Stormwater Pollution Prevention Guidance

Vehicle Maintenance and Repair, Fueling, Washing or Storage

Loading and Unloading, Outdoor Storage

Miscellaneous Wash Waters

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Introduction

Increased potential for stormwater contamination exists at commercial, industrial, institutional, municipal, or transport related operations that produce higher levels of stormwater pollutants (hotspots), and/or present a higher potential risk for spills, leaks or illicit discharges. The following are specific groupings of operations considered by the Department that are addressed in this guidance:

- Vehicle Maintenance and Repair, Fueling, Washing or Storage.
- Loading and Unloading, Outdoor Storage
- Pavement or Building Wash Water

For these types of operations, the practices in this guidance should be carefully considered in order to run a clean facility and avoid future liability by protecting waters of the State. The appropriate checklists and a stormwater pollution prevention plan (SWPPP) should be created to document the practices used and these checklists and the SWPPP should be kept onsite for use by your operation and for review by interested parties.

Suggested Documentation:

____Vehicle Maintenance and Repair Hotspot Checklist

____Vehicle Fueling Hotspot Checklist

____Vehicle Washing Hotspot Checklist

____Vehicle Storage Hotspot Checklist

____Loading and Unloading Hotspot Checklist

____Outdoor Storage Hotspot Checklist

____Wash Water Hotspot Checklist

____Stormwater Pollution Prevention Plan (SWPPP)

This document does not take the place of any required permits. If you are uncertain whether your facility requires an actual permit, please contact the Department.

Prepared in coordination with the Center for Watershed Protection.
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VEHICLE MAINTENANCE AND REPAIR

Vehicle maintenance and repair operations can impact water quality by exposing toxins in solvents, waste oil, antifreeze, and other fluids to stormwater. Often, vehicles that are wrecked or awaiting repair can be a stormwater hotspot if leaking fluids are exposed. The resulting oil and grease, trace metals, hydrocarbons, and other toxic organic compound pollution potential must be addressed through prevention.

Application

Pollution prevention practices should be applied to any facility that maintains or repairs vehicles. Examples include car dealerships, body shops, service stations, quick lubes, school bus depots, trucking companies, and fleet maintenance operations at larger industrial, institutional, municipal or transport-related operations.

Implementation Considerations

The discharge to surface water and stormwater management systems of wastewater from vehicle maintenance and service operations is prohibited without a discharge permit. Wastewater from these operations is also prohibited from being discharged onto the ground or into subsurface disposal systems such as septic systems, dry wells, seepage pits and drainage holes. Options for managing vehicle maintenance and service related wastewater include discharging to a sanitary sewer (if available and in compliance with the requirements of the sewer authority) and collection and storage in a holding tank for later offsite transport to a permitted facility.

The summary of required pollution prevention techniques for vehicle maintenance and repair operations that can prevent stormwater contamination are in Figure 1. You are encouraged to consult the Resources section of this sheet to get a more comprehensive review of pollution prevention practices for vehicle maintenance and repair operations.

- Avoid hosing down work or fueling areas
- Clean all spills immediately using dry cleaning techniques
- Collect and store used antifreeze, oil, grease, oil filters, cleaning solutions, solvents, batteries, hydraulic and transmission fluids for recycling or proper offsite treatment and disposal
- Conduct all vehicle and equipment repairs indoors or under a cover (if done outdoors)
- Connect outdoor vehicle storage areas to a separate stormwater collection system with an oil/grit separator that discharges to a holding tank, the sanitary sewer or a stormwater treatment practice
- Inspect the condition of all vehicles and equipment stored outdoors frequently
- Designate a specific location for outdoor maintenance activities that is designed to prevent stormwater and groundwater pollution (paved, away from storm drains, and with stormwater containment measures)
- Use a tarp, ground cloth, or drip pans beneath vehicles or equipment being repaired outdoors to capture all spills and drips
- Seal service bay concrete floors with an impervious material so cleanup can be done without

using solvents. The use of drip pans and dry absorbent can eliminate the need for wastewater collection and disposal systems. Do not wash service bays to outdoor storm drains or areas where it can seep into groundwater

- The discharge of maintenance and service related fluids and service bay floor washwater into subsurface disposal systems such as septic systems, dry wells, seepage pits and drainage holes is prohibited
- Store cracked batteries in a covered secondary containment area until they can be disposed of properly
- Wash parts in a self-contained solvent sink rather than outdoors
- Onsite discharge of maintenance and service related fluids is prohibited

Figure 1 - Pollution Prevention Practices for Vehicle Maintenance and Repair Activities

Employee training is essential to successfully implement vehicle repair pollution prevention practices. The connection between the storm drain system and local streams should be emphasized so that employees understand why any fluids need to be properly disposed of. It is also important to understand the demographics of the work force; in some communities, it may require a multilingual education program.

