Stormwater Maintenance and Source Control Plan

PREPARED FOR:

Mr. Don Huber
SPP Manufacturing
PO Box 64160
Tacoma, WA 98465

PROJECT:

Puyallup 2nd Street Apartments
XXX 2nd Street NE
Puyallup, Washington
2190606.10

PREPARED BY:

Allyson Burket
Project Engineer

REVIEWED BY:

J. Matthew Weber, PE
Principal

DATE:

December 2021
Revised February 2024

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02/08/2024

I hereby state that this Stormwater Maintenance and Source Control Plan for Puyallup 2nd Street Apartments has been prepared by me or under my supervision and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that City Puyallup does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

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1.0 Project Description

The 2nd Street Apartments project in Puyallup, referred to herein as the "project site" or "site", is located northeast of the intersection of 2nd Street NE and 5th Avenue NE on Tax Parcel 7600200051 and is located within the Northwest Quadrant of the Northwest Quadrant of Section 27, Township 20 North, Range 4 East, Willamette Meridian, within the city limits of Puyallup, Washington. The project is bounded to the north by an auto sales lot and a single-family residence, and to the east by a single-family residence and an apartment building. Access will be provided from 5th Avenue NE and 2nd Street NE. The site is currently zoned as central business district (CBD). Refer to Exhibit C-1 for a Vicinity Map.

The project proposes the construction of an apartment building with a footprint of approximately 7,600 square feet. Other improvements will include driveways, site paving, landscaping, and improvements to the adjacent right-of-way. Proposed utilities include storm drainage, a sanitary sewer connection, and a water system.

This report presents a maintenance program that meet the requirements of the 2021 Pierce County *Stormwater Management and Site Development Manual (SMSDM)*. This document provides the guidelines for facilities to be maintained in a timely and conscientious manner. If the stormwater facilities and conveyance systems are not adequately inspected and maintained periodically, it could lead to local flooding and increased erosion potential. Siltation, debris, or lack of general maintenance can reduce the performance capabilities of the facilities.

2.0 Maintenance Importance and Intent

The importance of maintenance for the proper functioning of stormwater control facilities cannot be overemphasized. A substantial portion of failures (clogging of filters, resuspension of sediments, loss of storage capacity, etc.) are due to inadequate maintenance. Stormwater Best Management Practice (BMP) maintenance is essential to ensure that BMPs function as intended throughout their life cycle.

The fundamental goals of maintenance activities are to ensure the entire flow regime and treatment train designed for this site continue to fully function. For this site, these include:

- Maintain designed stormwater infiltration capacity.
- Maintain ability to safely convey design stormwater flows.
- Maintain ability to treat stormwater runoff quality.
- Preserve soil and plant health, as well as stormwater flow contact with plant and soil systems.
- Clearly identify systems so they can be protected.
- Keep maintenance costs low.
- Prevent large-scale or expensive stormwater system failures.
- Prevent water quality violations or damage to downstream properties.

The intent of this section and manual is to pass on to the responsible parties all information critical to understanding the design of the system, risks and considerations for proper use, suggestions for maintenance frequencies, and cost so that realistic budgets can be established.

3.0 Responsible Parties

This project includes a mix of public and private facilities. The permeable concrete sidewalk located within the right-of-way is to be dedicated to City of Puyallup to own and maintain. The private stormwater facilities within the site shall be owned and maintained by SPP Manufacturing's maintenance personnel.

Maintenance of the stormwater facilities shall follow the schedule as specified in the attached maintenance checklists and as recommended by the media filter manufacturer guidelines. Additional maintenance may be required to respond to unusual storm events or reduced performance of the treatment system. A copy of the Pierce County-recommended maintenance schedule is attached and may be photocopied and used as inspection records. An annual inspection report must be submitted to City of Puyallup in accordance with the Maintenance Agreement.

4.0 Facilities Requiring Maintenance

A system of catch basins and pipes will convey stormwater from the proposed parking lot to one of three Contech StormFilter units before it reaches the underground gravel infiltration trench. The apartment buildings' roof downspouts will drain directly to the trench. A 1-foot wide gravel ditch along the east property line will infiltrate runoff form the property's east landscape buffer.

5.0 Maintenance Instructions

The parties responsible for maintenance must review and apply the maintenance requirements contained herein. These maintenance instructions outline conditions for determining whether maintenance actions are required, as identified through inspection. However, they are not intended to be measures of the facility's required condition at all times between inspections. Exceedance of these conditions at any time between inspections or maintenance activity does not automatically constitute a violation of these standards. However, based on inspection observations, the inspection and maintenance presented in the checklists shall be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action. For facilities not owned and maintained by the City, a log of maintenance activity that indicates what actions were taken must be kept onsite and be available for inspection by the City.

Maintenance should be conducted monthly from November through April, once in later summer (preferably September), and after any major storm event. Additional maintenance may be required to respond to unusual storm events or reduced performance of the facilities. A copy of the recommended maintenance schedule is included in Exhibit A and may be photocopied and used as inspection records. Inspection reports should be completed annually.

Routine inspection and maintenance apply to the following systems that are considered an integral part of the onsite stormwater and pollution prevention facilities:

- Catch Basins.
- Filter Cartridges.
- Gravel Trench.
- Roof Downspouts.
- Landscaping and Trees.

Exhibit A-1 contains a stormwater facility maintenance schedule. A maintenance guide for the storm filters is included in Exhibit A-2. Plan to complete a checklist for all system components per the following schedule:

- Monthly from November through April.
- Once in later summer (preferably September).
- After any major storm events.

Using photocopies of the attached pages, check off the problems that are noted each time the item is inspected. Document comments on problems found and the corrective action taken.

6.0 Vegetation Maintenance

The maintenance schedules in Exhibit A provide guidance on vegetation control and management within stormwater facilities and general ground maintenance. Irrigation and other maintenance, as necessary, shall be provided to ensure that vegetation remains viable and that a hardy root structure forms in the first year. Vegetation planting shall be provided as described in the construction documents.

7.0 Pollution Source Control Measures

Pollution source control is the application of pollution prevention practices on a developed site to reduce contamination of stormwater runoff at its source. Site-specific BMPs have been incorporated into the site plan to reduce contaminants used or discharged to the environment. Refer to Exhibit B for Source Control BMPs for commercial facilities.

This Stormwater Maintenance and Source Control Plan is developed for the operation of the Puyallup 2nd Street Apartments private stormwater systems. This maintenance document has been prepared within the guidelines of the City of Puyallup Construction Standards. If this plan is implemented, the owner can expect the stormwater system to function as designed.

AHBL, Inc.

Allyson Burket
Project Engineer

AB/lsk

December 2021
Revised October 2024

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Exhibit A

Maintenance Schedule

The site is located northeast of the intersection of 2nd Street NE and 5th Avenue NE in Puyallup, Washington.

The 2nd Street Apartments Plat proposes a permeable sidewalk along the building frontage to be managed and maintained by City of Puyallup. All other onsite stormwater improvements are to be the responsibility of SPP Manufacturing's maintenance personnel.

Table 1 below describes each stormwater facility, including what it does and how it works.

Table 1. Stormwater Facility Descriptions

Stormwater Facility	Description
Stormwater Drainage Manholes / Catch Basins	Manholes and catch basins collect stormwater from the site and are connected to the storm drainage pipes.
Roof Drain	Conveys roof runoff from downspouts to infiltration trench.
Infiltration Trench	Gravel-filled trench with underdrain provides temporary storage of stormwater runoff before gradually infiltrating into the surrounding soils.
Infiltration Ditch	Collects runoff and infiltrates into surrounding soils

Puyallup 2nd Street Apartments

Inspection Frequencies

Asset	Preferred Month	Interval
Storm Drainage Manholes / Catch Basins		Annually
Roof Drain		Annually
Infiltration Trench		Annually
Infiltration Ditch		Annually
Permeable Concrete Pavement		Annually
Landscaping	March through April September through October	Semi-annually

Puyallup 2nd Street Apartments

Maintenance Activity Log

DATE	FACILITY DEFECT OR PROBLEM	ACTION TAKEN	CONDITION AFTER MAINTENANCE

CONTECH®
ENGINEERED SOLUTIONS

StormFilter Inspection and Maintenance Procedures

The Stormwater Management StormFilter®

Maintenance Guidelines

The primary purpose of the Stormwater Management StormFilter® is to filter and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the StormFilter to its full efficiency and effectiveness.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance activities may be required in the event of a chemical spill or due to excessive sediment loading from site erosion or extreme storms. It is a good practice to inspect the system after major storm events.

Maintenance Procedures

Although there are many effective maintenance options, we believe the following procedure to be efficient, using common equipment and existing maintenance protocols. The following two-step procedure is recommended::

1. **Inspection**
   - Inspection of the vault interior to determine the need for maintenance.
2. **Maintenance**
   - Cartridge replacement
   - Sediment removal

Inspection and Maintenance Timing

At least one scheduled inspection should take place per year with maintenance following as warranted.

First, an inspection should be done before the winter season. During the inspection the need for maintenance should be determined and, if disposal during maintenance will be required, samples of the accumulated sediments and media should be obtained.

Second, if warranted, a maintenance (replacement of the filter cartridges and removal of accumulated sediments) should be performed during periods of dry weather.

In addition to these two activities, it is important to check the condition of the StormFilter unit after major storms for potential damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the inspection/ maintenance schedule depending on the actual operating conditions encountered by the system. In general, inspection activities can be conducted at any time, and maintenance should occur, if warranted, during dryer months in late summer to early fall.

Maintenance Frequency

The primary factor for determining frequency of maintenance for the StormFilter is sediment loading.

A properly functioning system will remove solids from water by trapping particulates in the porous structure of the filter media inside the cartridges. The flow through the system will naturally decrease as more and more particulates are trapped. Eventually the flow through the cartridges will be low enough to require replacement. It may be possible to extend the usable span of the cartridges by removing sediment from upstream trapping devices on a routine as-needed basis, in order to prevent material from being re-suspended and discharged to the StormFilter treatment system.

The average maintenance lifecycle is approximately 1-5 years. Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction may need to be inspected and maintained more often than those with fully stabilized surface conditions.

Regulatory requirements or a chemical spill can shift maintenance timing as well. The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after major storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual StormFilter system or site. It is recommended that the site owner develop a database to properly manage StormFilter inspection and maintenance programs..

Inspection Procedures

The primary goal of an inspection is to assess the condition of the cartridges relative to the level of visual sediment loading as it relates to decreased treatment capacity. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, then typically large amounts of sediments will be present and very little flow will be discharged from the drainage pipes. If this is the case, then maintenance is warranted and the cartridges need to be replaced.

Warning: In the case of a spill, the worker should abort inspection activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct an inspection:

Important: Inspection should be performed by a person who is familiar with the operation and configuration of the StormFilter treatment unit and the unit's role, relative to detention or retention facilities onsite.

1. If applicable, set up safety equipment to protect and notify surrounding vehicle and pedestrian traffic.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the access portals to the vault and allow the system vent.
4. Without entering the vault, visually inspect the inside of the unit, and note accumulations of liquids and solids.
5. Be sure to record the level of sediment build-up on the floor of the vault, in the forebay, and on top of the cartridges. If flow is occurring, note the flow of water per drainage pipe. Record all observations. Digital pictures are valuable for historical documentation.
6. Close and fasten the access portals.
7. Remove safety equipment.
8. If appropriate, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
9. Discuss conditions that suggest maintenance and make decision as to whether or not maintenance is needed.

Maintenance Decision Tree

The need for maintenance is typically based on results of the inspection. The following Maintenance Decision Tree should be used as a general guide. (Other factors, such as Regulatory Requirements, may need to be considered).

Please note Stormwater Management StormFilter devices installed downstream of, or integrated within, a stormwater storage facility typically have different operational parameters (i.e. draindown time). In these cases, the inspector must understand the relationship between the retention/detention facility and the treatment system by evaluating site specific civil engineering plans, or contacting the engineer of record, and make adjustments to the below guidance as necessary. Sediment deposition depths and patterns within the StormFilter are likely to be quite different compared to systems without upstream storage and therefore shouldn't be used exclusively to evaluate a need for maintenance.

1. Sediment loading on the vault floor.
   a. If >4" of accumulated sediment, maintenance is required.
2. Sediment loading on top of the cartridge.
   a. If >1/4" of accumulation, maintenance is required.
3. Submerged cartridges.
   a. If >4" of static water above cartridge bottom for more than 24 hours after end of rain event, maintenance is required. (Catch basins have standing water in the cartridge bay.)
4. Plugged media.
   a. While not required in all cases, inspection of the media within the cartridge may provide valuable additional information.
   b. If pore space between media granules is absent, maintenance is required.
5. Bypass condition.
   a. If inspection is conducted during an average rain fall event and StormFilter remains in bypass condition (water over the internal outlet baffle wall or submerged cartridges), maintenance is required.
6. Hazardous material release.
   a. If hazardous material release (automotive fluids or other) is reported, maintenance is required.
7. Pronounced scum line.
   a. If pronounced scum line (say ≥ 1/4" thick) is present above top cap, maintenance is required.

Maintenance

Depending on the configuration of the particular system, maintenance personnel will be required to enter the vault to perform the maintenance.

Important: If vault entry is required, OSHA rules for confined space entry must be followed.

Filter cartridge replacement should occur during dry weather. It may be necessary to plug the filter inlet pipe if base flows is occurring.

Replacement cartridges can be delivered to the site or customers facility. Information concerning how to obtain the replacement cartridges is available from Contech Engineered Solutions.

Warning: In the case of a spill, the maintenance personnel should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct cartridge replacement and sediment removal maintenance:

1. If applicable, set up safety equipment to protect maintenance personnel and pedestrians from site hazards.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the doors (access portals) to the vault and allow the system to vent.
4. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
5. Make notes about the external and internal condition of the vault. Give particular attention to recording the level of sediment build-up on the floor of the vault, in the forebay, and on top of the internal components.
6. Using appropriate equipment offload the replacement cartridges (up to 150 lbs. each) and set aside.
7. Remove used cartridges from the vault using one of the following methods:

Method 1:

A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

   Using appropriate hoisting equipment, attach a cable from the boom, crane, or tripod to the loose cartridge. Contact Contech Engineered Solutions for suggested attachment devices.

B. Remove the used cartridges (up to 250 lbs. each) from the vault.

Important: Care must be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner.

C. Set the used cartridge aside or load onto the hauling truck.

D. Continue steps a through c until all cartridges have been removed.

Method 2:

A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

B. Unscrew the cartridge cap.

C. Remove the cartridge hood and float.

D. At location under structure access, tip the cartridge on its side.

E. Empty the cartridge onto the vault floor. Reassemble the empty cartridge.

F. Set the empty, used cartridge aside or load onto the hauling truck.

G. Continue steps a through e until all cartridges have been removed.

8. Remove accumulated sediment from the floor of the vault and from the forebay. This can most effectively be accomplished by use of a vacuum truck.
9. Once the sediments are removed, assess the condition of the vault and the condition of the connectors.
10. Using the vacuum truck boom, crane, or tripod, lower and install the new cartridges. Once again, take care not to damage connections.
11. Close and fasten the door.
12. Remove safety equipment.
13. Finally, dispose of the accumulated materials in accordance with applicable regulations. Make arrangements to return the used **empty** cartridges to Contech Engineered Solutions.

Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads.

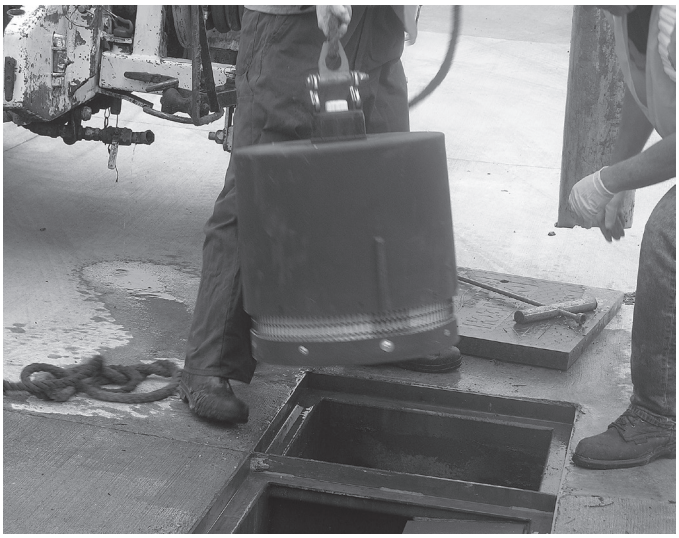
Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Related Maintenance Activities - Performed on an as-needed basis

StormFilter units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.



Inspection Report

Date: _____ Personnel: _____

Location: _____ System Size: _____ Months in Service: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other: _____

Sediment Thickness in Forebay: _____ Date: _____

Sediment Depth on Vault Floor: _____

Sediment Depth on Cartridge Top(s): _____

Structural Damage: _____

Estimated Flow from Drainage Pipes (if available): _____

Cartridges Submerged: Yes ☐ No ☐ Depth of Standing Water: _____

StormFilter Maintenance Activities (check off if done and give description)

☐ Trash and Debris Removal: _____

☐ Minor Structural Repairs: _____

☐ Drainage Area Report _____

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

Items Needing Further Work: _____

Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals.

Other Comments:

_____

_____

_____

_____

_____

_____

_____

_____

Review the condition reports from the previous inspection visits.

StormFilter Maintenance Report

Date: _____ Personnel: _____

Location: _____ System Size: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other: _____

List Safety Procedures and Equipment Used: _____

_____

_____

System Observations

Months in Service: _____

Oil in Forebay (if present): Yes ☐ No ☐

Sediment Depth in Forebay (if present): _____

Sediment Depth on Vault Floor: _____

Sediment Depth on Cartridge Top(s): _____

Structural Damage: _____

Drainage Area Report

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

StormFilter Cartridge Replacement Maintenance Activities

Remove Trash and Debris: Yes ☐ No ☐ Details: _____

Replace Cartridges: Yes ☐ No ☐ Details: _____

Sediment Removed: Yes ☐ No ☐ Details: _____

Quantity of Sediment Removed (estimate?):

Minor Structural Repairs: Yes ☐ No ☐ Details: _____

Residuals (debris, sediment) Disposal Methods: _____

Notes:

_____

_____

_____

_____

_____

_____

_____

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Support

- Drawings and specifications are available at www.conteches.com.
- Site-specific design support is available from our engineers.

Exhibit B

Source Control BMPs

Chapter 2. Worksheet for Commercial and Industrial Activities

This worksheet is designed for use by business and industry operators. This worksheet and the BMPs are organized by the different activities that businesses perform. The goal of the BMPs is to assure that nothing but uncontaminated stormwater be discharged to the Pierce County stormwater drainage system. If the listed activity is performed indoors and all discharges are controlled (e.g., process water, washwater, lubricants, solvents, fugitive dust, granular material, blow down waste) such that no exposure to stormwater occurs, then you do not have to institute new BMPs for that activity.

1. Complete the entire worksheet by checking the appropriate boxes for all activities that take place at your work place.
2. If you checked off any of the activities **that are being performed outdoors or can reach the stormwater drainage system**, use the activity code on the worksheet to find the BMPs recommended for you in Chapter 4.

If you checked off any of these activities that are occurring indoors at your business, then you are exempt from implementing BMPs, provided no indoor drains or processes can ultimately contact stormwater or be transported to surface waters such as rivers, lakes and streams. You must ensure that liquids, powders, dusts, and fine granular materials stay confined indoors; otherwise, you will be subject to all of the BMP requirements. For discharges to the sanitary sewer, permits must be obtained from the County Industrial Pretreatment Program at (253) 798-3013.

If you have questions, please contact Pierce County Planning & Public Works Surface Water Management at (253) 798-2725. They can provide assistance over the phone and also at your business.

Activity Code	Type of Activity	Check if You Are Involved in This
A1.1	Cleaning or Washing of Tools, Engines, and Manufacturing Equipment This includes parts washers and all types of manufactured equipment components.	
A1.2	Cleaning or Washing of Cooking Equipment This includes vents, filters, pots and pans, grills, and related items.	
A1.3	Washing, Pressure Washing, and Steam Cleaning of Vehicles/ Equipment/Building Structures This covers cleaning and washing at all types of establishments, including fleet vehicle yards, car dealerships, car washes, and maintenance facilities.	
A1.4	Collection and Disposal of Wastewater from Mobile Interior Washing Operations This includes carpet cleaners, upholstery cleaners, and drapery cleaners.	
A2.1	Loading and Unloading Areas for Liquid or Solid Material Loading and unloading of materials at industrial and commercial facilities.	
A2.2	Fueling at Dedicated Stations This includes gas stations, pumps at fleet vehicle yards or shops, and other privately owned pumps.	
A2.3	Engine Repair and Maintenance This covers oil changes and other engine fluids.	
A2.4	Mobile Fueling of Vehicles and Heavy Equipment Fleet fueling, wet fueling, and wet hosing.	
A2.5	In-Water and Over-Water Fueling Applies to transferring of fuels to vehicles or equipment in water.	
A3.1	Concrete and Asphalt Mixing and Production at Stationary Sites Applies to mixing of raw materials on site to produce concrete or asphalt.	
A3.2	Concrete Pouring, Concrete Cutting, and Asphalt Application at Temporary Sites This includes construction sites, and driveway and parking lot resurfacing.	
A3.3	Manufacturing and Postprocessing of Metal Products This includes machining, grinding, soldering, cutting, welding, quenching, rinsing, etc.	
A3.4	Wood Treatment Areas This includes wood treatment using pressure processes or by dipping or spraying.	
A3.5	Commercial Composting Includes commercial composting facilities operating outside.	
A3.6	Landscaping and Vegetation Management Activities, Including Vegetation Removal, Herbicide and Insecticide Application, Fertilizer Application, Irrigation, Watering, Gardening, and Lawn Care Includes businesses involved in landscaping, applying pesticides and managing vegetation.	✓

Activity Code	Type of Activity	Check if You Are Involved in This
A3.7	Painting, Finishing, and Coating of Vehicles, Boats, Buildings, and Equipment Includes surface preparation and the applications of paints, finishes, and/or coatings.	
A3.8	Commercial Printing Operations Includes materials used in the printing process.	
A3.9	Manufacturing Activities – Outside Includes outdoor manufacturing areas.	
A3.10	Agricultural Crop Production Includes commercial scale farming.	
A3.11	Application of Pesticides, Herbicides, Fungicides and Rodenticides for purposes other than landscaping Includes moss removal and outdoor insect extermination.	✓
A3.12	Nurseries and Greehouses Applies to commercial container plant, greenhouse grown, and cut foliage production operations.	
A4.1	Storage or Transfer (Outside) of Solid Raw Materials, By-products, or Finished Products	
A4.2	Storage and Treatment of Contaminated Soils This applies to contaminated soils that are excavated and left on site.	
A4.3	Temporary Storage or Processing of Fruits or Vegetables This includes processing activities at wineries, fresh and frozen juice makers, and other food and beverage processing operations.	
A4.4	Storage of Solid Wastes and Food Wastes This includes regular garbage and all other discarded non-liquid items.	✓
A4.5	Recyclers and Scrap Yards This includes scrapped equipment, vehicles, empty metal drums, and assorted recyclables.	
A4.6	Treatment, Storage, or Disposal of Dangerous Wastes Refer to Ecology and the Tacoma-Pierce County Health Department for more information, see Chapter 6.	
A4.7	Storage of Liquid, Food Waste, or Dangerous Waste Containers This includes containers located outside a building and used for temporary storage.	
A4.8	Storage of Liquids in Permanent Aboveground Tanks Includes all liquids in aboveground tanks.	
A4.9	Parking and Storage for Vehicles and Equipment Includes public and commercial parking lots.	✓
A4.10	Storage of Pesticides, Fertilizers, or other products that can leach pollutants.	
A5.1	Demolition of Buildings Applies to removal of existing buildings and subsequent clearing of the rubble.	
A5.2	Building Repair, Remodeling, and Construction Applies to construction of buildings, general exterior building repair work and remodeling of buildings.	✓

Activity Code	Type of Activity	Check if You Are Involved in This
A6.1	Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots	
A6.2	Dust Control at Manufacturing Sites Includes grain dust, sawdust, coal, gravel, crushed rock, cement, and boiler fly ash.	
A6.3	Soil Erosion and Sediment Control (ESC) at Industrial Sites Includes industrial activities that take place on soil.	
A7.1	Commercial Animal Handling Areas This includes kennels, fenced pens, veterinarians, and businesses that board animals.	
A7.2	Keeping Livestock in Stables, Pens, Pastures or Fields Applies to all types of livestock.	
A7.3	Log Sorting and Handling Applies to log yards typically located at sawmills, ports, and pulp mills.	
A7.4	Boat building, Mooring, Maintenance, and Repair This includes all types of maintenance, repair, and building operations.	
A7.5	Logging Applies to logging activities that fall under Class IV general forest practices.	
A7.6	Mining and Quarrying of Sand, Gravel, Rock, Minerals, Peat, Clay, and Other Materials This does not include excavation at construction sites.	
A7.7	Swimming Pool and Spa Cleaning and Maintenance This includes every swimming pool and spa not at a single family residence. Commercial pool cleaners are included here for all pools.	
A7.8	De-icing and Anti-icing Operations for Airports and Streets Includes aircraft, runways/taxiways, streets, and highways.	
A7.9	Roof Vents and Building Drains at Manufacturing and Commercial Buildings These sites will be referred to the Puget Sound Clean Air Agency.	
A7.10	Urban Streets Includes recommended BMPs.	
A7.11	Railroad Yards	
A7.12	Maintenance of Public and Private Utility Corridors and Facilities Includes public and private utility maintenance activities.	
A7.13	Maintenance of Roadside Ditches	
A7.14	Maintenance of Stormwater Drainage and Treatment Facilities	
A7.15	Spills of Oil and Hazardous Substances	
A7.16	Well, Utility, Directional and Geotechnical Drilling	

Chapter 4. Best Management Practices for Commercial and Industrial Activities

This chapter coordinates with the worksheet in Chapter 2. That worksheet and the BMPs are organized by the different activities businesses perform. If you perform the listed activity indoors, controlling all discharges from the activity (e.g., process water, washwater, lubricants, solvents, fugitive dust, granular material, blow down waste) such that no exposure to stormwater occurs, then you do not have to institute new BMPs for that activity. However, if you checked the column for activities performed outdoors, match the number from the worksheet to the activities listed in this section to find the BMPs you should utilize. See also Section 1.5 for explanation of required and suggested BMPs.

