City of Tumwater
Drainage Design and Erosion Control Manual

Volume IV -
Source Control

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Prepared for
City of Tumwater

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Chapter 1 – Introduction

1.1 What Is the Purpose of this Volume?

This volume of the Drainage Design and Erosion Control Manual helps businesses, homeowners and public agencies in Tumwater implement source control best management practices (BMPs) to prevent pollutants from contaminating stormwater runoff and entering rivers, lakes, and streams. BMPs included in this volume should be selected and incorporated into project stormwater planning documentation.

1.2 How this Volume Is Organized

Volume IV is organized into eight chapters and three appendices:

- Chapter 1: Introduction and first steps
- Chapter 2: Principles of pollution prevention
- Chapter 3: Commercial and Industrial Activities Worksheet
- Chapter 4: Industrial and Commercial BMPs
- Chapter 5: Source Control BMPs
- Chapter 6: Single Family Residence BMPs
- Chapter 7: Regulations and Requirements
- Chapter 8: Contact and Reference Information
- Appendix A: Recycling and Disposal of Vehicle Fluids and Other Wastes
- Appendix B: Example of an Integrated Pest Management Program
- Appendix C: Recommendations for Management of Street Wastes

1.3 How Do I Know What Applies to My Project?

The implementation of BMPs applies to all businesses, residences and public agencies in Tumwater that discharge stormwater under the provisions of the federal Clean Water Act (CWA) and Coastal Zone Management Act, the City of Tumwater's National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit, and the Puget Sound Partnership Action Agenda. It includes all permanent and temporary activities at public facilities, commercial and industrial facilities, agriculture and livestock farms, and residential dwellings. Anyone involved in a particular activity, whether they do so as an employee, supervisor, manager, landlord, tenant, or homeowner, must take part in implementing appropriate BMPs. BMPs need to be selected from this volume. Tumwater

complies with the Endangered Species Act and all other relevant federal regulations in this effort.

Operators under Ecology's Industrial Stormwater General Permit (ISGP), Boatyard General Permit, or Sand and Gravel General Permit should use this volume to identify required and suggested operational and structural source control BMPs for inclusion in their Stormwater Pollution Prevention Plans (SWPPPs). Operators of commercial, industrial, and multifamily properties not under an Ecology permit should use this volume in developing their SWPPPs.

1.4 When in the Design Process Should I Consult this Volume?

Source control is the practice of preventing pollution at its source and is the most efficient way of maintaining stormwater quality. Source control, or preventive measures, is usually much less expensive and more effective than treating runoff once it has been polluted. Daily operations of facilities and households directly influence source control. Therefore, it is highly recommended that you read all relevant sections of this volume if a potential pollution problem is identified or prior to designing any stormwater treatment facilities. For projects completing the full design process, the "Source Control Worksheet for Commercial and Industrial Activities" in Chapter 3 will be initially submitted and discussed in the **Drainage Scoping Process Meeting**, with updated submittals and appropriate supplemental materials in the **Preliminary Drainage Control Plan** and **Final Drainage Control Plan**.

1.5 What Pollutants Are Addressed in this Volume?

The NPDES permit mentioned above requires the city to show progress in eliminating virtually all non-stormwater discharges to the stormwater drainage system. In other words, **nothing but uncontaminated stormwater may be discharged** to any stormwater drainage system. There are severe state and federal penalties for anyone violating the terms of these permits. See Tumwater Municipal Code (TMC) Chapter 13.12.020, *Stormwater Management*, for more information. **You must keep pollutants from leaving your property and entering the county stormwater drainage system.**

The pollutant descriptions provided below are brief. You can obtain more information on a particular pollutant by calling one of the information numbers listed in Chapter 8.

1.5.1 pH

The pH value is a relative measure of whether a substance is acidic or basic. The pH value of a body of water is vitally important, since most aquatic life can only live within a relatively narrow band of pH values (6 to 8). Some sources that can contribute to a change in pH of stormwater and water bodies are cement in concrete pouring, paving, and recycling operations; solutions from metal plating; chemicals from printing businesses and other industrial processes; and household cleaners such as bleaches and deck washes.

1.5.2 Total Suspended Solids (TSS)

This represents particulate solids such as eroded soil, heavy metal precipitates, and biological solids (all considered as conventional pollutants), which can cause turbidity in receiving waters and sedimentation in streams and lakes. Sediment is the most common pollutant present in stormwater runoff. These sediments can destroy the desired habitat for fish and can impact drinking water supplies. The sediment may be carried to streams, lakes, or the Puget Sound where they may be toxic to aquatic life and make dredging necessary.

1.5.3 Oils and Greases

Oils and greases are petroleum-based or food-related. Petroleum-based compounds can be immediately toxic to fish and wildlife and, if they reach drinking water aquifers, make humans sick too. Food-based oils and greases may not be toxic to us, but they can coat fish gills and insects, suffocating them.

1.5.4 Oxygen-Demanding Substances

Degradable organic matter, such as yard, food, and pet wastes, and some chemical wastes, can have a drastic effect on water quality if they are allowed to enter stormwater. As these substances are broken down by bacteria, the oxygen in the water is consumed in the process. This stresses and can eventually kill fish and other creatures in the water. Chemical oxygen demand (COD) and biological oxygen demand (BOD) are two parameters that indicate the amount of oxygen that is used up by various pollutants.

1.5.5 Metals

Metals are utilized in many products important to our daily lives. Certain metals, known as heavy metals, wear off from our car brakes and tires, and come from the paint and moss-killing roof strips and herbicides we use at our homes. These metals can cause severe health and reproductive problems in fish and animals that live in water and sediments that become contaminated by runoff.

1.5.6 Bacteria and Viruses

Bacteria and viruses from pet wastes, failing septic systems and agricultural areas can contaminate drinking water and can close swimming and shellfish areas. A group of bacteria called **fecal coliform bacteria** are typically used as the indicators for pollution by more serious disease-causing microorganisms. The Washington State Department of Ecology (Ecology) has made changes to the State Water Quality Standards that include the use of new bacterial indicators: *E. coli* for fresh water and enterococci for marine water will replace fecal coliform bacteria, except that fecal coliform will still be used for marine waters that contain shellfish beds.

1.5.7 Nutrients

In the context of water quality, nutrients are mainly compounds of nitrogen and phosphorus. When nutrients are allowed to enter water bodies, undesirable effects such as algae overgrowth, oxygen depletion, channel clogging due to overgrowth of vegetation,

and fish and animal death can occur. Sources of nutrients can include fertilizers, failing septic systems, and yard and animal wastes.

1.5.8 Toxic Organic Compounds

A number of organic chemicals are toxic when they get into the aquatic environment. Many pesticides, herbicides, rodenticides, and fungicides are deadly to aquatic life. The same is true of compounds such as antifreeze, wood preservatives, cleansers, and a host of other, more exotic organics derived from industries or past practices (such as polychlorinated biphenyls [PCBs], DDT, and chlordane).

1.5.9 Other Chemicals and Substances

There are a host of other chemicals that can cause problems if allowed to enter the aquatic environment. Some of the most common chemicals and substances that pollute stormwater are oils, greases, soaps, and detergents. Common household bleach can be deadly to fish and other critters if drained directly to water bodies. Diatomaceous earth backwash from swimming pool filters can clog gills and suffocate fish. Arsenic has been used in rat and mole killing compounds. Even those compounds classified as **biodegradable or environmentally friendly** can have devastating **immediate** effects on aquatic life.

1.6 What Are Best Management Practices?

Best management practices are a set of activities designed to reduce stormwater pollution. BMPs are separated into two broad categories: *source control* and *treatment*.

1.6.1 Source Control BMPs

Source control BMPs prevent contaminants from entering stormwater runoff by controlling them at the source. There are two categories of source control BMPs:

Operational source control BMPs are considered to be the most cost-effective pollutant minimization practices. Operational source control BMPs are non-structural practices that prevent or reduce pollutants from entering stormwater. They can also include process changes such as raw material/product changes and recycling of wastes. Examples include:

- Formation of a pollution prevention team
- Good housekeeping practices
- Preventive maintenance procedures
- Spill prevention and cleanup
- Employee training
- Inspections of pollutant sources
- Record keeping

Structural source control BMPs are physical, structural or mechanical devices or facilities intended to prevent pollutants from entering stormwater. Structural BMPs typically cost more to construct, operate, and maintain than operational BMPs. Examples of structural source control BMPs typically include:

- Enclosing and/or covering the pollutant source, e.g., within a building or other enclosure, a roof over storage and working areas, a temporary tarpaulin, etc.
- Physically segregating the pollutant source to prevent contact with uncontaminated stormwater
- Devices that direct contaminated stormwater to appropriate treatment BMPs, e.g., discharge to a sanitary sewer. (Contact LOTT Alliance Industrial Pretreatment Program at 360-528-5708 to determine pretreatment and permitting requirements.)

1.6.2 Treatment Best Management Practices

Treatment BMPs are used to treat stormwater that is already contaminated. Most treatment BMPs require planning, designing, permitting and construction, but cannot remove 100 percent of contaminants once they enter stormwater. The difficulty of treatment, combined with the typical expense of treatment BMPs, makes source control BMPs the preferred choice. There may be instances where treatment BMPs are required, however. This volume identifies specific treatment BMPs that apply to particular pollutant sources, such as fueling stations, railroad yards, storage and transfer of materials, etc. After identifying the required treatment BMPs, the reader can refer to Volume I, Section 4 and Volume V for additional information about treatment BMPs.

Facilities required to install additional treatment BMPs to comply with Ecology's ISGP or other General Stormwater Permits should consider the BMPs identified in Volumes IV and V. In addition, facilities should consider the sediment control and treatment BMPs in Volume II if turbidity and/or sediment reduction is required.

1.7 Explanation of Required BMPs

Every person/business in the City of Tumwater is required to use BMPs. You need to select BMPs from this volume. The BMPs outlined in Chapters 4 and 6 include required and/or suggested BMPs. Any required BMPs are presented first for each section, and are identified by headings. Please note that in some instances there are required BMPs that are mandated by various federal, state, or county laws. Any additional suggested BMPs are also presented for each BMP. You are encouraged to use suggested BMPs to further protect water quality. For instance, if only one BMP is required, you may wish to couple it with another suggested BMP to prevent pollution from ever getting into stormwater in the first place.

Some businesses are or will be required to obtain a NPDES permit for stormwater discharges. These permits are issued and regulated by Ecology.

All sites covered under the ISGP must include and implement the applicable (mandatory) BMPs in their Industrial SWPPP.

- Industrial sites covered by individual industrial stormwater permits must comply with the specific source control and treatment BMPs listed in their permits. Operators under individual industrial stormwater permits may include additional BMPs from this manual, if desired.

- All sites covered under the Boatyard Stormwater General Permit must include and implement the applicable (mandatory) BMPs in their Boatyard SWPPP.

- Facilities covered under the Sand and Gravel General Permit must include source control BMPs as necessary in their Sand and Gravel SWPPP to achieve all known, available, and reasonable methods of prevention, control, and treatment (AKART) and compliance with the stormwater discharge limits in their permit.

The BMPs outlined in this volume are focused on source control, that is, using methods to prevent pollution from ever getting into stormwater in the first place. Many of these BMPs are common sense and "housekeeping" issues. For instance, you can sweep an indoor or outdoor work area instead of hosing it into a storm drain or other drainage conveyance. The use of source control BMPs is always the first line of defense in stormwater pollution prevention efforts for several reasons:

- In most cases, source control BMPs are all that is needed to correct stormwater pollution problems.

- Most source control BMPs are relatively inexpensive and easy to implement.

- Treatment BMPs are utilized after pollution has entered stormwater. These BMPs are expensive, and can never remove 100 percent of the pollution in stormwater. It is far better to use source control BMPs where possible and prevent the pollution in the first place. This volume identifies specific treatment BMPs that apply to particular pollutant sources, such as fueling stations, railroad yards, storage and transfer of materials, etc. Additional information about treatment BMPs are found in Volume V of this manual.