The vehicle maintenance and repair operations checklist (Figure 2) provides the best management practices (BMPS) required for these operations.

Requirement	Description of pollution prevention mechanism or BMP to be implemented
Conduct regular training for staff on your pollution prevention practices	
Provide locations for recycling collection of used antifreeze, oil, grease, oil filters, cleaning solutions, solvents, batteries, hydraulic and transmission fluids	
Cover all vehicle and equipment repair areas with a permanent roof or canopy.	
Connect outdoor vehicle storage areas to a separate stormwater collection system with an oil/grit separator or sand filter.	
Designate a specific location for outdoor maintenance activities that is designed to prevent stormwater pollution (paved, away from storm drains, and with stormwater containment measures)	
Stencil or mark storm drain inlets with "No Dumping, Drains to _____" message	

Figure 2 - Vehicle Maintenance and Repair Operations Checklist

Cost - Employee training is generally inexpensive, since training can be done using posters, pamphlets, or videos. Structural practices can vary based on what equipment is required. For instance, solvent sinks to clean parts can cost from $1,500 to $15,000, while spray cabinets may cost more than $50,000. Proper recycling/disposal of used or spilled fluids usually requires outside contractors that increase costs.

VEHICLE FUELING

Spills at vehicle fueling operations have the potential to directly contribute oil, grease, and gasoline to stormwater, and can be a significant source of lead, copper and zinc, and petroleum hydrocarbons. Delivery of pollutants to the storm drain can be sharply reduced by well-designed fueling areas and improved operational procedures.

Application

These practices can be applied to any facility that dispenses fuel. Examples include retail gas stations, bus depots, marinas, and fleet maintenance operations. In addition, these practices also apply to temporary above ground fueling areas for construction and earthmoving equipment. Many fueling areas are usually present in urban areas, and they tend to be clustered along commercial and highway corridors. These hotspots are often a priority for source control.

Feasibility

Vehicle fueling pollution prevention practices apply to all geographic and climatic regions. The practices are relatively low-cost, except for structural measures that are installed during new construction or station remodeling.

Implementation Considerations

The risk of spills depends on whether the fueling area is covered and has secondary containment. The type, condition, and exposure of the fueling surface can also be important. The summary of required pollution prevention techniques practices for fueling operations are found in Figure 3.

- Maintain an updated spill prevention and response plan on premises of all fueling facilities and make sure each staff member knows either where to find it or who to call who does know the plan
- Cover fueling stations with a canopy or roof to prevent direct contact with rainfall
- Design fueling pads for large mobile equipment to prevent the run-on of stormwater and collect any runoff in a dead-end sump
- Retrofit underground storage tanks with spill containment and overfill prevention systems
- Keep suitable cleanup materials on the premises to promptly clean up spills
- Install slotted inlets along the perimeter of the “downhill” side of fueling stations to collect fluids and connect the drain to a waste tank or stormwater treatment practice. The collection system should have a shutoff valve to contain a large fuel spill event
- Locate storm drain inlets away from the immediate vicinity of the fueling area
- Clean fuel-dispensing areas with dry cleanup methods. Never wash down areas before dry clean up has been done. Ensure that wash water is collected and disposed of in the sanitary sewer system or approved stormwater treatment practice
- Pave fueling stations with concrete rather than asphalt
- Protect above ground fuel tanks using a containment berm with an impervious floor of concrete. The containment berm should have enough capacity to contain 110 percent of the total tank volume

- Use fuel-dispensing nozzles with automatic shutoffs, if allowed
- Consider installing a perimeter sand filter to capture and treat any runoff produced by the station

Figure 3 - Pollution Prevention Practices For Fueling Operation Areas

Fueling Area Covers - Fueling areas can be covered by installing an overhanging roof or canopy. Covers prevent exposure to rainfall and are a desirable amenity for retail fueling station customers. The area of the fueling cover should exceed the area where fuel is dispensed. All downspouts draining the cover or roof should be routed to prevent discharge across the fueling area. If large equipment makes it difficult to install covers or roofs, fueling islands should be designed to prevent stormwater run-on through grading, and any runoff from the fueling area should be directed to a dead-end sump.