If you have questions, please contact Pierce County Planning and Public Works Surface Water Management (253) 798-2725. They can provide assistance over the phone and are also available for consultations at your business site.

Below is a summary of items that each business should consider. Most of these are common sense, housekeeping types of solutions; but if each business would take some action on each of these, the improvement in water quality would be substantial.

1. **Avoid the activity or reduce its occurrence**

   If possible, avoid the activity or do it less frequently. Is there a substitute process or a different material available to get the job done? Can a larger run of a process be performed at one time, thus reducing the number of times per week or month it needs to be repeated? For instance, raw materials could be delivered close to the time of use instead of being stockpiled and exposed to the weather. Perhaps the site could avoid one solvent-washing step altogether. Ecology or the Tacoma-Pierce County Health Department can provide pollution prevention assistance.

2. **Move the activity indoors**

   Sometimes it is fairly easy to move an activity indoors out of the weather. The benefits of this are twofold; preventing runoff contamination, and providing for easier, more controlled cleanup if a spill occurs. An example would be unloading and storing barrels of chemicals inside a garage area instead of doing it outside. Please be aware that moving storage areas indoors may require installation of fire suppression equipment or other building modifications as required by the International Building Code (IBC), the International Fire Code or local ordinances.

3. **Cleanup spills quickly**

   Promptly contain and cleanup solid and liquid pollutant leaks and spills on any exposed soil, vegetation, or paved area. Promptly repair or replace all leaking connections, pipes, hoses, valves, etc., which can contaminate stormwater.

4. **Use less material**

   Do not purchase or use more material than needed. This helps to keep potential disposal, storage, and pollution problems to a minimum too.

5. **Use the least toxic materials available**

   Investigate the use of materials that are less toxic than what is used now. Perhaps a

caustic-type detergent or a solvent could be replaced with a more environmentally friendly product. Such a change might allow the site to discharge process water to the sanitary sewer instead of paying for expensive disposal (contact Pierce County Planning and Public Works Sewer Division at (253) 798-3013 to find out about allowable sanitary discharges and pretreatment permits). Remember that even if using a biodegradable product, nothing but uncontaminated water is allowed to enter the stormwater drainage system.

6. **Create and maintain vegetated areas near activity locations**

   Vegetation of various kinds can help filter pollutants out of stormwater, so it is advisable to route stormwater through vegetated areas located near the activity. For instance, many parking lots contain grassy islands, typically formed in a "hump". By creating those islands as depressions instead of humps, they can be used to treat runoff from the parking lot or roof. For high-use sites, conveyance to an oil removal system may be required. For more information on high-use sites, refer to Volume V, Section 2.1, Step 3. Also, don't forget the erosion control benefits of vegetation at a site.

7. **Locate activities as far as possible from surface drainage paths**

   Activities located as far as possible from known drainage paths, ditches, streams, other water bodies, and drains will be less likely to pollute, since it will take longer for material to reach the drainage feature. This gives more time to react in the event of a spill, or if it is a "housekeeping" issue, may protect the local waters long enough for cleanup of the area around the activity. Don't forget that groundwater issues are always prominent, no matter where the activity is located, so the actions taken on the site on a day-to-day basis are always important, even in dry weather.

8. **Keep stormwater drainage systems clean and maintained**

   Pollutants can concentrate over time in storm drainage structures such as catch basins, ditches, and storm drains. When a large storm event occurs, it can mobilize these pollutants and carry them to receiving waters. Develop and implement maintenance practices, inspections, and schedules for treatment devices (e.g., detention ponds, oil/water separators, vegetated swales). Requirements for cleaning stormwater facilities will be discussed later in Chapter 5, specifically BMP S.9.

   Promptly repair or replace all substantially cracked or otherwise damaged paved secondary containment, high-intensity parking, and any other drainage areas that are subjected to pollutant material leaks or spills.

9. **Reduce, reuse, and recycle as much as possible**

   Always look for ways to recycle instead of just disposing. This can save money as well as keep both hazardous and non-hazardous materials out of the landfills. Learn more about other businesses that have made process changes allowing recycling of chemicals by calling Ecology at 1800RECYCLE and requesting publication No. 9245 and No. 9022. Another unique recycling opportunity for businesses is available through the Industrial Materials Exchange. This free service acts as a waste or surplus "matchmaker," helping one company's waste become another company's asset. For instance, waste vegetable oil can become biofuel for another business. Call Industrial Materials Exchange at (206) 263-8465 to list potentially usable solid or chemical waste in their publication.

10. **Be an advocate for stormwater pollution prevention**

    Help friends, partners, and business associates find ways to reduce stormwater pollution in

their activities. Most people want clean water and do not pollute intentionally. Share ideas and the BMPs in this volume to get them thinking about how their everyday activities effect water quality.

11. Report problems

We all must do our part to protect water, fish, wildlife, and our own health by employing proper BMPs, and reporting water quality problems that we observe. In Pierce County to report dumping to sewers, call Pretreatment Inspections at (253) 798-3013, to report incidents involving storm drains or ditches call Pierce County Planning and Public WOrks Surface Water Management at (253) 7982725. Also contact Ecology's Southwest Regional office at (360) 407-6300.

12. Oversight and training

Assign one or more individuals to be responsible for stormwater pollution control. Hold regular meetings to review the overall operation of the BMPs. Establish responsibilities for inspections, operation and maintenance (O&M), and availability for emergency situations. Train all team members in the operation, maintenance, and inspection of BMPs and reporting procedures.

13. Dust control

Sweep paved material handling and storage areas regularly as needed, to collect and dispose of dust and debris that could contaminate stormwater. Do not hose down pollutants from any area to the ground, storm drain, conveyance ditch, or receiving water unless necessary for dust control purposes to meet air quality regulations and unless the pollutants are conveyed to a treatment system approved by the county.

14. Maintenance

Clean oils, debris, sludge, etc. from all BMP systems regularly, including catch basins, settling/detention basins, oil/water separators, boomed areas, and conveyance systems, to prevent the contamination of stormwater.

Promptly repair or replace all substantially cracked or otherwise damaged paved secondary containment, high-intensity parking, and any other drainage areas that are subjected to pollutant material leaks or spills.

Promptly repair or replace all leaking connections, pipes, hoses, valves, etc. which can contaminate stormwater.

Maintenance standards can be found in Volume I, Appendix IA.

15. Eliminate illicit connections

An illicit connection is formally defined in the county's NPDES Municipal Stormwater permit, but generally includes any connection to the county stormwater system that is not intended, permitted, or used for collecting and conveying stormwater. A common problem with the stormwater drainage system for Pierce County is the existence of illegal hook-ups to the system. Many businesses and residences hooked internal building drains, sump overflows, process wastewater discharges, and even sanitary sewer and septic system pipes to the storm drain in the past. All businesses and residences in Pierce County must examine their plumbing systems to determine if illicit connections exist. Any time it is found that toilets, sinks, appliances, showers and bathtubs, floor drains, industrial process waters, or other indoor activities are connected to the stormwater drainage system, these

connections must be immediately rerouted to the sanitary or septic system, holding tanks, or process treatment system. Methods to eliminate illicit connections are described in detail in Chapter 5, BMP S.1.

16. Dispose of waste properly

Every business and residence in Pierce County must dispose of solid and liquid wastes and contaminated stormwater properly. There are generally four options for disposal depending on the type of materials. These options include:

- Sanitary sewer and septic systems
- Recycling facilities
- Municipal solid waste disposal facilities
- Hazardous waste treatment, storage, and disposal facilities.

Additional information on disposal is described in Chapter 5, BMP S.2.

Section A1 Cleaning or Washing Activities

A1.1 Cleaning or Washing of Tools, Engines, and Manufacturing Equipment

Description of Pollutant Sources: This activity applies to businesses and public agencies that clean manufacturing equipment such as saws, grinders, screens, and other processing devices outside of buildings, and to businesses engaged in pressure washing of engines, equipment, and portable objects.

Pollutants sources include toxic hydrocarbons, organic compounds, oils and greases, nutrients, heavy metals, pH, suspended solids, biochemical oxygen demand (BOD), and chemical oxygen demand (COD).

Pollutant Control Approach: The preferred approach is to cover and/or contain the cleaning activity or conduct the activity inside a building, to separate the uncontaminated stormwater from the pollutant sources. Washwater must be conveyed to a sanitary sewer after approval by Pierce County, temporarily stored before proper disposal, or recycled, with no discharge to the ground, a storm drain, or surface water. Washwater may be discharged to the ground after proper treatment in accordance with Ecology guidance WQR9556, Vehicle and Equipment Washwater Discharges/Best Management Practices Manual November 2012, or most recent update. The quality of any discharge to the ground after proper treatment must comply with Ecology's Ground Water Quality Standards, Chapter 173200 WAC. Contact the Ecology Southwest Regional Office for an NPDES permit application for discharge of washwater to surface water or to a storm drain after onsite treatment.

Required BMPs

The following BMPs, or equivalent measures, are required of all businesses and public agencies engaged in cleaning or washing of tools, engines, equipment, and portable objects:

- Illicit connections to the stormwater drainage system must be eliminated. See BMP S.1 in Chapter 5 for detailed information.
- Employees should be educated to control washing operations to prevent stormwater contamination.
- All washwater must discharge to a holding tank, process treatment system, or sanitary sewer, never to the stormwater drainage system. See BMP S.3 in Chapter 5 for detailed information on how this must be accomplished.
- Pressure washing must be done in a designated area (such as a wash pad) provided with a sump drain and stormwater runon prevention (Figures 4.1 and 4.2). See BMPs S.6 and S.7 in Chapter 5 for information on sumps (or holding tanks) and runon prevention. Contact the Pierce County Pretreatment Program (253) 798-3013 for washing operation policy.

Figure 4.1. - Wash Pad for Tool and Equipment Washing.

(Photo courtesy of Seattle Public Utilities)

Figure 4.2. - Uncovered Washing Area for Tools, Engines, Equipment, and Portable Objects, with Drains to a Sanitary Sewer, Process Treatment, or a DeadEnd Sump.

Suggested BMPs

The following BMPs are not required, but they can provide additional pollution control:

- If soaps or detergents are used, use the least toxic cleaner capable of doing the job. Use non-phosphate detergent, if possible, to reduce loadings at your local wastewater treatment plant.
- Limit the amount of water used in washing activities to reduce the potential of runoff carrying pollutants beyond the designated wash pad or capture system.
- Recycle washwater for subsequent washings.

Implement one or more of the stormwater treatment BMPs found in Volume V.

- For discharging washwaters containing soaps and detergents, the use of infiltration, bioretention, biofiltration, wet ponds, and wetlands must not result in the violation of groundwater quality standards.

A1.2 Cleaning or Washing of Cooking Equipment

Description of Pollutant Sources: This activity applies to businesses that clean cooking equipment such as vent filters, grills, and grease traps outside of buildings.

Pollutants of concern consist of oil and grease, nutrients, suspended solids, biochemical oxygen demand (BOD) and chemical oxygen demand (COD).

Pollutant Control Approach: Businesses engaged in this activity that cannot connect discharges to a sanitary sewer, holding tank, or process water treatment system must contact Ecology and obtain a NPDES wastewater permit.

Required BMPs

The following BMPs or equivalent measures are required of all businesses engaged in cleaning or washing of cooking equipment:

- Illicit connections to the stormwater drainage system must be eliminated. See BMP S.1 in Chapter 5 for detailed requirements.
- Employees must be educated about the need to prevent stormwater contamination from washing operations.
- Washwater cannot be discharged to the stormwater drainage system.
- Paved washing areas must be swept daily to collect loose solid materials for proper disposal.
- Greasy buildup on cooking equipment must be removed and properly disposed of prior to washing to reduce the amount of material that can potentially contaminate runoff.
- Move the activity indoors, into either an existing building or a newly constructed building or shed, with drainage to a sanitary sewer, holding tank, or process treatment system (Figure 4.3). See BMP S.3 in Chapter 5 for further information on drainage alternatives. Any connection to the sanitary sewer requires the approval of Industrial Pretreatment Program at (253) 798-3013.

  OR

  Use a tub or similar device to contain washwater. This water must be recycled for subsequent washing, or disposed of in a holding tank or sanitary sewer.

OR

If the washing activity cannot be moved indoors or contained in a tub, then the washing area must drain to a sanitary sewer, holding tank, or process treatment system, and provisions must be made to prevent stormwater runon onto the washing area. See BMP S.3 in Chapter 5 for detailed drainage requirements and BMP S.7 for runon prevention schemes. If discharging to a sanitary sewer, permits must be obtained from Industrial Pretreatment Program at (253) 798-3013.

Figure 4.3. - Cleaning and Washing Cooking Equipment Indoors.

(Photo courtesy of Seattle Public Utilities)

- If a holding tank is used for storage of washwater, the contents must be pumped out before it is full and disposed of appropriately to a sanitary sewer or wastewater treatment system.

Suggested BMPs

The following BMPs are not required, but they can provide additional pollution protection:

- A cover should be placed over a designated wash area to keep rain from falling on dirty equipment and producing contaminated runoff.
- Implement one or more of the treatment BMPs found in Volume V.

For discharging washwaters containing soaps and detergents, the use of infiltration, bioretention, biofiltration, wet ponds, and wetlands must not result in the violation of groundwater quality standards.

A1.3 Washing, Pressure Washing, and Steam Cleaning of Vehicles / Equipment / Building Structures

Description of Pollutant Sources: Pollutant sources include the commercial cleaning of vehicles, aircraft, vessels, carpets, industrial equipment, and large buildings with low or high pressure water or steam. This includes frequent "charity" car washes at gas stations and commercial parking lots. The cleaning can include hand washing, scrubbing, sanding, etc. Washwater from cleaning activities can contain oil and grease, suspended solids, heavy metals, soluble organics, soaps, and detergents that can contaminate stormwater.

Pollutant Control Approach: The preferred approach is to cover and/or contain the cleaning activity, or conduct the activity inside a building, to separate the uncontaminated stormwater from the washwater sources. Contact the Pierce County Industrial Pretreatment Program (253) 798-3013 for advice and consultation on appropriate treatment and for approvals to discharge to sanitary sewer. Convey washwater to a sanitary sewer after approval by the Pierce County Industrial Pretreatment Program. Provide temporary storage before proper disposal, or recycling. Under this preferred approach, no discharge to the ground, a storm drain, or surface water should occur.

The Industrial Stormwater General Permit prohibits the discharge of process wastewater (e.g., vehicle washing wastewater) to groundwater or surface water. Stormwater that commingles with process wastewater is considered process wastewater.

Facilities not covered under the Industrial Stormwater General Permit that are unable to follow one of the preferred approaches listed above may discharge washwater to the ground after proper treatment in accordance with Ecology guidance WQR9556, Vehicle and Equipment Washwater Discharges/Best Management Practices Manual, November 2012, or most recent update. The quality of any discharge to the ground after proper treatment must comply with Ecology's Ground Water Quality Standards, Chapter 173200 WAC. Contact the Ecology Southwest Regional Office to discuss permitting options for discharge of washwater to surface water or to a storm drain after onsite treatment.

Required BMPs

Conduct vehicle/equipment washing in one of the following locations:

- At a commercial washing facility in which the washing occurs in an enclosure and drains to the sanitary sewer, or
- In a building constructed specifically for washing of vehicles and equipment, which drains to a sanitary sewer.

Conduct outside washing operation in a designated wash area with the following features:

- In a paved area, construct a spill containment pad to prevent the runon of stormwater from adjacent areas. Slope the spill containment area to collect washwater in a containment pad drain system 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 washed vehicles and/or equipment.
- Convey the washwater to a sump (like a grit separator) and then to a sanitary sewer (if allowed by the Pierce County Sewer Utility), or other appropriate wastewater treatment or recycle system.

- Collect the washwater from building structures and convey it to appropriate treatment such as a sanitary sewer system if it contains oils, soaps, or detergents. If the washwater does not contain oils, soaps, or detergents (in this case only a low pressure, clean, cold water rinse is allowed), then it could drain to soils that have sufficient natural attenuation capacity for dust and sediment.
- Any discharge to the sanitary sewer requires the approval of Industrial Pretreatment Program at (253) 798-3013. Contact the utility for details on approved systems.

Suggested BMPs

- Mark the wash area at gas stations, multifamily residences, and any other business where non-employees wash vehicles.

Operators may use a manually operated positive control valve for uncovered wash pads, but a pneumatic or electric valve system is preferable. The valve may be on a timer circuit and opened upon completion of a wash cycle. After draining the sump or separator, the timer would then close the valve.

- Use phosphate-free biodegradable detergents when practicable.
- Consider recycling the washwater.
- Operators may use soluble/emulsifiable detergents in the wash medium, but should use it with care and the appropriate treatment. Carefully consider the selection of soaps and detergents and treatment BMPs. Oil/water separators are ineffective in removing emulsified or water soluble detergents. Another treatment appropriate for emulsified and water soluble detergents may be required.

Note that the purpose of the valve is to convey only washwater and contaminated stormwater to a treatment system.

- At commercial parking lots, where it is not possible to discharge the washwater to a sanitary sewer, a temporary plug or a temporary sump pump can be used at the storm drain to collect the washwater for offsite disposal.
- New and used car dealerships may wash vehicles in the parking stalls without soap, or if an approved treatment system for the washwater is in place.

Pierce County encourages residents to make use of car wash fundraising programs through the Puget Sound Car Wash Association (206) 622-8425 or online, visit pscarwash.org; or contact Brown Bear at (206) 774-3742; or contact Classy Chassis at (253) 284-9274.

At industrial sites contact the Ecology Southwest Regional Office for NPDES permit requirements even when not using soaps, detergents, and/or other chemical cleaners in washing trucks.

A1.4 Collection and Disposal of Wastewater in Mobile Interior Washing Operations

Description of Pollutant Sources: This activity applies to businesses that wash carpets and other interior items on a mobile site-to-site basis. The typical fleet washing process includes use of machines that spray the washwater solution onto the carpet or upholstery and then vacuums the dirty solution up into a portable tank with limited capacity.

Pollutants of concern consist of nutrients, suspended solids, organic compounds (such as pesticides and chemicals used for flea and odor control), biochemical oxygen demand (BOD), and chemical oxygen demand (COD).

Pollutant Control Approach: Common practice in the past was to discharge the dirty solution onto the ground or to a drain connected to the stormwater drainage system between site visits. *These practices are now illegal.* **Wastewater must be poured into a sanitary sewer drain at the site of collection, the business office, or at another proper location. If discharging to a sanitary sewer, permits must be obtained from Industrial Pretreatment Program at (253) 7983-013. If sanitary sewer disposal is not available or not allowed, the collected wastewater must be returned to the business site for process treatment or transfer to a holding tank.**

Required BMPs

This BMP is required of all businesses doing mobile interior wash activities:

- Absolutely no wastewater from mobile interior wash activities can be disposed of outdoors, or to a drain connected to the stormwater drainage system. This point must be made clear to all employees. Wastewater from mobile washing operations may be permitted for sanitary sewer disposal if it does not contain high concentrations of toxic materials. Some of the chemicals used for flea and odor control are listed by U.S. Environmental Protection Agency (U.S. EPA) as toxics. Industrial Pretreatment Program at (253) 7983013 will need to know the type of chemicals and amount of water you intend to discharge. If the discharge is approved, they will then issue a permit for your activity. Wastewater must be poured into a sanitary sewer drain at the site of collection, the business office, or at another proper location.
- If sanitary sewer disposal is not available or not allowed, the collected wastewater must be returned to the business site for process treatment or transfer to a holding tank. See BMP S.3 in Chapter 5 for details on these drainage/disposal alternatives.

Suggested BMPs

The following BMPs are not required, but can provide additional pollution protection:

- Use the least toxic detergents and cleaners that will get the job done. Select non-phosphate detergents when possible.
- Limit the amount of water used in interior washing operations. This will save you time, money, and effort when it comes to proper disposal.
- Recycle washwater for more than one use.

Section A2 Transfer of Liquid or Solid Materials

A2.1 Loading and Unloading Areas for Liquid or Solid Material

Description of Pollutant Sources: Operators typically conduct loading/unloading of liquid and solid materials at industrial and commercial facilities is typically conducted at shipping and receiving, outside storage, fueling areas, etc. Materials transferred can include products, raw materials, intermediate products, waste materials, fuels, scrap metals, etc. Leaks and spills of fuels, oils, powders, organics, heavy metals, salts, acids, alkalis, etc. during transfer are potential causes of stormwater contamination. Spills from hydraulic line breaks are a common problem at loading docks.

Pollutant Control Approach: Cover and contain the loading/unloading area where necessary to prevent runon of stormwater and runoff of contaminated stormwater.

Required BMPs

At All Loading/Unloading Areas:

- A significant amount of debris can accumulate outside, uncovered loading/unloading areas. Sweep these surfaces frequently to remove loose material that could contaminate stormwater. Sweep areas temporarily covered after removal of the containers, logs, or other material covering the ground.
- Place drip pans, storm drain covers or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Always use drip pans when making and breaking connections (Figure 4.4). Check loading/unloading equipment such as valves, pumps, flanges, and connections regularly for leaks and repair as needed.
    - Consistent with International Fire Code requirements and to the extent practicable, conduct unloading or loading of solids and liquids in a manufacturing building or under a roof, lean-to, or other appropriate cover.
    - Berm, dike, and/or slope the loading/unloading area to prevent runon of stormwater and to prevent the runoff or loss of any spilled material from the area.
    - Place curbs along the edge of the shoreline, or slope the edge such that the stormwater can flow to an internal stormwater drainage system that leads to an approved treatment BMP. Avoid draining directly to the surface water from loading areas.
    - Pave and slope loading/unloading areas to prevent the pooling of water. Minimize the use of catch basins and drain lines within the interior of the loading/unloading area or place in designated “alleyways” to avoid being covered by material, containers, or equipment.
    - Retain on site the necessary materials for rapid cleanup of spills.

Figure 4.4. - Drip Pan for Connections at Loading and Unloading Areas for Liquid Material.

Photo courtesy of Mark Dilley, Interstate Products, Inc.)

- To minimize the risk of accidental spillage, prepare an "Operations Plan" that describes procedures for loading/unloading. Train the employees, especially fork lift operators, in its execution and post it or otherwise have it readily available to employees and regulatory officials.
- Report spills of reportable quantities to Ecology Southwest Regional Office (refer to Chapter 7 for telephone number).
- Prepare and implement an emergency spill cleanup plan for the facility (BMP A7.15 Spills of Oil and Hazardous Substances) which includes the following BMPs:
    - Ensure cleanup of liquid/solid spills in the loading/unloading area immediately if a significant spill occurs, upon completion of the loading/unloading activity, or at the end of the working day.
    - Retain and maintain an appropriate oil spill cleanup kit on site for rapid cleanup of material spills (see BMP A7.15 Spills of Oil and Hazardous Substances).
    - Ensure that an employee trained in spill containment and cleanup is present during loading/unloading.

At Rail Transfer Areas to Above/Below-ground Storage Tanks:

- Install a drip pan system as illustrated (Figure 4.4) within the rails to collect spills/leaks from tank cars and hose connections, hose reels, and filler nozzles.

Loading/Unloading from/to Marine Vessels:

- Facilities and procedures for the loading or unloading of petroleum products must comply with Coast Guard requirements.

Transfer of Small Quantities from Tanks and Containers:

- Refer to BMPs A4.8 Storage of Liquids in Permanent Aboveground Tanks and A4.7 Storage of Liquid, Food Waste, or Dangerous Waste Containers for requirements on the transfer of small quantities from tanks and containers, respectively.

Suggested BMPs

- For the transfer of pollutant liquids in areas that cannot contain a catastrophic spill, install an automatic shutoff system in case of unanticipated off-loading interruption (e.g., coupling break, hose rupture, overfill).

At Loading and Unloading Docks:

- Install/maintain overhangs or door skirts that enclose the trailer end (Figures 4.5 and 4.6) to prevent contact with rainwater.
- Design the loading/unloading area with berms, sloping, etc. to prevent the runon of stormwater.

At Tanker Truck Transfer Areas to Above/Below-Ground Storage Tanks:

- Pave the area on which the transfer takes place. If any transferred liquid, such as gasoline, is reactive with asphalt, pave the area with Portland cement concrete.
- Slope, berm, or dike the transfer area to a dead-end sump, spill containment sump, spill control oil/water separator, or other spill control device (see also Volume I, Appendix I-A for dead-end sump maintenance guidelines). The minimum spill retention time should be 15 minutes at the highest fuel dispenser nozzle through-put rate or the peak flow rate of the 6month, 24hour storm event over the surface of the containment pad, whichever is greater. The volume of the spill containment sump should be a minimum of 50 gallons with an adequate grit sedimentation volume.

Figure 4.5. - Loading Docks with an Overhang to Prevent Material Contact with Rainwater.

Figure 4.6. - Door Skirts to Enclose the Trailer End of a Truck to Prevent Material Contact with Rainwater.

A2.2 Fueling at Dedicated Stations

Description of Pollutant Sources: A fueling station is a facility dedicated to the transfer of fuels from a stationary pumping station to mobile vehicles or equipment. It includes above or underground fuel storage facilities. In addition to general service gas stations, fueling may also occur at 24hour convenience stores, construction sites, warehouses, car washes, manufacturing establishments, port facilities, and businesses with fleet vehicles. Typical causes of stormwater contamination at fueling stations include leaks/spills of fuels, lube oils, radiator coolants, and vehicle washwater.

Pollutant Control Approach: New or substantially remodeled fueling stations must be constructed on an impervious concrete pad under a roof to keep out rainfall and stormwater runon. Substantial remodeling includes replacing the canopy or relocating or adding one or more fuel dispensers in such a way that the Portland cement concrete (or equivalent) paving in the fueling area is modified. The facility must use a treatment BMP for contaminated stormwater and wastewaters in the fueling containment area.

