



Vehicle and Equipment Washwater Discharges

Best Management Practices Manual



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Vehicle and Equipment Washwater Discharges

Best Management Practices Manual

by;

Program Development Services Section

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Olympia, Washington

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Section 1

Introduction

This guidance manual discusses the environmental concerns over discharges from washing or steam cleaning the exterior surfaces of vehicles and equipment such as cars and/or trucks, and light or heavy equipment. It provides Best Management Practices (BMPs) for the collection, treatment, and disposal of washwater generated by large/commercial vehicle/equipment washing operations in [Section 2](#). This document also provides guidance for pollution prevention by offering the “do’s and don’ts” of discharge control for some common types of operations in [Section 3](#).

Why should we be concerned with vehicle washwater

Washwater from vehicle/equipment cleaning activities may contain significant quantities of oil and grease, suspended solids, heavy metals, and organics, as well as pollutants from detergents. These pollutants can be toxic and harmful to living organisms, including fish. The ingestion of the affected fish by people can also be harmful. Washwater from pressure washing and steam cleaning are likely to have more pollutants than cold, low-pressure water. This document recommends limiting those cleaning methods to frequent users with appropriate controls. Pay special attention to your operation to see if these are listed as “don’ts” of discharge control.

Oil and grease contain hydrocarbon compounds, some of which can injure or kill aquatic life even at low concentrations. Oil and grease can also coat fish gills and prevent oxygen from entering water, starving fish and other aquatic life.

Some detergents may contain metals such as arsenic. Low concentrations of dissolved metals can be toxic to living organisms. Detergents contain emulsifiers that break up oil particles. Emulsifiers can also cause harm to aquatic life. Many detergents also contain nutrients such as phosphorous and nitrogen. High nutrient levels in streams and lakes can harm water quality by stimulating excess weed and algae growth. This overgrowth causes unpleasant odors and sights, and depletes oxygen levels necessary to support fish life.

What operations does this document cover

The operations listed below are just a few that discharge washwater and have the opportunity to take actions that could prevent pollution in Washington State waters. The manual includes a list of Best Management Practice recommendations for each operation in this document.

BMPs discussed in [Section 2](#) include:

- Businesses that regularly wash vehicle/equipment exterior surfaces.

BMPs discussed in [Section 3](#) include:

- At-site rinsing of farm and construction vehicle/equipment
- Mobile washers
- Washing vehicle exteriors at new and used car/truck dealerships
- Small dischargers (1 or 2 pieces of equipment and or vehicles per day and not to exceed 8 per week)
- Charity car washes

What operations does this document not cover

The washwater generated from the washing of tank truck interiors is not included in this guidance document. Operators must collect, treat, and dispose of washwater generated from cleaning of tank truck interiors in accordance with a treatment and disposal system approved by the Washington State Department of Ecology or a municipality with delegated pretreatment authority. The required treatment will vary with the cargo hauled by the tanker truck. In short, discharge of these washwaters to surface waters, municipal wastewater systems, or to the ground requires a permit or a discharge authorization.

Engine cleaning and the cleaning operations that use acids, caustics, or other metal brighteners should follow the BMPs for discharges to municipal wastewater systems or use closed-loop water recycling systems.

The BMPs in this document may not be adequate to protect ground- water resources in sensitive areas, such as:

- Sole source aquifer
- Wellhead protection areas
- Other designated groundwater protection areas.

Washwater discharge options

There are three options available for the disposal of vehicle washwater (one is not recommended).

- Preferred option: Zero discharge, or closed-loop water recycling
- Second option: Discharge to a municipal wastewater system
- Third option (not recommended): Discharge to land or ground

Of these options, zero discharge, or the use of water recycling systems is the preferred option and is strongly encouraged. The second most preferred option is to discharge to a municipal wastewater system.

Due to the high degree of treatment and extensive (and costly) monitoring that are required for discharges to a storm sewer, or the ground, Ecology does not recommend the third option.

Ecology must issue a National Pollutant Discharge Elimination System (NPDES) Permit or a State Waste Discharge Permit for such discharges. For more information, contact your closest Ecology regional office. (See list at end of this document.)

Note that this update of the vehicle wash guidance does not include the discharge of washwater to surface water bodies. Ecology does not consider discharge of washwater to surface water bodies as a practice that uses all known, available, and reasonable methods of treatment (AKART). Ecology guidance requires all Best Management Practices to use AKART.