NOTE: At times, the type of pollutants present or the condition of a site could mean treatment BMPs are required.

The minimum requirements for stormwater source control are contained in Volume I, Section 2.4.3 Minimum Requirement #3: Source Control of Pollution. In accordance with this minimum requirement, all known, available and reasonable source control BMPs shall be applied to all projects. Chapter 5 of this volume contains details on many source control BMPs, with references to appropriate documents for others.

Stormwater treatment may also be required for certain types of businesses, based on the information provided in this volume; in Volume I, Section 2.4.7 Minimum Requirement #6: Runoff Treatment; and in Volume V. Volume V contains detailed information about stormwater treatment BMPs.

1.8 What if I Am Already Implementing Best Management Practices?

Businesses already implementing BMPs in accordance with other federal, state, or local programs usually do not have to implement additional BMPs. Persons or businesses qualifying for exemptions include businesses required to obtain a general or individual NPDES permit for stormwater discharges (which must comply with the requirements of that permit). See regulatory requirement R.2 in Chapter 7 of this volume for details.

If you have a stormwater permit, the city assumes you are implementing the appropriate BMPs. If the city finds that you have not implemented your BMPs, or that the BMPs that you have implemented are not effectively addressing the discharge of contaminants, then you will be required to implement additional BMPs, potentially including more expensive treatment BMPs, to meet requirements. **Everyone** must implement BMPs, but how each business accomplishes this may differ.

1.9 How Do I Get Started?

If you are a landlord, tenant, or owner of a single-family residence, proceed to Chapter 2 for General Principles that everyone should implement and Chapter 6 for BMPs that are recommended for you.

If you own a business or industry, review the General Principles in Chapter 2 and complete the worksheet in Chapter 3. If you checked off (on the worksheet) any of the activities that are being performed outdoors, use the activity code on the worksheet to find the BMPs recommended for you in Chapter 4.

If you have questions, please contact City of Tumwater Transportation and Engineering Department, at 360-754-4140. They can provide assistance over the phone and also at your business site.

1.10 Related Stormwater Requirements

Under current Washington State and City of Tumwater laws, if you own commercial property and lease or rent it, you can be held responsible for water quality problems caused by your tenants. Make sure your tenants are informed of their responsibilities under the auspices of this manual and TMC Chapter 13.12, *Stormwater System*.

Another important requirement is the need for an accidental spill plan if your business has the potential for a spill. If you are currently under a pretreatment permit for discharge to sewers, it will probably require a minor amount of effort to amend it to include stormwater. Please contact City of Tumwater Transportation and Engineering Department, at 360-754-4140. They can provide assistance over the phone and also at your business site.

You are responsible for obtaining prior approval for your stormwater discharge to the city system. This means obtaining proper building and environmental permits from the city and Washington State. If you have questions, please contact City of Tumwater

Transportation and Engineering Department, at 360-754-4140 for more information. For Ecology permits, call 360-407-6400.

Chapter 2 – Principles of Pollution Prevention

This chapter describes simple pollution prevention principles that every business and homeowner should consider. Most of these are common sense, "housekeeping" types of solutions. With collective action by individuals and businesses throughout Tumwater in implementing each of these principles, the improvement in water quality can be substantial. Although most of these principles are aimed at commercial or industrial activities, many items apply to individual residents as well. If you have questions, please contact City of Tumwater Transportation and Engineering Department, at 360-754-4140. They can provide assistance over the phone and also at your residence or business site.

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 City of Tumwater Water Resources and Sustainability Department can provide pollution prevention assistance.

2. Move the activity indoors

Sometimes, it is fairly easy to move a polluting activity indoors out of the weather. The benefits of this are twofold: you prevent runoff contamination, and you provide for easier, more controlled cleanup if a spill occurs. An example would be unloading and storing 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), applicable fire codes, or local ordinances.

3. Clean up spills quickly

Promptly contain and cleanup solid and liquid pollutant leaks and spills on any exposed soil, vegetation, or paved area. Commercial spill kits are available, but readily available absorbent material, such as cat litter, also work well in many cases. Promptly repair or replace all leaking connections, pipes, hoses, valves, etc., which can contaminate stormwater.

4. Use less material

Do not buy or use more material than you really need. This not only helps keep potential disposal, storage, and pollution problems to a minimum, it will probably save you money, too.

5. Use the least toxic materials available

Investigate the use of materials that are less toxic than what you use now. Perhaps a caustic-type detergent or a solvent could be replaced with a more environmentally friendly product. Such a change might allow you to discharge process water to the sanitary sewer instead of paying for expensive disposal (contact your sewer service provider to find out about allowable sanitary discharges and pretreatment permits). Remember that, even if you do switch to 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 I, Section 4.2, Step 5c. 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 you 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 you to clean up the area around the activity. Remember that groundwater protection is important throughout Tumwater, no matter where the activity is located, so the actions taken on your site on a day-to-day basis are always important, even in dry weather.

8. Maintain stormwater drainage systems

Pollutants can concentrate over time in storm drainage facilities such as catch basins, vaults, ditches, and storm drains. When a large storm event occurs, turbulent runoff 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, etc.). 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 landfills. You can learn more about other businesses that have made process changes allowing recycling of chemicals by calling Ecology at 1-800-RECYCLE and requesting publication No. 92-45 and

No. 90-22. Thurston County Public Works Department Solid Waste Management web site has information and ideas related to business waste reduction. 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 206-625-6232 to list potentially usable solid or chemical waste in its publication.

10. Be an advocate for stormwater pollution prevention

Help friends, neighbors, and business associates find ways to reduce stormwater pollution in their activities. Most people want clean water and do not pollute intentionally. Share your ideas and the BMPs in this volume to get them thinking about how their everyday activities affect water quality.

11. Report problems

We all must do our part to protect water, fish, wildlife, and our own health by implementing proper BMPs, and reporting water quality problems that we observe. Call the City of Tumwater Spill Response Hotline at 360-754-4150 to report dumping incidents involving storm drains or ditches.

12. Provide 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, operations and maintenance, documentation, 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 city.

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 the Stormwater Facility Maintenance Standards, which are available on the city web site or from the Administrator upon request.

15. Eliminate illicit connections

An illicit connection is formally defined in the city's NPDES Municipal Stormwater permit, but generally includes any connection to the city stormwater system that is not intended, permitted, or used for collecting and conveying stormwater. A common problem with the stormwater drainage system for most communities is the existence of illicit connections of wastewater to the storm drainage system. Many businesses and residences have internal building drains, sump overflows, process wastewater discharges, and even sanitary sewer and septic system pipes that were connected to the nearby storm drainage system in the past as a matter of course. All businesses and residences in Tumwater 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, and/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 Tumwater must dispose of solid and liquid wastes and contaminated stormwater properly. Generally, there are 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.

Chapter 3 – Source Control Worksheet for Commercial and Industrial Activities

The worksheet on the following page 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 ensure that nothing but uncontaminated stormwater be discharged** to the city's 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.

- Complete the entire worksheet by checking the appropriate boxes for all activities that take place at your work place.

- 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 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 LOTT Alliance Industrial Pretreatment Program at 360-528-5708.

If you have questions, please contact City of Tumwater Water Resources and Sustainability Department at 360-754-4140. They can provide assistance over the phone and also at your business site.

Source Control Worksheet for Commercial and Industrial Activities			
Activity Code	Type of Activity	Check if You Are Involved in This	
		Indoor	Outdoor
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		
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.		

Source Control Worksheet for Commercial and Industrial Activities			
Activity Code	Type of Activity	Check if You Are Involved in This	
		Indoor	Outdoor
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 Greenhouses • Includes container plants, greenhouse grown and cut foliage operations		
A3.13	Irrigation • Includes chlorinated potable water runoff and erosion		
A3.14	Well, Utility, Directional and Geotechnical Drilling		
A4.1	Storage or Transfer (Outside) of Solid Raw Materials, Byproducts, 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 Tumwater Water Resources Department, see Chapter 7.		
A4.7	Storage of Liquid 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		

Source Control Worksheet for Commercial and Industrial Activities

Activity Code	Type of Activity	Check if You Are Involved in This	
		Indoor	Outdoor
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.		
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 at Industrial Sites • Includes industrial activities that take place on soil.		
A7.1	Commercial Animal Handling Areas • 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 • 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 and Building Drains at Manufacturing and Commercial Buildings • These sites will be referred to ORCAA.		
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		

Source Control Worksheet for Commercial and Industrial Activities			
Activity Code	Type of Activity	Check if You Are Involved in This	
		Indoor	Outdoor
A7.15	Spills of Oil and Hazardous Substances		
A7.16	Dock Washing • Includes wharves, piers, floats, an boat ramps		
A7.17	Portable Waterline Flushing, Water Tank Maintenance, and Hydrant Testing		
A7.18	Color Events • Includes charity, religious, or commercial events where a colored dye or liquid is used.		
A7.19	Roof Vents Includes processes that vent emissions to the roof and/or the accumulation of pollutants on roofs		
A7.20	Goose Waste and Goose Deterrents		

Chapter 4 – Best Management Practices for Commercial and Industrial Activities

This chapter coordinates with the worksheet in Chapter 3. That worksheet and the BMPs are organized by the different activities that 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, etc.) 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 chapter to find the suggested BMPs you should use. See also Section 1.7 for explanation of required and suggested BMPs.

If you have questions, please contact City of Tumwater Water Resources and Sustainability Department at 360-754-4140. They can provide assistance over the phone and also at your business site.

Before detailing the list of activity specific BMPs, please review Chapter 2 for 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.

Section A1

Cleaning and 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 businesses engaged in pressure washing of engines, equipment, and portable objects.

Pollutant sources include toxic hydrocarbons, organic compounds, oils and greases, nutrients, heavy metals, pH, suspended solids, BOD, and 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 your sewer service provider, 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 WQ-R-95-56, 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 173-200 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 on-site treatment.

Required BMPs

The following BMPs (or equivalent measures) are required of all businesses and public agencies that clean or wash 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.

- 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 performed in a designated area (such as a wash pad) provided with a sump drain and stormwater run-on 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 run-on prevention. Contact LOTT Alliance Industrial

Pretreatment Program at 360-528-5708 or your sewer service provider, if your site is not within the LOTT service area for pre-treatment requirements and for washing operation policy.

(Photo courtesy of Seattle Public Utilities)

Figure 4.1. Wash Pad for Tool and Equipment Washing.

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

Suggested BMPs

The following BMPs are not required but 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

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

Description of Pollutant Sources: Pollutants of concern consist of oil and grease, nutrients, suspended solids, BOD, and 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 the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your sewer service provider, if your site is not within the LOTT service area.

  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 run-on onto the washing area. See BMP S.3 in Chapter 5 for detailed drainage requirements and BMP S.7 for run-on prevention schemes. If discharging to a sanitary sewer, permits must be obtained from the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider if your site is not within the LOTT service area.

(Photo courtesy of Seattle Public Utilities)

Figure 4.3. Cleaning and Washing Cooking Equipment Indoors.

- 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 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: Commercial cleaning of vehicles, aircraft, vessels, carpets, industrial equipment, and large buildings with low or high pressure water or steam. This includes "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 LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider 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 LOTT Alliance 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 ISGP 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 ISGP 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 WQ-R-95-56, 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 173-200 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 run-on 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 LOTT Alliance), 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 the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider. 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. *Note: The purpose of the valve is to convey only washwater and contaminated stormwater to a treatment system.*

- 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.

- 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 off-site disposal.

Charity car washes are not allowed to discharge washwater to the city's stormwater drainage system. Charity car washes planners or commercial sites that wish to host charity car washes can obtain a "Clean Cars, Clean Streams" kit provided by the city, which includes sidewalk signage, catch basin seals, a discharge pump and a hose to direct

runoff to the sanitary sewer. For more information contact City of Tumwater Water Resources and Sustainability Department at 360-754-4140. For optional fundraiser information, contact the Puget Sound Car Wash Association at 800-509-9274. Online, visit: <www.charitycarwash.org>.