Required BMPs

For New or Substantially Remodeled Fueling Stations:

- Prepare an emergency spill response and cleanup plan (per BMP A7.15 Spills of Oil and Hazardous Substances) and have designated trained person(s) available either on site or on call at all times to promptly and properly implement that plan and immediately cleanup all spills. Keep suitable cleanup materials, such as dry adsorbent materials, on site to allow prompt cleanup of a spill.
- Train employees on the proper use of fuel dispensers. Post signs in accordance with the International Fire Code. Post “No Topping Off” signs (topping off gas tanks causes spillage and vents gas fumes to the air). Make sure that the automatic shut off on the fuel nozzle is functioning properly.
- The person conducting the fuel transfer must be present at the fueling pump during fuel transfer, particularly at unattended or self-serve stations.
- Keep drained oil filters in a suitable container or drum.
- Design the fueling island to control spills (dead-end sump or spill control separator in compliance with the International Fire Code) and to treat collected stormwater and/or wastewater to required levels (see also Volume I, Appendix I-A for dead-end sump maintenance guidelines). Slope the concrete containment pad around the fueling island toward drains: trench drains, catch basins, and/or a dead-end sump. The slope of the drains shall not be less than 1 percent (Section 5703.6.8 of the International Fire Code). Drains to treatment facilities must have a normally closed shutoff valve. The spill control sump must be sized in compliance with International Fire Code.

  OR

- Design the fueling island as a spill containment pad with a sill or berm raised to a minimum of 4-inches (compliant with International Fire Code) to prevent the runoff of spilled liquids and to prevent runon of stormwater from the surrounding area. Raised sills are not required at the open-grate trenches that connect to an approved drainage-control system.
- The fueling pad must be paved with Portland cement concrete, or equivalent. Asphalt is not

considered an equivalent material.

- The fueling island must have a roof or canopy to prevent the direct entry of precipitation onto the spill containment pad (Figure 4.7). The roof or canopy should, at a minimum, cover the spill containment pad (within the grade break or fuel dispensing area) and preferably extend several additional feet to reduce the introduction of windblown rain. Convey all roof drains to storm drains outside the fueling containment area.

Figure 4.7. - Roof at Fueling Island to Prevent Stormwater Runon.

(Photo courtesy of Austin Mowhawk and Company, Inc.)

- Convey stormwater collected on the fuel island containment pad to a sanitary sewer system, if approved by Pierce County, Industrial Pretreatment Program at (253) 7983013; or to an approved treatment system such as an oil/water separator and a basic treatment BMP (basic treatment BMPs are listed in Volume V and include media filters and biofilters). Discharges from treatment systems to storm drains or surface water or to the ground must not display ongoing or recurring visible sheen and must not contain oil or grease.
- Alternatively, collect stormwater from the fuel island containment pad and hold for proper offsite disposal.
- Approval from Pierce County is required for conveyance of any fuel-contaminated stormwater to a sanitary sewer and must comply with pretreatment regulations (WAC 173216060). These regulations prohibit discharges that could “cause fire or explosion.” State and federal pretreatment regulations define an explosive or flammable mixture based on a flash point determination of the mixture. Stormwater could be conveyed to a sanitary sewer system if it is determined not to be explosive. Contact the Industrial Pretreatment Program at (253) 798-3013.
- Transfer the fuel from the delivery tank trucks to the fuel storage tank in impervious contained areas and ensure that appropriate overflow protection is used. Alternatively, cover nearby storm drains during the filling process and use drip pans under all hose connections.

Additional BMP for Vehicles 10 Feet in Height or Greater:

A roof or canopy may not be practicable at fueling stations that regularly fuel vehicles that are 10 feet in height or greater, particularly at industrial or WSDOT sites. At those types of fueling facilities, the following BMPs apply, as well as all of the other required BMPs and fire prevention International Fire Code requirements.

- If a roof or canopy is impractical, the concrete fueling pad must be equipped with emergency spill control, including a shutoff valve for drainage from the fueling area. Maintain the valve in the closed position in the event of a spill. An electronically actuated valve is preferred to minimize the time lapse between spill and containment. Clean up spills and dispose of materials off site in accordance with BMP A7.14 Spills of Oil and Hazardous Substances.
- The valve may be opened to convey contaminated stormwater to a sanitary sewer, if approved by Pierce County (Industrial Pretreatment Program at (253) 7983013), or to oil removal treatment such as an American Petroleum Institute (API) or coalescent plate oil/water separator, or equivalent treatment, and then to a basic treatment BMP. See Volume V for more information. Discharges from treatment systems to storm drains or surface water or to the ground must not display ongoing or recurring visible sheen and must not contain greater than a significant amount of oil and grease.

A2.3 Engine Repair and Maintenance

Description of Pollutant Sources: This activity applies to businesses and public agencies where fuel filters, engine oil, and other fluids such as battery acid, coolants, and transmission and brake fluids are removed and replaced in vehicles and equipment. It also applies to mobile vehicle maintenance operations, such as at construction sites. Related vehicle maintenance activities are covered under the following activity headings in this volume, and other BMPs provided in this volume:

- A1.3 Washing, Pressure Washing, and Steam Cleaning of Vehicles/Equipment/Building Structures
- A2.1 Loading and Unloading Areas for Liquid or Solid Material
- A2.2 Fueling at Dedicated Stations
- A3.7 Painting, Finishing, and Coating of Vehicles, Products, and Equipment
- A4.1 Storage or Transfer (Outside) of Solid Raw Materials, By-Products, or Finished Products
- A4.7 Storage of Liquid, Food Waste, or Dangerous Waste Containers
- A4.8 Storage of Liquids in Permanent Aboveground Tanks
- A4.9 Parking and Storage for Vehicle and Equipment
- A7.15 Spills of Oil and Hazardous Substances

Pollutants of concern include toxic hydrocarbons, toxic organic compounds, oils and greases, pH, and heavy metals.

Pollutant Control Approach: Control of leaks and spills of fluids using good housekeeping and cover and containment BMPs.

Required BMPs

The following BMPs or equivalent measures are required of all businesses and agencies engaged in engine and vehicle repair:

- Employees must be educated about the need for careful handling of automotive fluids. Employees at businesses or agencies who routinely change or handle these fluids must be trained in spill response and cleanup procedures. Inspect all incoming vehicles, parts, and equipment stored temporarily outside for leaks.
- Remove batteries and liquids from vehicles and equipment in designated areas designed to prevent stormwater contamination. Store cracked batteries in a covered non-leaking secondary containment system.
- Empty fuel filters before disposal.
- Spill cleanup materials, such as rags and absorbent materials, must always be kept close at hand when changing oil and other fluids. You can comply more easily with sewer and stormwater requirements by running a 'dry shop', thereby reducing your consumption/ discharge of liquids. Soiled rags and other cleanup material must be properly disposed of or cleaned and reused. Contact Pierce County Planning and Public Works Sustainable Resources (253) 7982179, online at: <https://www.piercecountywa.org/1507/Recycle-Reduce-Waste >, or your local solid waste hauler for proper disposal options.
- No drains inside maintenance buildings may connect to the sanitary sewer without prior written approval by the county, contact the Industrial Pretreatment Program at (253) 7983013. Interior drains will not be allowed to be connected to the stormwater drainage system.
- Do not hose down the maintenance/repair area. Instead, sweep the area weekly to collect dirt, and wipe up spills with rags and other absorbent materials.
- If the work is done at a mobile location, such as a construction site, a tarpaulin, ground cloth, or drip pans must be used beneath the vehicle or equipment to capture all spills and drips (Figure 4.8). The collected drips and spills must be recycled or disposed of properly. See BMP S.2 in Chapter 5 for disposal options.

Figure 4.8. - Drip Pan for Use at Mobile Sites.

- If this activity occurs at a stationary business location, the activity area must be moved indoors. An exception to this requirement would be equipment that is too large to fit under a roofed area. In this case, the outdoor area must be paved, provided with a sump drain, and provision made for stormwater runon prevention. See BMP S.6 and S.7 in Chapter 5 for more on paving, sump drains and holding tanks, and runon prevention. Contact Industrial Pretreatment Program at (253) 798-3013 for information on requirements for disposal to sewer. If you are on a septic tank, sump contents will need to be pumped and disposed of by an oil recycler or hazardous waste company.
- Recycle oil, antifreeze, batteries, and air conditioning coolant.
- Contaminated stormwater runoff from vehicle staging and maintenance areas must be conveyed to an API or coalescent plate oil and water separator followed by a basic treatment BMP (see Volume V), applicable filter, or other equivalent oil treatment system.

Suggested BMPs

- Drain all fluids from wrecked vehicles and 'parts' cars/equipment upon arrival. Recover air conditioning gases.
- Use reusable cloth rags to cleanup drips and small spills instead of disposables: these can be professionally laundered and reused. Do not attempt to launder these at home or at a coin-op laundry.
- Use absorbent pillows or booms in or around storm drains and catch basins to absorb oil and fuel.

A2.4 Mobile Fueling of Vehicles and Heavy Equipment

Description of Pollutant Sources: Mobile fueling, also known as fleet fueling, wet fueling, or wet hosing, is the practice of filling fuel tanks of vehicles by tank trucks that are driven to the yards or sites where the vehicles to be fueled are located.

Historically organizations conducted mobile fueling for off-road vehicles operated for extended periods in remote areas. This includes construction sites, logging operations, and farms. Some organizations conduct mobile fueling of on-road vehicles commercially in the State of Washington.

Note that some local fire departments may have restrictions on mobile fueling.

Pollutant Control Approach: Operators typically need proper training of the fueling operations, and the use of spill/drip control and reliable fuel transfer equipment with backup shutoff valving.

Required BMPs

Organizations and individuals conducting mobile fueling operations must implement the BMPs listed below. The operating procedures for the driver/operator should be simple, clear, effective and their implementation verified by the organization that will potentially be liable for environmental and third party damage.

- Ensure that the Pierce County Fire District approves of all mobile fueling operations. Comply with county and Washington State fire codes.
- In fueling locations that are in close proximity to sensitive aquifers, designated wetlands, wetland buffers, or other waters of the state, approval by Pierce County is necessary to ensure compliance with additional local requirements.
- Ensure compliance with all 49 CFR 178 requirements for DOT 406 cargo tanker. Documentation from a U.S. Department of Transportation Registered Inspector provides proof of compliance.
- Ensure the presence and the constant observation/monitoring of the driver/operator at the fuel transfer location at all times during fuel transfer and implementation of the following procedures at the fuel transfer locations:
    - Locate the point of fueling at least 25-feet from the nearest storm drain or inside an impervious containment with a volumetric holding capacity equal to or greater than 110 percent of the fueling tank volume, or covering the storm drain to ensure no inflow of spilled or leaked fuel. Covers are not required for storm drains that convey the inflow to a spill control separator approved by Pierce County, including the Pierce County Fire District. Potential spill/leak conveyance surfaces must be impervious and in good repair.
    - Place a drip pan or an absorbent pad under each fueling location prior to and during all dispensing operations. The pan (must be liquid tight) and the absorbent pad must have a capacity of at least 5 gallons. There is no need to report spills retained in the drip pan or the pad.
    - Manage the handling and operating of fuel transfer hoses and nozzle, drip pan(s), and absorbent pads as needed to prevent spills/leaks of fuel from reaching the ground, storm drains, and receiving waters.
    - Avoid extending the fueling hoses across a traffic lane without fluorescent traffic cones, or equivalent devices, conspicuously placed so that all traffic is blocked from

crossing the fuel hose.

- Remove the fill nozzle and cease filling the tank when the automatic shut-off valve engages. Do not lock automatic shutoff fueling nozzles in the open position.
- Do not "top off" the fuel receiving equipment.

- Provide the driver/operator of the fueling vehicle with:
  - Adequate flashlights or other mobile lighting to view fuel fill openings with poor accessibility. Consult with the Pierce County Fire District for additional lighting requirements.
  - Two-way communication with his/her home base.
- Train the driver/operator annually in spill prevention and cleanup measures and emergency procedures. Make all employees aware of the significant liability associated with fuel spills.
- The responsible manager shall properly sign and date the fueling operating procedures. Distribute procedures to the operators, retain them in the organization files, and make them available in the event an authorized government agency requests a review.
- Immediately notify the Pierce County Fire District (911) and the Ecology Southwest Regional Office in the event of any spill entering surface or groundwater. Establish a "call down list" to ensure the rapid and proper notification of management and government officials should any significant amount of product be lost off site. Keep the list in a protected but readily accessible location in the mobile fueling truck. The "call down list" should also pre-identify spill response contractors available in the area to ensure the rapid removal of significant product spillage into the environment.
- Maintain a minimum of the following spill cleanup materials in all fueling vehicles, that are readily available for use:
  - Non-water absorbents capable of absorbing at least 15 gallons of diesel fuel
  - A storm drain plug or cover kit
  - A non-water absorbent containment boom of a minimum 10 feet in length with a 12gallon absorbent capacity (Figure 4.9)
  - A non-spark generating shovel (a steel shovel could generate a spark and cause an explosion in the right environment around a spill)
  - Two, 5gallon buckets with lids.

Figure 4.9. - Spill Containment Boom.

- Use automatic shutoff nozzles for dispensing the fuel. Replace automatic shut-off nozzles as recommended by the manufacturer.
- Maintain and replace equipment on fueling vehicles, particularly hoses and nozzles, at established intervals to prevent failures.
- Include the following fuel transfer site components:
  - Automatic fuel transfer shut-off nozzles
  - An adequate lighting system at the filling point.

A2.5 In-Water and Over-Water Fueling

Description of Pollutant Sources: BMPs in this section apply to businesses and public agencies that operate a facility used for the transfer of fuels from a stationary pumping station to vehicles or equipment in water. This type of fueling station includes aboveground or underground fuel storage facilities, which may be permanent or temporary. Fueling stations include facilities such as, but not limited to, commercial gasoline stations, port facilities, marinas, private fleet fueling stations, and boatyards.

Typically, stormwater contamination at fueling stations is caused by leaks or spills of fuels, lubrication oils, and fuel additives. These materials contain organic compounds, oil and greases, and metals that can be harmful to humans and aquatic life.

Most fuel dock spills are small and result from overfilling boat fuel tanks, burps from air vent lines, and drips from the pump nozzle as it is being returned to the pump.

Pollutant Control Approach: Provide employees with proper training and use spill control devices to prevent the discharge of pollutants in the receiving water or the drainage system.

Required BMPs for Fuel Docks

General

- Facilities and procedures for the loading or unloading of petroleum products must comply with U.S. Coast Guard requirements. Refer to specifications in Coast Guard Requirements for Marine Transfer of Petroleum Products.

Training and Fueling Dock Supervision

- Train staff on proper fueling procedures. Document training and maintain records.
- Have a trained employee supervise the fuel dock during fueling activities.
- Do not allow self-service on a marina dock without some means of controlling the dock activity. According to NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages, each facility must have an attendant on duty to supervise, observe, and "control" the operation when open for business. This can be done via camera, intercom, and shutoff abilities in the office. However, this can lead to complacency and nothing can replace having an attendant on the dock to attend to emergencies when they occur.(NFPA, 2012)

Fueling Dock Setup, Maintenance, and Inspection

- Install a tank and leak detection monitoring system that shuts off the pump and fuel line when a leak is sensed.
- Install personal watercraft floats at fuel docks to stabilize personal watercraft/jet skis while refueling.
- Provide a spill containment equipment storage area where materials are easily accessible and clearly marked.
- Use automatic shut-off nozzles and promote the use of "whistles" and fuel/air separators on air vents or tank stems of inboard fuel tanks to reduce the amount of fuel spilled into receiving waters during fueling of boats.
- Post readable refueling directions, BMPs, and emergency protocols.
- Always have a "Spills Aren't Slick" sign with emergency spill reporting numbers clearly

visible. Marinas on land leased from the Washington Department of Natural Resources (DNR) are required to post these signs.

- Display "No Smoking" signs on fuel docks.
- Create a regular inspection, maintenance, and replacement schedule for fuel hoses, pipes, and tanks. Have staff walk the dock fuel lines from dispenser to tank to look for signs of leakage at joints and determine hose condition from end to end.

Fueling Practices

- Discourage operators from "topping off" (no more than 90% capacity). Fuel expands and can slosh out of the vent when temperatures rise or waters become choppy.
- When handing over the nozzle, wrap an absorbent pad around the nozzle end or plug inside the nozzle end to prevent fuel in the nozzle from spilling.
- Have the boat operator place an absorbent pad or suction cup bottle under the vent(s) to capture fuel spurts from the vent.
- Never block open the fuel nozzle trigger and always disable hands-free clips to ensure the boater remains with the nozzle to prevent overfilling. Hands-free clips are not allowed in Washington, per WAC 296-24-33015.
- Always keep the nozzle tip pointing up and hang the nozzle vertically when not in use.
- During fueling operations, visually monitor the liquid level indicator to prevent the tank from being overfilled.
- The maximum amount of product received must not exceed 90 percent capacity of the receiving tank.

Spill cleanup

- Refer to Activity A7.15 for Spills of Oil and Hazardous Substances.
- Manage petroleum-contaminated booms, pads, and absorbents in a designated collection container and properly dispose of these materials (refer to Activity A4.7 for Storage of Liquid, Food Waste, or Dangerous Waste Containers).
- Ensure customers do not use soaps in the event of a spill. Use oil absorbent booms or pads instead.

Required BMPs for Fueling by Portable Container

- Have boats fuel on shore or at a fuel dock rather than transport fuel from an upland facility to the boats. Only use hand-held fueling containers or "jerry cans" when necessary or when on shore or at dock fueling is not practical.
- Always refill portable fuel containers on the pavement or dock to ensure a good electrical ground. While the deck of the boat may seem stable, static electricity can build up and cause a spark.
- On the dock, put an absorbent pad under the container and wrap an absorbent pad around the fuel fill — this can easily be done by putting a hole in the pad.
- Ensure the nozzle stays in contact with the tank opening.
- When transferring fuel from a portable can, use a fuel siphon with a shut-off feature. If a

siphon is not available, a nozzle/spout with a shut off is a good alternative.

- Since fueling boats with a portable container can take time, make sure the container is comfortable to carry, hold, and balance.
- Use a high flow funnel. Funnels can help prevent spills by making a larger opening for fueling.
- Place a plug of absorbent pad or paper towel in the nozzle when not in use to capture any extra drops that accumulate.
- Fuel slowly and pour deliberately, and watch the container (especially the nozzle mechanism) for signs of wear.
- Store portable fuel tanks out of direct sunlight and keep in a cool, dry place to minimize condensation.

Section A3 Production and Application Activities

A3.1 Concrete and Asphalt Mixing and Production at Stationary Sites

Description of Pollutant Sources: This activity applies to businesses and agencies that mix raw materials on site to produce concrete or asphalt. It also applies to subsequent uses such as pouring concrete structures and making other concrete or asphalt products. Mobile concrete pouring and asphalt application are covered under Activity A3.2 in this section. Requirements for stockpiling of raw materials are covered under Activity A4.1 Storage or Transfer (Outside) of Solid Raw Materials, By-products or Finished Products.

Pollutants of concern include toxic hydrocarbons, toxic organic compounds, oils and greases, heavy metals, and pH.

Pollutant Control Approach: Cover and contain processes where possible and prevent stormwater runon and contamination, where feasible.

Any facility categorized under SIC Code 2951 (asphalt paving mixtures and blocks) or SIC Code 3273 (ready-mix concrete) may need to comply with Ecology's NPDES Sand and Gravel General Permit. Contact Ecology at (360) 4076400 for additional information.

Required BMPs

The following BMPs or equivalent measures are required of all businesses and public agencies active in concrete and asphalt mixing and production:

- Eliminate all illicit connections to the stormwater drainage system. See BMP S.1 in Chapter 5 for a detailed discussion on identifying and eliminating these connections.
- All process water from production, pouring, and equipment cleaning must be discharged to a dead-end sump, process water treatment system, or sanitary sewer (subject to approval by Industrial Pretreatment Program; call (253) 7983013), or recycled (see also Volume I, Appendix I-A for dead-end sump maintenance guidelines). Never wash fresh concrete or concrete mixer washout into streets, stormwater drainage systems, streams, other water bodies, or to groundwater.
- A BMP maintenance schedule must be established, and employees educated about the need to prevent stormwater contamination through the use and proper maintenance of BMPs.

Suggested BMPs

- The production and pouring area should be swept at the end of each workday to collect loose chunks of aggregate and raw materials for recycling or proper disposal. See BMP S.2 in Chapter 5 for disposal options.
- Sweep all driveways and gutters that show accumulation of materials to minimize the amount that could be carried off site by rain and enter the stormwater drainage system.
- Asphalt plants should use an oil/water separator to treat stormwater runoff. See Volume V of this manual, Runoff Treatment BMPs for more information.
- Production and pouring areas should be protected from stormwater runon. See BMP S.7 in Chapter 5 for methods of runon protection.
- Use absorbent materials in and around storm drains and catch basins to filter out contaminants. See Volume V of this manual, Runoff Treatment BMPs, for more information.

- Pave the mixing, production, and pouring areas. A sump drain in these areas is probably not advisable due to potential clogging problems, but could be used in a curing area. Sweep these areas to remove loose aggregate and recycle or dispose of properly.
- Use storm drain covers or similarly effective containment devices to prevent runoff from entering the stormwater drainage system. Accumulations of dirty runoff must be disposed of properly.

Contact Pierce County Surface Water Management (253) 798-2725 for information about water quality treatment BMPs for these types of operations. Visit Ecology's website for accepted water quality treatment at: https://ecology.wa.gov/Water-Shorelines/Water-quality/Runoff-pollution/Stormwater.

The use of any treatment BMP must not result in the violation of groundwater or surface water quality standards.

A3.2 Concrete Pouring, Concrete Cutting, and Asphalt Application at Temporary Sites

Description of Pollutant Sources: This activity applies to businesses and public agencies that apply asphalt or pour or cut concrete for building construction and remodeling, road construction, sidewalk, curb and gutter repairs and construction, sealing of driveways and roofs, and other applications. These activities are typically done on a temporary site-to-site basis where permanent BMP measures do not apply. Concrete pouring activities can not only severely alter the pH of receiving waters, but slurry from aggregate washing can harden in storm pipes, thus reducing capacity and creating flooding problems.

Pollutants of concern include toxic hydrocarbons, toxic organic compounds, oils and greases, heavy metals, suspended solids, and pH.

Pollutant Control Approach: Train employees on proper procedures, sweep or shovel aggregate chunks, collect accumulated runoff and solids, and wash equipment in designated areas.

Required BMPs

The following BMPs or equivalent measures are required of all businesses and agencies doing concrete pouring and asphalt application at temporary sites:

- Employees must be educated on the pollution hazards of concrete and asphalt application and cutting.
- Loose aggregate chunks and dust must be swept or shoveled and collected (not hosed down a storm drain) for recycling or proper disposal at the end of each workday, especially at work sites such as streets, driveways, parking lots, sidewalks, curbs, and gutters where rain can readily pick up the loose material and carry it to the nearest stormwater conveyance. Small amounts of excess concrete, grout, and mortar can be disposed of in the trash.
- Storm drain covers or similarly effective containment devices must be placed over all nearby drains at the beginning of each day. Shovel or vacuum slurry and remove from the site. All accumulated runoff and solids must be collected and properly disposed of (see BMP S.2 in Chapter 5 for disposal options) at the end of each workday, or more often if necessary.
- Exposed aggregate washing, where the top layer of unhardened concrete is hosed or scraped off to leave a rough finish, must be done with a mechanism for containment and collection of the discarded concrete slurry.
- Cleaning of concrete application and mixing equipment or concrete vehicles must be done in a designated area where the rinse water is controlled and properly disposed. See Volume II, Section 3.1, BMP C154 for more information.

The use of any treatment BMP must not result in the violation of groundwater or surface water quality standards.

Suggested BMPs

- Avoid the activity when rain is occurring or expected.
- If possible, portable asphalt mixing equipment should be covered by an awning, a lean-to, or another simple structure to avoid contact with rain. See BMP S.4 in Chapter 5 for further

details on cover structures.

- Recycle broken concrete and asphalt. Look under Recycling Services in the Yellow Pages of the phone book to find the recycler nearest you.

A3.3 Manufacturing and Postprocessing of Metal Products

Description of Pollutant Sources: This activity applies to businesses such as mills, foundries, and fabricators that manufacture or postprocess metal products. A variety of activities such as machining, grinding, soldering, cutting, welding, quenching, etching, bending, coating, cooling, and rinsing may take place. These businesses may be required to obtain a NPDES permit from Ecology. See Chapter 6 for a discussion of NPDES requirements. Note: Painting, finishing and coating of metal products is covered under A3.7 Painting, Finishing, and Coating of Vehicles, Boats, Buildings, and Equipment.

Pollutants of concern include toxic organic compounds, heavy metals, oils and greases, pH, suspended solids, and chemical oxygen demand (COD).

Pollutant Control Approach: Cover and contain operations and apply good housekeeping and preventive maintenance practices to prevent the contamination of stormwater.

Required BMPs

The following BMPs or equivalent measures are required of all businesses engaged in metals manufacturing or postprocessing:

- Eliminate illicit connections to the stormwater drainage system. See BMP S.1 in Chapter 5 for detailed information on identifying and eliminating illicit connections.
- Process wastewater (including contact cooling water, filter backwash, cooling tower blow down, etc.) from processing or production, and stormwater runoff from activity areas, must discharge to the sanitary sewer, holding tank, or process treatment system need an Ecology NPDES permit for discharge to surface water or storm drain. Contact Industrial Pretreatment Program at (253) 7983013 to obtain permits for discharge to the sewer. See BMP S.3 in Chapter 5 for detailed requirements.
- Employees must be educated in proper handling to control their work with metal products to minimize pollution.
- The activity area must be swept at the end of each workday to collect and dispose of metal fragments and product residues properly. See BMP S.2 in Chapter 5 for disposal alternatives. Do not allow metal fragments, residues, or dust to accumulate in areas exposed to stormwater.

Suggested BMPs

- Limit the amount of water used in quenching and rinsing. Recycle used water where possible.
- Cover the activity area to prevent rain from contacting the process and reduce the amount of runoff that has to be detained or treated. See BMP A3.9.
- Refer to the BMPs under sections A2 Transfer of Liquid or Solid Materials and A4 Storage and Stockpiling Activities, and utilize those BMPs which are applicable for materials storage and maintenance activities in your shop.