Surfaces - Fuel dispensing areas should be paved with concrete; the use of asphalt should be avoided, unless the surface is sealed with an impervious sealant. Concrete pads used in fuel dispensing areas should extend to the full length that the hose and nozzle assembly can be pulled, plus an additional foot.

Grading - Fuel dispensing areas should be graded with a slope that prevents ponding, and separated from the rest of the site by berms, dikes or other grade breaks that prevent run-on of urban runoff. The recommended grade for fuel dispensing areas is 2–4 percent (CSWQTF, 1997).

The vehicle maintenance and repair operations checklist (Figure 4) provides the best management practices (BMPS) required for these operations.

Requirement	Description of pollution prevention mechanism or BMP to be implemented
Cover fueling stations with a canopy or roof to prevent direct contact with rainfall	
Design fueling pads to prevent the run-on of stormwater and address any runoff with an oil/grit separator or a sand filter	
Locate storm drain inlets away from the immediate vicinity of the fueling area	
Stencil or mark storm drain inlets with "No Dumping, Drains to_____" message	
Pave fueling stations with concrete rather than asphalt	

Figure 4 - Vehicle Fueling Checklist

Cost - Costs to implement pollution prevention practices at fueling stations will vary, with many of the costs coming upfront during the design of a new fueling facility. Once a facility has implemented the, ongoing maintenance costs should be low.

VEHICLE WASHING

Vehicle wash water may contain chlorine, salts, sediments, phosphorus, metals, surfactants, chlorinated hydrocarbons, oil and grease, and other pollutants that can degrade water quality. When vehicles are washed on impervious surfaces such as parking lots or industrial areas, dirty wash water can contaminate stormwater that ends up in streams. Washwater that seeps into the ground or is discharged into a subsurface disposal system such as a septic system, dry well, seepage pit or drainage hole can contaminate groundwater.

Application

Vehicle washing pollution prevention practices apply to many commercial, industrial, institutional, municipal and transport-related operations. Improved washing practices can be used at any facility that routinely washes vehicles. Examples include commercial car washes, bus depots, car dealerships, rental car companies, trucking companies, and fleet operations. In addition, washing dump trucks and other construction equipment can be a problem.

Feasibility

Improved vehicle washing practices are relatively simple to implement and are very effective at preventing stormwater contamination. Training is essential to get owners and employees to adopt these practices, and should be designed to overcome cultural and social barriers to improved washing practices.

Implementation Considerations

Options for managing vehicle washwater include discharging to a sanitary sewer (if available and in compliance with the requirements of the sewer authority), collection and storage in a holding tank for later offsite transport and proper disposal, offsite washing at a permitted facility, or discharged onsite as authorized by an individual NPDES surface water or state groundwater discharge permit. The discharge of wastewater from vehicle washing is not eligible for coverage under the Department's NPDES General Industrial Stormwater Permit.

The best way to avoid stormwater contamination during washing operations is to drain the wash water to the sanitary sewer system, if available and in compliance with the requirements of the sewer authority. The ideal practice is to wash all vehicles at commercial car washes or indoor facilities that are specially designed for washing operations. Design new facilities with designated areas for indoor vehicle washing where no other activities are performed (e.g., fluid changes or repair services). Operations that produce high volumes of wash water should consider installing systems that connect to the sanitary sewer with a storm drain filter should be used to capture solid contaminants. Figure 5 offers some suggestions for indoor car wash sites.