Zero discharge or closed-loop water recycling systems

A closed-loop system uses recycled water and has zero discharge. However, closed-loop water recycling systems may use chemicals to help remove solids from the waste. Systems that do use chemicals generate chemical sludge. Operators of systems that generate chemical sludge must safely handle and dispose of the sludge in a manner that will not cause pollution of the waters of the state. In addition, the closed-loop recycling systems may have a reservoir to store the recycled water for reuse. It may be necessary to discard the reservoir water periodically as oil, grease, and other pollutants accumulate. Follow the steps below for safe handling and disposal of the sludge and the contaminated reservoir water generated by these systems:

- The sludge generated in these systems seldom designates as a hazardous or dangerous waste (per Chapter 173-303 WAC, Dangerous Waste Regulations), and it can usually be disposed of in a solid waste landfill. To be sure, check with your local health department and/or landfill operator. If still in doubt, test the sludge to determine if it designates as a hazardous or dangerous waste.
- If the sludge designates as a hazardous or dangerous waste, it must be disposed of through a permitted treatment, storage, and disposal (TSD) facility. Also, requirements for storage of dangerous wastes (Chapter 173-303 WAC), such as secondary containment, would apply to a sludge that designates as a hazardous or dangerous waste.
- Discharge the decanted contaminated reservoir water to a municipal wastewater system with the prior authorization from the local sewer authority.

Discharges to a municipal wastewater system

Discharges to a municipal wastewater system receive treatment by the municipal treatment facility before final discharge to the environment (rivers, lakes, seawater, or the land).

Dischargers of vehicle washwater must obtain approval from the local sewer authority prior to discharge to the municipal wastewater system. Many local sewer authorities have limits on pollutant concentrations in the discharge that dischargers must meet. Local sewer limits are to:

- Protect water quality of the receiving water body
- Check decanted washwater quality, making sure that it is a treatable product
- Prevent operational problems at the sewage treatment plant and in the collection system
- Protect worker health and safety

This manual contains some recommendations for the collection and treatment of the washwater prior to discharge to a municipal wastewater system (see [Section 2](#)).

Discharges to the ground (not recommended)

Treat discharges to the ground to prevent ground water pollution. You must permit these discharges through a State Waste Discharge Permit. A grassy ground surface can provide treatment for small and infrequent discharges as long as cold, low-pressure water is used and it contains no soaps, emulsifiers, or detergents. No pressure washing or steam cleaning should be discharged to the ground. [Section 3](#) of this manual provides some do's and don'ts recommendations for such dischargers.

Regardless of the number and type of vehicle washing activity, all discharges to ground water must comply with state ground water standards (Chapter 173-200 WAC) and may require a State Waste Discharge Permit. In some areas of the state, such as those over sole source aquifers, regulations may not allow discharge to ground or may require further controls. In those sensitive areas, closed-loop water recycling or other options would be necessary. For more information, contact your nearest Ecology office or local government.



Section 2

BMPs for collection, treatment, and disposal of washwater

This section contains the mandatory and recommended BMPs for collection, treatment, and disposal of washwater generated from large/commercial operations washing vehicle/equipment exterior surfaces. The following provides BMPs for treatment and disposal options. These are the BMPs for closed loop discharges and discharges to a municipal wastewater system.

When feasible, Ecology strongly recommends the use of closed-loop water recycling systems to treat and reuse the washwater over discharges to the municipal wastewater systems or the ground.

Where a municipal wastewater system is accessible, discharge the washwater to the municipal system. Discharge to the municipal wastewater system requires the approval of the local sewer authority.

Washwater discharges to the ground (not recommended) must be adequately treated so as not to cause violation of state ground water standards (Chapter 173-200 WAC) and covered by a State Waste Discharge Permit.

Washwater containment and collection

Conduct vehicle and/or equipment washing in one of the preferred designated areas described below.

- At a commercial washing business in which the washing occurs in an enclosure that drains to a municipal wastewater system, a treatment facility, or a dead end sump.
- In a building constructed specifically for washing of vehicles and equipment, plumbed to drain to a municipal wastewater system, a treatment facility, or a dead end sump.
- In an outside location designated as a wash area, without walls and/or roof and meeting the guidance for uncovered wash areas outlined below.