A3.4 Wood Treatment Areas

Description of Pollutant Sources: Wood treatment includes both anti-staining and wood preserving using pressure processes or by dipping or spraying. Wood preservatives include creosote, creosote/coal tar, pentachlorophenol, copper naphthenate, arsenic trioxide, malathion, or inorganic arsenicals such as chromated copper arsenate, acid copper chromate, chromate zinc chloride, and fluor-chrome-arsenate-phenol. Anti-staining chemical additives include iodo-prophenyl-butyl carbamate, dimethyl sulfoxide, didecyl dimethyl ammonium chloride, sodium azide, 8quinolinol, copper (II) chelate, sodium ortho-phenylphenate, 2(thiocyanomethylthio)-benzothiazole (TCMTB) and methylene bis- (thiocyanate), and zinc naphthenate.

Pollutant sources include drips of condensate or preservative after pressurized treatment, product washwater (in the treatment or storage areas), spills and leaks from process equipment and preservative tanks, fugitive emissions from vapors in the process, blowouts and emergency pressure releases, and kick-back from lumber (phenomenon where preservative leaks as it returns to normal pressure). Potential pollutants typically include the wood treating chemicals, BOD, suspended solids, oil and grease, benzene, toluene, ethylbenzene, phenol, chlorophenols, nitrophenols, heavy metals, and PAH, depending on the chemical additive used.

Pollutant Control Approach: Cover and contain all wood treating areas and prevent all leaching of and stormwater contamination by wood treating chemicals. Wood treating facilities may be covered by the Industrial Stormwater General Permit or by an individual permit. Individual permits covering wood treatment areas include applicable source control BMPs or require the development of BMPs or a SWPPP. Facilities covered under the Industrial Stormwater General Permit must prepare and implement a SWPPP. When developing a SWPPP or BMPs, wood treating facilities should include the applicable source control BMPs listed below.

Required BMPs

- Use dedicated equipment for treatment activities to prevent the tracking of treatment chemicals to other areas on the site.
- Eliminate non-process traffic on the drip pad. Scrub down non-dedicated lift trucks on the drip pad.
- Immediately remove and properly dispose of soils with visible surface contamination (green soil) to prevent the spread of chemicals to groundwater and/or surface water via stormwater runoff.
- If any treated wood is observed to be contributing chemicals to the environment in the treated wood storage area, relocate it on a concrete chemical containment structure until the surface is clean and until it is drip free and surface dry.
- Cover and/or enclose, and contain with impervious surfaces, all wood treatment areas. Slope and drain areas around dip tanks, spray booths, retorts, and any other process equipment in a manner that allows return of treatment chemicals to the wood treatment process.
- Cover storage areas for freshly treated wood to prevent contact of treated wood products with stormwater. Segregate clean stormwater from process water. Convey all process water to an approved treatment system.
- Seal any holes or cracks in the asphalt areas that are subject to wood treatment chemical contamination.

- Elevate stored, treated wood products to prevent contact with stormwater runon and runoff.
- Place dipped lumber over the dip tank or on an inclined ramp for a minimum of 30 minutes to allow excess chemical to drip back to the dip tank.
- Place treated lumber from dip tanks or retorts in a covered paved storage area for at least 24 hours before placement in outside storage. Use a longer storage period during cold weather unless the temporary storage building is heated. Prior to moving wood outside, ensure that the wood is drip free and surface dry.

Suggested BMP

- Consider using preservative chemicals that do not adversely impact receiving surface water and groundwater.

A3.5 Commercial Composting

Description of Pollutant Sources: Commercial compost facilities, operating outside without cover, require large areas to decompose wastes and other feedstocks. Design these facilities to separate stormwater from leachate (i.e., industrial wastewater) to the greatest extent possible. When stormwater contacts any active composting areas, including waste receiving and processing areas, it becomes leachate. Pollutants in leachate include nutrients, biochemical oxygen demand (BOD), organics, coliform bacteria, acidic pH, and suspended solids. Stormwater at a compost facility consists of runoff from areas at the facility that are not associated with active processing and curing, such as product storage areas, vehicle maintenance areas, and access roads.

NPDES and State Solid Waste Permit Requirements: Composting facilities are regulated under WAC 173-350-220. Solid Waste Regulations require the collection and containment of all leachate produced from activities at commercial composting facilities. Composting facilities that propose to discharge to surface water, municipal sewer system, or groundwater must obtain the appropriate permits. Zero discharge is possible by containing all leachate from the facility (in tanks or ponds) for use early in the composting process or preventing production of leachate (by composting under a roof or in an enclosed building).

The Tacoma-Pierce County Health Department regulates solid waste facilities in accordance with WAC 173304. The Tacoma-Pierce County Health Department should be contacted at (253) 798-6047 to obtain permits and requirements for composting and recycling facilities.

Pollutant Control Approach: Consider zero leachate discharge.

Required BMPs

- See WAC 173-350-220, Composting Facilities
- View this Ecology publication for common sense actions that a facility can adopt to help run a successful program: Siting and operating Composting Facilities in Washington State Good Management Practices. This document is available at: <fortress.wa.gov/ecy/publications/publications/1107005.pdf>.
- See Ecology's Organic Materials Management Rule and Law page for the most up-to-date information: <https://ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Organic-materials>. >.
- Contact other federal, state, and Pierce County agencies with environmental or zoning authority for applicable permit and regulatory information. The Tacoma-Pierce County Health Department is responsible for issuing solid waste handling permits for commercial compost facilities.
- Apply for coverage under the Industrial Stormwater General Permit if the facility discharges stormwater to surface water or a municipal stormwater system. If all stormwater from the facility properly infiltrates to groundwater, the Industrial Stormwater General Permit is not required.
- There are some cases where an Individual State Waste discharge Permit is required. Check with the Ecology Southwest Regional Office and health department to discuss your permitting options.

A3.6 Landscaping and Lawn/Vegetation Management

Description of Pollutant Sources: Landscaping can include grading, soil transfer, vegetation removal, pesticide and fertilizer application, and watering. Stormwater contaminants include toxic organic compounds, heavy metals, oils, total suspended solids, coliform bacteria, fertilizers, and pesticides.

Lawn and vegetation management can include control of objectionable weeds, insects, mold, bacteria, and other pests with pesticides. Pesticides include herbicides, rodenticides, insecticides, fungicides, etc. Examples of pesticide uses include:

- Weed control on golf course lawns, access roads, and utility corridors and during landscaping;
- Sap stain and insect control on lumber and logs;
- Rooftop moss removal;
- Killing nuisance rodents;
- Fungicide application to patio decks;
- Residential lawn/plant care.

It is possible to release toxic pesticides such as pentachlorophenol, carbamates, and organometallics to the environment by leaching and dripping from treated parts, container leaks, product misuse, and outside storage of pesticide contaminated materials and equipment. Poor management of the vegetation and poor application of pesticides or fertilizers can cause appreciable stormwater contamination.

Irrigation consists of discharges from irrigation water lines, landscape irrigation, and lawn or garden watering. Excessive watering can lead to discharges of chlorinated potable water runoff into drainage systems; it can also cause erosion; and negatively affect plant health. Improper irrigation can encourage pest problems, leach nutrients, and make a lawn completely dependent on artificial watering. Mosquito breeding habitats may form through excessive watering.

Pollutant Control Approach: Control of fertilizer and pesticide applications, soil erosion, and site debris to prevent contamination of stormwater.

Develop and implement an Integrated Pest Management Plan and use pesticides only as a last resort. Refer to Appendix IVB Example of an Integrated Pest Management Program for more information. Carefully apply pesticides/herbicides in accordance with label instructions. Maintain appropriate vegetation, with proper fertilizer application where practicable, to control erosion and the discharge of stormwater pollutants. Where practicable, grow plant species appropriate for the site, or adjust the soil properties of the subject site to grow desired plant species.

Limit the amount and location of watering to prevent runoff and discharge to drainage systems.

Required BMPs for Landscaping

- Do not dispose of collected vegetation into waterways or stormwater drainage systems.
- Use mulch or other erosion control measures when soils are exposed for more than 1 week during the dry season or 2 days during the rainy season.
- If oil or other chemicals are handled, store and maintain appropriate oil and chemical spill cleanup materials in readily accessible locations. Ensure that employees are familiar with

proper spill cleanup procedures.

Suggested BMPs for Landscaping

- Conduct mulch-mowing whenever practicable.
- Install engineered soil/landscape systems to improve the infiltration and regulation of stormwater in landscaped areas.
- Dispose of grass clippings, leaves, sticks, or other collected vegetation by composting, if feasible.
- Till fertilizers into the soil rather than dumping or broadcasting onto the surface. Determine the proper fertilizer application rate for the types of soil and vegetation encountered.
- Till a topsoil mix or composted organic material into the soil to create a well-mixed transition layer that encourages deeper root systems and drought-resistant plants.
- Use manual and/or mechanical methods of vegetation removal rather than applying herbicides, where practical.

Required BMPs for the Use of Pesticides

- Train employees on proper application of pesticides and disposal practices.
- Follow manufacturer's application guidelines and label requirements.
- Develop and implement an Integrated Pest Management Program if pests are present. (see section on Integrated Pest Management below)
- Remove weeds/vegetation in stormwater ditches, stormwater facilities, and drainage systems by hand or other mechanical means and use pesticides only as a last resort.
- Implement a pesticide-use plan and include at a minimum:
    - A list of selected pesticides and their specific uses;
    - Brands, formulations, application methods, and quantities to be used;
    - Equipment use and maintenance procedures;
    - Safety, storage, and disposal methods; and
    - Monitoring, record keeping, and public notice procedures. All procedures shall conform to the requirements of Chapter 17.21 Revised Code of Washington (RCW) and Chapter 16228 WAC.
- Choose the least toxic pesticide available that is capable of reducing the infestation to acceptable levels. The pesticide should readily degrade in the environment and/or have properties that strongly bind it to the soil. Conduct any pest control activity at the life stage when the pest is most vulnerable. For example, if it is necessary to use a Bacillus thuringiensis application to control tent caterpillars, apply it before the caterpillars cocoon or it will be ineffective. Any method used should be site-specific and not used wholesale over a wide area.
- Do not apply pesticides in quantities that exceed the limits on the product the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) label. Avoid excessive application of chemical.
- Mix the pesticides and clean the application equipment in an area where accidental spills

will not enter surface or groundwater, and will not contaminate the soil.

- Store pesticides in enclosed areas or in covered impervious containment. Do not discharge pesticide contaminated stormwater or spills/leaks of pesticides to storm drains. Do not hose down paved areas to a storm drain or conveyance ditch. Store and maintain appropriate spill cleanup materials in a location known to all near the storage area.
- Cleanup any spilled pesticides. Keep pesticide contaminated waste materials in designated covered and contained areas.
- The pesticide application equipment must be capable of immediate shutoff in the event of an emergency.
- Spraying pesticides within 100 feet of open waters including wetlands, ponds, rivers, streams, creeks, sloughs, and any drainage ditch or channel that leads to open water, may have additional regulatory requirements beyond just following the pesticide label. Additional requirements may include:
  - Obtaining a discharge permit from Ecology
  - Obtaining approval from PPW per PCC Title 18E
  - Using an aquatic labeled pesticide.
- Flag all sensitive areas including wells, creeks, and wetlands prior to spraying.
- Post notices and delineate the spray area prior to the application, as required by Pierce County or by Ecology.
- Conduct spray applications during weather conditions as specified in the label direction and applicable local and state regulations. Do not apply during rain or immediately before expected rain.

Suggested BMPs for the Use of Pesticides

- Consider alternatives to the use of pesticides such as covering or harvesting weeds, substitute vegetative growth, and manual weed control/moss removal.
- Choose pesticides categorized by EPA as reduced risk. For example, the herbicide imazamox.
- When possible, apply pesticides during the dry season so that the pesticide residue is degraded prior to the next rain event.
- Use manual pest control strategies such as physically scraping moss from rooftops, high-pressure sprayers to remove moss, and rodent traps.
- Consider the use of soil amendments, such as compost, that are known to control some common diseases in plants, such as Pythium root rot, ashy stem blight, and parasitic nematodes. The following are three possible mechanisms for disease control by compost addition (USEPA publication 530F9044):
  - Successful competition for nutrients by antibiotic production
  - Successful predation against pathogens by beneficial microorganism; and
  - Activation of disease-resistant genes in plants by composts.

  Installing an amended soil/landscape system can preserve both the plant system and the soil

system more effectively. This type of approach provides a soil/landscape system with adequate depth, permeability, and organic matter to sustain itself and continue working as an effective stormwater infiltration system and a sustainable nutrient cycle.

- Once a pesticide is applied, evaluate its effectiveness for possible improvement. Records should be kept showing the effectiveness of the pesticides considered.
- Develop an annual evaluation procedure including a review of the effectiveness of pesticide applications, impact on buffers and sensitive areas (including potable wells), public concerns, and recent toxicological information on pesticides used/proposed for use. If individual or public potable wells are located in the proximity of commercial pesticide applications, contact the regional Ecology hydrogeologist to determine if additional pesticide application control measures are necessary.
- Follow the FIFRA label requirements for disposal. If the FIFRA label does not have disposal requirements the rinsate from equipment cleaning and/or triple-rinsing of pesticide containers should be used as product or recycled into product.

  For more information, contact the Washington State University (WSU) Extension Home-Assist Program at (253) 798-7180; Pesticide Information Center Online (PICOL) Databases at http://cru66.cahe.wsu.edu/LabelTolerance.html; Bio-Integral Resource Center (BIRC), P.O. Box 7414, Berkeley, CA 94707; or U.S. EPA to obtain a publication entitled "Suspended, Canceled and Restricted Pesticides" which lists all restricted pesticides and the specific uses that are allowed.

  Washington pesticide law requires most businesses that commercially apply pesticides to the property of another to be licensed as a Commercial Applicator from the Washington State Department of Agriculture.

Required BMPs for Integrated Pest Management

Develop and implement an Integrated Pest Management (IPM) program if pests are present. The IPM program shall consist of the following steps:

- Step 1 Correctly identify problem pests and understand their life cycle.
- Step 2 Establish tolerance thresholds for pests.
- Step 3 Monitor to detect and prevent pest problems.
- Step 4 Modify the maintenance program to promote healthy plants and discourage pests.
- Step 5 Use cultural, physical, mechanical, or biological controls first if pests exceed the tolerance thresholds.
- Step 6 Evaluate and record the effectiveness of the control and modify maintenance practices to support lawn or landscape recovery and prevent recurrence.

For an elaboration of these steps refer to Appendix IV-B, Example of an Integrated Pest Management Program.

Suggested BMPs for Vegetation Management

- Use at least an 8inch "topsoil" layer with at least 8 percent organic matter to provide a sufficient vegetation-growing medium (see soil preservation and amendment in Volume III, Section 3.1 for soil mix and installation guidance). Amending existing landscapes and turf systems can substantially improve the permeability of the soil, improve the disease and

drought resistance of the vegetation, and reduce fertilizer demand. Return natural plant debris and mulch to the soil to continue recycling nutrients indefinitely.

- Select the appropriate turfgrass mixture for the climate and soil type. Certain tall fescues and rye grasses resist insect attack because the symbiotic endophytic fungi found naturally in their tissues repel or kill common leaf and stem-eating lawn insects. However, they do not repel root-feeding lawn pests such as Crane Fly larvae, and are toxic to ruminants such as cattle and sheep. The fungus causes no known adverse effects to the host plant or to humans. Endophytic grasses are commercially available; use them in areas such as parks or golf courses where grazing does not occur. Local agricultural or gardening resources such as Washington State University Extension office can offer advice on which types of grass are best suited to the area and soil type.
- Use the following seeding and planting BMPs, or equivalent BMPs, to obtain information on grass mixtures, temporary and permanent seeding procedures, maintenance of a recently planted area, and fertilizer application rates: Temporary and Permanent Seeding, Mulching; Plastic Covering; and Sodding as described in Volume II.
- Adjusting the soil properties of the subject site can assist in selection of desired plant species. For example, design a constructed wetland to resist the invasion of reed canary grass by layering specific strata of organic matters (e.g., composted forest product residuals) and creating a mildly acidic pH and carbon-rich soil medium. Consult a soil restoration specialist for site-specific conditions.
- Aerate lawns regularly in areas of heavy use, where the soil tends to become compacted. Conduct aeration while the grasses in the lawn are growing most vigorously. Remove layers of thatch greater than 0.75-inches deep.
- Mowing is a stress-creating activity for turfgrass. Grass decreases its productivity when mown too short and there is less growth of roots and rhizomes. The turf becomes less tolerant of environmental stresses, more disease prone, and more reliant on outside means such as pesticides, fertilizers, and irrigation to remain healthy. Set the mowing height at the highest acceptable level and mow at times and intervals designed to minimize stress on the turf. Generally, mowing only one-third of the grass blade height will prevent stressing the turf.

Required BMPs for Irrigation

- Irrigate with the minimum amount of water needed. Never water at rates that exceed the infiltration rate of the soil.
- Maintain all irrigation systems so that irrigation water is applied evenly and where it is needed.
- Ensure sprinkler systems do not overspray vegetated areas resulting in excess water discharging into the drainage system.
- Inspect irrigated areas for excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.
- Place sprinkler systems appropriately so that water is not being sprayed on impervious

surfaces instead of vegetation.

- Repair broken or leaking sprinkler nozzles as soon as possible.
- Appropriately irrigate lawns based on the species planted, the available water holding capacity of the soil, and the efficiency of the irrigation system.
- The depth from which a plant normally extracts water depends on the rooting depth of the plant. Appropriately irrigated lawn grasses normally root in the top 6-to-12 inches of soil; lawns irrigated on a daily basis often root only in the top 1-inch of soil.
- Do not irrigate plants during or immediately after fertilizer application. The longer the period between fertilizer application and irrigation, the less fertilizer runoff occurs.
- Do not irrigate plants during or immediately after pesticide application (unless the pesticide label directs such timing).
- Reduce frequency and/or intensity of watering as appropriate for the wet season (October 1 to April 30).
- Place irrigation system to ensure that plants receive water where they need it. For example, do not place irrigation systems downgradient of plant's root zones on hillsides.

Suggested BMPs for Irrigation

- Add a tree bag or slow-release watering device (e.g., bucket with a perforated bottom) for watering newly installed trees when irrigation system is not present.
- Water deeply, but infrequently, so that the top 6- to 12-inches of the root zone is moist.
- Use soaker hoses or spot water with a shower type wand when an irrigation system is not present.
    - Pulse water to enhance soil absorption, when feasible.
    - Pre-moisten soil to break surface tension of dry or hydrophobic soils/mulch, followed by several more passes. With this method, each pass increases soil absorption and allows more water to infiltrate prior to runoff.
- Identify trigger mechanisms for drought-stress (e.g., leaf wilt, leaf senescence, etc.) of different species and water immediately after initial signs of stress appear.
- Water during drought conditions or more often if necessary to maintain plant cover.
- Adjust irrigation frequency/intensity as appropriate after plant establishment.
- Annually inspect irrigation systems to ensure:
    - That there are no blockages of sprayer nozzles.
    - Sprayer nozzles are rotating as appropriate.
    - Sprayer systems are still aligned with the plant locations and root zones.
- Consult with the Tacoma Water, the Pierce Conservation District, or the Pierce County Cooperative Extension office to help determine optimum irrigation practices.
- Do not use chemigation and fertigation in irrigation systems. This will help avoid over application of pesticides and fertilizers.

Required BMPs for Fertilizer Management

- Apply the minimum amount of slow-release fertilizer necessary to achieve successful plant establishment.
- Never apply fertilizers if it is raining or about to rain.
- Determine the proper fertilizer application for the types of soil and vegetation involved.
- Follow manufacturers' recommendations and label directions.
- Train employees on the proper use and application of fertilizers.
- Keep fertilizer granules off impervious surfaces. Clean up spills immediately. Do not hose down to a storm drain, conveyance ditch, or water body.
- If possible, do not fertilize areas within 100 feet of water bodies including wetlands, ponds, and streams.
- Avoid fertilizer applications in stormwater ditches, stormwater facilities, and drainage systems.
- Apply fertilizers in amounts appropriate for the target vegetation and at the time of year that minimizes losses to surface and groundwater.
- Do not fertilize when the soil is dry or during a drought.
- Do not apply fertilizers within 3 days prior to predicted rainfall. The longer the period between fertilizer application and either rainfall or irrigation, the less fertilizer runoff occurs.
- Use slow release fertilizers such as methylene urea, IDBU, or resin coated fertilizers when appropriate, generally in the spring. Use of slow release fertilizers is especially important in areas with sandy or gravelly soils.
- Time the fertilizer application to periods of maximum plant uptake. Ecology generally recommends application in the fall and spring, although Washington State University turf specialists recommend four fertilizer applications per year.
- Apply no fertilizer at commercial and industrial facilities to grass swales, filter strips, or buffer areas that drain to sensitive water bodies unless approved by the county.
- Do not use turf fertilizers containing phosphorous unless a soil sample analysis taken within the past 36 months indicates the soil of the established lawn is deficient in phosphorus. For more information about restrictions on turf fertilizers containing phosphorus, see the following website: https://agr.wa.gov/departments/pesticides-and-fertilizers/fertilizers/fertilizers-containing-phosphorus.

Suggested BMPs for Fertilizer Management

Test Soils to determine the correct fertilizer application rates.

- Evaluation of soil nutrient levels through regular testing ensures the best possible efficiency and economy of fertilization.
- Fertilization needs vary by site depending on plant, soil, and climatic conditions.
- Choose organic fertilizers when possible.
- For details on soil testing, contact the Pierce Conservation District, a soils testing professional, or Washington State University Extension office.

A3.7 Painting, Finishing, and Coating of Vehicles, Boats, Buildings, and Equipment

Description of Pollutant Sources: Surface preparation and the application of paints, finishes, and/or coatings to vehicles, boats, buildings, and/or equipment outdoors can be sources of pollutants. Potential pollutants include organic compounds, oils and greases, heavy metals, and suspended solids.

Pollutant Control Approach: Cover and contain painting and sanding operations and apply good housekeeping and preventive maintenance practices to prevent the contamination of stormwater with painting over sprays and grit from sanding.

Required BMPs

- Train employees in the careful application of paints, finishes, and coatings to reduce misuse and overspray. Use ground or drop cloths underneath outdoor painting, scraping, sandblasting work, and properly clean and temporarily store collected debris daily.
- Do not conduct spraying, blasting, or sanding activities over open water or where wind may blow paint or waste into water.
- Wipe up spills with rags and other absorbent materials immediately. Do not hose down the area to a storm drain, conveyance ditch, or receiving water.
- On marine dock areas, sweep rather than hose down debris. Collect any hose water generated and convey to appropriate treatment and disposal.
- Use an effective runoff control device if dust, grit, washwater, or other pollutants may escape the work area and enter a catch basin. The containment device(s) must be in place at the beginning of the workday. Collect contaminated runoff and solids and properly dispose of such wastes before removing the containment device(s) at the end of the workday.
- Use a ground cloth, pail, drum, drip pan, tarpaulin, or other protective device for activities such as outdoor paint mixing and tool cleaning, or where spills can contaminate stormwater.
- Properly dispose of all wastes and prevent all uncontrolled releases to the air, ground, or water.
- Clean brushes and tools covered with non-water-based paints, finishes, or other materials in a manner that allows collection of used solvents (e.g., paint thinner, turpentine, xylol) for recycling or proper disposal.
- Store toxic materials under cover (tarpaulin, etc.) during precipitation events and when not in use to prevent contact with stormwater.
- Enclose and/or contain all work while using a spray gun or conducting sand blasting and in compliance with applicable Puget Sound Air Pollution Control Agency Air Quality (PSAPCA), Occupational Safety and Health Administration (OSHA), and Washington Industrial Safety and Health Act (WISHA) requirements. Do not conduct outside spraying, grit blasting, or sanding activities during windy conditions that render containment ineffective.

Suggested BMPs

- Incidental cleaning of paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers. Dump pollutants collected in portable containers into a sanitary sewer drain, NOT a stormwater drain.

- Recycle paint, paint thinner, solvents, pressure washwater, and any other recyclable materials.
- Use efficient spray equipment such as electrostatic, air-atomized, high volume/low pressure, or gravity feed spray equipment.
- Purchase recycled paints, paint thinner, solvents, and other products if feasible.

A3.8 Commercial Printing Operations

Description of Pollutant Sources: Materials used in the printing process include inorganic and organic acids, resins, solvents, polyester film, developers, alcohol, vinyl lacquer, dyes, acetates, and polymers. Waste products may include waste inks and ink sludge, resins, photographic chemicals, solvents, acid and alkaline solutions, chlorides, chromium, zinc, lead, spent formaldehyde, silver, plasticizers, and used lubricating oils. With indoor printing operations, the only likely points of potential contact with stormwater are the outside temporary waste material storage area and area where chemicals are offloaded at external unloading bays. Pollutants can include total suspended solids, pH, heavy metals, oil and grease, and COD.

Pollutant Control Approach: Ensure appropriate disposal and NPDES permitting of process wastes. Cover and contain stored raw and waste materials.

Required BMPs

- Discharge process wastewaters to a sanitary sewer (if approved by Pierce County Industrial Pretreatment Program at (253) 7983013) or to an approved process wastewater treatment system.
- Do not discharge process wastes or wastewaters into storm drains or surface water.
- Determine whether any of these wastes qualify for regulation as dangerous wastes and dispose of them accordingly.
- Store raw materials or waste materials that could contaminate stormwater in covered and contained areas.

Suggested BMPs

- Train all employees in pollution prevention, spill response, and environmentally acceptable materials handling procedures.
- Store materials in proper, appropriately labeled containers. Identify and label all chemical substances.
- Regularly inspect all stormwater management devices and maintain as necessary.
- Try to use press washes without listed solvents, and with the lowest VOC content possible. Do not evaporate ink cleanup trays to the outside atmosphere.
- Place cleanup sludges into a container with a tight lid and dispose of as dangerous waste. Do not dispose of cleanup sludges in the garbage or in containers of soiled towels.

For additional information on pollution prevention the following Ecology publications are recommended: *A Guide for Screen Printers, publication No. 94137 and A Guide for Lithographic Printers, publication No. 94139.*

A3.9 Manufacturing Operations (Outside)

Description of Pollutant Sources: Manufacturing pollutant sources include outside process areas, stack emissions, and areas where manufacturing activity has taken place in the past and significant pollutant materials remain.