- Facilities should have designated areas for indoor vehicle washing where no other activities are performed (e.g., fluid changes or repair services)
- Indoor vehicle wash areas should have floor drains that receive only vehicle washing wastewater (not floor washdown or spill removal wash waters) and be connected to a holding tank with a gravity discharge pipe to a sump that pumps to a holding tank for offsite treatment and proper disposal, or to an oil/grit separator that discharges to a municipal sanitary sewer
- The floor of indoor vehicle wash bays should be completely bermed to collect wash water
- Aromatic and chlorinated hydrocarbon solvents should be eliminated from vehicle-washing operations
- Vehicle-washing operations should use vehicle rinsewater to create new wash water through the use of recycling systems that filter and remove grit

Figure 5 - Tips for Indoor Car Wash Sites (Adapted from U.S. EPA, 2003)

When washing operations are conducted outside, a designated wash area should have the characteristics in Figure 6. Outdoor vehicle washing facilities should use pressurized hoses without detergents to remove most dirt and grime. If detergents are used, they should be phosphate-free to reduce nutrient loading. If acids, bases, metal brighteners, or degreasing agents are used, wash water should be discharged to a treatment facility, sanitary sewer, or a holding tank for offiste transport and proper treatment and disposal. In addition, waters from the pressure washing of engines and vehicle undercarriages must be disposed of using the same options.

- Paved with an impervious surface, such as Portland cement concrete
- Bermed to contain wash water
- Sloped so that wash water is collected and discharged to the sanitary sewer system, holding tank or dead-end sump
- Operated by trained workers to confine washing operations to the designated wash area

Figure 6 - Containment System Preventing Wash Water from Entering the Storm Drain

The summary of required pollution prevention techniques for vehicle washing operations that can prevent stormwater contamination are in Figure 7.

- Wash vehicles at indoor car washes that recycle, treat or convey wash water to the sanitary sewer system
- Use biodegradable, phosphate-free, waterbased soaps
- Use flow-restricted hose nozzles that automatically turn off when left unattended
- Wash vehicles on a washpad that has a containment system
- Prohibit discharge of wash water into the storm drain system by using temporary berms, storm drain covers, drain plugs or other containment system
- Onsite discharge of vehicle washwater into subsurface disposal systems such as septic systems, dry wells, seepage pits, drainage holes or where it can seep into the ground requires a discharge permit. Contact Groundwater Permits Division (410-537-3778) for washwater management options.
- Label storm drains with "No Dumping" signs to deter disposal of wash water in the storm drain system
- Avoid steam cleaning and engine and undercarriage washing which produces high pollutant concentrations
- Obtain permission from sewage treatment facilities to discharge to the sanitary sewer

Figure 7 - Pollution Prevention Practices for Vehicle Washing

The vehicle washing checklist (Figure 8) provides the best management practices (BMPS) required for these operations.

Requirement	Description of pollution prevention mechanism or BMP to be implemented
Training on proper techniques to prevent pollution.	
Include flow-restricted hose nozzles that automatically turn off when left unattended.	
Use a containment system for washing vehicles such that wash water does not flow into storm drain system.	
Mark storm drain inlets with "No Dumping, Drains to _" signs to deter disposal of wash water in the storm drain system.	

Figure 8 - Vehicle Washing Checklist

Cost - The cost of using vehicle-washing practices can vary greatly and depends on the size of the operation (Table 3). The cost of constructing a commercial grade system connected to the sanitary sewer can exceed $100,000. Disposal fees and frequency of washing can also influence the cost.

Item	Cost
Containment mat	$480–$5,840**
Storm drain cover (24-in. drain)	$120 **
Water dike/ berm (20 ft)	$100.00 **
Pump	$75–$3,000**
Wastewater storage container	$50–$1,000+**

Figure 9 - Sample Equipment Costs for Vehicle Washing Practices (Source: ** Robinson, 2003)

VEHICLE STORAGE

Parking lots and vehicle storage areas can introduce sediment, metals, oil and grease, and trash into stormwater runoff. Simple pavement sweeping, litter control, and stormwater treatment practices can minimize pollutant export from these hotspots.

Application

Pollution prevention practices can be used at larger parking lots. Examples include regional malls, stadium lots, big box retail, airport parking, car dealerships, rental car companies, trucking companies, and fleet operations. The largest, most heavily used parking lots with vehicles in the poorest condition (e.g., older cars or wrecked vehicles) have the highest potential for pollution.

Feasibility

Sweeping can be employed for parking lots that empty out on a regular basis. Mechanical sweepers can be used to remove small quantities of solids. Vacuum sweepers should be used on larger parking lot storage areas, since they are superior in picking up deposited pollutants.

Constraints for sweeping large parking lots include high annual costs, difficulty in controlling parking, and the inability of current sweeper technology to remove oil and grease. Proper disposal of swept materials might also represent a limitation.

Implementation Considerations

The design of parking lots and vehicle storage areas can greatly influence the ability to treat stormwater runoff.