Uncovered wash areas containment and collection

The designated uncovered wash area should be:

- Constructed as a containment pad in paved areas to prevent the run-on of stormwater from adjacent areas.
 - Slope the spill containment area to collect washwater in a containment pad.
 - Drain the wash area with perimeter drains, trench drains or catchment drains.
 - Size the containment pad to extend out a minimum of four feet on all sides of the vehicles and/or equipment being washed.

- Built to convey the washwater
 - To a sump (like a grit separator) and then to a sanitary sewer (if allowed by the local Sewer Authority) or
 - Other appropriate wastewater treatment or recycle system.

An NPDES permit may be required for any washwater discharge to a storm drain after treatment. Contact the Ecology regional office for NPDES Permit requirements.
- Equipped with a positive control outlet valve.
 - The positive control outlet valve is located prior to the connection to the sanitary sewer. (not shown in [Figure 1](#))
 - The valve provides spill control by storing spills within live containment volume, and oil/water separation. It allows the spill to be cleaned up prior to opening flow to the sanitary sewer.
 - Size the minimum live storage volume to contain the maximum expected daily washwater flow plus sludge storage volume below the outlet pipe.
 - Shut the outlet valve during the washing cycle to collect the washwater in the sump.
 - The valve should remain shut for at least two hours following the washing operation to allow the oil and solids to separate before discharge to a sanitary sewer
- Equipped with an inlet control valve in the discharge pipe, closed when washing is not occurring.
 - The inlet control valve is located immediately after the drain from the pad and prior to the live containment and oil/water separation.
 - This prevents the entry of uncontaminated stormwater into the pretreatment/ treatment system.
 - The stormwater can then drain into the conveyance/discharge system outside of the wash pad (essentially bypasses the washwater treatment/conveyance system).
 - Clean the concrete pad thoroughly until there is no foam or visible sheen in the washwater prior to closing the inlet valve and allowing uncontaminated stormwater to overflow and drain off the pad. (See [Figure 1](#))
- Post signs to inform people of the operation and purpose of the valves.

Also:

- Ecology recommends a portland cement concrete spill containment pad for steam cleaning.
- The wash area should be well marked at gas stations, multifamily residences, and any other business where nonemployees may wash vehicles. The posting will include a statement forbidding the changing of oil in the wash area and the location of the nearest oil recycling facility. See [Figure 1](#) for an illustration of these requirements.
- You may manually operate the positive control outlet valve, but a pneumatic or electric valve system is preferable. The valve may be on a timer circuit where it is opened upon completion of a wash cycle. The timer would then close the valve after the sump or separator is drained ([Figure 1](#)).

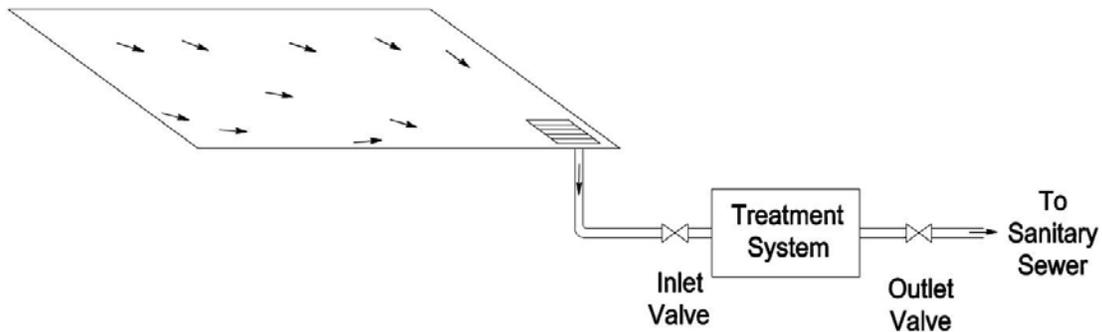


Figure 1. Requirements for an Uncovered Wash Area

Discharges to a municipal wastewater system

Treatment System

Treat the washwater to meet the local sewer authority's discharge requirements. In general, local sewer authorities have pollutant concentration limits for total suspended solids (TSS), oil and grease (O & G), and metals. Use a gravity oil/water separator such as an American Petroleum Institute (API) or baffle separator or Coalescing Plate Separator (CPS) prior to discharge to a municipal wastewater system. The expected effluent TSS and Oil & Grease (O & G) concentrations are less than 100 ppm and 50 ppm, respectively. However, the type and quantity of the detergent used may reduce the efficiency of the gravity separation (e.g. API/baffle separator) systems for total O & G removal.