Pollution Control Approach: Cover and contain outside manufacturing and prevent stormwater runon and contamination, where feasible.

Required BMPs

- Sweep paved areas regularly, as needed, to prevent contamination of stormwater.
- Eliminate or minimize the contamination of stormwater by altering the activity.
- Enclose the activity (Figure 4.10). If possible, enclose the manufacturing activity in a building.

Figure 4.10. - Commercially Available Bermed Workspace.

(Photo courtesy of Mark Dilley, Interstate Products, Inc.)

- Cover the activity and connect floor drains to a sanitary sewer (Figure 4.11), if approved by Pierce County Industrial Pretreatment Program (253) 7983013. Berm or slope the floor as needed to prevent drainage of pollutants to outside areas.
- Isolate and segregate pollutants, as feasible. Convey the segregated pollutants to a sanitary sewer, process treatment, or dead-end sump, depending on available methods and applicable permit requirements (see also Volume I, Appendix I-A for dead-end sump maintenance guidelines).

Figure 4.11. - Structure Used to Cover Manufacturing Operations.

(Photo courtesy of Seattle Public Utilities)

A3.10 Agricultural Crop Production

This activity applies to farming of crops on a commercial scale. Crop farming practices can cause a large variety of pollution problems in receiving waters. Many of these practices can be altered without adversely affecting the farmers' ability to produce the same crops.

One of the most effective BMPs for stormwater pollution prevention the farmer can pursue is to contact the Pierce County Conservation District at (253) 8459770. They will help develop a farm plan that covers all aspects of the farming operation, with particular care and attention to soil conservation and water resource protection. They also have access to grants to pay for conservation plantings and stream corridor fencing.

Pollutants of Concern: Toxic organic compounds, oils, heavy metals, nutrients, Biochemical oxygen demand (BOD), suspended solids (e.g., sediments), fecal bacteria.

Crop farms should implement agricultural practices proven to limit erosion. Several farming techniques aimed at reducing erosion have been proven successful. Individual farms should implement the combination of the following BMPs that best suits conditions present:

Suggested BMPs

- Maintain ground cover. Cover bare areas with material such as mulch or green manure during times when land is not in production.
- Practice conservation tillage. Implement tillage or planting systems in which at least 30 percent of the soil surface is covered by plant residue after planting.
- Practice conservation cover. Establish and maintain perennial vegetation cover to protect soil and water resources on land retired from agricultural production.
- Utilize contour farming. Plow, prepare, plant and cultivate land on contours perpendicular to the slope of the land in a terrace-like fashion, so that runoff cannot proceed directly along a row but rather is impeded by rows in its path, thus allowing for more infiltration.
- Plant critical areas. Plant vegetation such as trees, shrubs, vines, grasses, and legumes on highly erodible or critical areas to stabilize the soil.
- Plant and maintain vegetated buffers and filter strips. Maintain a strip of permanent vegetation downslope of crop fields so that sediments and associated pollutants in surface water runoff can be filtered out. These filter strips are especially important along stream banks, shorelines, and drainage ditches. Contact the Pierce County Conservation District at (253) 8459770 and the Natural Resources Conservation Service at (253) 8459272 for more information. In some instances, these organizations may be able to provide plant materials for such work free or for a low cost.
- Practice conservation irrigation. Replace flood irrigation systems with sprinkler head or drip irrigation systems that use less water. These irrigation methods reduce the amount of crop field runoff and thereby reduce erosion and pollutant transport.

Some other suggested BMPs to consider for your farm include the following:

- Use an Integrated PestManagement (IPM) Plan and reduce reliance on pesticides. Information on IPM is available from the Washington State University/Pierce County Cooperative Extension Service. BMP S.8 in Chapter 5 provides some details on IPM and in Appendix IVB for an example. See Activity 3.6 for information on BMPs for pesticide and fertilizer use.

- If possible, crops should be planted as far as possible from surface drainages. This will help keep nutrients from fertilizers out of water bodies.
- Contact the Natural Resources Conservation Service (formerly the Soil Conservation Service) at (253) 845-9272 for information on developing specific fertilization schedules. Applying fertilizers at the right time and in the right quantity can help minimize pollution.
- If possible, crop cultivation should be avoided on steep slopes.

A3.11 Application of Pesticides, Herbicides, Fungicides, and Rodenticides for Purposes Other than Landscaping

This activity applies to businesses and government agencies using pesticides, herbicides, fungicides and rodenticides for purposes such as removing moss from rooftops or decks, killing nuisance rodents and some insects (such as termites and carpenter ants) that live outdoors but can invade the home if left unchecked. Businesses and government agencies involved in these activities must comply with Tacoma-Pierce County Health Department regulations and Washington State Department of Agriculture pesticide regulations. See Chapter 6 for more information on these regulations. The BMPs listed are intended to complement other regulations. Application of pesticides for landscaping purposes must follow the BMPs discussed under **A3.6 Landscaping and Lawn/Vegetation Management.**

Pollutants of Concern: Toxic organic compounds, oils, heavy metals, Chemical oxygen demand (COD)

Required BMPs

The following BMPs or equivalent measures are required of all businesses and agencies applying pesticides, herbicides, fungicides and rodenticides for non-landscaping purposes:

- Proper application practices must be used to avoid excessive application. Follow the manufacturers' guidelines and directions carefully.
- Never apply pesticides, herbicides, fungicides or rodenticides when rain is expected, or during rain events.
- Do not apply chemicals when it is windy. Early morning is typically the calmest time of day.
- Employees must be educated regarding the pollution potential of misusing the chemicals they are working with.
- Manage residues properly. Triple rinse or pressure rinse empty containers and mixing and application equipment. Collect all rinse water, and use it for diluting the next batch.

Suggested BMPs

- Use manual pest control measures, such as scraping or using high-pressure sprayers to remove moss from roofs and decks, before resorting to chemicals. Rodent traps can also be highly effective, without endangering pets and children as chemical baits can.
- Integrated Pest Management (IPM)is a comprehensive approach to the use of pesticides. IPM minimizes pesticide application and stresses selection of proper products and tailored application rates. It is a sensible long-term strategy rather than a hit-and-run operation, and as such is probably the most effective BMP measure that can be utilized under this activity. See BMP S.8 in Chapter 5 for more details on IPM and in Appendix IVB for an example.

A3.12 Nurseries and Greenhouses

Description of Pollutant Sources: These BMPs are for use by commercial container plant, greenhouse grown, and cut foliage production operations. Common practices at nurseries and greenhouses can cause elevated levels of phosphorus, nitrogen, sediment, bacteria, and organic material which can contribute to the degradation of water quality.

Pollutant Control Approach: Minimize the pollutants that leave the site by controlling the placement of materials, stabilizing the site, and managing irrigation water.

Required BMPs

- Establish nursery composting areas, soil storage, and mixing areas at least 100 feet away from any stream or other surface water body and as far away as possible from drainage systems.
- Do not dispose of collected vegetation into waterways or storm drain systems.
- Do not blow, sweep, or otherwise allow vegetation or other debris into the drainage system.
- Regularly clean up spilled potting soil to prevent its movement, especially if fertilizers and pesticides are incorporated. (Haver, 2014)
- Use soil mixing and layering techniques with composted organic material to reduce herbicide use and watering.
- Utilize soil incorporated with fertilizers and/or pesticides immediately; do not store for extended periods. (Haver, 2014)
- Cover soil storage and compost storage piles. Refer to Activity A4.1 for Storage or Transfer of Solid Raw Materials, Byproducts, or Finished Products.
- Dispose of pathogen-laced potting substrate and diseased plants appropriately.
- Place plants on gravel, geotextile, or weed cloth to allow infiltration and minimize erosion, including inside greenhouse structures. (Haver, 2014)
- Properly reuse, recycle, or dispose of used polyfilm, containers, and other plastic-based products so that they do not collect stormwater. (FDACS, 2014)
- Evaluate and manage irrigation to reduce runoff, sediment transport, and erosion:
    - Place irrigation inputs to keep moisture primarily in the plant's root zone. This will significantly reduce nutrient related impacts from fertilizers. (FDACS, 2014)
    - Avoid over-irrigating. This may exceed the soil's water-holding capacity and lead to runoff or leaching. (FDACS, 2014)
    - Consider and adjust as needed the uniformity of application, the amount of water retained within the potting substrate, and the amount of water that enters containers compared to that which exits the containers and/or falls between containers. (FDACS, 2014)
    - Consolidate containers and turn off irrigation in areas not in production. This may require individual on/off valves at each sprinkler head. (Haver, 2014)
    - Based on the stage of plant growth, space containers and flats as close as possible to minimize the amount of irrigation water that falls between containers. (FDACS, 2014)

    - Group plants of similar irrigation needs together. (FDACS, 2014)
    - Consider minimizing water losses by using cyclic irrigation (multiple applications of small amounts). (FDACS, 2014)
    - Consider using sub-irrigation systems (e.g., capillary mat, ebb-and-flow benches, and trays or benches with liners); these systems can conserve water and reduce nutrient loss, particularly when nutrients are supplied in irrigation water that is reused. (FDACS, 2014)
    - Refer to Activity A3.6 for Landscaping and Lawn/Vegetation Management for additional irrigation BMP considerations.
- Refer to Activity A3.6 for Landscaping and Lawn/Vegetation Management for irrigation, for fertilizer application, and for pesticides information and Appendix IV-B for an Example of an Integrated Pest Management Program.
- Use windbreaks or other means (e.g., pot in pot) to minimize plant blowover. (FDACS, 2014)
- Cover potting areas with a permanent structure to minimize movement of loose soil. Use a temporary structure if a permanent structure is not feasible. (Haver, 2014)
- Control runoff from central potting locations that have a watering station used to irrigate plants immediately after potting. Either:
    - Collect runoff in a small basin and reuse the runoff.
    - Or, route runoff through an onsite vegetative treatment area.
    - Or, use a graveled area and allow runoff to infiltrate.
- Surround soil storage and compost storage areas with a berm or wattles.
- Utilize a synthetic (geotextile) groundcover material to stabilize disturbed areas and prevent erosion in areas where vegetative cover is not an option. (FDACS, 2014)
- In areas with a large amount of foot traffic, use appropriate aggregate such as rock and gravel for stabilization. (FDACS, 2014)
- Store potting substrate that contains fertilizer in a dedicated area with an impermeable base. If the storage area is not under a roof to protect it from rainfall, manage runoff by directing it to a stormwater treatment area. (FDACS, 2014)

References:

(Haver, 2014) Darren Haver, Best Management Practices: A Water Quality Field Guide for Nurseries, Southern California Edition, The Regents of the University of California, 2014. (viii)

(FDACS, 2014) Florida Department of Agriculture and Consumer Services (FDACS), Water Quality/Quantity Best Management Practices for Florida Nurseries, DACS-P-1267, April 2014. [v(D)]

Section A4 Storage and Stockpiling Activities

A4.1 Storage or Transfer (Outside) of Solid Raw Materials, Byproducts, or Finished Products

Description of Pollutant Sources: Some pollutant sources stored outside in large piles, stacks, etc. at commercial or industrial establishments include:

- Solid raw materials
- By-products
- Gravel
- Sand
- Salts
- Topsoil
- Compost
- Logs
- Sawdust
- Wood chips
- Lumber and other building materials
- Concrete
- Metal products

Contact between bulk materials stored outside and stormwater can cause leachate and erosion of the stored materials. Contaminants include total suspended solids, oxygen demanding substances (i.e., BOD and COD), organics, and dissolved salts (sodium, calcium, magnesium chloride, etc.).

Pollutant Control Approach: Provide impervious containment with berms, dikes, etc. and/or cover to prevent runon and discharge of leachate pollutant(s) and total suspended solids.

Required BMPs

- Do not hose down the contained stockpile area to a storm drain or a conveyance to a storm drain or receiving water.
- The source control BMP options listed below are applicable to stockpiles greater than 5 cubic yards of erodible or water soluble materials such as:
    - Soil
    - Road de-icing salts
    - Compost
    - Unwashed sand and gravel
    - Sawdust
    - Outside storage areas for solid materials such as
    - Logs
    - Bark

- Lumber
- Metal products

Choose one or more of the following Source Controls:

- Store in a building or paved and bermed covered area as shown in Figure 4.12.

Figure 4.12. - Covered and Secured Storage Area for Bulk Solids.

- Place temporary plastic sheeting (polyethylene, polypropylene, hypalon, or equivalent) over the material (Figure 4.13); or
- Pave the area and install a stormwater drainage system. Place curbs or berms along the perimeter of the area to prevent the runon of uncontaminated stormwater and to collect and convey runoff to treatment. Slope the paved area in a manner that minimizes the contact between stormwater (e.g., pooling) and leachable materials in compost, logs, bark, wood chips, etc.
- For large uncovered stockpiles, implement containment practices at the perimeter of the site and at any catch basins as needed to prevent erosion and discharge of the stockpiled material offsite or to a storm drain. Ensure that no direct discharge of contaminated stormwater to catch basins exists without conveying runoff through an appropriate treatment BMP.

Figure 4.13. - Temporary Plastic Sheeting Anchored over Raw Materials Stored Outdoors.

- Convey contaminated stormwater from the stockpile area to a wet pond, wet vault, settling basin, media filter, or other appropriate treatment system, depending on the contamination.

Suggested BMPs

- Maintain drainage areas in and around storage of solid materials with a minimum slope of 1.5 percent to prevent pooling and minimize leachate formation. Areas should be sloped to drain stormwater to the perimeter for collection, or to internal drainage "alleyways" where no stockpiled material exists.
- Sweep paved storage areas regularly for collection and disposal of loose solid materials.
- If and when feasible, collect and recycle water-soluble materials (leachates).
- Stock cleanup materials such as brooms, dustpans, and vacuum sweepers near the storage area.

A4.2 Storage and Treatment of Contaminated Soils

Description of Pollutant Sources: This activity applies to businesses and agencies that store and treat soils contaminated with toxic organic compounds, petroleum products, or heavy metals. Such contamination typically comes to light when an environmental audit is done or old underground tanks are removed. The soils are usually excavated and taken off site for treatment via aeration and perhaps chemical stabilization. Stormwater runoff that comes in contact with contaminated soil can carry those contaminants along with loose dirt into receiving waters.

Pollutants of concern include toxic organic compounds, oils and greases, and heavy metals.

Pollutant Control Approach: The Tacoma-Pierce County Health Department Waste Management Section at (235) 7986047 regulates and permits businesses treating contaminated soil. In addition, a permit from the Puget Sound Clean Air Agency is required if the treatment method for removing soil contaminants involves forcing air through, or extracting air from, the soil. Contact these agencies for additional information regarding the appropriate pollutant control approach.

The use of any treatment BMP must not result in the violation of groundwater or surface water quality standards.

A4.3 Temporary Storage or Processing of Fruits or Vegetables

Description of Pollutant Sources: This activity applies to businesses that temporarily store fruits and vegetables outdoors prior to processing or sale, or that crush, cut, or shred fruits or vegetables for wines, frozen juices, and other food and beverage products.

Activities involving the storage or processing of fruits, vegetables, and grains can potentially result in the delivery of pollutants to stormwater. Potentialpollutants of concern from all fruits and vegetable storage and processing activities include nutrients, suspended solids, substances that increase biological oxygen demand (BOD) and color. These pollutants must not be discharged to the drainage system or directly into receiving waters.

Pollutant Control Approach: Store and process fruits and vegetables indoors or under cover whenever possible. Educate employees about proper procedures. Eliminate illicit connections to the stormwater drainage system. Cover and contain operations and apply good housekeeping and preventive maintenance practices to prevent the contamination of stormwater.

Required BMPs

The following BMPs or equivalent measures are required of all businesses engaged in storage of fruits or vegetables:

- Employees must be educated on benefits of keeping a clean storage area.
- Keep fruits, vegetables, and grains stored outside for longer than a day in plastic bins or in bins lined with plastic. The edge of the plastic liner should be higher than the amount of fruit stored or should drape over the side of the bin.
- Dispose of rotten fruit, vegetables, and grains in a timely manner (typically, within a week).
- Make sure all outside materials that have the potential to leach or spill to the drainage system are covered, contained, or moved to an indoor location. For fruits, vegetables, and grains stored outside for a week or more, cover with a tarp or other waterproof material. Make sure coverings are secured from wind.

  Eliminate illicit connections to the stormwater drainage system. See BMP S.1 in Chapter 5 for details on detecting and eliminating these connections.

  No untreated water used to clean produce can enter the stormwater drainage system. Minimize the use of water when cleaning produce to avoid excess runoff.
- The storage areas must be swept or shoveled daily to collect dirt and fruit and vegetable fragments for proper disposal. Keep hosing to a minimum.

  Cleanup materials, such as brooms and dustpans, must be kept near the storage area.

  Gutters, storm drains, and catch basins on the property must be cleaned as needed. See BMP S.9 in Chapter 5 for details on catch basin cleaning requirements.
- If a holding tank is used for the storage of wastewater, pump out the contents before the tank is full and dispose of wastewater to a sanitary sewer or approved wastewater treatment system.

The following BMPs or equivalent measures are required of all businesses that process fruits or vegetables:

- Eliminate illicit connections to the stormwater drainage system. See BMP S.1 in Chapter 5 for details on detecting and eliminating these connections.
- Employees must be educated on benefits of keeping a clean processing area.
- Cleanup materials, such as brooms, dustpans, and shovels, must be kept near the storage area.
- The processing area must be swept or shoveled daily to collect dirt and fruit and vegetable fragments for proper disposal.
- The processing area must be enclosed in a building or shed, or covered with provisions for stormwater runon prevention. See BMPs S.4, S.5, and S.7 in Chapter 5 for more on covering and runon prevention.

  OR

- The processing area must be paved and sloped to a sanitary sewer drain, holding tank, or process treatment system collection drain, and stormwater runon prevention must be provided for the processing area. Call Pierce County Industrial Pretreatment Program (253) 7983013 for information on discharging to the sanitary sewer. See BMPs S.6 and S.3 in Chapter 5 for details on paving and drainage.

Suggested BMPs

The following BMPs are not required but can provide additional pollution protection:

- Cover storage areas for fruits and vegetables. See BMPs S.4 and S.5 in Chapter 5 for more details on coverings.
- A containment curb, dike, or berm can be used to prevent offsite runoff from storage or processing areas and also to prevent stormwater runon. See BMP S.7 in Chapter 5 for more information. Note that runon prevention is required for processing areas, but not for storage areas.
- Use an approved or equivalent treatment BMPs for any runoff (see Volume V).

A4.4 Storage of Solid Wastes and Food Wastes

Description of Pollutant Sources: This activity applies to businesses and public agencies that store solid wastes and food wastes outdoors. This includes ordinary garbage. If improperly stored in our climate, these wastes can contribute a variety of different pollutants to stormwater. Requirements for handling and storing solid waste may include a permit from the Tacoma-Pierce County Health Department. For more information, call the Waste Management Section at (253) 7986047.

NOTE: Dangerous solid wastes must be stored and handled under special guidelines. Businesses and agencies that store dangerous wastes must follow specific regulations outlined by Ecology and, in some cases, the Tacoma-Pierce County Health Department. Ecology regulations are outlined in Chapter 6. Please contact Ecology at (360) 407-6300 and the Tacoma-Pierce County Health Department at (253) 798-6047 for the specific requirements and permitting information.

Pollutants of concern include toxic organic compounds, oils and greases, heavy metals, nutrients, suspended solids, and oxygen demanding substances (i.e., BOD and COD).

Pollutant Control Approach: Store wastes in suitable containers with leak-proof lids. Sweep or shovel loose solids. Educate employees about the need to check for and replace leaking containers.

Required BMPs

The following BMPs are required of all businesses and public agencies engaged in storage of non-dangerous solid wastes or food wastes:

- All solid and food wastes must be stored in suitable containers. Piling of wastes without any cover is not acceptable.
- Storage containers must be checked for leaks and replaced if they are leaking, corroded, or otherwise deteriorating.
- Storage containers must have leak-proof lids or be covered by some other means (Figure 4.14). Lids must be kept closed at all times. This is especially important for dumpsters, as birds can pick out garbage and drop it, promoting rodent, health, and stormwater problems.

  OR

- If lids cannot be provided for the waste containers, or they cannot otherwise be covered, there is another option: a designated waste storage area must be provided with a containment berm, dike, or curb, and the designated area must drain to a sanitary sewer (contact Industrial Pretreatment Program at (253) 798-3013 prior to any connections) or holding tank for further treatment. See BMP S.7 and S.3 in Chapter 5 for more information.

Figure 4.14. - Solid Waste Dumpsters with Properly Sealed Lids.

- Employees must be trained to frequently check storage containers for leaks and to ensure that the lids are on tightly.
- The waste storage area must be swept or otherwise cleaned frequently to collect all loose solids for proper disposal in a storage container. Do not hose the area to collect or clean solids.
- If you clean your containers, all rinse water from cleaning must be disposed of in a sanitary sewer or septic system.
- Clean out catch basins on your property that receive drainage from your waste storage area. See BMP S.9 in Chapter 5 for details on catch basin cleaning.

Suggested BMPs

- If the amount of waste accumulated appears to frequently exceed the capacity of the storage container, then another storage container should be obtained and utilized.
- Store containers such that wind will not be able to knock them over.
- Designate a storage area, pave the area, and slope the drainage to a holding tank to prevent stormwater runon or runoff. If a holding tank is used, the contents must be pumped out before the tank is full and properly disposed of. See BMP S.2 in Chapter 5 for more information on disposal options.
- Compost appropriate wastes. Contact Pierce County Planning and Public Works Sustainable Resources at (253) 798-2179 for more information on composting.
- Recycle your solid wastes. The Industrial Materials Exchange program facilitates the transfer of excess materials and wastes to those who can use them. Industrial Materials Exchange can be reached at (206) 296-4899, toll free 1-888-TRY-IMEX or at https://www.hazwastehelp.org/IMEX.

A4.5 Recyclers and Scrap Yards

Description of Pollutant Sources: This activity applies to businesses and public agencies that salvage and store scrap metal, scrap equipment, junk appliances and vehicles, empty metal drums, and recyclable items such as cans, bottles, paper products, construction materials, metals, and beverage containers. This does not apply to businesses and agencies that store these items for less than 2 weeks. Businesses engaged in these activities may be required to obtain an NPDES permit for stormwater discharges from Ecology. See the discussion of NPDES requirements in Chapter 6 for more information. For these permit holders, the BMPs listed below should be used to complement NPDES requirements.

Potential sources of pollutants include paper, plastic, metal scrap debris, engines, transmissions, radiators, batteries, and other materials contaminated or that contain fluids. Other pollutant sources include leachate from metal components, contaminated soil, and the erosion of soil. Activities that can generate pollutants include the transfer, dismantling, and crushing of vehicles and scrap metal; the transfer and removal of fluids; maintenance and cleaning of vehicles, parts, and equipment; and storage of fluids, parts for resale, solid wastes, scrap parts, and materials, equipment and vehicles that contain fluids, generally in uncovered areas.

Potential pollutants typically found at these facilities include: toxic hydrocarbons, polychlorinated biphenyls (PCBs), other toxic organic compounds, heavy metals, oils and greases, suspended solids, oxygen demanding substances (i.e., BOD and COD), ethylene and propylene glycol, and acidic pH.

Required BMPs

- For facilities subject to Ecology's industrial stormwater general permit refer to BMP Guidance Document No. 94146 "Vehicle Recyclers: A Guide for Implementing the Industrial Stormwater General National Pollutant Discharge Elimination System (NPDES) Permit Requirements," Ecology, March 2011, Website: <https://fortress.wa.gov/ecy/publications/documents/94146.pdf>.
- For facilities not subject to Ecology's industrial stormwater general permit, apply the BMPs in BMP Guidance Document No. 94146 (see above), as well as the following required BMPs where applicable, depending on the pollutant sources existing at those facilities:
    - Gasoline, engine fluids, freon, and other contaminated liquids must be drained from scrapped items in a designated area and disposed of or recycled properly before the items are placed in the scrap storage area. See BMP S.2 in Chapter 5 for acceptable disposal options. The designated fluid draining area must be covered and paved, or if not covered, must be paved and sloped to a drain and holding tank. See BMP S.3 in Chapter 5 for drainage alternatives. Batteries must also be removed and recycled properly prior to storage.
    - Employees must be educated about the need for stormwater pollution protection, and proper maintenance of BMPs. They also must have training in spill cleanup procedures, and appropriate cleanup materials must be stocked near the fluid draining area.
    - Catch basins on the property must be cleaned as needed. See BMP S.9 in Chapter 5 for more details.
    - If the storage area is small, the scrap or recycling materials must be covered. See BMPs S.4 and S.5 in Chapter 5 for further details on coverings.

OR

- If the storage area cannot be covered, a stormwater treatment system consisting of a wet pond/vault, infiltration basin with underdrains, filtration system, or vegetated biofilter preceded by an oil/water separator must be provided to treat runoff from the entire material storage area. See Volume V for detailed information on these treatment methods.

Suggested BMPs

- The material storage area can be paved and sloped to a drain and holding tank. See BMP S.6 in Chapter 5 for details on this drainage strategy.
- Use of a containment dike, curb, or berm can help prevent contaminated runoff from leaving the site, and can function to direct runoff to one of the treatment methods mentioned under the Required BMPs. See BMP S.7 in Chapter 5 for more details.
- Chemical addition can be used to enhance settling or adjust pH in a wet pond/vault or filtration system. See Volume II, Section 3.2, BMP C252 for details on pH adjustment.
- Recycle, reuse, or let others use your scrap materials.

A4.6 Treatment, Storage, or Disposal of Dangerous Wastes

This activity applies to businesses and public agencies that are permitted by Ecology to treat, store, or dispose of dangerous wastes. Ecology regulates these facilities with specific requirements, which include the need for a NPDES permit. Detailed BMPs are not included in this volume since site requirements for these facilities are well beyond the level of typical BMP applications. See Chapter 6 for reference information.

The Tacoma-Pierce County Health Department also administers some aspects of dangerous waste treatment, storage, and disposal. Call (253) 649-1420 for more information.