Parking lots are prime areas to implement stormwater controls from Maryland's Design Manual. Many parking areas are landscaped with small vegetative areas between parking rows for aesthetic reasons or to create a visual pattern for traffic flow. These landscaped areas can be modified to provide stormwater treatment in the form of bioretention.	

Figure 10 - Parking Lot Island Turned into Bioretention

Catch basin cleanouts are also an important practice in parking areas. Catch basins within the parking lot should be inspected at least twice a year and cleaned as necessary.

Cleanouts can be done manually or by vacuum truck. The cleanout method selected depends on the number and size of the inlets present.

Most communities have contractors that can be hired to clean out catch basins and vacuum sweep lots. Mechanical sweeping services are available, although the cost to purchase a new sweeper can exceed $200,000. Employee training regarding spill prevention for parking areas is generally low-cost and requires limited staff time.

The summary of required pollution prevention techniques intended to prevent or reduce the discharge of pollutants from parking and vehicle storage areas are found in Figure 11.

Parking Lots • Post signs to control litter and prevent patrons from changing automobile fluids in the parking lot (e.g., changing oil, adding transmission fluid, etc.) • Pick up litter daily and provide trash receptacles to discourage littering • Stencil or mark storm drain inlets with "No Dumping, Drains to_____" message • Direct runoff to bioretention areas, vegetated swales, or sand filters • Design landscape islands in parking areas to function as bioretention areas • Disconnect rooftop drains that discharge to paved surfaces • Use permeable pavement options for spillover parking • Inspect catch basins twice a year and remove accumulated sediments, as needed • Vacuum or sweep large parking lots on a monthly basis, or more frequently • Install parking lot retrofits such as bioretention, swales, infiltration trenches, and stormwater filters found in Maryland's Design Manual
Vehicle Storage Areas • Do not store wrecked vehicles on lots unless runoff containment and treatment are provided • Use drip pans or other spill containment measures for vehicles that will be parked for extended periods of time • Use absorbent material to clean up automotive fluids from parking lots

Figure 11 - Pollution Prevention Practices for Parking Lot and Vehicle Storage Areas

The vehicle storage checklist (Figure 12) provides the best management practices (BMPS) required for these operations.

Requirement	Description of pollution prevention mechanism or BMP to be implemented
Label storm drain inlets with "No Dumping, Drains to ” message	
All stormwater runoff from vehicle storage must receive pretreatment via an oil/grit separator or sand filter.	

Figure 12 - Vehicle Storage Checklist

LOADING AND UNLOADING

Materials spilled or leaked during loading and unloading can either be carried away in stormwater runoff or washed off when the area is cleaned. As a result, many different pollutants can be introduced into the storm drain system, including sediment, nutrients, trash, organic material, trace metals, and an assortment of other pollutants.

Application

Outdoor loading and unloading normally takes place on docks or terminals at many commercial, industrial, institutional, and municipal operations. While nearly every commercial, industrial, institutional, municipal and transport-related site has a location where materials or products are shipped or received, the risk of stormwater pollution is greatest for operations that transfer high volumes of material or liquids, or unload potentially hazardous materials. Some notable examples to look for in a subwatershed include distribution centers, grocery stores, building supply outlets, lawn and garden centers, petroleum wholesalers, warehouses, landfills, ports, solid waste facilities, and maintenance depots. Attention should also be paid to industrial operations that process bulk materials and any operations regulated under industrial stormwater NPDES permits.

Feasibility

Loading/unloading pollution prevention practices can be applied in all geographic and climatic regions, and work most effectively at preventing sediment, nutrients, toxic materials, and oil from coming into contact with stormwater runoff or runon. Few impediments exist to using this practice, except for the cost to retrofit existing loading and unloading areas with covers or secondary containment.

Implementation Considerations

Loading/unloading pollution prevention practices should be integrated into the overall stormwater pollution prevention plan for a facility. Employee training should focus on proper techniques to transfer materials, using informational signs at loading docks and material handling sites and during routine safety meetings.

The summary of required pollution prevention techniques intended to prevent or reduce the discharge of pollutants from at loading/unloading areas is found in Figure 13.