[Figures 2](#) and [3](#) show examples of the API and CPS systems. The API separator has a grit/sludge removal baffle allowing solids separation. A pretreatment unit for solids separation (e.g., a grit trap) may have to precede the CPS system. The flow residence time through the API system should not be less than 30 minutes at the highest expected discharge flow. Additional design information for oil/water separators is available in BMP T11.10 and T11.11 in Volume V of the Stormwater Management Manual for Western Washington (SWMMWW).

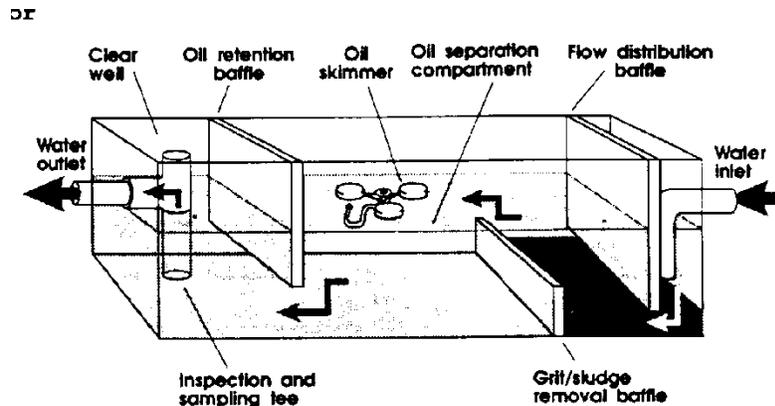


Figure 2. An API Separator

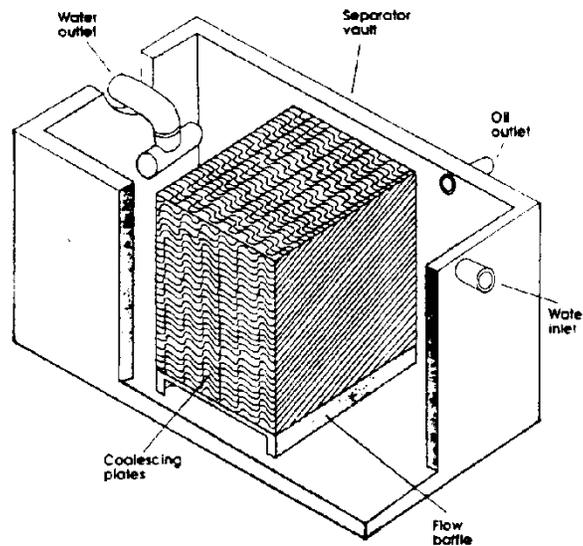


Figure 3. A Coalescing Plate Separator

Another treatment option is a containment sump. [Figure 4](#) is an illustration of a typical containment sump.

Note the turn down elbow that provides a gravity separation prior to overflow. The outlet valve should be a positive control valve between the containment sump and the municipal sewer. Size the sump's minimum containment volume to accommodate the maximum expected daily volume plus the sludge storage volume below the invert of the outlet pipe.

Shut the outlet valve during the washing operation and the washwater will be stored in the volume provided. The valve should remain shut at least two hours following the last washing operation to allow oil and solids separation under a quiescent condition. After this quiescent period, open the valve to allow discharge to the municipal sewer. Operate the containment sump valve on a daily cycle. Larger containment volumes can store more than one-day's flow.