A4.7 Storage of Liquid or Dangerous Waste Containers

Description of Pollutant Sources: Steel and plastic drums with volumetric capacities of 55 gallons or less are typically used at industrial facilities for container storage of liquids and powders. The BMPs specified below apply to container(s) located outside a building. Use these BMPs when temporarily storing accumulated food wastes, vegetable or animal grease, used oil, liquid feedstock or cleaning chemicals, or Dangerous Wastes (liquid or solid), unless the business is permitted by Ecology to store the wastes. Leaks and spills of pollutant materials during handling and storage are the primary sources of pollutants. Oil and grease, acid/alkali pH, oxygen demanding substances (i.e., BOD and COD) are potential pollutant constituents.

Pollutant Control Approach: Store containers in impervious containment under a roof or other appropriate cover, or in a building. For storage areas on site for less than 30 days, consider using a portable temporary secondary system in lieu of a permanent system as described above.

Required BMPs

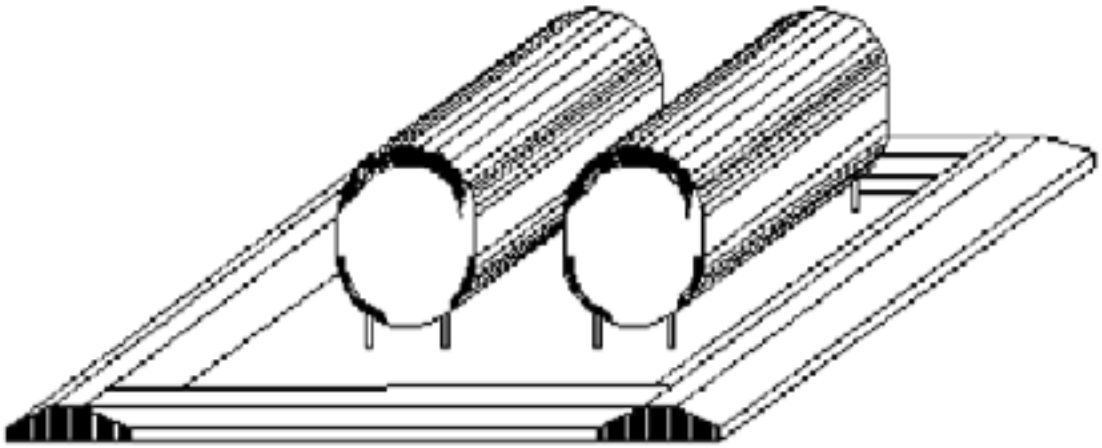
- Place tight-fitting lids on all containers.
- Place drip pans beneath all mounted container taps and at all potential drip and spill locations during filling and unloading of containers.
- Inspect container storage areas regularly for corrosion, structural failure, spills, leaks, overfills, and failure of piping systems. Check containers daily for leaks/spills. Replace containers, and replace and tighten bungs in drums, as needed.
- Businesses accumulating Dangerous Wastes that do not contain free liquids need only to store these wastes in a sloped designated area with the containers elevated or otherwise protected from stormwater runon.
- Secure drums when stored in an area where unauthorized persons may gain access in a manner that prevents accidental spillage, pilferage, or any unauthorized use (Figure 4.15).
- If the material is a Dangerous Waste, the business owner must comply with any additional Ecology requirements as specified in Chapter 6, Section 6.2, R.2.
- Storage of reactive, ignitable, or flammable liquids must comply with the International Fire Code.
- Cover dumpsters or keep them under cover, such as a lean-to, to prevent the entry of stormwater. Replace or repair leaking garbage dumpsters.
- Drain dumpsters and/or dumpster pads to sanitary sewer. Dumpster drains must not discharge to stormwater systems. Keep dumpster lids closed. Install waterproof liners.

Figure 4.15. - Outdoor Drum Storage Unit with Locking Doors.

(Photo courtesy of Mark Dilley, Interstate Products, Inc.)

- Keep containers with Dangerous Waste, food waste, or other potential pollutant liquids inside a building unless this is impracticable due to site constraints or International Fire Code requirements.
- Store containers in a designated area that is covered, bermed, or diked; paved; and impervious in order to contain leaks and spills. Slope the secondary containment to drain into a dead-end sump for the collection of leaks and small spills (see also Volume I, Appendix I-A for dead-end sump maintenance guidelines).
- For liquid wastes, surround the containers with a dike as illustrated in Figure 4.16. The dike must be of sufficient height to provide a volume of either 10 percent of the total enclosed container volume or 110 percent of the volume contained in the largest container, whichever is greater.

Figure 4.16. - Containment Berm Used to Control Liquid-Material Leaks or Spills.



- Where material is temporarily stored in drums, use a containment system, as illustrated, in lieu of the above system (Figure 4.17).

Figure 4.17. - Temporary Secondary Containment.

(Photo courtesy of Seattle Public Utilities)

- Place containers mounted for direct removal of a liquid chemical for use by employees inside a containment area as described above. Use a drip pan during liquid transfer (Figure 4.18).

Figure 4.18. - Mounted Containers with Drip Pans.

- For contaminated stormwater in the containment area, connect the sump outlet to a sanitary sewer, if approved by Pierce County Industrial Pretreatment Program at (253) 798-3013, or to appropriate treatment such as an API or coalescent plate oil/water separator, or other appropriate system (see Volume V). Equip the sump outlet with a normally closed valve to prevent the release of spilled or leaked liquids, especially flammables (in compliance with International Fire Codes), and dangerous liquids. Open this valve only for the conveyance of contaminated stormwater to treatment.
- Another option for discharge of contaminated stormwater is to pump it from a dead-end sump or catchment to a tank truck or other appropriate vehicle for offsite treatment and/or disposal.

A4.8 Storage of Liquids in Permanent Aboveground Tanks

Description of Pollutant Sources: Aboveground tanks containing liquids (excluding uncontaminated water) may be equipped with a valved drain, vent, pump, and bottom hose connection. Aboveground tanks may be heated with steam heat exchangers equipped with steam traps. Leaks and spills can occur at connections and during liquid transfer. Oil and grease, organics, acids, alkalis, and heavy metals in tank water and condensate drainage can also cause stormwater contamination at storage tanks.

Pollutant Control Approach: Install secondary containment or a double-walled tank. Slope the containment area to a drain with a sump. Operators may need to discharge stormwater collected in the containment area to treatment such as an API or coalescent plate oil/water separator, or equivalent BMP. Add safeguards against accidental releases including protective guards around tanks to protect against vehicle or forklift damage, and tag valves to reduce human error. Tank water and condensate discharges are process wastewater that may need an NPDES permit.

Required BMPs

- Inspect the tank containment areas regularly for leaks/spills, cracks, corrosion, etc. to identify problem components such as fittings, pipe connections, and valves.
- Place adequately sized drip pans beneath all mounted taps and drip/spill locations during filling/unloading of tanks. Operators may need valved drain tubing in mounted drip pans.
- Vacuum sweep and clean the tank storage area regularly, if paved.
- Replace or repair tanks that are leaking, corroded, or otherwise deteriorating.
- All installations shall comply with the International Fire Code and the National Electric Code.
- Locate permanent tanks in impervious (Portland cement concrete or equivalent) secondary containment surrounded by dikes as illustrated in Figure 4.19, or use Underwriters Laboratory approved double-walled tanks. The dike must be of sufficient height to provide a containment volume of either 10 percent of the total enclosed tank volume or 110 percent of the volume contained in the largest tank, whichever is greater.
- Slope the secondary containment to drain to a dead-end sump, or equivalent, for the collection of small spills (see also Volume I, Appendix I-A for dead-end sump maintenance guidelines).
- Include a tank overfill protection system to minimize the risk of spillage during loading.

Figure 4.19. - Aboveground Storage Tanks with Secondary Containment.

(Photo courtesy of Seattle Public Utilities)

- For an uncovered tank containment area, equip the outlet from the spill-containment sump with a shutoff valve. The shutoff valve is normally closed and operators may open it manually or automatically, only to convey contaminated stormwater to approved treatment or disposal or convey uncontaminated stormwater to a storm drain. Evidence of contamination can include the presence of visible sheen, color, or turbidity in the runoff, or existing or historical operational problems at the facility. Use simple pH tests with litmus or pH paper for areas subject to acid or alkaline contamination.
- At petroleum tank farms, convey stormwater contaminated with floating oil or debris in the contained area through an API or coalescent plate type oil/water separator (Volume V) or other approved treatment prior to discharge to storm drain or surface water.

A4.9 Parking and Storage for Vehicles and Equipment

Description of Pollutant Sources: Parked vehicles at public and commercial parking lots, such as retail store, fleet vehicle (including rent-a-car lots and car dealerships), equipment sale and rental parking lots, and parking lot driveways, can be sources of toxic hydrocarbons and other organic compounds, oils and greases, metals, and suspended solids.

Required BMPs

- An oil removal system such as an API or coalescent plate oil and water separator, or equivalent BMP (see Volume V), approved by Pierce County, is applicable for parking lots meeting the threshold vehicle traffic intensity level of a high-use site. For more information on high-use sites, refer to Volume V, Section 2.1, Step 3.
- If washing a parking lot, discharge the washwater to a sanitary sewer (if allowed by Pierce County Industrial Pretreatment Program at (253) 7983013) or other approved wastewater treatment system, or collect washwater for offsite disposal.
- Do not hose down the area to a storm drain or receiving water. Vacuum sweep parking lots, storage areas, and driveways regularly to collect dirt, waste, and debris.

A4.10 Storage of Pesticides, Fertilizers, or Other Products That Can Leach Pollutants

This activity applies to businesses, public agencies and farms that store non-liquid pesticides, fertilizers, or a variety of other products, such as treated lumber, metal building materials, and metal tools, that have the potential to leach pollutants into underlying soil or stormwater runoff. The main problem with the potential pollutants from these sources is their solubility, which means they are difficult or impossible to filter out of runoff. If there is any question as to whether materials on your site have the potential to leach pollutants into stormwater runoff or underlying soil, call Pierce County Planning and Public Works Surface Water Management at (253) 798-2725 or Tacoma Stormwater Source Control Unit at (253) 591-5588 and ask to speak to a water quality person. Note that the storage of liquid pesticides is covered under activity A4.7 Storage of liquid chemicals, waste oils, solvents or petroleum products in portable containers.

Pollutants of Concern: Toxic organic compounds, oils, heavy metals, nutrients, fecal bacteria, oxygen demanding substances (i.e., BOD and COD), Biochemical oxygen demand (BOD), suspended solids.

Required BMPs

The following BMPs or equivalent measures are required of all businesses, public agencies and farms engaged in storage of pesticides, fertilizers or finished products that can leach pollutants:

- Employees must be trained on the proper storage, handling, application and disposal of fertilizers and pesticides, from keeping bags intact to storing in a covered or contained area.
- Store pesticides and fertilizers in enclosed impervious containment areas that prevent precipitation or unauthorized personnel from coming into contact with the materials.
- Outdated or banned pesticides must be disposed of at an approved hazardous waste facility.
- Sweep paved storage areas as needed. Collect and dispose of spilled materials. Do not hose storage areas to a storm drain or conveyance ditch.
- Do not discharge pesticide contaminated stormwater or spills/leaks of pesticides to storm drain or to the sanitary sewer. Contaminated stormwater must be collected and disposed of properly. Unused or spilled/leaked pesticides must be disposed of according to the label.

For fertilizers or pesticides:

- Containers and bags must be covered, intact, and off the ground.
- Store all material so that it cannot come into contact with water.
- Immediately clean up any spilled fertilizer or pesticides.
- Keep pesticide and fertilizer contaminated waste materials in designated covered and contained areas, and dispose of properly.
- Store and maintain spill cleanup materials near the storage area.
- Comply with WAC 16-228-1220 and Chapter 16-229 WAC.

Suggested BMPs

Contained storage areas should drain to a sump or a holding tank. Note that this only applies to

finished products other than treated lumber. The sump should have an outlet pipe for discharges to the stormwater drainage system. The sump must be cleaned at least once per year, and solid materials and residues collected in the bottom of the sump must be properly disposed of. See BMP S.2 in Chapter 5 for information on disposal options.

See BMPs S.4 and S.5 in Chapter 5 for further information on coverings of pesticides, fertilzers, and finished products that can leach pollutants. Stormwater runon prevention must be provided for the covered area, or the stored materials must be raised off the ground. See BMP S.7 in Chapter 5 for more information on runon prevention options.

Storage areas for treated lumber should be paved, and either covered or sloped to drain to a dead-end sump or treatment system (see also Volume I, Appendix I-A for dead-end sump maintenance guidelines). Material collected from the sump must be disposed of as a hazardous waste (it may be economical to install an evaporation system for the uncovered area). Stormwater runon must be prevented from entering the covered area if the lumber is not elevated off the ground. See BMPs S.4 and S.7 in Chapter 5 for more information on roof covers and runon prevention.

- Paved storage areas for finished products should be swept weekly and collected materials disposed of properly. Small amounts of fertilizers can be disposed of in the regular garbage after double wrapping in plastic.
- Use less pesticide or fertilizer, or store less finished product, so that the size of the designated storage areas can be smaller and stormwater contamination potential is reduced.
- If it is not feasible to use the source-control BMPs listed above, one or more of the following stormwater treatment BMPs should be used (see Volume V for more information on each BMP):
    - Infiltration with underdrains to prevent groundwater contamination
    - Filtration
    - Wet pond with nutrient control, for fertilizer storage only
    - Constructed wetland
    - Vegetated biofilter.

Section A5 Construction and Demolition Activities

A5.1 Construction Demolition

Description of Pollutant Sources: This activity applies to removal of existing buildings and other structures by controlled explosions, wrecking balls, or manual methods, and subsequent clearing of the rubble. The loose debris can contaminate stormwater. Demolitions will also need to verify if asbestos is present and my require additional permits to remove.

Pollutants of concern include toxic organic compounds, hazardous wastes, high pH, heavy metals, and suspended solids.

Pollutant Control Approach: Do not expose hazardous materials to stormwater. Regularly cleanup debris that can contaminate stormwater. Protect the stormwater drainage system from dirty runoff and loose particles. Sweep paved surfaces daily. Educate employees about the need to control site activities.

Required BMPs

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in building demolition:

- Identify, remove, and properly dispose of hazardous substances from the building before beginning construction demolition activities that could expose them to stormwater. Such substances could include PCBs, asbestos, lead paint, mercury switches, and electronic waste.
- Educate employees about the need to control site activities to prevent stormwater pollution, and also train them in spill cleanup procedures.
- Keep debris containers, dumpsters, and debris piles covered.
- Storm drain covers or a similarly effective containment device must be placed on all nearby drains to prevent dirty runoff and loose particles from entering the stormwater drainage system (Figure 4.20). Covers shall be placed at the beginning of the workday and the accumulated materials collected and disposed of before removing the covers at the end of the workday. If storm drains are not present, dikes, berms, or other methods must be used to protect overland discharge paths from runoff. See BMPs S.2 and S.7 in Chapter 5 for more information on runoff control and disposal options.

Figure 4.20. - Commercially Available Gutter Guard Being Replaced.

(Photo courtesy of Mark Dilley, Interstate Products, Inc.)

- Sweep gutters, sidewalks, driveways, and other paved surfaces in the immediate area of the demolition must be swept at the end of each workday to collect and properly dispose of loose debris and garbage.
- Lightly spray water (such as from a hydrant or water truck) throughout the site to help control windblown fine materials such as soil, concrete dust, and paint chips. Control the amount of dust control water so that runoff from the site does not occur, yet dust control is achieved. Do not use oils for dust control.

Check with Pierce County Planning and Public Works (253) 798-3739 and Puget Sound Clean Air Agency to obtain required permits. Additional information is available at:

- piercecountywa.gov/applyforapermit
- pscleanair.gov

Suggested BMPs

- If possible, a wall or screen should be constructed to prevent stray building materials and dust from escaping the area during demolition. Size and orient the wall or screen to capture wind-blown materials and contain them onsite.
- Schedule demolition to take place at a dry time of the year to prevent stormwater runoff from the demolition site.

A5.2 Building Repair, Remodeling, Painting, and Construction

Description of Pollutant Sources: This activity refers to activities associated with construction of buildings and other structures, remodeling of existing buildings and houses, and general exterior building repair work. Concrete pouring is covered under A3.2 Concrete Pouring and Asphalt Application at Temporary Sites.

Pollutants of concern include toxic hydrocarbons, toxic organics, suspended solids, heavy metals, pH, oils, and greases.

Pollutant Control Approach: Employees must be educated about the need to control site activities. Control leaks, spills, and loose material. Utilize good housekeeping practices.

Required BMPs

The following BMPs or equivalent measures are required of all businesses engaged in building repair, remodeling, painting, or construction:

- Identify, remove and properly dispose of hazardous substances from the building before beginning repairing or remodeling activities that could expose them to stormwater. Such substances could include PCBs, asbestos, lead paint, mercury switches, and electronic waste.
- Employees must be educated about the need to control site activities to prevent stormwater pollution, and also trained in spill cleanup procedures.
- Spill cleanup materials, appropriate to the chemicals being used on site, must be available at the work site at all times.
- The work site must be cleaned up at the end of each workday, with materials such as solvents put away indoors or covered and secured so that vandals will not have access to them.
- The area must be swept daily to collect loose litter, paint chips, grit, and dirt.
- Absolutely no substance can be dumped on pavement, on the ground, or in or toward storm drains, regardless of its content, unless it is clean water only.
- For wood treating activities drop cloths must be placed where space and access permit before the work begins. Additional drip pans must be used in areas where drips are likely to occur that cannot be protected with a drop cloth.
- Ground or drop cloths must be used underneath scraping, sandblasting work. Ground cloths, buckets, or tubs must also be used anywhere that work materials are laid down.
- Incidental cleaning of paint brushes and other tools that are covered with water-based paints must be cleaned in sinks connected to sanitary sewers or in portable containers that can subsequently be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based finishes or other materials must be cleaned in a manner that enables collection of used solvents for recycling or proper disposal and cannot be discharged to the sanitary sewer. See BMP S.2 in Chapter 5 for disposal options.
- Storm drain covers or similarly effective devices must be used if dust, grit, washwater, or other pollutants may escape the work area. This is particularly necessary on rainy days. The cover or containment device shall be placed over the storm drain at the beginning of the workday, and accumulated dirty runoff and solids must be collected and disposed of before

removing the cover at the end of the day.

- Refer to Activity A1.3 Washing and Steam Cleaning Vehicles/Equipment/Building Structures for best management practices associated with power washing buildings.

Suggested BMPs

The following BMPs are not required, but can provide additional pollution protection:

- Recycle materials whenever possible.
- Light spraying of water on the work site can control some of the dust and grit that can blow away. Oils must never be used for dust control. Never spray to the point of runoff from the site.
- Activities such as tool cleaning should occur over a ground cloth or within a containment device such as a tub.
- Consider using filtered vacuuming to collect waste that may be hard to sweep, such as dust on a drop cloth.
- If conducting work in wet weather conditions, consider setting up temporary cover when scraping or pressure-washing lead based paint.

Section A6 Dust Control and Soil and Sediment Control

A6.1 Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots

Description of Pollutant Sources: Dust can cause air and water pollution problems particularly at demolition sites, disturbed land areas, and unpaved roadways and parking lots.

Pollutant Control Approach: Minimize dust generation and apply environmentally friendly and government approved dust suppressant chemicals, if necessary.

Required BMPs

- Sprinkle or wet down soil or dust with water as long as it does not result in a wastewater discharge (Figure 4.21).

Figure 4.21. - Dust Suppression by Water Spray.

- Use in the recommended manner, only local and/or state government approved dust suppressant chemicals such as those listed in Ecology publication No. 96433, "Techniques for Dust Prevention and Suppression." See BMP C126, Polyacrylamide for Soil Erosion Protection, in Volume II of this manual.
- Avoid excessive and repeated applications of dust suppressant chemicals. Time the application of dust suppressants to avoid or minimize their wash-off by rainfall or human activity such as irrigation.
- Apply stormwater containment to prevent the conveyance of sediments and/or dust suppressant chemicals into storm drains or receiving waters.
- The use of motor oil for dust control is prohibited. Take care when using lignin derivatives and other high BOD chemicals in areas susceptible to contaminating surface water or groundwater.
- Consult with the Ecology Southwest Regional Office and the Pierce County Planning and Public Works department on discharge permit requirements if the dust suppression process results in a wastewater discharge to the ground, groundwater, storm drain, or surface water.

Suggested BMPs for Roadways and Other Trafficked Areas

- Consider limiting use of off-road recreational vehicles on dust generating land.
- Consider graveling or paving unpaved permanent roads and other trafficked areas at municipal, commercial, and industrial areas.
- Consider paving or stabilizing shoulders of paved roads with gravel, vegetation, or Pierce County approved chemicals.
- Encourage use of alternate paved routes, if available.
- Vacuum sweep fine dirt and skid control materials from paved roads soon after winter weather ends or when needed.
- Consider using pre-washed traction sand to reduce dust emissions.

Suggested BMPs for Dust Generating Areas

- Prepare a dust control plan. Helpful references include: Control of Open Fugitive Dust Sources (EPA450/388088) and Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures (EPA450/292004).
- Limit exposure of soil (dust source) as much as feasible.
- Stabilize dust-generating soil by growing and maintaining vegetation, mulching, topsoiling, and/or applying stone, sand, or gravel.
- Apply windbreaks in the soil such as trees, board fences, tarpaulin curtains, bales of hay, etc.

Additional information on dust control can be found in Volume II of this manual.

A6.2 Dust Control at Manufacturing Sites

Description of Pollutant Sources: Industrial material handling activities can generate considerable amounts of dust that is typically removed using exhaust systems. Dusts can be generated at cement and concrete product mixing facilities, and wherever powdered materials are handled. Particulate materials that are of concern to air pollution control agencies include grain dust, sawdust, coal, gravel, crushed rock, cement, and boiler fly ash. Air emissions can contaminate stormwater. The objective of this BMP is to reduce the stormwater pollutants caused by dust generation and control.

Pollutant Control Approach: Prevent dust generation and emissions where feasible, regularly cleanup dust that can contaminate stormwater, and convey dust contaminated stormwater to proper treatment.

Required BMPs

- Clean powder material handling equipment and vehicles.
- Regularly sweep dust accumulation areas that can contaminate stormwater. Conduct sweeping using vacuum filter equipment to minimize dust generation and to ensure optimal dust removal.
- Use in the recommended manner, approved dust suppressants such as those listed in Ecology publication “Techniques for Dust Prevention and Suppression,” No. 96433 (Ecology 1996). Application of some products may not be appropriate in close proximity to receiving

waters or conveyances close to receiving waters. For more information, check with the Ecology Southwest Regional Office or Pierce County.

Suggested BMPs

- In manufacturing operations, train employees to handle powders carefully to prevent generation of dust.
- Use dust filtration/collection systems such as bag house filters, cyclone separators, etc. to control vented dust emissions that could contaminate stormwater. Control of zinc dusts in rubber production is one example.
- Use water spray to flush dust accumulations to sanitary sewers where allowed by Pierce County or to other appropriate treatment system. Contact Industrial Pretreatment Program at (253) 798-3013 for details.
- Install sedimentation basins, wet ponds, wet vaults, vegetated filter strips, or equivalent sediment removal BMPs. Refer to Volume V for more information about these BMPs.

Additional information on dust control can be found in Volume II of this manual.

A6.3 Soil Erosion and Sediment Control at Industrial Sites

Description of Pollutant Sources: Industrial activities on soil areas, exposed and disturbed soils, steep grades, etc. can be sources of sediments that can contaminate stormwater runoff.

Pollutant Control Approach: Limit the exposure of erodible soil, stabilize or cover erodible soil where necessary to prevent erosion, and/or provide treatment for stormwater contaminated with total suspended solids caused by eroded soil.

Required BMPs

- Apply one or more of the following cover practices:
  - Vegetative cover such as grass, trees, or shrubs on erodible soil areas
  - Covering with mats such as clear plastic, jute, or synthetic fiber
  - Preservation of natural vegetation including grass, trees, shrubs, and vines
- Apply one or more of the following structural practices:
  - Vegetated swale
  - Dike
  - Silt fence
  - Check dam
  - Sedimentation basin
  - Properly grading

For design information, refer to Volume II, Standards and Specifications for BMPs.

Section A7 Other Activities

A7.1 Commercial Animal Handling Areas

Description of Pollutant Sources: Animals at racetracks, kennels, fenced pens, veterinarians, and businesses that provide boarding services for horses, dogs, cats, etc. can generate pollutants from the following activities: manure deposits, animal washing, grazing, and any other animal handling activity that could contaminate stormwater. Pollutants can include coliform bacteria, nutrients, and total suspended solids. Individual Stormwater Permits covering commercial animal handling facilities include additional applicable source controls.

Pollutant Control Approach: To prevent, to the maximum extent practicable, the discharge of contaminated stormwater from animal handling and keeping areas.

Required BMPs

- Regularly sweep and clean animal keeping areas to collect and properly dispose of droppings, uneaten food, and other potential stormwater contaminants.
- Do not hose down areas that contain potential stormwater contaminants where they drain to storm drains or to receiving waters.
- Do not discharge any washwater to storm drains or to receiving waters without proper treatment.
- If the operator keeps animals in unpaved and uncovered areas, the ground must have either vegetative cover or some other type of ground cover, such as mulch.
- Surround the area where animals are kept with a fence or other means to prevent animals from moving away from the controlled area where BMPs are used.

A7.2 Keeping Livestock in Stables, Pens, Pastures, or Fields

This activity applies to management of all types of livestock. Manure from livestock can pollute stormwater and local water bodies. Animals that are not fenced off from creeks and streams can also cause severe erosion of stream banks, which in turn can silt up fish spawning areas. Certain areas of Pierce County require the filing of a livestock management plan. Contact the Pierce County Conservation District at (253) 845-9770 for more information and assistance in preparing such a plan. Pierce County/WSU Cooperative Extension at (253) 7987180 also has literature to help you more effectively manage your pastures and livestock.

Pollutants of Concern: Nutrients, suspended solids, oxygen demanding substances (i.e., BOD and COD), fecal bacteria.