- 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.

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

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.

Description of Pollutant Sources: Pollutants of concern are nutrients, suspended solids, organic compounds (such as pesticides and chemicals used for flea and odor control), BOD, and COD.

Pollutant Control Approach: Common practice in the past was to discharge the dirty solution to 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 the LOTT Alliance Industrial Pretreatment Program at 360-528-5708. 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

The following 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 chemicals used for flea and odor control are listed by U.S. Environmental Protection Agency (U.S. EPA) as toxics. The LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider 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. 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: Loading and unloading of liquid and solid materials at industrial and commercial facilities is typically conducted at shipping and receiving, outside storage, and fueling areas. Transferred materials can include raw materials, waste materials, fuels, and scrap metals. Leaks and spills of fuels, oils, powders, organics, heavy metals, salts, acids, alkalis, and other chemicals 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 run-on of stormwater and runoff of contaminated stormwater.

Required BMPs

At All Loading/Unloading Areas

- A significant amount of debris can accumulate at 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 applicable 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 run-on 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.

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

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

- 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 at 360-407-6300.

- 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 BMP A4.7: Storage of Liquid or Dangerous Waste Containers, and BMP A4.8: Storage of Liquids in Permanent Aboveground Tanks 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, etc.).

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 run-on of stormwater.

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.

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 the Stormwater Facility Maintenance Standards, available on the city web site or from the Administrator upon request, for 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 6-month, 24-hour 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.

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 under-ground fuel storage facilities. In addition to general service gas stations, fueling may also occur at 24-hour 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 run-on. 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 A7.14: 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 fire codes. 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 the Stormwater Facility Maintenance Standards, available on the city web site or from the Administrator upon request, for applicable 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 or in accordance with the applicable fire code) to prevent the runoff of spilled liquids and to prevent run-on 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 Run-On.

- Convey stormwater collected on the fuel island containment pad to a sanitary sewer system, if approved by the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider; or to an approved treatment system such as an oil/water separator and a basic treatment BMP (basic treatment BMPs are listed in Volume I 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 display ongoing or recurring visible sheen and must not contain oil and grease.

- Alternatively, stormwater collected on the fuel island containment pad may be collected and held for proper off-site disposal.

- Conveyance of any fuel-contaminated stormwater to a sanitary sewer must comply with pretreatment regulations (WAC 173-216-060). 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 LOTT Alliance at 360-528-5708 or your local sewer service provider.

- 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 Washington State Department of Transportation (WSDOT) sites. At those types of fueling facilities, the following BMPs apply, as well as all other required BMPs and fire prevention requirements.

- If a roof or canopy is impractical, the concrete fueling pad must be equipped with emergency spill control, which includes a shutoff valve for the 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 A7.15: Spills of Oil and Hazardous Substances.

- The valve may be opened to convey contaminated stormwater to a sanitary sewer, if approved by the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider, 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 I 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

A2.4 Mobile Fueling of Vehicles and Heavy Equipment

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

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

A4.7 Storage of Liquid or Dangerous Waste Containers

A4.8 Storage of Liquids in Permanent Aboveground Tanks

A4.9 Parking and Storage for Vehicles 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 City of Tumwater Water Resources and Sustainability Department at 360-754-4140 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 of your sewer service provider. Contact the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider. 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 run-on prevention. See BMP S.6 and S.7 in Chapter 5 for more on paving, sump drains and holding tanks, and run-on prevention. Contact the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider 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 coalescing plate oil and water separator followed by a basic treatment BMP (see Volume I), 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-operated 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 that are operated for extended periods in remote areas. This includes construction sites, logging operations, and farms. Mobile fueling of on-road vehicles is also conducted commercially in Washington State.

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 all mobile fueling operations are approved by the Tumwater Fire District. Comply with city 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 the city is necessary to ensure compliance with additional local requirements.

- Ensure the compliance with all 49 CFR 178 requirements for DOT 406 cargo tanker. Documentation from a U.S. Department of Transportation Registered Inspector shall be 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 the city, including the Tumwater Fire Chief. 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 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" fuel tanks.

- 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 Tumwater Fire Chief 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 Ecology Southwest Regional Office and the local fire district (or department) 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 12-gallon 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 5-gallon 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; and
    - An adequate lighting system at the filling point.

A2.5 In-Water and Over-Water Fueling

Description of Pollution 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. 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.

Required BMPs:

- 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)
- 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 leak-age at joints and determine hose condition from end to end.

Required BMPs for 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 95 percent capacity of the receiving tank.

Required BMPs for Spill Cleanup:

- See A7.15 Spills of Oil and Hazardous.
- Manage petroleum-contaminated booms, pads, and absorbents in a designated collection container and properly dispose of these materials (see A4.4 Storage of Solid Wastes and Food Wastes.
- Do not use soaps to disperse the visible sheen 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 onsite 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 BMP A3.2 in this section. Requirements for stockpiling of raw materials are covered under BMP A4.1: Storage or Transfer (Outside) of Solid Raw Materials, Byproducts, 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 run-on and contamination, where feasible.

Any facility categorized under Standard Industrial Classification (SIC) Code 2951 (asphalt paving mixtures and blocks) or SIC Code 3273 (ready-mix concrete) may need to comply with Ecology's sand and gravel general permit. Contact Ecology at 360-407-6400 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 the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider if outside of the LOTT service area), or recycled (see the Stormwater Facility Maintenance Standards, available on the city web site or from the Administrator upon request, for applicable maintenance guidelines). Never wash fresh concrete or concrete mixer washout into streets, stormwater drainage systems, streams, or other water bodies, or to groundwater.

- Auxiliary concrete truck components (e.g. chutes and hoses) and small concrete handling equipment (e.g. hand tools, screeds, shovels, rakes, floats, trowels, and wheel-barrows) may be washed into formed areas awaiting concrete pour.

- 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 for more information.

- Production and pouring areas should be protected from stormwater run-on. See BMP S.7 in Chapter 5 for methods of run-on 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 the City of Tumwater Water Resources and Sustainability Department at 360-754-4140 for information about water quality treatment BMPs for these types of operations. Visit Ecology's web site for accepted water quality treatment at: <http://www.ecy.wa.gov/programs/wq/stormwater/index.html>.

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, BMP C154 for more information.

- Auxiliary concrete truck components (e.g. chutes and hoses) and small concrete handling equipment (e.g. hand tools, screeds, shovels, rakes, floats, trowels, and wheel-barrows) may be washed into formed areas awaiting concrete pour.

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 phone book or on your web browser 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 7 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 COD.

Pollutant Control Approach: Cover and contain operations. and apply good housekeeping and preventative maintenance practices such as sweeping and avoid storage where metals are exposed to rain.

Required BMPs

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

- 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 that would need an Ecology NPDES permit for discharge to surface water or storm drain. Contact the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider if outside the LOTT service area 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 that 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, 8-quinolinol, 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 polyaromatic hydrocarbons (PAHs), 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 ISGP 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 ISGP 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 run-on 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 either 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 feed stocks. 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, BOD, organics, coliform bacteria, acidic pH, color, 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 Thurston County Public Health and Social Services Department regulates solid waste facilities in accordance with WAC 173-304. Contact the Health & Social Services Department at 360-786-5581 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: <www.ecy.wa.gov/programs/swfa/organics/law.html>.
- Apply for coverage under the ISGP if the facility discharges stormwater to surface water or a municipal stormwater system. If all stormwater from the facility properly infiltrates to groundwater, the ISGP is not required.
- In some cases, an Individual State Waste Discharge Permit is required. Check with the Ecology Southwest Regional Office and Thurston County Public Health and Social Services 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. Examples 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; and 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.

Pollutant Control Approach: Control 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 IV-B – 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.

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 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

- Develop and implement an integrated pest management plan (see section on integrated pest management below) 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 RCW Chapter 17.21 and Chapter 16-228 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* (Bt) 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.

- Apply the pesticide according to label directions. Do not apply pesticides in quantities that exceed manufacturer's instructions.

- 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 the city

    - Using a pesticide approved for use in aquatic environments.

- 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 the city or 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.

- 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 (U.S. EPA Publication 530-F-9-044):

    - 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.

- 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 253-445-4556, or the Bio-Integral Resource Center (BIRC), P.O. Box 7414, Berkeley, California 94707. Or, contact 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.

Suggested BMPs for Vegetation Management

- Use at least an 8-inch "topsoil" layer with at least 8 percent organic matter to provide a sufficient vegetation-growing medium (see soil preservation and amendment in Volume V, Section 6 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 turf grass 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: BMP C120: Temporary and Permanent Seeding, BMP C121: Mulching; BMP C123: Plastic Covering; and BMP C124: 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 3/4 inch deep.

- Mowing is a stress-creating activity for turf grass. 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.

Suggested BMPs for Irrigation

- 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. Improper irrigation can encourage pest problems, leach nutrients, and make a lawn completely dependent on artificial watering. The amount of water applied depends on the normal rooting depth of the turf grass species used, the available water holding capacity of the soil, and the efficiency of the irrigation system. Consult with your local water purveyor, the Thurston Conservation District (360-754-3588), or a Cooperative Extension office to help determine optimum irrigation practices.

Suggested BMPs for Fertilizer Management

- Turf grass is most responsive to nitrogen fertilization, followed by potassium and phosphorus. Fertilization needs vary by site depending on plant, soil, and climatic conditions. Evaluation of soil nutrient levels through regular testing ensures the best possible efficiency and economy of fertilization. For details on soils testing, contact the Thurston Conservation District or WSU Extension Service.

- 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 during a drought or when the soil is dry. Alternatively, 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, isobutylidine diurea (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.

- 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

- 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. Do not apply fertilizer at commercial and industrial facilities to grass swales, filter strips, or buffer areas that drain to sensitive water bodies, unless approved by the city.

- Properly trained persons should apply all fertilizers. Follow manufacturers' recommendations and label directions.

- Keep fertilizer granules off impervious surfaces. Clean up any spills immediately. Do not hose down to a storm drain, conveyance ditch, or water body.

- Choose organic fertilizers when possible.

Suggested BMPs for Integrated Pest Management

An integrated pest management program might 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.

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, or conveyance ditch to 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 Olympic Region Clean Air Agency (ORCAA), 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, which 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 LOTT Alliance Industrial Pretreatment Program 360-528-5708 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. Don’t evaporate ink cleanup trays to the outside atmosphere.
- Place cleanup sludge into a container with a tight lid and dispose of as dangerous waste. Do not dispose of cleanup sludge 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. 94-137; and A Guide for Lithographic Printers, Publication No. 94-139.

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 run-on 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.

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

Figure 4.10. Commercially Available, Bermed Workspace.

- Cover the activity and connect floor drains to a sanitary sewer (Figure 4.11), if approved by LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider if outside of the LOTT service area. 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-B for dead-end sump maintenance guidelines).

(Photo courtesy of Seattle Public Utilities)

Figure 4.11. Structure Used To Cover Manufacturing Operations.

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 Thurston Conservation District at 360-754-3588. 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, 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 Thurston Conservation District at 360-754-3588 and the Natural Resources Conservation Service (NRCS) at 360-704-7740 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 pest management plan and reduce reliance on pesticides. Information on integrated pest management is available from the Washington State University/Thurston County Cooperative Extension Service. BMP S.8 in Chapter 5 provides some details on integrated pest management and Appendix IV-B provides an example plan. 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 NRCS at 360-704-7740 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 (referred to generally as "pesticides" below) 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, and for vegetation management. Businesses and government agencies involved in these activities must comply with city regulations and Washington State Department of Agriculture pesticide regulations. See Chapter 7 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 BMP A3.6: Landscaping and Lawn/Vegetation Management.

Pollutants of Concern: Toxic organic compounds, oils, heavy metals, and COD.

