usage according to the road width and design, traffic concentration and proximity to surface waters.
- # Calibration devices mounted in the cabs of spreader trucks help maintains the amount of salt spread on roadways.
- # Sand is mixed with the salt either at a 1:1 or 2:1 ratio.

Maintenance

- # Cover road salts in order to prevent runoff.
- # Product is in storage throughout most of the year and only used when icy roads occur.

Roadway Maintenance^{ix}

Description

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent run-on and runoff pollution, properly disposing of wastes, and training of employees. This management practice is likely to create partial reductions in sediment, toxic materials, and oil and grease.

Approach

- # Avoid paving during wet weather.
- # Protect water courses, particularly in areas with a grade, by employing BMPs to divert runoff or trap/filter sediment.
- # Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials rather than burying.
- # Cover catch basins and manholes when applying seal coat, tack coat, slurry seal, fog seal, etc.
- # If paving involves asphalt concrete, follow these steps:
 - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks by sweeping. Properly dispose of this waste.
 - Old asphalt must be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Maintenance

- # Inspect and maintain machinery regularly to minimize leaks and drips.
- # Maintain inlet protection so that water is not allowed to back up onto areas subject to traffic. Clean inlet protection measures when sediment reaches the sediment storage capacity.
- # Repair inlet protection measures as needed.

Sanitary Sewer Maintenance^x

Description

Prevent or reduce the discharge of pollutants to stormwater system and natural streams from sanitary and septic waste. Provide convenient and well-maintained restroom facilities. Arrange for permanent connections to the sanitary sewer system or schedule for regular service and disposal. This management practice will significantly reduce nutrients, bacteria and viruses, and oxygen demanding substances.

Refer to CMOM Manual on detailed maintenance operations and procedures.

Storm Drain Cleaning^{xi}

Description

Storm drains are flushed with water to suspend and remove deposited materials. Flushing is particularly beneficial for storm drain pipes with grades too flat to be self-cleansing. Flushing helps ensure that pipes convey design flow and also removes pollutants from the storm drain system. This BMP is likely to create a significant reduction in sediment if flushed effluent is properly collected or treated.

Approach

Locate reaches of storm drains with deposit problems and develop a flushing schedule to clean storm drains of deposits. Flushed effluent should be collected and pumped to a sediment trap, sediment basin or a detention basin.

Storm drain flushing usually takes place along segments of pipe with grades and are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump. The backed-up water is quickly released, resulting in the cleaning of the storm drain.

If the flushed water does not drain to a stormwater treatment device (e.g., detention basin or swale), then a second inflatable device, placed well downstream, may be used to collect the flushed water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to a stormwater treatment practice. In some cases, an interceptor structure may be more practical to collect the flushed waters.

Requirements

TDEC regulations prohibit the discharge of soil, debris, refuse, hazardous waste, and other pollutants that may hinder the designed conveyance capacity or damage stormwater quality or habitat in the storm drain system. This includes flushing any system connected to any blue line stream on the USGS or any waterway as determined by TDEC personnel in the field. TDEC must be consulted if this practice is planned.

Equipment

1. Water source (water tank truck or fire hydrant)
2. Sediment collector (vacuum, etc.)
3. Inflatable device to block flow
4. Containment/treatment equipment for sediment and turbidity if flushing to an open channel.

Additional Information

- # It's been found cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, drainage slope, pipe length, flow rate, pipe diameter and population density.
- # The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water.
- # Most effective in smaller pipes (36" diameter pipe or less) depending on water supply and sediment collection capacity.
- # May have difficulty finding available upstream water source.
- # May have difficulty finding downstream area to collect sediments. Requires liquid and sediment collection and disposal.
- # Refer to CMOM manual for additional information.

Street Sweeping

Description

Our streets accumulate large amounts of pollutants which contribute to stormwater pollutant runoff to our surface waters. Pollutants (i.e., sediment, debris, trash, road salt, metals, etc.) can be minimized by street sweeping. Street sweeping can also improve the aesthetics of municipal roadways, control dust and decrease the accumulation of pollutants in catch basins.

Approach

*There are three different types of street sweepers – each has their own set of pros and cons. We use Sweeping Corp. and they use the TYMCO brand of street sweepers, specifically model 600.

*Our roads are swept twice a month and Sweeping Corp. disposes of the waste at BFI AAA's transfer station. They provide us with information on the streets swept.

*Street sweeping is effective in removing trash sediment buildup (salt, sand, grit, etc.) and large debris from curb gutters. These sweepers remove several tons of debris a year from city streets which minimize pollutants in our stormwater runoff.

Requirements

Maintain logs showing the mileage amount of curbs that are swept each time and total for a given year. Show the amount of waste that is collected. This data is kept in our stormwater files.

Maintenance

Sweeping Corp. maintains their equipment on a regular basis.