Required BMPs

The following BMPs or equivalent measures are required of all businesses and citizens keeping livestock in stables, pens, pastures, or fields:

- Restrict animal access to creeks and streams, preferably by fencing. There are ways to fence and still allow animals drinking access to the stream, without allowing bank trampling and minimizing fecal inputs into the stream. Contact the Pierce County Conservation District for more information on fencing, including possible financing to provide such fencing. They can also help you with replanting stream banks to prevent further erosion. A minimum setback of 20-feet from the center of the streambed will be required on each side. Major tributaries and large farm ditches should be fenced as well.
- Dispose of manure from stables and pens properly. Do not pile it where rain will wash nutrients into constructed or natural stormwater drainage systems that leave your land. Place it within a bermed area to contain runoff, or cover it with a tarpaulin. It may also be placed in a grassy area as far from watercourses as possible, so that any seepage has a chance to be filtered and absorbed by the grasses before reaching a creek or stream.

Suggested BMPs

- On fields where animals are pastured, a rotational grazing system should be developed. This would mean that a field would need to be divided into a minimum of four equal units, and the stock rotated from one unit to another. The stock should not be allowed onto the pastures until the grass reaches a minimum height of 6 inches. They should be moved to the second field when the grass height is down to approximately 3-inches. Each field should be allowed to recover for a period of 21 to 28 days prior to regrazing.
- Monitor grazing carefully. If 90 percent of the plants' leaves are removed, the roots will stop growing for at least 18 days. If only 40 percent or less of the leaves are removed, the roots will continue to grow. Not only will overgrazing or overstocking limit pasture production, but the pastures become vulnerable to the invasion of unpalatable or poisonous weed species such as tussock, moss, buttercup, tansy ragwort, and thistle.
- Grazing should be discontinued starting in early October. Neither the animals nor the fields benefit from grazing during the winter. Since the plants are basically dormant, the protein content is extremely low. The fields become compacted and rutted, thus reducing soil tilth, which in turn reduces summer grass yields. Fence off a small portion of your pasture to sacrifice during winter, and feed hay and grain instead of grazing.
- Proper pasture management should also include the practices of clipping and harrowing the

fields after the stock has been removed. This is done to assure uniform growth and to avoid excessive damage to the stand and a consequent reduction in yields. This would also be the optimum time to apply fertilizer, such as manure, to the fields.

- Weed control is very important for maintaining highly productive pastures. If you follow the practices described above, you will go a long way toward effective weed control. You may occasionally need to apply herbicides, but do so judiciously. Remember that it is much easier to take care of a few thistles early on than it is to get rid of a field full.

A7.3 Log Sorting and Handling

Description of Pollutant Sources: Log yards are paved or unpaved areas where logs are transferred, sorted, debarked, cut, and stored to prepare them for shipment or for the production of dimensional lumber, plywood, chips, poles, or other products. Log yards are generally maintained at sawmills, shipping ports, and pulp mills. Typical pollutants include oil and grease, oxygen demanding substances (i.e., BOD and COD), settleable solids, total suspended solids (including soil), high and low pH, heavy metals, pesticides, wood-based debris, and leachate.

The following are pollutant sources:

1. Log storage, rollout, sorting, scaling, and cutting areas
2. Log and liquid loading areas
3. Log sprinkling
4. Debarking, bark bin, and conveyor areas
5. Bark, ash, sawdust and wood debris piles, and solid wastes
6. Metal salvage areas
7. Truck, rail, ship, stacker, and loader access areas
8. Log trucks, stackers, loaders, forklifts, and other heavy equipment
9. Maintenance shops and parking areas
10. Cleaning areas for vehicles, parts, and equipment
11. Storage and handling areas for hydraulic oils, lubricants, fuels, paints, liquid wastes, and other liquid materials
12. Pesticide usage for log preservation and surface protection
13. Application of herbicides for weed control
14. Contaminated soil resulting from leaks or spills of fluids.

Ecology's Baseline General Permit Requirements

Industries with log yards are required to obtain coverage under the Industrial Stormwater General Permit for discharges of stormwater associated with industrial activities. The permit requires preparation and onsite retention of an Industrial Stormwater Pollution Prevention Plan (SWPPP). Required and Suggested operational, source control, and treatment BMPs are presented in detail in Ecology's Guidance Document: *Industrial Stormwater General Permit Implementation Manual for Log Yards, publication No. 0410031*. It is recommended that all log yard facilities obtain a copy of this document.

A7.4 Boat Building, Mooring, Maintenance, and Repair

Description of Pollutant Sources: Sources of pollutants at boat and ship building, repair, and maintenance facilities at boatyards, shipyards, ports, and marinas include pressure washing, surface preparation, paint removal, sanding, painting, engine maintenance and repairs, and material handling and storage, if conducted outdoors.

Potential pollutants include spent abrasive grits, solvents, oils, ethylene glycol, washwater, paint over-spray, cleaners/detergents, anti-corrosive compounds, paint chips, scrap metal, welding rods, resins, glass fibers, dust, and miscellaneous trash. Pollutant constituents include total suspended solids, oil and grease, organics, copper, lead, tin, and zinc. Related activities are covered under the following activity headings in this volume, and other BMPs provided in this volume:

- A1.3 Washing, Pressure Washing, and Steam Cleaning of Vehicles/Equipment/ Building Structures
- A2.2 Fueling at Dedicated Stations
- A7.15 Spills of Oil and Hazardous Substances

Pollutant Control Approach: Apply good housekeeping, preventive maintenance, and cover and contain BMPs in and around work areas.

Required BMPs

The following BMPs or equivalent measures are required of all businesses, public agencies, and private boat owners engaged in boat building, mooring, maintenance and repair that are not covered by Ecology's NPDES Boatyard General Permit:

- Maintenance and repair activities that can be moved onshore must be moved accordingly. This action reduces some of the potential for direct pollution impact on water bodies.
- Blasting and spray painting activities must be sheltered by hanging tarps to block the wind and prevent dust and overspray from escaping. Move the activity indoors if possible. See Chapter 6 for details on Puget Sound Clean Air Agency limitations.
- Ground cloths must be used for collection of drips and spills in painting and finishing operations, and paint chips and used blasting sand from sand blasting (Figure 4.22).
- Collect spent abrasives regularly and store under cover to await proper disposal.
- Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly.

Figure 4.22. - Drop Cloth Used During Hull Sanding.

- Drain oil filters before disposal or recycling.
- Bilge water must be collected for proper disposal rather than discharged on land or water. See BMP S.2 in Chapter 5 for detail on disposal options. Several companies are available for bilge pumpout services. The problem can be avoided if oil-absorbent pads are used to capture the oil in the bilge water before or during pumping. If pads are used, they must be recycled or properly disposed of.
- Ballast water that has an oily sheen on the surface must be collected for proper disposal rather than discharged on land or water. See BMP S.2 in Chapter 5 for details on disposal options.
- Maintenance yard areas must be swept and cleaned, without hosing down the area, at least once per week or as needed. This prevents sandblasting materials, scrapings, paint chips, oils, and other loose debris from being carried away with stormwater. The collected materials must be disposed of properly. See BMP S.2 in Chapter 5 for disposal options.
- Docks and boat ramps must be swept at least once per week or as needed, and the collected materials must be disposed of properly. Dry docks must be swept before flooding.
- Paint and solvent mixing, fuel mixing and similar handling of liquids shall be performed on

shore, or such that no spillage can occur directly into surface water bodies.

- Routine cleanup materials such as oil-absorbent pads, brooms, dustpans, mops, buckets, and sponges must be stocked near docks.
- When washing, no pollutants, including soaps, may enter the stormwater drainage system or receiving water.
- Comply with BMP A2.3 and A4.2 if engine repair and maintenance are conducted.
- In the event of an accidental discharge of oil or hazardous material into waters of the state or onto land with a potential for entry into state waters, immediately notify the yard, port, or marina owner or manager, Ecology, and the National Response Center at 1-800-424-8802 (24hour). If the spill can reach or has reached marine waters, contact the U.S. Coast Guard at (206) 217-6232.

Suggested BMPs

- Boat construction and structural repair activities should be covered.
- Avoid the use of soaps, detergents, and other chemicals that need to be rinsed or hosed off in the water. If necessary, consider applying sparingly so that a sponge, towel, or rag can be used to remove residuals. Consider instead washing the boat in a suitable controlled area (see BMP A1.3 Washing, Pressure Washing, and Steam Cleaning of Vehicles/Equipment/ Building Structures) while it is out of the water.
- Materials such as paints, tools, and ground cloths should be stored indoors or in a covered area when not in use.
- Select the least toxic anti-fouling paint available.
- Boat interiors should be routinely cleaned, with proper disposal of collected materials, so that accumulations of water drained from them are not contaminated.
- Use sanders that have dust containment bags and avoid sanding in windy conditions.
- All used oil should be recycled if feasible. Most marinas now offer used oil recycling services. To dispose of filters, let drain 24 hours, then double wrap in plastic and dispose of in the regular garbage, or take them to the Tacoma Landfill Household Hazardous Waste facility for recycling. Pending state legislation may make disposal in the garbage illegal, so call the Hazardous Waste Line at 1-800-287-6429 for current information.
- Citizens for a Healthy Bay, a local environmental group, provides “Clean Bay Boating Kits.” Call them at (253) 383-2429 to obtain a free kit.
- Use one of the following treatment BMPs when paint chips or blasting grit are prevalent in the work area:
    - Infiltration basin
    - Wet pond or vault
    - Constructed wetland
    - Vegetated biofilter
    - Filtration with media designed for the pollutants that are present
    - Equivalent BMP (see Volume V).

A7.5 Logging

Description of Pollutant Sources: This activity covers logging activities that fall under the Washington State Forest Practices Act category of Class IV general forest practices. These are situations where timber harvesting is done in the process of converting forest lands into other land uses, such as home and business construction. Stormwater runoff from bare ground can be loaded with dirt and other pollutants. This material can clog ditches and stream channels, thus reducing carrying capacity and increasing flooding, as well as smothering spawning beds for fish. Simply controlling runoff and not allowing it to leave the site will prevent these harmful effects. Clearing and grading activities are covered in detail in Volume II of this manual.

Coverage under Ecology's Construction Stormwater General Permit is required for construction sites that result in the disturbance of 1 acre or more of land. Compliance with the Construction Stormwater Pollution Prevention requirements in Ecology's manual is required, as applicable. Virtually all logging operations will require a permit from the Washington State Department of Natural Resources (WDNR). Sensitive/critical areas and wetlands ordinances for Pierce County also contain requirements for logging activities in the vicinity of water bodies.

Pollutants of concern include suspended solids, oils and greases, oxygen demanding substances (i.e., BOD and COD), nutrients, toxic organic compounds, and heavy metals.

Pollutant Control Approach: Maintain required buffers adjacent to critical areas, including streams and wetlands. Keep sediments out of water bodies and off paved areas.

Required BMPs

- Vegetation along stream corridors, and adjacent to other water bodies and wetlands, must be preserved. Maintenance of a vegetated buffer enables filtration of most of the pollutants of concern for this activity. The above-mentioned ordinances contain specific requirements for buffer setbacks.
- Logging access roads must have a crushed rock or spall apron construction entrance where they join the pavement to prevent sediments from being tracked onto the pavement.
- Onsite fueling and maintenance operations must follow the required BMPs as outlined in A2.4 Mobile Fueling of Vehicles and Heavy Equipment; A2.3 Engine Repair and Maintenance; and A.4.7 Storage of Liquid Chemicals, Waste Oils, Solvents, or Petroleum Products in Portable Containers.

Suggested BMPs

- Erosion potential can be reduced by avoiding logging on steep slopes.
- If access roads are constructed for logging, they should be provided with drainage ditches that divert runoff into vegetated areas or stormwater treatment systems.
- Plant vegetated buffers in areas where they are already lost downslope of proposed logging areas, with sufficient lead time to allow for effective growth.

A7.6 Mining and Quarrying of Sand, Gravel, Rock, Minerals, Peat, Clay, and Other Materials

Description of Pollutant Sources: This activity applies to surface excavation and onsite storage of sand, gravel, and other materials that are mined. All mining operations that have stormwater runoff from the site are required to apply for a NPDES permit with Ecology. Ecology has specific BMPs required by the permit. Some additional BMPs to help meet Ecology's discharge performance standards are listed below.

Pollutants of concern are suspended solids, nutrients, pH, and metals.

Pollutant Control Approach: Provide containment and or cover for any onsite storage areas to prevent runon and discharge of suspended solids and other pollutants.

Suggested BMPs

- If the material is appropriate, use excavated spoil material to form compacted berms along downslope sides of the site to contain runoff. Berms should be seeded to promote growth of grass or other vegetation to limit erosion from the berms. Safety considerations must be examined to prevent flooding due to berm failure.
- Semi-permanent stockpiles should be seeded to promote vegetation growth to limit erosion from the stockpiles.
- Use detention ponds to promote settling of suspended solids, or infiltration basins to filter suspended solids, to cleanup runoff before it leaves the site. See Volume V for a further discussion of treatment BMPs.
- Use anchored tarps to cover stockpiles at small-scale mining operations if there is a potential for contaminated stormwater to leave the site.

A7.7 Swimming Pool and Spa Cleaning and Maintenance

Description of Pollutant Sources: This activity applies to all municipal and commercial swimming pools and spas, including Tacoma-Pierce County Health Department regulated facilities. Pools and spas at hotels, motels, and apartment and condominium complexes are covered here. Pools at single-family residences are covered in Chapter 3 of this volume. Commercial pool and spa cleaning services must follow these required BMPs for all pools they service.

Pollutants of concern include nutrients, suspended solids, chlorine, pH, and chemical oxygen demand (COD).

Discharge from pools, spas, hot tubs, and fountains can degrade ambient water quality. The waters from these sources typically contain bacteria that contaminate the receiving waters. Chemicals lethal to aquatic life such as chlorine, bromine and algaecides can be found in pools, spas, hot tubs, and fountains. These waters may be at an elevated temperature and can have negative effects on receiving waters and to aquatic life. Diatomaceous earth backwash from swimming pool filters can clog gills and suffocate fish.

Routine maintenance activities generate a variety of wastes. Chlorinated water, backwash residues, algaecides, and acid washes are a few examples. Direct disposal of these waters to stormwater drainage systems and waters of the State is not permitted without prior treatment and approval.

The quality of any discharge to the ground after proper treatment must comply with Ecology's Ground Water Quality Standards, Chapter 173-200 WAC.

The Washington State Department of Health and local health authorities regulate Water Recreation facilities which include pools, spas, and hot tubs. Owners and operators of those facilities must comply with those regulations, policies and procedures. Following the guidelines here does not exempt or supersede any requirements of the regulatory authorities.

Pollutant Control Approach: Many manufacturers do not recommend draining pools, spas, hot tubs or fountains; refer to the facility's operation and maintenance manual. Dispose of pool, spa and hot tub water to the sanitary sewer after getting preapproval from the Industrial Pretreatment Program at (253) 798-3013.

Required BMPs

- The preferred method of pool, spa or hot tub water disposal is to the sanitary sewer. If a sanitary sewer is available, all Tacoma-Pierce County Health Department regulated facilities are required to connect for draining and backwash. Contact Industrial Pretreatment Program at (253) 798-3013 for specific instructions on allowable flow rates and timing before starting to drain the pool. Never discharge pool water to a septic system, as it will cause the system to fail.
- If discharge to the sanitary sewer is not possible, pool and spa water may be discharged to a ditch or stormwater drainage system if the discharge water is:
    - Dechlorinated to a concentration of 0.1 ppm or less (some guidance on dechlorination is provided in the Department of Health's Water System Design Manual, Revised 12/09, DOH Publication 331-123. The Department of Health manual further references AWWA. 1999b. C651 – AWWA Standard for Disinfecting Water Mains. American Water Works Association, Denver, CO. and AWWA. 2002. C652 – AWWA Standard for Disinfecting

Water Storage Facilities. American Water Works Association, Denver, CO. for more details.) Contact a pool chemical supplier to obtain the neutralizing chemicals needed.

- pH-adjusted if necessary.
- Reoxygenated.
- Volumetrically and velocity controlled to prevent resuspension of sediments.
- Free of any filter media.
- Free of acid cleaning wastes.
- At a temperature that will prevent an increase in temperature in the receiving water. Cool heated water prior to discharge.
- Released at a rate that can be accommodated by the receiving body (i.e. can infiltrate or be safely conveyed).

- Swimming pool cleaning wastewater and filter backwash shall not be discharged to the Pierce County stormwater system. You are required to contact Pierce County Surface Water Management at (253) 7982725 prior to discharge for instructions on allowable flow rates for the system or ditch that is being discharged to. Neutralizing chemicals are available for dechlorinating water. Letting the pool, spa or hot tub "sit" may also reduce chlorine levels. Use a test kit to determine if the concentration has reached zero.
- State law may allow discharges of pool water to the ground. However, the water must not cross property lines or impact neighboring properties, and a satisfactory means for distributing the water to the ground must be used so there is no runoff. Check with Ecology prior to release.
- Diatomaceous earth used in pool filters cannot be discharged to surface waters, stormwater drainage systems, or septic systems, or on the ground.
- Ensure that the pool/spa/hot tub/fountain system is free of leaks and operates within the design parameters.
- Do not provide any permanent links to stormwater drainage systems. All connections should be visible and carefully controlled.
- If the dechlorination or cooling process selected requires the water to be stored for a time, it should be contained within the pool or appropriate temporary storage container.

Suggested BMPs

- Hire a professional pool-draining service to collect all pool water for offsite disposal.
- Clean the pool, spa, hot tub, or fountain regularly, maintain proper chlorine levels and maintain water filtration and circulation. Doing so will limit the need to drain the facility.
- Manage pH and water hardness to reduce copper pipe corrosion that can stain the facility and pollute receiving waters.
- Before using copper algaecides, try less toxic alternatives. Only use copper algaecides if the others alternative do not work. Ask a pool/spa/hot tub/fountain maintenance service or store for help resolving persistent algae problems without using copper algaecides.
- Develop and regularly update a facility maintenance plan that follows all discharge requirements.

- Dispose of unwanted chemicals properly. Many of them are hazardous wastes when discarded.

A7.8 De-icing and Anti-icing Operations for Airports and Streets

Description of Pollutant Sources: De-icing and/or anti-icing compounds are used on highways, streets, airport runways, and on aircraft to control ice and snow. Typically ethylene glycol and propylene glycol are de-icing chemicals used on aircraft. De-icing chemicals commonly used on highways and streets include calcium magnesium acetate (CMA), calcium chloride, magnesium chloride, sodium chloride, urea, and potassium acetate. The de-icing and anti-icing compounds become pollutants when they are conveyed to storm drains or to surface water after application. Leaks and spills of these chemicals can also occur during their handling and storage.

BMPs for Airport De/anti-icing Operations

Pollutant Control Approach for Aircraft: Spent glycol discharges in aircraft application areas are regulated process wastewaters under Ecology's Industrial Stormwater General Permit. BMPs for aircraft anti-icing chemicals must be consistent with aviation safety and the operational needs of the aircraft operator.

Refer to 40 CFR Part 449 for EPA effluent limitations guidelines and new source performance standards to control discharges of pollutants from airport deicing operations.

Required BMPs for Aircraft:

- Conduct aircraft de-icing or anti-icing applications in impervious containment areas. Collect aircraft de-icing spent chemicals, such as glycol, draining from aircraft in de-icing or anti-icing application areas and convey to a sanitary sewer, treatment, or other approved disposal or recovery method. Contact the Industrial Pretreatment Program at (253) 7983013 to obtain permit for discharges to sanitary sewer. Divert de-icing runoff from paved gate areas to appropriate collection areas or conveyances for proper treatment or disposal.
- Do not discharge spent de-icing chemicals or stormwater contaminated with aircraft de-icing chemicals from application areas including gate areas, into storm drains. No discharge to surface water or groundwater, directly or indirectly, should occur.
- Transfer de-icing and anti-icing chemicals on an impervious containment pad, or equivalent spill/leak containment area, and store in secondary containment areas (see Storage of Liquids in Aboveground Tanks).

Suggested BMPs for Aircraft:

Establish a centralized aircraft de/anti-icing facility, if feasible and practicable, or in designated areas of the tarmac equipped with separate collection drains for the spent de-icing liquids.

- Consider installing an aircraft de/anti-icing chemical recovery system, or contract with a chemical recycler, if practicable.

Note: the applicable containment BMP of aircraft de/anti-icing applications, and applicable treatment BMPs for anti-icing spent chemicals such as glycols.

Required BMPs for Airport Runways/Taxiways:

- Avoid excessive application of all de/anti-icing chemicals, which could contaminate stormwater.
- Store and transfer de/anti-icing materials on an impervious containment pad or an equivalent containment area and/or under cover in accordance with BMP Storage or Transfer (Outside) of Solid Raw Materials, By-Products, or Finished Products in this volume.

Consider other material storage and transfer approaches only if the anti-icing material cannot reach surface or groundwater.

Suggested BMPs for Airport Runways/Taxiways:

- Include limits on toxic materials and phosphorous in the specifications for de/anti-icing chemicals, where applicable.
- Consider using anti-icing materials rather than de-icing if it will result in less adverse environmental impact.
- Select cost-effective de/anti-icing chemicals that cause the least adverse environmental impact.

BMPs for Streets/Highways

Required BMPs for Streets/Highways:

- Select de/ anti-icing chemicals that cause the least adverse environmental impact. Apply only as needed using minimum quantities.
- Where practicable, use roadway de-icing, such as calcium magnesium acetate, potassium acetate, or similar materials that cause less adverse environmental impact than urea and sodium chloride.
- Store and transfer de/anti-icing materials on an impervious containment pad in accordance with BMP Storage or Transfer (Outside) of Solid Raw Materials, By-Products, or Finished Products in this volume.
- Sweep/cleanup accumulated de/and anti-icing materials and grit from roads as soon as possible after the road surface clears.

Suggested BMPs for Streets/Highways:

- Intensify roadway cleaning in early spring to help remove particulates from road surfaces.
- Include limits on toxic metals in the specifications for anti-icing chemicals.

A7.9 Roof Vents and Building Drains at Manufacturing and Commercial Buildings

Description of Pollutant Sources: Stormwater runoff from roofs and sides of manufacturing and commercial buildings can be sources of pollutants caused by leaching of roofing materials, vent emissions to the roof and/or the accumulation of pollutants on roofs, and other air emission sources. Processes of special concern are stone cutting, metal grinding, spray painting, painting stripping, galvanizing and electroplating. Pollutants from these processes may build up on roofs and may pollute stormwater roof runoff.

Vapors and entrained liquid and solid droplets/particles have been identified as potential pollutants in roof/building runoff. Metals, solvents, acidic/alkaline pH, oxygen demanding substances (i.e., BOD and COD), and organics are some of the pollutant constituents identified.

Ecology has performed a study on zinc in industrial stormwater. The study is presented in Ecology Publication 08-10-025 Suggested Practices to reduce Zinc Concentrations in Industrial Stormwater Discharges at fortress.wa.gov/ecy/publications/publications/0810025.pdf. The user should refer to this document for more details on addressing zinc in stormwater.

Pollutant Control Approach: Evaluate the potential sources of stormwater pollutants and apply source control BMPs where feasible.

Required BMPs

- Identify processes that are vented and may contribute pollutants to the roof. Pollutants of concern include and are not limited to:
  - Metal dust
  - Grease from food preparation
  - Solvents
  - Hydrocarbons
  - Fines
  - Stone dust
- Look for chemical deposition around vents, pipes, and other surfaces.
- Install and maintain appropriate source control measures such as air pollution control equipment (filters, scrubbers, and other treatment).
  - Check that your scrubber solution is appropriate for the chemistry of the fumes.
  - Install vent covers and drip pans where there are none.
  - Prevent leaks in pipefittings and containment vessels with routine maintenance.
- Consider instituting operational or process changes to reduce pollution.
- If proper installation and maintenance of air pollution control equipment does not prevent pollutant fallout on your roof, additional treatment of the roof runoff may be necessary.
  - Install/provide appropriate devices for roof runoff before it is discharged off site. This may include approved water quality treatment BMPs or structural stormwater treatment systems.

- Maintain air filters and pollution control equipment on a regular basis to ensure they are working properly. (The smell of odors from outside the building indicates that the pollution control equipment may need maintenance or evaluation.)
- When cleaning accumulated emissions from roof tops, collect the washwater and loose materials using a sump pump, wet vacuum or similar device. The collected runoff may be discharge to the sanitary sewer, subject to approval by the Pierce County Industrial Pretreatment Program at (253) 798-3013 or have a waste disposal company remove it.
- If leachates and/or emissions from buildings are suspected sources of stormwater pollutants, then sample and analyze the stormwater draining from the building.
- Sweep the area routinely to remove any zinc residuals.
- If a roof/building stormwater pollutant source is identified, implement appropriate source control measures such as air pollution control equipment, selection of materials, operational changes, material recycle, process changes, etc.
- Bare galvanized metal shall not be used for materials that convey stormwater, such as roofs, canopies, siding, gutters, downspouts, roof drains, and pipes. Any galvanized materials shall have an inert, non-leachable finish, such as a baked enamel, fluorocarbon paint (such as Kynar or Hylar), factory-applied epoxy, pure aluminum, or asphalt coating. Acrylic paint, polyester paint, field-applied, and Galvalume coatings are not acceptable. Paint/coat the galvanized surfaces as described in Ecology Publication # 08-10-025.

A7.10 Urban Streets

Description of Pollutant Sources: Streets can be the sources of vegetative debris, paper, fine dust, vehicle liquids, tire wear residues, heavy metals (lead and zinc), soil particles, ice control salts, domestic wastes, lawn chemicals, and vehicle combustion products. Street surface contaminants have been found to contain significant concentrations of particle sizes less than 250 microns (Sartor and Boyd 1972).

Pollutant Control Approach: Conduct efficient street sweeping where and when appropriate to minimize the contamination of stormwater. Do not wash street debris into storm drains.

Suggested BMPs

- For maximum stormwater pollutant reductions on curbed streets and high volume parking lots, use efficient vacuum sweepers.

  Note: High-efficiency street sweepers utilize strong vacuums and the mechanical action of main and gutter brooms combined with an air filtration system that only returns clean air to the atmosphere (i.e., filters very fine particulates). They sweep dry and use no water since they do not emit any dust.

  High-efficiency vacuum sweepers have the capability of removing, 80 percent or more of the accumulated street dirt particles whose diameters are less than 250 microns (Sutherland 1998). This assumes pavements under good condition and reasonably expected accumulation conditions.