Required BMPs

- Develop and implement an Integrated Pest Management Plan (see section on integrated pest management below) and use chemical pest management only as a last resort. Integrated Pest Management is a comprehensive approach to the use of pesticides. Integrated pest management minimizes pesticide application and stresses selection of proper products and tailored application rates. It is a sensible long-term strategy 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 integrated pest management and Appendix IV-B for an example.

- 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 RCW Chapter 17.21 and Chapter 16-228 WAC.

- Employees must be educated regarding the proper application and pollution potential of misusing the chemicals they are working with.

- 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* (Bt) 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.

- Apply the pesticide according to label directions. Do not apply pesticides in quantities that exceed manufacturer's instructions.

- 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. Triple rinse or pressure rinse empty containers and mixing and application equipment. Collect all rinse water, and use it for diluting the next batch.

- 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.

- Clean up 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 the city

    - Using a pesticide approved for use in aquatic environments.

- 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 the city or 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.

- 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 (U.S. EPA Publication 530-F-9-044):

    - 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.

- 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 253-445-4556, or the Bio-Integral Resource Center (BIRC), P.O. Box 7414, Berkeley, California 94707. Or, contact 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.

A3.12 Nurseries and Greenhouses

These BMPs are for use by commercial container plant, green-house grown, and cut foliage production operations to minimize the pollutants that leave the site by controlling the placement of materials, stabilizing the site, and managing irrigation water. Common practices at nurseries and green-houses can cause elevated levels of nutrients and sediment which can contribute to the degradation of water quality.

Pollutants of Concern: phosphorus, nitrogen, sediment, bacteria, and organic material

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 sewer 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 A4.1 BMPs for Storage or Transfer (Outside) 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 run-off 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 A3.13 Irrigation for additional BMP considerations.

- Refer to A3.6 Landscaping and Lawn/Vegetation Management and A3.11 Application of Pesticides, Herbicides, Fungicides, and Rodenticides for Purposes Other than Landscaping.

A3.13 Irrigation

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. The best irrigation approach is to limit the amount and location of watering to prevent runoff and discharges to drainage systems.

Pollutant of Concern: Sediment, chlorinated water runoff, erosion, excess nutrients

Required BMPs:

- 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 systems 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:

- 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 local water utility, Conservation District, or 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.

A3.14 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 cut-tings 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, sand bags, erosion fences, or other similar methods. Immediately notify Ecology and the local jurisdiction if sediment-laden water impacts the storm sewer 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 Section A4.1 for Storage or Transfer (Outside) of Solid Raw Materials, Byproducts, or Finished Products BMPs.

- Stabilize exposed soils at the end of the job, using mulch or other erosion control measures. See A6.3 for Soil Erosion and Sediment Control at Industrial Site BMPs.

- 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).

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 (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 run-on 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 a covered area that is paved and bermed, as shown in Figure 4.12;
- 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 run-on 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, or other materials.
- 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 off site 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.
- 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.

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

Figure 4.13. Temporary Plastic Sheeting Covering Raw Materials Stored Outdoors.

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) to the stockpile.

- 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 Thurston County Public Health and Social Services Department at 360-786-5581 regulates and permits businesses treating contaminated soil. In addition, a permit from ORCAA 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. Nutrients and soil washing off of fruit can have a detrimental effect on receiving waters.

Pollutants of concern include nutrients, suspended solids, oxygen-demanding substances (BOD and COD), and color.

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.
- 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.
- 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.

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 run-on prevention. See BMPs S.4, S.5, and S.7 in Chapter 5 for more on covering and run-on 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 run-on prevention must be provided for the processing area. Call LOTT Alliance Industrial Pretreatment Program at 360-528-5708 for information on discharging to the sanitary sewer or your local sewer provider if not located within the LOTT service area. 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 off-site runoff from storage or processing areas, as well as to prevent stormwater run-on. See BMP S.7 in Chapter 5 for more information. Note that run-on prevention is required for processing areas, but not for storage areas.

- The storage area should be swept or shoveled daily to collect dirt and fruit and vegetable fragments for proper disposal. Keep hosing to a minimum.

- Use an approved or equivalent treatment BMPs for any run off (see Volume I).

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, these wastes can contribute a variety of different pollutants to stormwater. Requirements for handling and storing solid waste may include a permit from the Thurston County Public Health and Social Services Department. For more information, call the Waste Management section at 360-786-5461.

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 county health department. Ecology regulations are outlined in Chapter 7. Contact Ecology at 360-407-6300 and the Thurston County Public Health and Social Services Department at 360-786-5581 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 (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 LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider 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 run-on or run-off. 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 Thurston County Waste Management at 360-357-2491 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 on the web at: <https://kingcountyhazwastewa.gov/en/business-disposal/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 from Ecology for stormwater discharges. See the discussion of NPDES requirements in Chapter 7 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. 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 (BOD and COD), ethylene and propylene glycol, and acidic pH.

Required BMPs

For facilities subject to Ecology's ISGP, refer to BMP Guidance Document No. 94-146 "Vehicle Recyclers: A Guide for Implementing the Industrial Stormwater General National Pollutant Discharge Elimination System (NPDES) Permit Requirements," Ecology, March 2011, web site: https://apps.ecology.wa.gov/publications/documents/94146.pdf for selection of BMPs. The BMPs in that guidance document can also be applied to scrap material recycling facilities (depending on the pollutant sources existing at those facilities) and to non-permitted facilities.

For facilities not subject to Ecology's ISGP, apply the BMPs in BMP Guidance Document No. 94-146 (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, BMPs C252 and C253 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 7 for reference information.

The Thurston County Public Health and Social Services Department also administers some aspects of dangerous waste treatment, storage, and disposal. Call 360-786-5581 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 (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 run-on.
- 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 7, Section 7.2, R.2.
- Storage of reactive, ignitable, or flammable liquids must comply with the International Fire Code.

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

Figure 4.15. Outdoor Drum Storage Unit with Locking Doors.

- 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.

- 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-B 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 of the stored containers or 110 percent of the volume contained in the largest container, whichever is greater.

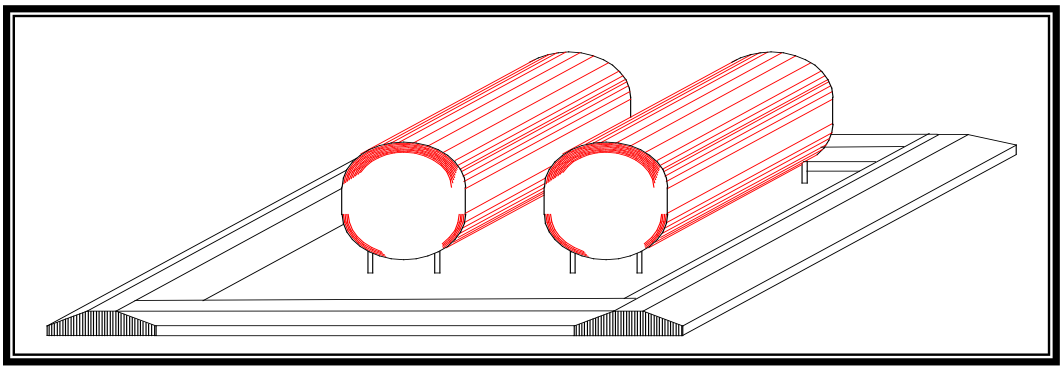

Figure 4.16. Containment Berm Used To Control Liquid-Material Leaks or Spills.

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

(Photo courtesy of Seattle Public Utilities)

Figure 4.17. Temporary Secondary Containment.

- 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 LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider, 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 off-site 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 trap a volume of either 10 percent of the total enclosed volume of the tank or 110 percent of the volume contained in the largest tank, whichever is greater.

(Photo courtesy of Seattle Public Utilities)

Figure 4.19. Aboveground Storage Tanks with Secondary Containment.

- Slope the secondary containment to drain to a dead-end sump (optional), or equivalent, for the collection of small spills (see the Stormwater Facility Maintenance Standards, available on the city web site or from the Administrator upon request, for applicable maintenance guidelines).

- Include a tank overfill protection system to minimize the risk of spillage during loading.

- 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 the city, 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 I, Section 4.2.

- If washing of a parking lot is conducted, discharge the washwater to a sanitary sewer (if allowed by LOTT Alliance Industrial Pretreatment Program at 360-528-5708) or other approved wastewater treatment system, or collect it for off-site 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 City of Tumwater Transportation and Engineering Department, at 360-754-4140. The storage of liquid pesticides is covered under BMP A4.7: Storage of Liquid or Dangerous Waste Containers.

Pollutants of Concern: Toxic organic compounds, oils, heavy metals, nutrients, fecal bacteria, oxygen-demanding substances (BOD and COD), and 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.

- Outdated or banned pesticides must be disposed of at an approved hazardous waste facility. Do not hose storage areas to a storm drain or conveyance ditch.

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.

- Storage areas for pesticides, fertilizers, and finished products that can leach pollutants should be covered. See BMPs S.4 and S.5 in Chapter 5 for further information on coverings. Stormwater run-on 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 run-on 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 the Stormwater Facility Maintenance Standards, available on the city web site or from the Administrator

upon request, for applicable 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 run-on 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 run-on 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, use one or more of the following stormwater treatment BMPs (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 Demolition of Buildings

Description of Pollutant Sources: This activity applies to removal of existing buildings 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 may require additional permits to remove. Pollutants of concern include toxic organic compounds, heavy metals, and suspended solids.

Pollutant Control Approach: Regularly cleanup debris that can contaminate stormwater. Protect the stormwater drainage system from dirty runoff and loose particles. Sweep paved surfaces daily.

Required BMPs

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

- 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.

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

Figure 4.20. Commercially Available Gutter Guard Being Replaced.

- Street 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.

- Contact City of Tumwater Development Services at 360-754-4180 to obtain required permits.

Suggested BMPs

- Water should be sprayed throughout the site to help control wind blowing of fine materials such as soil, concrete dust, and paint chips. The amount of water must be controlled so that runoff from the site does not occur, yet dust control is achieved. Oils must never be used for dust control.

- If possible, a wall should be constructed to prevent stray building materials and dust from escaping the area during demolition.

- Schedule demolition to take place at a dry time of the year.

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, and construction:

- Employees must be educated about the need to control site activities to prevent stormwater pollution, and also be 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 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.

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.

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. 96-433, "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 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 city-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 (EPA-450/3-88-088) and Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures (EPA-450/2-92-004).

- 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. 96-433 (Ecology 1996). Application of some products may not be appropriate close to receiving waters or to conveyances close to receiving waters. For more information, check with the Ecology Southwest Regional Office or City of Tumwater Transportation and Engineering Department.

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 the city or to other appropriate treatment system. Contact LOTT Clean Water Alliance at 360-528-5708 or your local sewer service provider 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
  - Proper 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. Ecology's General Permits covering concentrated animal feeding operations 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 Tumwater require the filing of a livestock management plan. Contact the Thurston Conservation District at 360-754-3588 for more information and assistance in preparing such a plan. Thurston County/WSU Extension at 360-786-5445 also has literature to help you more effectively manage your pastures and livestock.

Pollutants of Concern: Nutrients, suspended solids, oxygen-demanding substances (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 Thurston Conservation District for more information on fencing, including how to get money to provide such fencing. They can also help you with replanting the 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 ensure 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 (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:

- Log storage, rollout, sorting, scaling, and cutting areas
- Log and liquid loading areas
- Log sprinkling
- Debarking, bark bin, and conveyor areas
- Bark, ash, sawdust and wood debris piles, and other solid wastes
- Metal salvage areas
- Truck, rail, ship, stacker, and loader access areas
- Log trucks, stackers, loaders, forklifts, and other heavy equipment
- Maintenance shops and parking areas
- Cleaning areas for vehicles, parts, and equipment
- Storage and handling areas for hydraulic oils, lubricants, fuels, paints, liquid wastes, and other liquid materials
- Pesticide usage for log preservation and surface protection
- Application of herbicides for weed control
- 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 ISGP 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. 0410-031. 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 overspray, 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:

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

BMP A2.2: Fueling at Dedicated Stations

BMP 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 on-shore 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 7 for details on ORCAA 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.