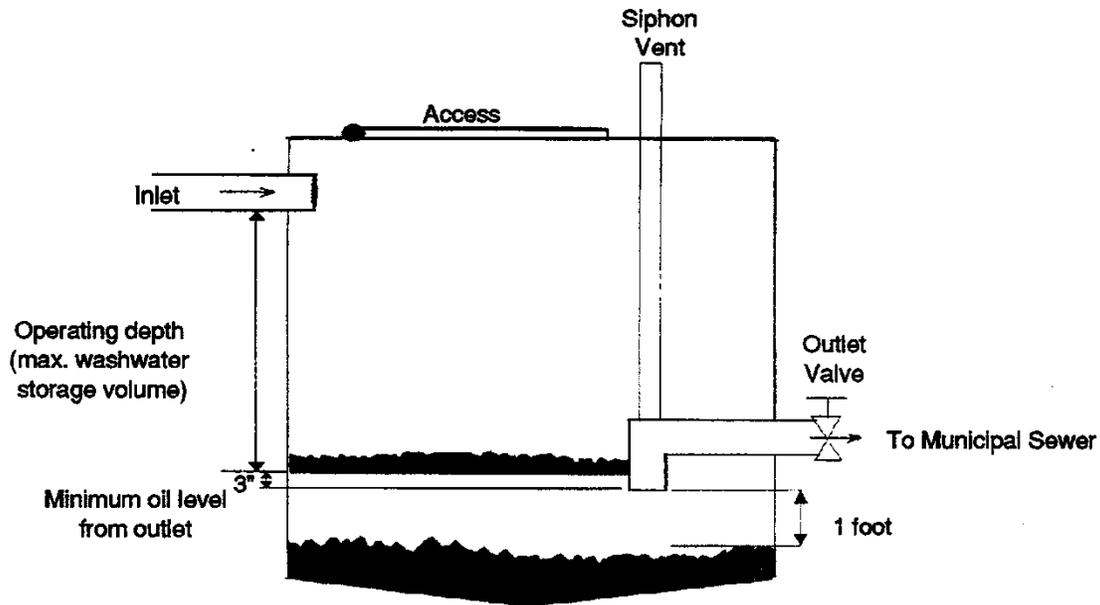


Figure 4.A Typical Containment Sump

Operation: During the washing operation, close the outlet valve. Washwater is stored in the sump. The valve should remain shut for a quiescent period of at least 2 hours after the last washing operation. Discharge the washwater to the municipal sewer by opening the outlet valve after the quiescent period.

The sludge concentration generated in a containment sump can be quite variable. In an EPA study, the median TSS concentration from the wand type car wash facilities was 659 ppm (the range was from 106 to 2970 ppm). Based on this median TSS concentration and assuming a sludge solids concentration of 5 percent, the sludge volume generated from 3,000 gallons of washwater is approximately 40 gallons.

The same EPA study reported the median TSS concentrations from the roll-over and tunnel type car washes as 158 and 101 ppm, respectively (the ranges were 30-576 ppm for roll-over type and 36-848 ppm for tunnel type). To prevent resuspension and discharge of the solids to the municipal sewer, the sludge depth should remain a minimum of one foot below the outlet. In addition, the floating oily layer should stay well above the outlet pipe to prevent its discharge to the municipal sewer.

Maintenance

Inspect any grit traps daily and clean as needed, but not less than once per week. Operate and maintain the gravity separation unit according to the manufacturer's recommended maintenance procedures at the specified frequencies or as needed.

- Check oil accumulation in an API system at least once a week or more frequently as needed. If oil accumulation exceeds three inches, clean the unit.
- Generally, the manufacturer recommends cleaning the horizontal coalescing plates in a CPS system when the dirt and grit have reduced the gap between the plates by 40 percent.

These requirements may be different for each case and, ultimately, the owner/operator is responsible for the proper and periodic maintenance and operation of the separator in use.

Inspect the containment sump ([Figure 4](#)) during each fill and discharge cycle and clean before the accumulating sludge and oil layers have reached the limits shown in the figure. Keep a log of all maintenance activities on-site and make it available to Ecology or the local sewer authority when requested. The log should include the type of maintenance activity, name of person responsible for the activity, and time and date of the activity.

Solids and other materials removed from the treatment system must be disposed at a location and in a manner to not cause pollution of any waters of the state. If the wastes do not designate as a hazardous or dangerous waste, disposal in a solid waste landfill with the approval of the jurisdictional health authority, may be a practical option. Contact waste disposal companies for help in cleaning and disposal of the separator's content.

Discharges to ground

Discharges to ground are allowed only when cold, low-pressure water is used and it contains no soaps, emulsifiers, or detergents. Ecology may approve any other discharges to ground under a State Waste Discharge Permit with an Engineering Report describing the proposed treatment for the discharge. The treatment system must produce an effluent that will not cause a violation of the Washington State Groundwater Quality Standards.

Section 3

On-site washing of farm and construction vehicles/ equipment

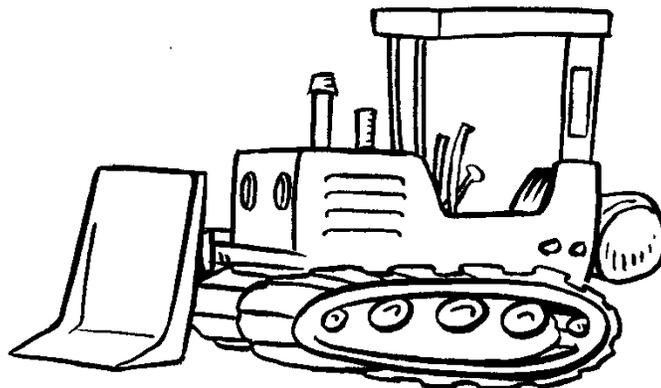
The following applies when performing rinsing to prevent tracking of dirt, sediment, and floatable materials and to remove pesticide residuals from farm and construction vehicle/equipment exterior surfaces.