- Avoid loading/unloading materials in the rain
- Close adjacent storm drains during loading/unloading operations
- Surround the loading/unloading area with berms or grading to prevent run-on or pooling of stormwater. If possible, cover the area with a canopy or roof
- Ensure that a trained employee is always present to handle and cleanup spills
- Inspect the integrity of all containers before loading/unloading
- Inspect equipment such as valves, pumps, flanges, and connections regularly for leaks, and repair as needed
- Install an automatic shutoff valve to interrupt flow in the event of a catastrophic liquid spill
- Install a high-level alarm on storage tanks to prevent overfilling
- Pave the loading/unloading area with concrete rather than asphalt
- Place drip pans or other temporary containment devices at locations where leaks or spills may occur, and always use pans when making and breaking connections
- Position roof downspouts to direct stormwater away from loading/unloading areas and into bioretention areas
- Prepare and implement an Emergency Spill Cleanup Plan for the facility
- Sweep loading/unloading area surfaces frequently to remove material that could otherwise be washed off by stormwater
- Train all employees, especially fork lift operators, on basic pollution prevention practices and post signs
- Use seals, overhangs, or door skirts on docks and terminals to prevent contact with rainwater

Figure 13 - Pollution Prevention Practices for Loading and Unloading Areas

The loading and unloading checklist (Figure 14) provides the best management practices (BMPS) required for these operations.

Requirement	Description of pollution prevention mechanism or BMP to be implemented
Design liquid storage areas with impervious surfaces and secondary containment	
Minimize stormwater run-on by covering storage areas with a permanent canopy or roof	
Slope containment areas to a drain with a positive control (lock, valve, or plug) that leads to the sanitary sewer (if permitted) or to a holding tank	
Provide permanent cover for building materials stored outside	
Direct runoff away from building material storage areas	
Install a high-level alarm on storage tanks to prevent overfilling	

Figure 14 - Loading and Unloading Checklist

Cost - Costs to implement loading/unloading pollution prevention practices consist of one-time construction costs to retrofit new or existing loading areas, but annual maintenance costs are relatively low thereafter. Exceptions include industries that elect to use expensive air pressure or vacuum systems

for loading/unloading facilities, which can also be expensive to maintain (U.S. EPA, 1992). Ongoing costs include employee training and periodic monitoring of loading/unloading activities.

OUTDOOR STORAGE

Unprotected outdoor storage areas can generate a wide range of stormwater pollutants, such as sediment, nutrients, toxic materials, and oil and grease.

Application

Many businesses store materials or products outdoors. Protecting outdoor storage areas is a simple and effective pollution prevention practice for many commercial, industrial, institutional, municipal, and transport related operations. The underlying concept is to prevent runoff contamination by avoiding contact between outdoor materials and rainfall (or runoff). The risk of stormwater pollution is greatest for operations that store large quantities of liquids or bulk materials at sites that are connected to the storm drain system.

Several notable operations include nurseries and garden centers, boat building/repair, auto recyclers/body shops, building supply outlets, landfills, ports, recycling centers, solid waste and composting facilities, highway maintenance depots, and power plants. Attention should also be paid to industrial operations that process bulk materials, which are often regulated under the industrial stormwater permit.

Feasibility

Outdoor storage requires routine monitoring by employees. Most operations have used covering as the major practice to handle outdoor storage protection (U.S. EPA, 1999). The strategy is to design and maintain outdoor material storage areas so that they:

- Reduce exposure to stormwater and prevent runon
- Use secondary containment to capture spills
- Can be regularly inspected
- Have an adequate spill response plan and cleanup equipment

Implementation Considerations

Materials can be protected by installing covers, secondary containment, and other structures to prevent accidental release. Outdoor storage areas can be protected on a temporary basis (tarps or plastic sheeting) or permanently through structural containment measures (such as roofs, buildings, or concrete berms).

Covers - The use of impermeable covers is an effective pollution prevention practice for non-hazardous materials. Covers can be as simple as plastic sheeting or tarps, or more elaborate roofs and canopies. Site layout, available space, affordability, and compatibility with the covered material all dictate the type of cover needed for a site. In addition, the cover should be compatible with local fire and building codes and OSHA workplace safety standards. Care should be taken to ensure that the cover fully protects the storage site and is firmly anchored into place.

Secondary Containment – Secondary containment is designed to contain possible spills of liquids and prevent stormwater run-on from entering outdoor storage areas. Secondary containment structures vary in design, ranging from berms and drum holding areas to specially-designed solvent storage rooms.	