Figure 4.22. Drop Cloth Used During Hull Sanding.

- Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly.

- 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 (this chapter) 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 (24-hour). 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. See the Thurston County or Ecology web sites for guidance on appropriate disposal of used oil and filters.
  <https://www.co.thurston.wa.us/solidwaste/hazardous/haz-home.htm>
  <http://www.ecy.wa.gov/programs/hwtr/dangermat/oil_index.html>

- Use one of the following treatment BMPs when paint chips or blasting grit are prevalent in the work area:
    - Infiltration basin
    - Wet pond or wet 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). The city's sensitive/critical areas and wetlands ordinances also contain requirements for logging activities near water bodies.

Pollutants of concern include suspended solids, oils and greases, oxygen-demanding substances (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 critical areas 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.

- On site fueling and maintenance operations must follow the required BMPs as outlined in BMP A2.4: Mobile Fueling of Vehicles and Heavy Equipment; BMP A2.3: Engine Repair and Maintenance; and BMP A4.7: Storage of Liquid or Dangerous Waste 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 run on 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 5 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 facilities regulated by the Thurston County Health Department. 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 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 (DOH) 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 or spa water to the sanitary sewer after getting preapproval from the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider.

Required BMPs

- The preferred method of pool or spa water disposal is to the sanitary sewer. County health department—regulated facilities are required to connect and discharge to a sanitary sewer if one is available. Contact LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider 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 part per million (ppm) or less. Some guidance on dechlorination is provided in the DOH Water System Design Manual, revised 12/09, DOH Publication 331-123: https://doh.wa.gov/sites/default/files/2022-02/331-123.pdf

- For more details, that manual references:

    - AWWA. 1999b. C651 – AWWA Standard for Disinfecting Water Mains. American Water Works Association, Denver, Colorado.

    - AWWA. 2002. C652 – AWWA Standard for Disinfecting Water Storage Facilities. American Water Works Association, Denver, Colorado.)

    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 city's stormwater system. You are required to contact City of Tumwater Water Resources and Sustainability Department 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 or spa "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 ISGP. BMPs for aircraft anti-icing chemicals must be consistent with aviation safety and the operational needs of the aircraft operator. *Note: Refer to 40 CFR Part 449 for EPA effluent limitations guidelines and new source performance standards to control discharges of pollutants from airport de-icing 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 LOTT Alliance Industrial Pretreatment Program at 360-528-5708 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 BMP A4.8: Storage of Liquids in Permanent 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. *Note the applicable containment BMP of aircraft de/anti-icing applications, and applicable treatment BMPs for spent, anti-icing chemicals such as glycols.*

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

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 A4.1: Storage or Transfer (Outside) of Solid Raw Materials, Byproducts, 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 and 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, Byproducts, or Finished Products in this volume.

- Sweep/cleanup accumulated de/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 de-icing chemicals.

A7.9 Roof 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, building vents, and other air emission sources. 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 (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*, web site: <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

- 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 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 IV-C of this volume.
- Inform citizens about the importance of eliminating yard debris, oil, and other wastes in street gutters 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 (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. 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 the contaminated stormwater to appropriate treatment such as a sanitary sewer (if approved by LOTT Alliance Industrial Pretreatment Program at 360-528-5708), to an API or coalescent plate oil/water separator for floating oils, or other appropriate treatment BMP (as approved by the city). 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 (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, A.9 Landscaping and Lawn/Vegetation Management and in Chapter 7, Section 7.2, 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 173-340 WAC). Water removed from the vaults can be discharged in accordance with the federal 40 CFR 761.79, and state regulations (Chapter 173-201A WAC and Chapter 173-200 WAC), or via the sanitary sewer if the requirements, including applicable permits, for such a discharge are met. (See also Chapter 7, Section 7.2-R2.)

- 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, Storage and Stockpiling Activities, of this volume 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 construction and reconstruction of roads.

A7.13 Maintenance of Roadside Ditches

Description of Pollutant Sources: Common road debris including eroded soil, 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 erosion and sediment control (refer to BMP A3.6: Landscaping and Lawn/Vegetation Management, in this volume).

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 173-303 WAC). If testing determines materials are not dangerous waste but contaminants are present, consult with Thurston County Public Health and Social Services, Environmental Health 360-867-2664 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 Thurston County Public Health and Social Services, Environmental Health 360-867-2664 to discuss use or disposal options for the soil portion. For more information, please see "Recommendations for Management of Street Wastes," in Appendix IV-C 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 Stormwater Maintenance Agreement, or if not agreement exists, per the operations and maintenance guidelines in Volume V and the Stormwater Facility Maintenance Standards available on the city web site or from the Administrator upon request, in addition to the following BMPs:

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

- Promptly repair any deterioration threatening the structural integrity of the facilities. These include replacement of clean-out gates, catch basin lids, and rock in emergency spillways. Ensure adequacy of storm sewer 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 a local or state government approved disposal site.

- Clean catch basins in accordance with the information provided in the Stormwater Facility Maintenance Standards available on the city web site or available from the administrator upon request. 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 a storm drain marker adjacent to all storm drain inlets where practical (Figure 4.24) and Appendix IV-D. Contact the City of Tumwater Water Resources and Sustainability Department or the Administrator to obtain free storm drain markers.

Figure 4.23. Catch Basin Cleaning with a Vacuum Truck.

Figure 4.24. "No Dumping" Storm Drain Stencil.

- Disposal of sediments and liquids from the catch basins must comply with "Recommendations for Management of Street Wastes" described in Appendix IV-C of this volume.

- Select additional applicable BMPs from this chapter depending on the pollutant sources and activities conducted at the facility. Those BMPs include:
    - BMP A3.11 Application of Pesticides, Herbicides, Fungicides, and Rodenticides (Administrator approval is required before these chemicals can be used on stormwater facilities)
    - BMP A4.7: Storage of Liquid or Dangerous Waste Containers
    - BMP A6.3: Soil Erosion and Sediment Control at Industrial Sites
    - BMP A7.10: Urban Streets
    - BMP 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.
- Do not apply pesticides unless approved by the Administrator through submittal of a pesticide-use plan. Refer to BMP A3.6 for additional information regarding pesticide-use plans.

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 its 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 to have an SPECP. These businesses should refer to Chapter 7, Section 7.2, R-2. 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."

The city also requires SPECP plans when:

- The criteria above for oil quantities is met for any petroleum product or antifreeze.
- The products could be reasonably discharged to groundwater, even if discharge to navigable waters of the United States is not reasonably expected.

Pollutant Control Approach: Maintain, update, and implement an SPECP.

Required BMPs

- Prepare a Spill Prevention and Emergency Control 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, Tumwater Fire Chief, the local fire district, Washington State Patrol, Thurston 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 the City of Tumwater Water Resources and Sustainability at 360-754-4150 if a spill may reach sanitary or storm sewers, groundwater, or surface water, in accordance with federal and Ecology spill reporting requirements. (See below for Spill Response)

- Immediately clean up 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 sewer.

- 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).

(Photo courtesy of Seattle Public Utilities)

Figure 4.25. Example of Spill Kit Contents.

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

Spill Response

If you witness potential spills or illegal dumping into catch basins, streets, ditches, or water bodies, or onto the ground where it would eventually flow to one of the areas listed, please call and report the spill to the spill reporting hotline(s).

If there is a potentially flammable, toxic or explosive condition, evacuate the vicinity of the spill and call 911 immediately. When reporting a spill, be ready to provide the following information:

- Name and contact information of the caller
- Location of spill or dumping event
- Date and time of the observation
- The type of material spilled
- Name and contract of the person or company responsible for the spill
- Source and cause of spill or discharge
- Amount of material spilled

To report a spill or dumping event:

- Call the City of Tumwater's 24-hour Spill Hotline: 360-754-4150
- For large spills, call the WA Dept. of Ecology 24-hour hotline: 360-407-6300. A large spill is considered a spill of greater than 10 gallons or a spill of any quantity that has reached a surface water, into a sewer, storm drain, ditch, or culvert leading to a surface water, is immediately reported to one or more municipal, state, or federal authority
- For spills that are an immediate threat to life, call 9-1-1

Report a spill

Whether you are the spiller or an observer, reporting a spill is critical in reducing impacts to the environment.

Water

Report spills of oil or other hazardous substances to water immediately.

IMMEDIATELY call:
1-800-424-8802
AND
1-800-258-5990

Land

Report spills of oil to land.

Call your local Ecology regional office **WITHIN 90 DAYS.**

Underground Storage Tanks

Report leaks and drips from underground storage tanks.

Call your local Ecology regional office **WITHIN 24 HOURS.**

Dangerous Waste

Report spills of any dangerous waste immediately.

IMMEDIATELY call:
911
AND
your local Ecology regional office.

*If in doubt about when to report a spill, just call immediately. Better to call earlier than later.

A7.16 Dock Washing

Description of Pollutant Sources: Washing docks (or wharves, piers, floats, and boat ramps) can result in the discharge dirt, bird feces, soaps, and detergents that can be toxic to aquatic life, especially after they take on contaminants while cleaning. The BMPs in this section do not address dry docks, graving docks, or marine railway cleaning operations.

Pollutant Control Approach: Use dry methods and equipment (scraping, sweeping, vacuuming) to remove debris and contaminants prior to cleaning with water to prevent these substances from entering surface water.

Required BMPs:

Surface Preparation and Spot Cleaning

- Scoop and collect debris and bird feces.
- Sweep, capture, and dispose of debris from the dock as solid waste. Sweep or vacuum docks to minimize the need for chemical cleaners.
- During cleaning activities, if debris, substances, or wash water could enter surface waters through drains, temporarily block the drains and collect the water for proper disposal.
- Hose down the area if necessary and collect water as feasible.
- Try spot cleaning with water and a coarse cloth before using soaps or detergents.
- If a cleaner is needed for spot cleaning:
    - Mix it in a bucket and use it to scrub down only the areas that need extra attention.
    - Start with vinegar and baking soda and move to other options as needed. Spot clean using a rag if harsher cleaning products are needed.
    - Avoid or minimize the use of petroleum distillates, chlorinated solvents, and ammoniated cleaning agents.
    - Use degreasers or absorbent material to remove residual grease by hand and do not allow this material to enter surface water.
    - Keep cleaners in sealed containers. Keep cleaner containers closed securely when transporting between the shore and docks.
    - Properly dispose of the dirty bucket water.

- Minimize the scour impact of wash water to any exposed soil at the landward end(s) of the dock or below the dock. Place a tarp over exposed soil, plant vegetation, or put berms to contain eroded soil.

Dock Washing and Disposal

- To the extent practicable, collect any wash water generated from hosing down, pressure washing, or cleaning dock areas, and dispose of it properly.

- The following video, provided courtesy of the Port of Seattle, highlights the methods they have developed to collect wash water generated during dock washing.

- Try pressure washing using light pressure. This uses less water and decreases the need for soap and scrubbing when washing the dock. Avoid using excessive pressure, which may damage the dock or send flakes of paint and other material into the water.

- Do not place any debris and substances resulting from cleaning activities in shoreline areas, riparian areas, or on adjacent land where these substances may erode into waters of the state.

- Where treated wood associated with the structure being washed are present, use non-abrasive methods and tools that, to the maximum extent practicable, minimize removal of the creosote or treated wood fibers when it removes marine growth from creosote or any other treated wood.

- Do not discharge removed marine growth to waters of the state where such marine growth would accumulate on the sea bed.

- Do not discharge emulsifiers, disersants, solvents, or other toxic deleterious materials to waters of the state.

A7.17 Portable Water Line Flushing, Water Tank Maintenance, and Hydrant Testing

Description of Pollutant Sources: Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in systems. Flushing done improperly can result in the discharge of solids to receiving waters. Hydrant testing may result in the discharge of rust particles. Chemicals used in line flushing and tank maintenance are highly toxic to aquatic organisms and can degrade receiving waters.