- For moderate stormwater pollutant reductions on curbed streets, use regenerative air sweepers or tandem sweeping operations.

  Note: A tandem sweeping operation involves a single pass of a mechanical sweeper followed immediately by a single pass of a vacuum sweeper or regenerative air sweeper.

  - A regenerative air sweeper blows air down on the pavement to entrain particles and uses a return vacuum to transport the material to the hopper.
  - These operations usually use water to control dust. This reduces their ability to pick up fine particulates.

  These types of sweepers have the capability of removing approximately 25 to 50 percent of the accumulated street dirt particles whose diameters are less than 250 microns (Sutherland 1998). This assumes pavements under good conditions and typical accumulation conditions.

- For minimal stormwater pollutant reductions on curbed streets, use mechanical sweepers.

  Note: The industry refers to mechanical sweepers as broom sweepers and uses the mechanical action of main and gutter brooms to throw material on a conveyor belt that transports it to the hopper.

  These sweepers usually use water to control dust. This reduces their ability to pick up fine particulates.

  Mechanical sweepers have the capability of removing only 10 to 20 percent of the accumulated street dirt particles whose diameters are less than 250 microns (Sutherland 1998). This assumes pavements under good condition and the most favorable accumulation conditions.

- Conduct vacuum sweeping at optimal frequencies. Optimal frequencies are those scheduled sweeping intervals that produce the most cost-effective annual reduction of pollutants normally found in stormwater and can vary depending on land use, traffic volume, and rainfall patterns.
- Train operators in those factors that result in optimal pollutant removal. These factors include sweeper speed, brush adjustment and rotation rate, sweeping pattern, maneuvering around parked vehicles, and interim storage and disposal methods.
- Consider the use of periodic parking restrictions in low to medium density single-family residential areas to ensure the sweeper's ability to sweep along the curb.
- Establish programs for prompt vacuum sweeping, removal, and disposal of debris from special events that will generate higher than normal loadings.
- Disposal of street sweeping solids must comply with "Recommendations for Management of Street Wastes" described in Appendix IVC of this volume.
- Inform citizens about the importance of eliminating yard debris, oil, and other wastes in street gutters in order to reduce street pollutant sources.

A7.11 Railroad Yards

Description of Pollutant Sources: Pollutant sources can include:

- Drips/leaks of vehicle fluids onto the railroad bed
- Human waste disposal
- Litter
- Locomotive/railcar/equipment cleaning
- Fueling
- Outside material storage
- The erosion and loss of soil particles from the railroad bed
- Maintenance and repair activities at railroad terminals, switching yards, and maintenance yards
- Herbicides used for vegetation management

Waste materials can include waste oil, solvents, degreasers, antifreeze solutions, radiator flush, acids, brake fluids, soiled rags, oil filters, sulfuric acid and battery sludges, machine chips with residual machining oil, and toxic fluids/solids lost during transit. Potential pollutants include oil and grease, total suspended solids, oxygen demanding substances (i.e., BOD and COD), organics, pesticides, and metals.

Pollutant Control Approach: Apply good housekeeping and preventive maintenance practices to control leaks and spills of liquids in railroad yard areas.

Required BMPs

- Implement the applicable BMPs in this chapter depending on the pollution generating activities/sources at a railroad yard facility.
- Do not allow discharge to outside areas from toilets while a train is in transit. Use pumpout facilities to service these units.
- Use drip pans at hose/pipe connections during liquid transfer and other leak-prone areas (BMP A2.1).
- During maintenance do not discard debris or waste liquids along the tracks or in railroad yards.

In areas subjected to leaks/spills of oils or other chemicals, convey stormwater to appropriate treatment such as a sanitary sewer (if approved by Pierce County Industrial Pretreatment Program at (253) 7983013), to an API or coalescent plate oil/water separator for floating oils, or other appropriate treatment BMP (as approved by Pierce County). See Volume V.

A7.12 Maintenance of Public and Utility Corridors and Facilities

Description of Pollutant Sources: Passageways and equipment at petroleum product, natural gas, and water pipelines and electrical power transmission corridors and rights-of-way can be sources of pollutants, such as herbicides used for vegetation management and eroded soil particles from unpaved access roads. At pump stations, waste materials generated during maintenance activities may be temporarily stored outside. Additional potential pollutant sources include the leaching of preservatives from wood utility poles, PCBs in older transformers, water that is removed from underground transformer vaults, and leaks/spills from petroleum pipelines. The following are potential pollutants: oil and grease, total suspended solids, oxygen demanding substances (i.e., BOD and COD), organics, PCB, pesticides, and heavy metals.

Pollutant Control Approach: Control of fertilizer and pesticide applications, soil erosion, and site debris that can contaminate stormwater.

Required BMPs

- Implement BMPs included in Chapter 4, Section 4.3, A3.6 Landscaping and Lawn/Vegetation Management and in Chapter 6, Section 6.2, R.6 Pesticide Regulations.
- When removing water or sediments from electric transformer vaults, determine the presence of contaminants before disposing of the water and sediments. This includes inspecting for the presence of oil or sheen, and determining from records or testing if the transformers contain PCBs. If records or tests indicate that the sediments or water are contaminated above applicable levels, manage these media in accordance with applicable federal and state regulations, including the federal PCB rules (40 CFR 761) and the state MTCA cleanup regulations (Chapter 173340 WAC). Water removed from the vaults can be discharged in accordance with the federal 40 CFR 761.79, and state regulations (Chapter 173201A WAC and Chapter 173200 WAC), or via the sanitary sewer if the requirements, including applicable permits, for such a discharge are met. (See also Chapter 6, Section 6.2R2).
- Within utility corridors, prepare maintenance procedures to minimize the erosion of soil. An implementation schedule may provide for vegetative, gravel, or equivalent cover that minimizes bare or thinly vegetated ground surfaces within the corridor.
- Provide maintenance practices to prevent stormwater from accumulating and draining across and/or onto roadways. Convey stormwater through roadside ditches and culverts. The road should be crowned, outsloped, water barred, or otherwise left in a condition not conducive to erosion. Appropriately maintaining grassy roadside ditches discharging to surface waters is an effective way of removing some pollutants associated with sediments carried by stormwater.
- Maintain ditches and culverts at an appropriate frequency to ensure that plugging and flooding across the roadbed, with resulting overflow erosion, does not occur.
- Apply the appropriate BMPs from Section A4 of this volume, Storage Activities, for the storage of waste materials that can contaminate stormwater.

Suggested BMPs

- When selecting utility poles for a specific location, consider the potential environmental effects of the pole or poles during storage, handling, and end-use, as well as its cost, safety, efficacy, and expected life. Use wood products treated with chemical preservatives

made in accordance with generally accepted industry standards such as the American Wood Preservers Association Standards. Consider alternative materials or technologies if placing poles in or near an environmentally sensitive area, such as a wetland or a drinking water well. Alternative technologies include poles constructed with material(s) other than wood, such as fiberglass composites, metal, or concrete. Consider other technologies and materials, such as sleeves or caissons for wood poles, when they are determined to be practicable and available.

- As soon as practicable, remove all litter from wire cutting/replacing operations.
- Implement temporary erosion and sediment control in areas cleared of trees and vegetation and during the construction of new roads.

A7.13 Maintenance of Roadside Ditches

Description of Pollutant Sources: Common road debris including eroded soil, oils, vegetative particles, and heavy metals can be sources of stormwater pollutants.

Pollutant Control Approach: Maintain roadside ditches to preserve the condition and capacity for which they were originally constructed, and to minimize bare or thinly vegetated ground surfaces. Maintenance practices should provide for ESC (refer to Activity A3.6 Landscaping and Lawn/ Vegetation Management).

Required BMPs

- Inspect roadside ditches regularly to identify sediment accumulations and localized erosion.
- Clean ditches on a regular basis, as needed. Keep ditches free of rubbish and debris.
- Vegetation in ditches often prevents erosion and cleanses runoff waters. Remove vegetation only when flow is blocked or excess sediments have accumulated. Conduct ditch maintenance (seeding, fertilizer application, harvesting) in late spring and/or early fall, where possible. This allows re-establishment of vegetative cover by the next wet season, thereby minimizing erosion of the ditch as well as making the ditch effective as a biofilter.
- In the area between the edge of the pavement and the bottom of the ditch, commonly known as the “bare earth zone,” use grass vegetation, wherever possible. Establish vegetation from the edge of the pavement, if possible, or at least from the top of the slope of the ditch.
- Maintain diversion ditches on top of cut slopes constructed to prevent slope erosion by intercepting surface drainage to retain their diversion shape and capability.
- Do not leave ditch cleanings on the roadway surfaces. Sweep, collect, and dispose of dirt and debris remaining on the pavement at the completion of ditch cleaning operations.
- Roadside ditch cleanings contaminated by spills or other releases known or suspected to contain dangerous waste must be handled following the Dangerous Waste Regulations (Chapter 173303 WAC). If testing determines materials are not dangerous waste but contaminants are present, consult with the Tacoma-Pierce County Health Department (253) 798-6047 for disposal options.
- Inspect culverts on a regular basis for scour or sedimentation at the inlet and outlet, and repair as necessary. Give priority to those culverts conveying perennial and/or salmon-bearing streams and culverts near streams in areas of high sediment load, such as those near subdivisions during construction.

Suggested BMPs

- Install biofiltration swales and filter strips to treat roadside runoff wherever practicable and use engineered topsoils wherever necessary to maintain adequate vegetation. These systems can improve infiltration and stormwater pollutant control upstream of roadside ditches. Refer to Volume V of this manual for additional information about biofiltration swales and filter strips.
- Consider screening roadside ditch cleanings not contaminated by spills or other releases and not associated with a stormwater treatment system such as a bioswale may be screened to remove litter. Separate screenings into soil and vegetative matter (leaves,

grass, needles, branches, etc.) categories. Compost or dispose of the vegetative matter in a municipal waste landfill. Consult the Tacoma-Pierce County Health Department (253) 7986047 to discuss use or disposal options for the soil portion. For more information, please see “Recommendations for Management of Street Wastes,” in Appendix IVC of this volume.

A7.14 Maintenance of Stormwater Drainage and Treatment Facilities

Description of Pollutant Sources: Facilities include roadside catch basins on arterials and within residential areas, conveyance systems, detention facilities such as ponds and vaults, oil and water separators, bioretention, biofilters, settling basins, infiltration systems, and all other types of stormwater treatment systems presented in Volume V. Oil and grease, hydrocarbons, debris, heavy metals, sediments, and contaminated water are found in catch basins, oil and water separators, settling basins, etc.

Pollutant Control Approach: Provide maintenance and cleaning of debris, sediments, and oil from stormwater collection, conveyance, and treatment systems to obtain proper operation.

Required BMPs

Maintain stormwater treatment facilities per the operations and maintenance (O&M) procedures presented in Volume I, Appendix IA, in addition to the following BMPs:

- Inspect and clean treatment BMPs, conveyance systems, and catch basins (Figure 4.23) as needed, and determine necessary O&M improvements.

Figure 4.23. - Catch Basin Cleaning with a Vacuum Truck.

- Promptly repair any deterioration threatening the structural integrity of stormwater facilities. These include replacement of clean-out gates, catch basin lids, and rock in emergency spillways.
- Ensure adequacy of storm drain capacities and prevent heavy sediment discharges to the sanitary sewer system.

- Regularly remove debris and sludge from BMPs used for peak-rate control, treatment, etc. and truck to an appropriate local or state government approved disposal site.
- Clean catch basins in accordance with the information provided in Volume I, Appendix IA. Additional information is also included in Chapter 5 of this volume, BMP S.9 Cleaning Catch Basins.
- Clean woody debris in a catch basin as frequently as needed to ensure proper operation of the catch basin.
- Include notifications, e.g., "Only Rain Down the Drain/Puget Sound Starts Here," "Dump No Waste – Drains to Groundwater," "Streams," "Lakes." Emboss on or adjacent to all storm drain inlets *where practical* (Figure 4.24).

Figure 4.24. - "Dump No Waste" Storm Drain Stencil.

(Photo courtesy of Seattle Public Utilities)

- Disposal of sediments and liquids from catch basins must comply with "Recommendations for Management of Street Wastes" described in Appendix IVC of this volume.
- Select additional applicable BMPs from this chapter depending on the pollutant sources and activities conducted at the facility. Those BMPs include:
  - A4.7 – Storage of Liquid, Food Waste, or Dangerous Waste Containers
  - A6.3 – Soil ESC at Industrial Sites
  - A7.10 – Urban Streets
  - A7.15 – Spills of Oil and Hazardous Substances.
- Eliminate illicit connections to the stormwater drainage system. See BMP S.1 in Chapter 5 for details on detecting and eliminating these connections.

A7.15 Spills of Oil and Hazardous Substances

Description of Pollutant Sources: Federal law requires owners or operators of facilities engaged in drilling, producing, gathering, storing, processing, transferring, distributing, refining or consuming oil and/or oil products to have a Spill Prevention and Emergency Cleanup Plan (SPECP). The SPECP is required if the above ground storage capacity of the facility is 1,320 gallons or more of oil. Additionally, the SPECP is required if any single container with a capacity in excess of 660 gallons and which, due to their location, could reasonably be expected to discharge oil in harmful quantities, as defined in 40 CFR.

Part 110, into or upon the navigable waters of the United States or adjoining shorelines'

{40 CFR 112.1(b)}. Onshore and offshore facilities, which, due to their location, could not reasonably be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines are exempt from these regulations {40 CFR 112.1(1)(i)}. State Law requires owners of businesses that produce dangerous wastes are also required by state law to have a SPECP. These businesses should refer to Chapter 6, Section 6.2, R2. The federal definition of oil is oil of any kind or any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

Pollutant Control Approach: Maintain, update, and implement a Spill Prevention and Emergency Cleanup Plan.

Required BMPs

- Prepare a Spill Prevention and Emergency Cleanup Plan (SPECP), which includes:
  - A description of the facility including the owner's name and address.
  - The nature of the activity at the facility.
  - The general types of chemicals used or stored at the facility.
  - A site plan showing the location of storage areas for chemicals, the locations of storm drains, the areas draining to them, and the location and description of any devices to stop spills from leaving the site such as positive control valves.
  - Cleanup procedures.
  - Notification procedures to be used in the event of a spill, such as notifying key personnel. Agencies such as Ecology, Pierce County Fire District, Washington State Patrol, Pierce County, U.S. Coast Guard, and the U.S. EPA shall be notified.
  - The name of the designated person with overall spill cleanup and notification responsibility.
- Train key personnel in the implementation of the SPECP. Prepare a summary of the plan and post it at appropriate points in the building, identifying the spill cleanup coordinators, location of cleanup kits, and phone numbers of regulatory agencies to contact in the event of a spill.
- Update the SPECP regularly.
- Immediately notify Ecology and Pierce County if a spill may reach sanitary sewer or storm drain, groundwater, or surface water, in accordance with federal and Ecology spill reporting requirements.

- Immediately cleanup spills. Do not use emulsifiers for cleanup unless there is an appropriate disposal method for the resulting oily wastewater. Do not wash absorbent material down a floor drain or into a storm drain.
- Locate emergency spill containment and cleanup kit(s) in high potential spill areas. The contents of the kit shall be appropriate for the type and quantities of chemical liquids stored at the facility (Figure 4.25).

Figure 4.25. - Example of Spill Kit Contents.

(Photo courtesy of Seattle Public Utilities)

Suggested BMP

- Spill kits should include appropriately lined drums, absorbent pads, and granular or powdered materials for neutralizing acids or alkaline liquids where applicable. In fueling areas: Package absorbent material in small bags for easy use and make available small drums for storage of absorbent and/or used absorbent. Deploy spill kits in a manner that allows rapid access and use by employees.

A7.16 Well, Utility, Directional and Geotechnical Drilling

Description of Pollutant Sources: This activity applies to drilling water wells and utilities, environmental protection and monitoring wells, and geotechnical borings that use machinery in the drilling. It does not apply to the use of devices such as hand augers, or for large structural drilling such as drilled shafts.

Drilling activities can expose soil and contaminated soil. These activities may cause the discharge of stormwater contaminated with sediments and other contaminates. This risk increases when drilling in areas with contaminated soils.

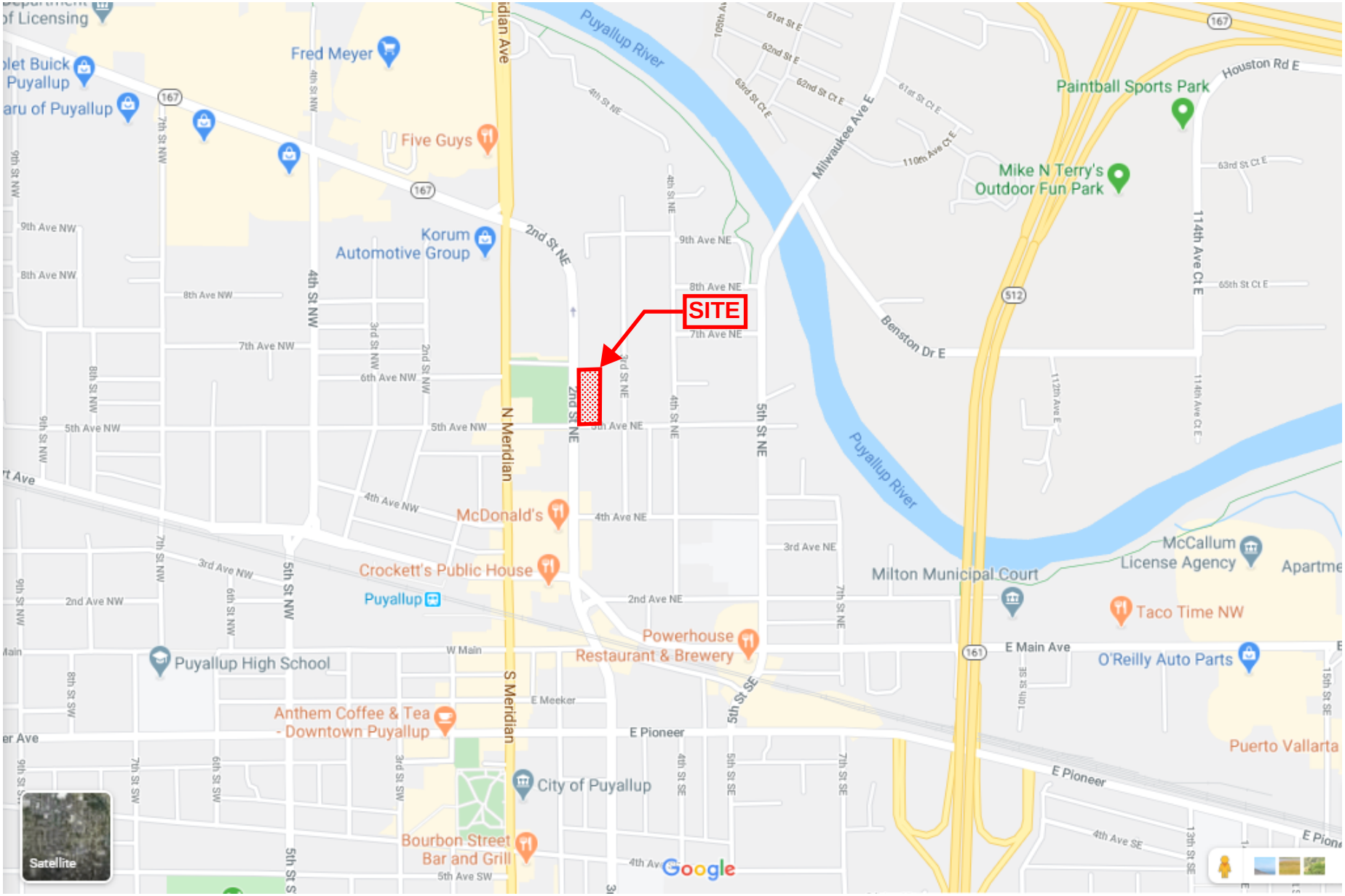
Pollutant Control Approach: Reduce sediment runoff from drilling operations.

Required BMPs:

- When drilling in areas of known or suspected soil contamination, test and characterize soil cuttings and accumulated sediment to determine proper management and disposal methods. If applicable, generator knowledge may be used to characterize the soil cuttings and accumulated sediment.
- Obtain permits for drilling activities and for clearing and grading the access routes and the work site.
- Protect environmentally sensitive areas (streams, wetlands, floodplains, floodways, erosion hazards, and landslide hazards) within the area of influence of the work site.
- Mitigate potential impacts to surrounding areas and/or the drainage system.
- For horizontal directional drilling, take measures to capture and contain drilling fluids and slurry.
- Equip the driller to quickly respond to unusual conditions that may arise.
- Locate and prepare access roadways to minimize the amount of excavation and the potential for erosion.
- Contain accumulated uncontaminated water and sediment on site and pump into a storage tank or direct through a geotextile filtration system (or equivalent system) before discharging to the surrounding ground surface. Contaminants may include, but are not limited to, hydraulic fluids, contaminants in the soil and/or groundwater, polymers, and other drilling fluid additives.
- Keep all sediment-laden water out of storm drains and surface waters. If sediment-laden water does escape from the immediate drilling location, block flow to any nearby waterways or catch basins using fabric, inlet protections, sandbags, erosion fences, or other similar methods. Immediately notify Pierce County Surface Water Management at (253) 798-2725 and/or Ecology at 1-800-424-8802 if sediment-laden water impacts the storm drain system or surface waters.
- Divert any concentrated flows of water into the site using sandbags or check dams up-slope from the site.
- Dispose of soil cuttings and accumulated sediment appropriately. If cuttings or other soils disturbed in the drilling process are to be temporarily stockpiled on site, they must be covered and surrounded by a berm or filter device. See Activity A4.1 for Storage or Transfer (Outside) of Solid Raw Materials, Byproducts, or Finished Products.

- Stabilize exposed soils at the end of the job using mulch or other erosion control measures. See Activity A6.3 for Soil Erosion and Sediment Control at Industrial Sites.
- Contain spent drilling slurry on site and allow it to dewater, or haul to an appropriate, approved disposal site.
- Restore disturbed areas with mulch (see BMP C121: Mulching) and seeding or hydroseeding (see BMP C120: Temporary and Permanent Seeding).

Exhibit C



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PUYALLUP 2ND STREET APARTMENTS
2190606.10

VICINITY MAP

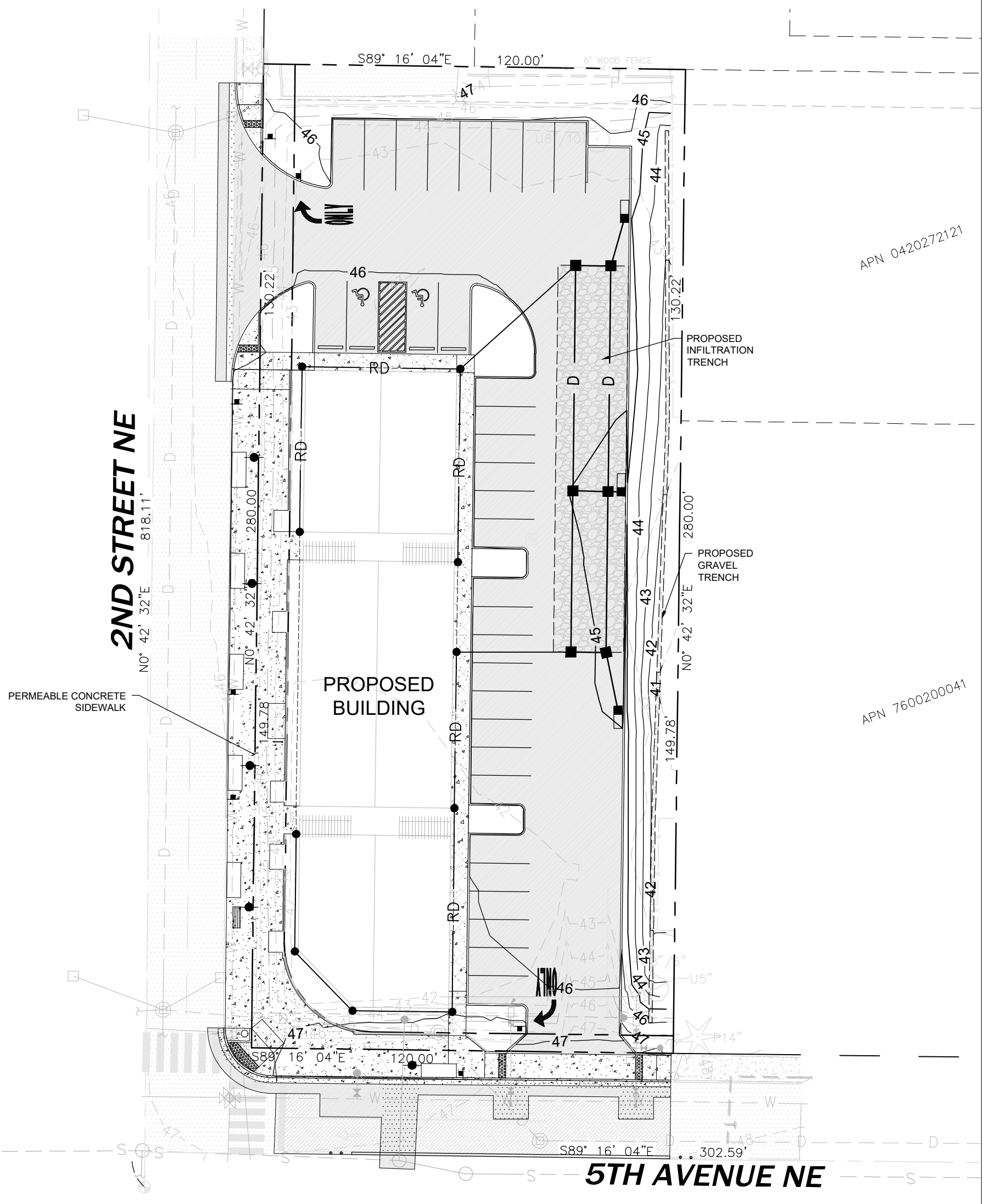
EXHIBIT C-1

N

GRAPHIC SCALE

0 15 30 60

1" = 30 FEET



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DEVELOPED CONDITIONS MAP

C-2