Do

- ❖ Farm and construction vehicle/equipment should be field washed with cold, low-pressure water over a grassy ground or dirt area where it can soak into the ground, evaporate, or otherwise be kept out of surface waters or storm sewers.
- ❖ Rinse pesticide truck exteriors with water in the field to remove pesticide chemical residues before bringing trucks to a central washing area.
- ❖ Where rinsing occurs on impervious surfaces, use a catch basin with a gravity separator (e.g. an oil/water separator). Discharge from the gravity separator should be directed to a sanitary sewer where available. If a sanitary sewer is not available, the discharge from the gravity separator should go to a grassy ground surface or dirt area.

Don't

- ❖ Do not use soap, detergents, or cleaners.
- ❖ Do not discharge to a storm sewer or surface water.
- ❖ Do not pressure wash vehicles.
- ❖ Do not steam clean.



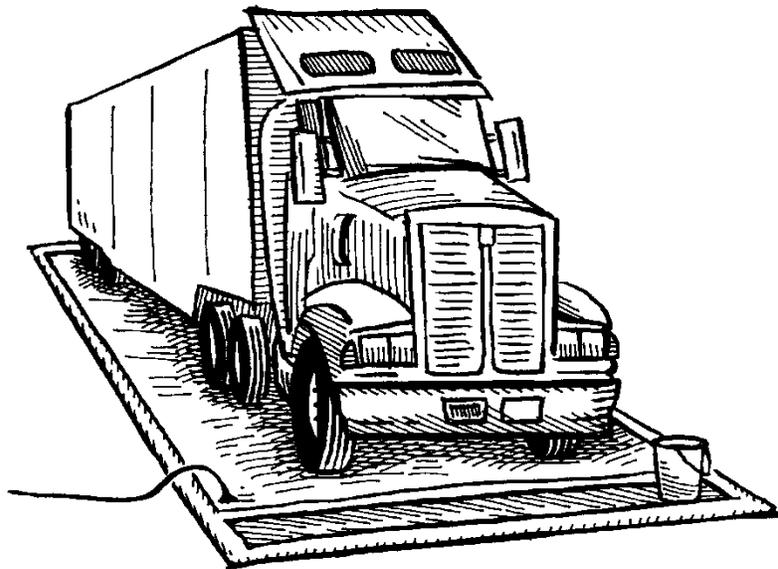
Mobile washers

Do

- ❖ Washwater must be collected and discharged to a municipal wastewater system; or reused in a closed-loop water recycling system; or collected and hauled to a treatment facility.
- ❖ Mobile washing operations must be performed on an impervious surface (i.e., concrete, plastic, or other) to contain and collect the washwater. The impervious surface must extend to a minimum of 4 feet on all sides of vehicle/equipment to trap overspray.
- ❖ Mobile washers must use a portable impervious surface material when washing on a porous surface. Use a portable wash pit, vacuum recovery unit, or comparable device to collect washwater for proper disposal.
- ❖ Where washing is over an impervious area draining to a storm sewer, place a temporary plug in the storm drain and pump the accumulated water to the nearest wastewater system or collect washwater and haul it to a treatment facility.
- ❖ Clean or rinse the wash area with water before a rain event. Collect and discharge the washwater to the nearest wastewater system.
- ❖ Consult your local sewer utility about diverting washwater to the sanitary sewer through collection and pumping.

Don't

- ❖ Do not discharge to the ground, storm sewers, or surface waters.



Rinsing vehicle exteriors at new and used car/ truck dealerships

The following recommendations are for rinsing vehicles with cold water. Cleaning operations using soaps, detergents, or other cleaners should contain the washwater and discharge it to a municipal wastewater system with approval from the local sewer authority or use closed-loop water recycling systems (see Chapter 2).