Pollutant Control Approach: Dechlorinate and pH adjust water used for flushing, tank maintenance, or hydrant testing. Dispose of the water to the sanitary sewer if possible.

Required BMPs:

- Remove solids from associated curbs and gutters before flushing water. Use erosion and sediment control BMPs such as BMP C235: Wattles, BMP C220: Inlet Protection, etc. to collect any solids resulting from flushing activities.

- If using super chlorination or chemical treatment as part of flushing, discharge water to the sanitary sewer. If sanitary sewer is not available, the water may be infiltrated to the ground as long as all of the following are met:
    - The water is dechlorinated to a total residual chlorine of 0.1 ppm or less.
    - Water quality standards are met.
    - A diffuser is used to prevent erosion.
    - The water does not cross property lines.

- Discharging water to a drainage system requires approval from the local jurisdiction. Check with the local jurisdiction to determine their requirements for approval. Most jurisdictions will require the water to be dechlorinated to a total residual chlorine concentration of 0.1 ppm or less and pH adjusted if necessary. Water must be volumetrically and velocity controlled to pre-vent resuspension of sediments or pollutants in the Municipal Separate Storm Sewer System (MS4).

- Do not over apply dechlorination agents. This can deplete the dissolved oxygen concentration and reduce the pH in discharge / receiving waters.

Suggested BMPs:

- If possible, design flushing to convey accumulated material to strategic locations, such as to the sanitary sewer or to a treatment facility; thus, preventing re-suspension and overflow of a portion of the solids during storm events.

- If possible, conduct flushing and tank maintenance activities on non-rainy days and during the time of year that poses the least risk to aquatic biota.

Treatment BMPs:

- Treatment for dechlorinating can include an application of a stoichiometric quantity of:
    - Ascorbic Acid, Sodium Ascorbate (Vitamin C)
    - Calcium Thiosulfate
    - Sodium Sulfite tablets
    - Sodium Thiosulfate
    - Sodium Bisulfite
    - Alternate Dechlorination Solutions

A7.18 Color Events

Description of Pollutant Sources: Color events are charity, religious, or commercial events that involve the use of powdered (typically cornstarch based) and/or liquid dyes. Because they typically occur outside, there is a high likelihood of the color material entering drainage systems and surface water unless measures are taken to prevent these illicit discharges from occurring. "Biodegradable" and "non–toxic" do NOT mean that a substance can go into storm drains or water bodies. The dye material can harm aquatic organisms by altering water quality and chemistry. State and Federal environmental laws require local jurisdictions to prohibit non-stormwater discharges to storm drains. Dye material and any wash water are prohibited discharges.

Pollutant Control Approach: Plan for the event. Control the application areas for the powder or liquid dyes. Block off storm drain inlets prior to the event. Clean up the areas immediately after the event.

Required BMPs:

- Create a map of your event that includes the following:
    - Event route.
    - Nearby streams, lakes, and ponds.
    - Start and finish areas.
    - Color application stations / areas.
    - Storm drain inlets and open stormwater system features (e.g., ditches, swales, bioretention, rain gardens) at the color application, start and finish areas.
- Create a Pollution Plan that details:
    - Measures taken to ensure that NO dye material, either during or after the event, will enter the drainage system.
    - How all dye material will be removed and disposed of.
    - What will happen in the event of rain (including addressing localized flooding, runoff, and collection of the stormwater).
    - Emergency numbers for the local city or county in case dye material does enter the storm drain or water body.

- Use handheld brooms to complete the initial cleanup of paved surfaces. Follow with use of a vacuum sweeper truck on roads.

- Contract with a commercial street sweeping firm to clean paved surfaces. Have a storm drain cleaning contractor on–call for discharges to storm drains or emergency clean–up if necessary.

- Ensure that the commercial street sweeping firm has a plan in place for the proper disposal of sweepings from the event and associated air filters.

- Ensure that all clean-up will be completed prior to the next forecasted rainfall, or no later than 24-hours after the race event, and that the contractor will have enough equipment and staff on hand for the clean-up.

- Request a copy of the dye product's SDS (Safety Data Sheet) from the manufacturer or supplier. Review the SDS for potential safety and environmental hazards.

- Comply with local jurisdiction event permit requirements that contain stormwater pollution prevention BMPs. If no local event permit is required, provide to the local jurisdiction in charge of stormwater drainage and/or surface water management, in plenty of time (two weeks or more) prior to the event:

    - Copies of the map

    - Pollution prevention plan

    - Commercial cleaning contract

    - Dye SDSs

    - Names and contact information of the event officials for both during and after the event.

- Protect storm drains by using berms, covering the drains, and using catch basin covers.

- Use care when removing berms, covers, and tarps to ensure no dye enters the storm drains.

- Prohibit participants from throwing dye within 100 feet of any stream or other surface waterbody.

- Prohibit participants from throwing dye within 100 feet of any open stormwater feature (e.g. ditch, swale, bioretention, rain garden, detention pond)

- Set up color stations at least 100 feet away from any surface water or open stormwater feature.

- The route, start, finish, and color application stations must be at least 100' away from any permeable pavement or the permeable pavement must be completely covered.

- If the event will be held on a small, contained area, cordon off the area and place enough covers on the ground to cover the entire site. If possible, contain the color application to grassy areas where ground covers are unnecessary.

Required BMPs for Event Clean-up:

- Dry off tarps and stained wet pavement with towels or absorbent pads.

- Use brooms or street sweepers to clean up paved areas. The fineness of the material may require sweepers with dust control systems.

- Do not use blowers to move dye material.

- Do not use hoses or pressure washers to rinse excess dye off of tarps, sidewalks or paved areas. If it becomes necessary to use water to clean surfaces, all the water must be collected and disposed of to the sanitary sewer system, with approval from the local sewer agency.

- Call the local spill response hotline immediately (24/7) if any colored water enters a storm drain or water body.

- Dispose of the collected sweeping materials, cleaning materials, and air filters appropriately.

- All litter and debris must be picked up and properly disposed of.

- All clean-up must be done within 24-hours of the race event.

(Image courtesy of Washington Department of Ecology)

Figure 4.26 Example of a Color Event

A7.19 Roof Vents

Description of Pollutant Sources: This activity applies to processes that vent emissions to the roof and/or the accumulation of pollutants on roofs. Processes of special concern are stone cutting, metal grinding, spray painting, paint stripping, galvanizing and electroplating. Pollutants from these processes may build up on roofs and may pollute stormwater roof runoff.

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. Discharge the collected runoff to the sanitary sewer after approval by the local sewer authority, or have a waste disposal company remove it.

A7.20 Goose Waste and Goose Deterrents

Description of Pollutant Sources:
Goose waste deposited near water or in water can contribute nutrients and algae growth. Goose feces may contain pathogens and contribute to the spread of diseases. Swimmers itch (schistosome or cercarial dermatitis) is caused by a parasite that can be spread by goose droppings, but does not mature or reproduce in humans.

Pollutant Control Approach:
To help decrease geese pollution to water sources, remove waste periodically and use deterrent management practices.

Suggested BMPs for areas of chronic accumulation of goose waste that impact stormwater systems:

- If possible, pick up goose waste using shovels, brooms, rakes, power sweepers, and trash cans. Properly dispose of goose waste in the garbage.
- Do not blow, sweep, or wash goose waste into waterways or storm sewer systems.
- Regularly clean goose waste from areas of chronic deposition where deterrence measures are impractical.
- Do not feed wild geese or any other wild animals.
- In recreational areas post signs discouraging the feeding of geese and other wild animals.
- Change the habitat from goose friendly to goose resistant. Reduce lawn areas and increase the height of shoreline vegetation (tall grass, shrubs); as geese are reluctant to walk through tall vegetation.
- Create a natural geese barrier. 20 to 100 feet of herbaceous vegetation at least 3 feet in height to discourage geese. A narrow, winding path through the plantings will allow for beach access, while preventing geese from having a direct line of sight through the planted area.
- Make bank slopes steeper than 4:1 to discourage geese by preventing a clear view of the bank top and potential predators. Or, separate the beach from the grass with a few steep steps, which makes the ascent too difficult for most geese.
- Narrow ponds to limit takeoff and landing opportunities.
- Where space is limited use one or two rows of shrub plantings combined with a fence. Fences can be made from woven wire, poultry netting, plastic netting, plastic snow fencing, mono-filament line, or electrified wire. Fences should be at least 24 inches tall (3 feet may be better), firmly constructed, and installed to prevent the geese from walking

around the ends. Lower openings should be no larger than 4 inches from the ground to prevent goslings from walking under or through the fence.

- Construct a grid of wire or line above the water's surface to prevent geese from flying into a pond that they have been accustomed to using. The grid should be one to two feet above the water surface, but may be taller if humans need access to the area under the grid. There should be no more than five feet of space between grid lines. To prevent geese from walking under the grid install a perimeter fence. Regularly monitor the grid for holes, trapped wildlife, and sagging.
- Canada geese are protected under federal and state law and a hunting license and open sea-son are required to hunt them. Where lethal control of Canada geese is necessary outside of hunting seasons, it should be carried out only after the above nonlethal control techniques have proven unsuccessful and only under permits issued by the U.S. Fish and Wildlife Service. Currently, the only agency permitted for lethal removal is the U.S. Department of Agriculture's Wildlife Services. Lethal control techniques include legal hunting, shooting out of season by permit, egg destruction by permit, and euthanasia of adults by government officials.
- Scare geese away when they are around. Geese often learn quickly to ignore scare devices that are not a real physical danger. Vary the use, timing, and location of tactics. Take advantage of geese being fearful of new objects. Examples of harassment and scare tactics:
    - **Dog patrols:** When directed by a handler, dogs are the method of choice for large open areas. Results are often immediate. After an aggressive initial use (several times a day for one or two weeks), geese get tired of being harassed and will use adjacent areas instead. A dog can be tethered to a long lead (which may require relocating the dog and tether frequently to cover more area), be allowed to chase and retrieve a decoy thrown over a large flock of geese, or be periodically released to chase the birds (if this is not against leash laws).
    - **Eyespot Balloons:** Large, helium-filled balloons with large eye-like images. Tether balloons on a 20 to 40 foot monofilament line attached to a stake or heavy object. Locate balloons where they will not tangle with trees or utility lines.
    - **Flags and Streamers:** Simple flags from plastic mounted on tall poles or mylar tape to make 6-foot streamers attached to the top of 8 foot long poles. Flags and streamers work best in areas where there is steady wind.
    - **Scarecrows:** Effective in areas where geese view humans as dangerous predators. For maximum effect, the arms and legs should move in the wind, use bright colors, and large eyes. Large, blow-up toy snakes are reported to work as a type of scarecrow.
        - **Noisemakers:** Devices that make a loud bang such as propane cannons, blanks, and whistle bombs can scare geese. Making the noise as soon as geese arrive and

persistence are the keys to success when using these devices. Consult noise ordinances and other permitting authorities before using.

- **Lasers:** Relatively low-power, long-wavelength lasers provide an effective means of dispersing geese under low light conditions. The birds view the light as a physical object or predator coming toward them and generally fly away to escape. Never aim lasers in the direction of people, roads, or aircraft.

- Geese's favorite food is new shoots of grass. Low lying grass also allows easy access to the water for protection from predators. Let grass grow to six inches or taller. Stop fertilizing and watering the lawn to reduce the palatability of the lawn.
- Minimize open sight lines for geese to less than 30 feet.
- Plant shrubs or trees along ponds to limit takeoff and landing opportunities.

Refer to: https://www.humanesociety.org/sites/default/files/docs/canada-goose-guide.pdf and https://wdfw.wa.gov/species-habitats/species/branta-canadensis for additional information.

Chapter 5 – General Source Control Best Management Practices

This chapter provides general source control BMPs to complement the pollution prevention principals in Chapter 2 and the activity-specific BMPs in Chapter 4. The implementation of these BMPs will help improve water quality.