Figure 15 - Secondary Containment of Storage Drums behind a Car Repair Shop

Secondary containment can be constructed from a variety of materials, such as concrete curbs, earthen berms, plastic tubs, or fiberglass or metal containers. The type of material used depends on the substance contained and its resistance to weathering. In general, secondary containment areas should be sized to hold 110 percent of the volume of the storage tank or container unless other containment sizing regulations apply (e.g., fire codes).

If secondary containment areas are uncovered, any contaminated water that accumulates must be collected in a sanitary sewer, a stormwater treatment system, or a licensed disposal facility. If a spill or leak has occurred, then you should ship it out or treat it until there is no more evidence of pollution. Water quality monitoring may be needed to determine whether the water is contaminated and dictate the method of disposal. If the stormwater is clean, or an on-site stormwater treatment practice is used, a valve should be installed in the containment dike so that excess stormwater can be drained out of the storage area and directed either to the storm drain (if clean) or into the stormwater treatment system (if contaminated). If there is a visible sheen, the water may be treated by passing it through a sorbent material to remove the contaminant. The valve should always be kept closed except when stormwater is drained, so that any spills that occur can be effectively contained. Local sewer authorities may not allow discharges from a large containment area into the sewer system, and permission must be obtained prior to discharge. If discharges to the sanitary sewer system are prohibited, containment should be provided, such as a holding tank that is regularly pumped out.

Employee training on outdoor storage pollution prevention should focus on the activities and site areas with the potential to pollute stormwater and the proper techniques to manage material storage areas to prevent runoff contamination. Training can be conducted through safety meetings and the posting of on-site informational signs. Employees should also know the onsite person who is trained in spill response.

The summary of required pollution prevention techniques intended to prevent or reduce the discharge of pollutants from an outdoor storage areas is found in Figure 16.

- Emphasize employee education regarding storage area maintenance
- Keep an up-to-date inventory of materials stored outdoors, and try to minimize them
- Store liquids in designated areas on an impervious surface with secondary containment
- Inspect outdoor storage containers regularly to ensure that they are in good condition
- Minimize stormwater run-on by enclosing storage areas or building a berm around them
- Slope containment areas to a drain with a positive control (lock, valve, or plug) that leads to the sanitary sewer (if permitted) or to a holding tank
- Schedule regular pumping of holding tanks containing stormwater collected from secondary containment areas

Figure 16 - Pollution Prevention Practices for Protecting Outdoor Storage Areas

The Outdoor or Bulk Material Storage checklist (Figure 17) provides the best management practices (BMPS) required for these operations.

Requirement	Description of pollution prevention mechanism or BMP to be implemented
Training provided for spill response procedures.	
Grade the designated loading/unloading to prevent run-on or pooling of stormwater	
Cover the loading/unloading areas with a permanent canopy or roof	
Install an automatic shutoff valve to interrupt flow in the event of a liquid spill	
Install a high-level alarm on storage tanks to prevent overfilling	
Pave the loading/unloading area with concrete rather than asphalt	
Position roof downspouts to direct storm water away from loading/unloading areas	

Figure 17 - Outdoor or Bulk Material Storage Checklist

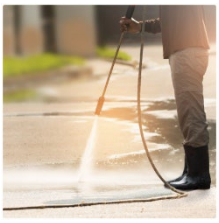
Cost - Many storage protection practices are relatively inexpensive to install. Actual costs depend on the size of the storage area and the nature of the pollution prevention practices. Other factors are whether practices are temporary or permanent and the type of materials used for covers and containment. Employee training can be done in connection with other safety training to reduce program costs. Training costs can also be reduced by using existing educational materials from local governments, professional associations or National Compliance Assistance Centers http://www.assistancecenters.net.

Storage Protection Device	Cost
Concrete Slab (6”)	$3.50 to $5.00 per ft2
Containment Pallets	$50 to $350 based on size and # of barrels to be stored
Storage buildings	$6 to $11 per ft2
Tarps & Canopies	$25 to $500 depending on size of area to cover
	Sources: Costs were derived from a review of Ferguson et al., 1997 and numerous websites that handle proprietary spill control or hazardous material control products

Figure 18 - Sample Equipment Costs for Outdoor Storage Protection

PAVEMENT OR BUILDING WASHDOWN

Although these types of wash waters are not stormwater, many businesses discharge the water to either a storm drain, stormwater conveyance or stormwater pond. We include this guidance within this document so that this commonly asked question is addressed uniformly.