Do

- ❖ Rinse vehicles in the parking stalls as long as only cold water is used.
- ❖ Direct the rinse water away from storm drains to a grassy swale or a landscaped area.
- ❖ If the site allows rinse water to run off to a storm drain, retrofit the drain with catch basins to trap sediment and floating oils (see below).

Don't

- ❖ Do not use soap, detergents, or cleaners.
- ❖ Do not discharge to surface water or a storm sewer without a catch basin (see below) or an equivalent treatment system.
- ❖ Do not steam or pressure clean engines.
- ❖ Do not steam clean

Catch basins for trapping sediment and oil

- Each catch basin serves a maximum of one acre of an impervious (pavement, cement, etc.) surface area.
- The inlet must have a normally closed shut off valve when washing is occurring. This prevents the discharge of rinsewater into the stormwater system.
- A typical catch basin's size is 2.5' x 2.5' by 48" deep. A grated cover on the basin must trap large floating debris and the outlet pipe must contain an inverted elbow.
- A sediment sump must be 24" minimum below the outlet pipe invert.
- Clean catch basins by removing solids and oil when 30 percent full with solids, or at least once a year. Clean catch basins during dry weather to prevent discharge of pollutants into the storm sewer. Solids and oil must be disposed of in a dumpster with prior notification of the local health department.

Small dischargers

Small dischargers are defined as those where washing is carried out infrequently:

- Involving 1 or 2 pieces of equipment and/or vehicles per day, not exceeding eight during any week; and/or
- Discharging less than 100 gallons of washwater each day; and

- Washing of the vehicle/equipment is not the primary business activity of the discharges. For example, mobile washers are not small dischargers. Follow recommendations in this manual for “mobile washers.”

Do

Discharge to a wastewater collection system when possible, with permission of the system operator. If you are not sure the nearby drain is a sanitary sewer, contact your local sewer utility.

- ❖ If a wastewater collection system is not available, discharge to a landscaped, grassy ground surface, or dirt area where the washwater can soak into the ground or evaporate.
- ❖ Keep a distance of at least 100 feet from a wellhead if letting washwater soak into the ground.
- ❖ Only cold, low-pressure water may be used and it contains no soaps, emulsifiers, or detergents.



Don't

- ❖ Do not discharge to surface water or a storm sewer.
- ❖ Do not clean engines or do any cleaning involving soaps, emulsifiers, detergents, strong acids, caustics, or other metal brighteners.
- ❖ Do not pressure wash vehicles.
- ❖ Do not steam clean.

Charity car washes

Do

- ❖ Discharge washwater only to a sanitary sewer.
- ❖ When washing is over an impervious area like pavement that drains to a storm sewer or dry well, place a temporary plug in the storm drain and pump the accumulated water to the nearest wastewater system. Talk to your local sewer utility about diverting washwater to the sanitary sewer through collection and pumping.
- ❖ Minimize the amount of soaps and detergents used.

Don't

- ❖ Do not discharge to storm sewers, the ground, or surface waters.
- ❖ Do not clean engines or do any cleaning involving soaps, emulsifiers, detergents, strong acids, caustics, or other metal brighteners.
- ❖ Do not pressure wash vehicles.
- ❖ Do not steam clean.

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Appendix

Applicable Washington State law and regulations

Chapter 90.48 RCW, Water Pollution Control, requires “...the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington.”

Washington State Regulations promulgated by the Department of Ecology to fulfill the intent of Chapter 90.48 RCW are:

Chapter 173-200 WAC, Water Quality Standards for Ground Waters of the State of Washington.

Chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington.

Chapter 173-216 WAC, State Waste Discharge Permit Program, applicable to discharge of waste materials from industrial, commercial, and municipal operations into ground and surface waters of state and into municipal wastewater systems.

Chapter 173-218 WAC, Underground Injection Control Program, prohibits discharge of wastewater into wells.

Chapter 173-220 WAC, National Pollutant Discharge Elimination System (NPDES) Program, applicable to the discharge of pollutants and other wastes and materials to the surface waters of the state, operating under state law as a part of the NPDES created by section 402 of the Federal Water Pollution Control Act (FWPCA).

Chapter 173-240 WAC, Submission of Plans and Reports for Construction of Wastewater Facilities, requires that engineering reports and plans and specifications for the project shall be submitted to and approved by the department (Ecology).

Contacts

If you have questions or want more information, please contact Dan Gariépy at Ecology Headquarters office in Lacey at 360-407-6470 (voice), dan.gariepy@ecy.wa.gov (e-mail); Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

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