S.1 Eliminate Illicit Storm Drain Connections

A common problem with the city's stormwater drainage system 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 as a matter of course. These connections allow a variety of pollutants to flow directly to receiving waters instead of to the sanitary sewer or septic system. Frequently, these connections are unknown to the current owner, and do not appear on any plans for the site. Because of the potential to pollute that these connections represent, the U.S. EPA, under the mandate of the NPDES stormwater permits, has made the elimination of such illicit connections a top priority.

All businesses and residences in the city must examine their plumbing systems to identify any potential illicit connections. Start with an examination of the site plans. This will help the current owner understand what piping systems were installed initially, making piping that does not appear on the plan a priority for investigation. 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. Exceptions to this requirement would be those industries and businesses that have been issued an NPDES Industrial Stormwater General Permit by Ecology, and are allowed specific discharges under that permit. Please refer to R.3 in Chapter 7 to determine if your type of business is required to have a NPDES permit.

If it is found that sanitary facilities, such as toilets, are connected to the stormwater drainage system, you must obtain a permit from your local sewer utility and reroute them to the sanitary sewer. If sanitary service is not available, contact the Thurston County Public Health and Social Services Department at 360-786-5581 for septic permits.

Dye testing with a non-toxic dye is one way to determine where a pipe or structure drains if it is not obvious by observations or on plans. The dye is put into the structure and flushed with some water. Observations are then made at ends-of-pipes, drainage ditches, catch basins, and manholes to look for the color coming through. Contact City of Tumwater Water Resources and Sustainability Department at 360-754-4140 if you need assistance in locating structures adjacent to your property.

Smoke testing can also help detect illicit connections and is typically best done by qualified personnel. All indoor discharges should be shut off before this test is conducted. A smoke bomb or other smoke-generating device is placed in a storm drain manhole, and air is forced in after it. Personnel should be stationed at each suspect drain location to observe if smoke is coming out. Smoking drains should be tagged for future rerouting.

Drains that are found to connect to the stormwater drainage system must either be permanently plugged or disconnected and rerouted as soon as possible. Drains that are no longer needed can be plugged with concrete or similarly effective permanent materials. If a drain pipe is to be rerouted and a sanitary sewer services the property, then the local sewer district must be contacted. Contact the number listed above for specific directions

prior to rerouting. Restrictions on certain types of discharges, particularly industrial process waters, may require pretreatment of discharges before entering the sanitary sewer. It is the responsibility of the property owner or business operator to follow through on rerouting illicit storm drainage connections to the sanitary sewer.

If the property is not served by a sanitary sewer, alternate measures will be necessary. If the discharge is simply domestic waste, a septic system may be feasible. If it is necessary to install a septic system, the proper permits will need to be obtained from the Thurston County Public Health and Social Services Department at 360-786-5581. If the discharge is anything other than domestic waste, then a holding tank or onsite treatment will be necessary. Contact LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider for specific directions for installation and disposal.

S.2 Dispose of Collected Runoff and Waste Materials Properly

Every business and residence in Tumwater 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.

Many liquid wastes and contaminated stormwater (depending on the pollutants and associated concentrations present) may be put into the sanitary sewer, subject to approval by the LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider.

If wastes cannot be legally discharged to a sanitary sewer or septic system, one of the other three disposal options must be used. Sumps or holding tanks may be useful for storing liquid wastes temporarily. The contents must be disposed of in the sanitary sewer or at a dangerous waste facility depending on the nature of the waste.

Recycling facilities are a recommended option for many commercial and household items, including used oils, used batteries, old equipment, glass, some plastics, metal scrap materials, solvents, paints, wood and land clearing wastes, and various other solid wastes. Solid wastes that cannot be recycled and that are not hazardous must be disposed of at a licensed municipal solid waste disposal facility. The list in Chapter 8 of this volume has the phone numbers and addresses of these facilities in Thurston County.

Dangerous and hazardous wastes must be properly transported to an appropriate hazardous waste treatment, storage, and disposal facility. Included in Chapter 8 is a list of companies dealing in these activities.

Costs of disposal vary considerably from option to option. Especially in the case of dangerous wastes, different types of wastes should be kept segregated. Disposal costs are usually determined by the most hazardous or difficult to dispose of waste present, so you can keep your costs down by not mixing wastes. The Thurston County Public Health and Social Services, Environmental Health 360-867-2664 can help you determine the best disposal options for your waste.

S.3 Connect Process Water Discharges to a Sanitary Sewer, Holding Tank, or Wastewater Treatment System

This BMP is a minimum requirement for all industrial and commercial activities that generate contaminated process wastewater, such as washing activities, composting activities, and production and processing activities. The water used in these activities cannot drain to surface waters or groundwater untreated. Process water must drain to a sanitary sewer, holding tank, or wastewater treatment system, or it can be recycled.

The first priority for businesses is discharge of process water to a sanitary sewer via a new or existing plumbing connection. To connect to the sewer, you must contact LOTT Alliance Industrial Pretreatment Program at 360-528-5708 or your local sewer service provider for information on permits for the connection. Pretreatment of industrial wastewaters will often be necessary before it is allowed to discharge to the sewer, and more information can be obtained by calling the number above.

If a sanitary sewer is not available, or if it is determined that a discharge connection is not allowed, the only remaining options are holding tanks or an onsite wastewater treatment facility. Consideration should be given to using a holding tank for used process water if the volume of process water generated by the activity is not excessive. The contents of the holding tank must be pumped out or drained before the tank is full and disposed of properly (see BMP S.2 in this chapter for information on disposal options). If a sanitary sewer connection cannot be made and a holding tank is not used, a wastewater treatment facility must be constructed on the site. This treatment facility must be designed to receive and effectively treat all discharges of process water from the business. Ecology must be contacted for approval of such a facility, since discharges from the treatment facility will enter surface waters or be spread on land. See Chapter 7 for Ecology's requirements for discharges of process waters.

For all types of process water discharges the following measures are required if the activity is to remain uncovered. Define a designated area for the activity and provide a mechanism for prevention of stormwater run-on into the activity area. This can be a curb, dike, or berm (see BMP S.7 in this chapter for more information) or similar effective means to prevent run-on. In this manner, only the precipitation that falls within the activity area is discharged and/or treated along with the activity process water. The designated area should be paved and sloped to a central collection drain. The collection drain must connect to the sanitary sewer (with pretreatment if required), the onsite holding tank, or the onsite treatment facility, whichever method is selected.

This process water BMP can be made more effective if the activity is covered, thus reducing the total amount of water to be treated.

S.4 Cover the Activity with a Roof or Awning

Not every activity can or needs to be located inside a building. In many cases, a simple roof or awning will protect the activity from coming into contact with stormwater, and usually at a lower cost than a complete building. If you do decide to build one of these structures, you will need to obtain permits from City of Tumwater Community Development Services at 360-754-4180. They will also be able to help you with fire code requirements and zoning code provisions.

The roof structure can be designed in several ways. One option is a lean-to type of structure, where sheets of corrugated steel, fiberglass, aluminum, or similar impermeable material are attached to the wall of a building and are supported by sturdy poles. Similarly, if there is no building to attach to, roofing materials can be sufficiently supported at all four corners as a standalone cap, or a waterproof tent canopy can be used.

The area of the roof cover should be sufficient to prevent any precipitation from reaching the covered materials. An example of this type of structure is provided in Figure 5.1.

(Photo courtesy of Seattle Public Utilities)

Figure 5.1. Structure Used To Cover Manufacturing Operations.

Another option for covering an activity is to use an overhanging awning of sufficient size to prevent rain from reaching the materials. Many of the building permit, fire code, and zoning requirements will also apply to these structures. An example of an awning cover is shown in Figure 5.2.

Figure 5.2. Loading Docks with an Overhang To Prevent Material Contact with Rainwater.

Activities such as fueling operations may be more conveniently covered by an island-type overhanging roof. This type of roof is supported by columns along the center of the structure rather than at the corners, enabling vehicles easy access underneath while still providing sufficient protection from rain. An example of this type of roof structure is shown in Figure 5.3.

Figure 5.3. Roof at Fueling Island To Prevent Stormwater Run-On.

Note that floating fuel stations (such as some used for refueling boats) cannot be covered, according to the fire code.

The particular roof cover option used at a given site is subject to the site layout and available space, affordability, and limitations imposed by other regulations. Structural cover options other than those given above can be used if they perform the same function. This BMP should usually be implemented in conjunction with sump or sanitary sewer drains and provisions for prevention of stormwater run-on into the covered area. BMPs S.6 and S.7 in this chapter present information on sump installation and run-on prevention.

S.5 Cover the Activity with an Anchored Tarpaulin or Plastic Sheet

Some activities, such as stockpiling of raw materials, can be effectively covered with a sturdy tarpaulin or heavy plastic sheet made of impermeable material. Weights such as bricks, tires, or sandbags should be used to anchor the cover in place. Care should be taken to ensure that the tarpaulin or sheet covers the activity completely and that stormwater run-on does not penetrate significantly under the cover. If several sheets are used to form a cover, the sheets should be tethered together or laid in an overlapping manner. If necessary, pins or stakes should be used to anchor the tarpaulin to the ground. The tarpaulin must be inspected daily to ensure that no holes or gaps are present in the tarpaulin coverage. An example of this type of cover is shown in Figure 5.4.

Figure 5.4. Temporary Plastic Sheeting Anchored over Raw Materials Stored Outdoors.

The tarpaulin covering will be easier to keep in place and will last longer if some form of wind protection is possible. Attempts should be made to locate stockpiles adjacent to buildings where winds are reduced, but not in between buildings where a wind tunnel effect can occur.

Tarpaulins are an inexpensive and cost effective BMP for many activities. This BMP can be combined with runoff containment/run-on prevention curbs, dikes, and berms for better effectiveness (see BMP S.7 for more information).

S.6 Pave the Activity Area and Slope to a Sump or Holding Tank

This BMP applies to several activities that cannot be covered effectively. It is particularly suited to activities with the potential for leaks and spills, but that otherwise do not generate excessive amounts of polluted runoff. Examples are storage of liquid chemicals, waste oils, and solvents in portable containers such as drums; loading and unloading of liquids from trucks; and painting, finishing, and coating activities. A sump or holding tank serves to provide spill containment until the liquids can be pumped out and properly disposed of. If the activity produces large amounts of runoff, this BMP will not be very effective because the stray contaminants will overflow the sump or pass through the sump before collection and disposal are possible. **To prevent run-on, the area should be enclosed with a berm, curb, or dike**. The following implementation information is intended for situations where this BMP can be effective.

A designated activity area should be paved and sloped to drain to a central collection point. A sump, vault, or holding tank should be installed underneath this collection drain. Some materials, such as gasoline, can react with asphalt pavement and break it down, releasing additional pollutants. If the area is not yet paved and materials are present that may react with asphalt, the area must be paved with concrete. If the area is already paved with asphalt, an asphalt sealant can be applied, which can aid in preventing pavement degradation. Whichever paving material is used, the paved surface must be free of gaps and cracks.

The sump or holding tank should have a capacity large enough to contain the entire volume of a potential spill. An example of a paved activity area with a sump drain is shown in Figure 5.5.