Vehicle and Equipment Washing^{xii}

Description

Prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning by using off-site facilities, washing in designated, contained areas only, eliminating discharges to the storm drain by infiltrating or recycling the wash water, and training employees and subcontractors. This management practice is likely to cause a reduction in toxic materials and oil and grease.

Approach

- # Washing vehicles and equipment outdoors or in areas where wash water flows onto paved surfaces or into drainage pathways can pollute stormwater.
- # Use designated wash areas to prevent wash water from entering the creek.
- # Use phosphate-free, biodegradable soaps.
- # When cleaning vehicles/equipment:
 - Use as little water as possible to avoid having to install erosion and sediment controls for the wash area. High-pressure sprayers may use less water than a hose, and should be considered.
 - Use positive shutoff valve to minimize water usage.
- # Don't use solvents.

Vehicle Maintenance^{xiii}

Description

Prevent or reduce the discharge of pollutants to stormwater from vehicle maintenance.

This BMP is likely to partially reduce sediment, nutrients, toxic materials, oil and grease, and heavy metals. For other information on materials, see Spill Prevention and Control.

Approach

Vehicle maintenance is a potentially significant source of stormwater pollution. Some activities are engine repair and service (cleaning of parts, spilled fluids, etc.) as well as storage of vehicles which leak fluids.

Perform maintenance using indoor facilities instead of outside whenever possible as to protect the stormwater runoff. If maintenance should be done outside, ensure correct procedures are followed where prevention practices for spills and leaks can be practiced if needed.

Train employees on how to handle and avoid chemical spills.

If an outdoor maintenance area is needed, it should be located on a paved concrete surface in order to facilitate cleanup. Use barriers to prevent stormwater runoff from entering the area.

Use a secondary containment such as a drain pan or drop cloth to catch spills or leaks. Keep a drip pan under the vehicle when removing hoses, filters, or other parts.

Have an ample supply of cleanup materials where they are readily accessible and properly stored. Ensure all employees know where these materials are located.

Clean leaks and other spills with as little amount of water as possible. Use rags for small spills, a damp mop for general cleanup and dry absorbent materials for larger spills.

1. Clean spills with rags or other absorbent materials.
2. Sweep floor using dry absorbent materials.
3. Mop water may be discharged to a sanitary sewer or a sink.

Provide spill containment dikes or secondary containment around stored oil and chemical drums.

Label storm drains on our property with our blue and silver metal placards.

Limitations

Space and time limitations may preclude all work being conducted indoors in a control automotive shop.

Appendix

ⁱ *California Stormwater BMP Handbook, Municipal, pages SC60 1-3, January 2003.*

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ⁱⁱ *California Storm Water Best Management Practice Handbooks, Construction and Industrial Handbooks, CDM et. al. for the California SWQTF, 1993.*

Caltrans Storm Water Quality Handbooks, CDM et. al. for the California Department of Transportation, 1997.

ⁱⁱⁱ *Knoxville BMP Manual, Activities and Methods, pages AM-08 1-5, May 2003.*

^{iv} *California Storm Water Quality Handbooks, Drainage System Maintenance, CDM et. Al. for the California SWQTF, 1993. www.cabmphandbooks.com p. 2, January 2003.*

www.SanDiego.gov/stormwater/pdf, Metropolitan Wastewater Operations, p. 2.1.7-5. 2001.

^v *California Storm Water Best Management Practice Handbooks, Construction and Industrial Handbooks, CDM et. al. for the California SWQTF, 1993.*

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^{vi} *Knoxville BMP Manual, Activities and Methods, pages ES-06 1-2, January 2001.*

^{vii} *California Storm Water Best Management Practice Handbooks, Construction and Industrial Handbooks, CDM et. al. for the California SWQTF, 1993.*

Caltrans Storm Water Quality Handbooks, CDM et. al. for the California Department of Transportation, 1997.

^{viii} Koppelman, L.E., E. Tananbaum, and C. Swick. 1984. *Nonpoint Source Management Handbook*. Long Island Regional Planning Board, Hauppauge, NY.

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^{ix} *California Storm Water Best Management Practice Handbooks, Construction and Industrial Handbooks, CDM et. al. for the California SWQTF, 1993.*

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^x *Knoxville BMP Manual, Activities and Methods*, page AM-09 1-2, May 2003.

^{xi} *Knoxville BMP Manual, Activities and Methods*, page AM-05 1-2, May 2003.

^{xii} *California Storm Water Best Management Practice Handbooks, Construction and Industrial Handbooks*, CDM et. al. for the California SWQTF, 1993.

Caltrans Storm Water Quality Handbooks, CDM et. al. for the California Department of Transportation, 1997.

Swisher, R.D., 1987, *Surfactant Biodegradation*, Marcel Decker Corporation.

^{xiii} *Knoxville BMP Manual, Activities and Methods*. Page AM-16 1-4, May 2003.

Best Management Practices and Erosion Control Manual for Construction Sites; Flood Control District of Maricopa County, AZ, September 1992.

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.