Application

As buildings age or spills, dirt or grime accumulate on surfaces, it is desirable to pressure wash the surfaces and thus enjoy a cleaner looking property. However this same dirt or grime in the washwater can also pollute receiving waters.

Feasibility

Most pressure washing uses little actual water and the potential discharge is minimal. The strategy is to plan the operation so that they:

- Can be monitored and any debris filtered and disposed of.
- Avoid using soaps or chemicals.
- Are directed to infiltrate or potentially collected and sent to sanitary sewer.

Implementation Considerations

The following guidelines should be considered to minimize potential toxic discharges, as specified for each source:

- Pavement wash waters may be discharged provided that the following conditions are met:
    - Detergents or hazardous cleaning products are not used (e.g., bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols); AND
    - The wash waters do not come into contact with oil and grease deposits, sources of pollutants associated with industrial activities (see Part III.C.5), or any other toxic or hazardous materials, unless residues are first cleaned up using dry clean-up methods (e.g., applying absorbent materials and sweeping, using hydrophobic mops/rags); AND
    - You have implemented appropriate control measures to minimize discharges of mobilized solids and other pollutants (e.g., filtration, detention, settlement).
- Routine external building wash down may be discharged provided that the following conditions

are met:

- No detergents or hazardous cleaning products are used AND
- Any dislodged paint chips or other solids (which don't pass a Tyler 20 mesh screen) are filtered.

- If you wish to use soaps or chemical cleaners in your wash water for buildings or pavement, there are a few options:
  - Capturing the water and hauling away.
  - Sending the water to the sanitary sewer.
  - Obtaining an individual discharge permit to discharge the water to a storm drain or surface water body.
  - Direct the discharge for groundwater infiltration. Although you may need a groundwater permit for this.

The Wash Water checklist (Figure 18) provides the best management practices (BMPS) required for these operations.

Requirement	Description of pollution prevention mechanism or BMP to be implemented
Training provided for washing procedures.	
Filter washwater to collect any debris.	
Minimize the amount of water used so that it can be controlled or contained.	
Collect the water and send to sanitary sewer if it contains any chemical cleaners.	
Encourage the water to infiltrate for use by plants and to avoid the need to discharge.	

Figure 18 – Wash Water Checklist

Resources

Many thanks to the Center of Watershed Protection for providing many of the recommendations considered in this document. www.cwp.org

Coordinating Committee For Automotive Repair (CCAR) Source: US EPA CCARGreenLink®, the National Automotive Environmental Compliance Assistance Center CCAR-GreenLink® Virtual Shop http://www.ccar-greenlink.org/

US EPA. Virtual Facility Regulatory Tour: Vehicle Maintenance. FedSite Federal Facilities Compliance Assistance Center. https://www.fedcenter.gov/assistance/facilitytour/vehicle/

TERC. http://www.tercenter.org/

Maryland Department of the Environment, **Maryland Stormwater Design Manual , Volumes I & II.**
https://mde.maryland.gov/programs/water/StormwaterManagementProgram/Pages/stormwater_design.aspx

US EPA. SWPPP Guidance Industrial Stormwater Fact Sheet Series Sector P: Motor Freight Transportation Facilities, Passenger Transportation.

> Sector P: Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, Rail Transportation Facilities, and United States Postal Service Transportation Facilities

MDE has web-based tools that allow you to find the nearest receiving water, and providing information on the impairment status of the water, applicable total maximum daily loads (TMDLs), and potential pollutants of concern.
https://mde.maryland.gov/programs/water/waterquality/Pages/WaterQualityMaps.aspx

MDE has a useful template to create your own SWPPP. The Template is for MDE's Industrial Stormwater General Permit, and has several items that are not part of your requirements, however it provides step-by- step instructions for developing a SWPPP for your site.
https://mde.maryland.gov/programs/permits/WaterManagementPermits/Documents/GDP%20Stormwater/SWPPPTemplate.docx

For more information

If you have additional questions regarding stormwater discharges that might need a permit, call Industrial and General Permits Division 410-537-3323.

If you have questions regarding vehicle wash or maintenance bay wastewater discharged onsite to subsurface disposal systems such as septic systems, drywells, seepage pits, or drainage holes call: Groundwater Permits Division 410-537-3778.