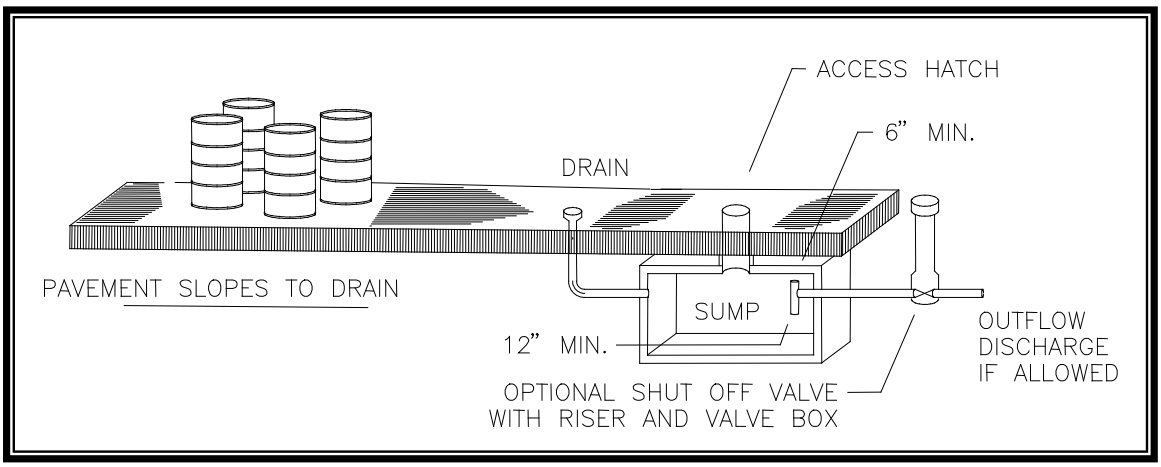

Figure 5.5. Paved Area with Sump Drain.

Wash pads may frequently need to use a sump arrangement like this. To keep disposal costs down, a drain cover, plug, or shutoff valve upstream of the sump should be used at times when the activity is not occurring.

The cost of constructing a sump and the disposal of accumulated contents can be high, so businesses should consider whether other allowable alternative BMPs can be used.

Commercial services that pump sumps and holding tanks can be searched for using key words such as “Environmental” and “Ecological Services.”

BMPs S.4, S.5, and S.7 in this chapter present information on covering activities and run-on prevention.

S.7 Surround the Activity Area with a Curb, Berm, or Dike, or Elevate the Activity

This set of BMP options can be an effective means for prevention of stormwater run-on to an activity area. In addition, a curb, berm, or dike can be used for containment of spills in the activity area, or for containment of contaminated activity runoff. Generally, a containment BMP is most applicable to spill control situations; that is, sites where runoff is relatively clean, but occasional spills may occur. This BMP may be less expensive to implement than paving the activity area and providing proper drainage collection, but can also be more difficult to maintain if stormwater ponding occurs inside a containment dike.

If a curb, dike, or berm is used to prevent stormwater run-on to a covered activity area, and the activity area is paved or otherwise impermeable, the berm should be placed underneath the covering so that rain will not pond inside it. Stormwater run-on can also be prevented by elevating the activity with a platform or other type of pedestal.

Containment may be achieved with concrete curbing, an earthen berm, a tub such as a plastic wading pool, or some other dike material, depending on the activity, its size, and resources available. Activities that require more space and therefore cannot be contained with a tub may need to be surrounded by a curb, dike, or berm. Aboveground storage tanks of liquids, storage of chemicals or wastes in numerous drums, and stockpiling of fertilizer are examples of activities that can be contained effectively in this manner. As the activity area gets larger, containment with an earthen berm can probably be provided less expensively than concrete curbing.

If a curb, berm, or dike is used for runoff containment, and other containment sizing regulations (such as fire codes, Ecology or Thurston County Environmental Health restrictions) do not apply, it should function so that all stormwater runoff from rain events up to the 6-month storm is contained in the immediate activity area until it infiltrates into the ground or is properly disposed of later. This approach is applicable for activities that involve liquid material storage, and that may consequently incur spills. It is also applicable to stockpile areas where runoff is typically polluted with suspended solids. If a stormwater treatment system is presently on site, a valve should be installed in the containment dike so that excess stormwater can be drained out of the activity area and directed to the treatment system. This valve should always be kept closed unless excess stormwater is being discharged, so that any spills that occur within the activity area can be effectively contained.

Difficulties in maintenance may arise with disposal of the captured water on sites without stormwater treatment capability. The collected rainwater may need to be treated before discharge. If the activity is located on impermeable ground, then potentially contaminated water will accumulate within the containment area. If contaminated, this accumulated water cannot simply be drained from the area; it must be collected and disposed of at a licensed disposal facility. During the wet season, this course of action can lead to frequent draining that may prove costly. In addition, some type of monitoring would be

needed to determine if ponded water is contaminated. Depending on the monitoring requirements, this can also be very costly.

For storage of small items, the simplest containment device is a tub or wading pool. A plastic child's wading pool may be sufficient for some activities that do not require a lot of space, such as storing painting materials, and temporary storage of wastes in drums. An example is shown in Figure 5.6. Make sure the material you are using does not react with the plastic.

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

Figure 5.6. Temporary Spill Containment.

For larger areas, a containment curb, dike, or berm may be necessary. If an earthen berm is used, it must be seeded with grass or other vegetation so that it does not erode. Sketches of a containment berm are shown in Figure 5.7.

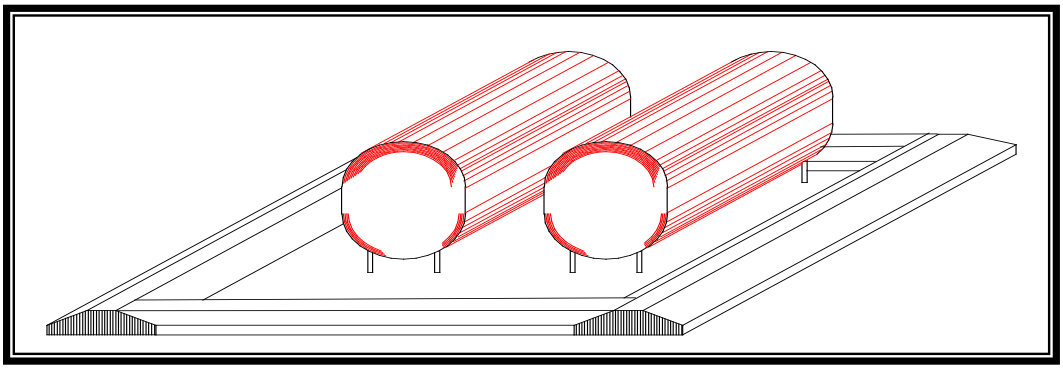

Figure 5.7. Containment Berm Used To Control Liquid-Material Leaks or Spills.

The volume of the containment area should be the greater of either 110 percent of the volume of the largest tank.

It should be noted that neglect and poor maintenance can render the containment useless. Other BMPs should be considered before containment is. Commercial products are available that are a combination containment box/elevated pedestal. These effective devices prevent stormwater run-on by elevating containers off the ground, and allow for collection of spills and drips inside the pedestal box. Similar arrangements can be constructed by hand as well.

BMPs S.4, S.5, and S.6 in this chapter provide information on covering activities and sump installation.

S.8 Implement IPM Measures

Use of herbicides, fungicides, and rodenticides should always be done with extreme caution, not only because of the potential harm to humans and pets, but also because of the potential harm to fish, wildlife, and our water resources. Considering the toxic nature of these compounds, special attention should be given to pesticide usage in all applications. The discussion below applies more to large-scale pesticide users, but should be considered for backyard applications as well.

Commercial, agricultural, municipal, and other large scale pesticide users, such as golf courses and parks, should adhere to the principles of integrated pest management, a decision-making process for pest management that strives for intelligent, environmentally sound control of pests. It is a systems approach to pest management that combines agronomic, biological, chemical, and genetic information for educated decisions on the type of control to use, the timing and extent of chemical application, and whether non-chemical means can attain an acceptable level of pest control.

Integrated pest management is a preventive measure aimed at knowing the exact pests being targeted for control, the locations and times when pests will pose problems, the level of pest-induced damage that can be tolerated without taking action, the most vulnerable life stage, and control actions that are least damaging to the environment. The major components of integrated pest management are as follows:

- Monitoring and inventory of pest populations
- Determination of pest-induced injury and action levels
- Identification of priority pest problems
- Selection and timing of least toxic management tools
- Site-specific treatment with minimized chemical use
- Evaluation and adjustment of pesticide applications.

Monitoring of pest populations is a key to successful integrated pest management implementation. Pest problems are universally easier to control if the problem can be discovered early. With integrated pest management pesticides are used only as a last resort. Maximization of natural controls, including biological controls and removal of pests by hand, is always the first choice.

More information on integrated pest management is available from the Washington State Department of Agriculture and from the Washington State University Extension Service. Refer to Appendix IV-B for an example of an Integrated Pest Management Program.

S.9 Cleaning Catch Basins

Cleaning catch basins regularly is one of the most important stormwater source control measures that a business can take (Figure 5.8).

Figure 5.8. Catch Basin Cleaning with a Vacuum Truck.

Catch basins are typically located under low spots in parking lots, along curbs and road edges, and where storm drain pipes combine flows. Catch basins on the surface collect runoff for storm drains that are typically located directly underneath them. Most catch basins have some storage in the bottom that never drains to an outflow pipe. This permanent storage area is intended to trap sediments, debris, and other particles that can settle out of stormwater, thus preventing clogging of downstream pipes and washing of these solids into receiving waters.

Clean catch basins when the depth of deposits reaches 33 percent of the sump depth as measured from the bottom of basin to the invert of the lowest pipe into or out of the basin. However, in no case should there be less than 6 inches of clearance from the debris surface to the invert of the lowest pipe. Some catch basins (for example, WSDOT Type 1L basins) may have as little as 12 inches of sediment storage below the invert. These catch basins will need more frequent inspection and cleaning to prevent scouring. Where these catch basins are part of a stormwater collection and treatment system, the system owner/operator may choose to concentrate maintenance efforts on downstream control devices as part of a systems approach.

For additional information on the maintenance of catch basins, refer to the Stormwater Facility Maintenance Standards, which are available on the city web site or from the Administrator upon request.

Several companies offer catch basin cleaning services. Pertinent equipment dealers and cleaning services can be found in the telephone Yellow Pages under headings like “Sewer Cleaning Equipment and Supplies” and “Sewer Contractors.” All the solids and stagnant water collected from catch basin sumps must be disposed of properly. None of the sump contents can be flushed into the catch basin outflow pipe. Depending on the nature of the pollutants in the sump, and the associated types of activities taking place on the site, the sump contents may need to be disposed of as hazardous waste. Contractors who perform catch basin cleanout services will be required to follow specified disposal requirements.

It should be apparent that use of other BMPs, such as frequent sweeping of activity areas, covering activity areas, reducing activity occurrence, and containing runoff from activity areas will help reduce catch basin cleaning frequency, thus saving time and money. All businesses and agencies should set up maintenance schedules for all of their BMPs so that coordinated BMP maintenance efforts result in reduced catch basin cleaning frequencies.

Chapter 6 – Best Management Practices for Single-Family Residences

The actions we take each day in and around our homes have a profound effect on surface water quality and fish habitat in this region. Stormwater goes directly to our rivers, lakes, streams, groundwater, and to Puget Sound. It does not go to the wastewater treatment plant. Any pollutants that get into the stormwater go directly to surface waters or groundwater. Small amounts of pollution from many different sources can significantly affect our waterways. Yard maintenance, waste storage, car washing and maintenance, and pool cleaning are some of the activities that can adversely impact water quality. The BMPs discussed in this section are practical ways to keep stormwater from becoming polluted in the first place. It is recommended that all residents in Tumwater use these BMPs. **Note that some of these procedures are required by various state, or local laws, and are noted as required BMPs.**

Below is a general list of BMPs for Tumwater residents. The list includes brief information on applicability. For more information on the following BMPs, refer to the information in Sections 3.1 through 3.7 of this chapter. Additionally, BMPs addressing roof runoff systems and on-site stormwater management features are described in Volume V.

6.1 Automobile Washing

Many residents wash their cars in the driveway or on the street. Washwaters typically flow to a storm drain or ditch, which discharges stormwater directly to the underlying groundwater or to the nearest stream, lake, or Puget Sound. Soaps and detergents, even the biodegradable ones, can have immediate and long-term effects on aquatic life in water bodies. The grime washed off the car also contains a variety of pollutants that can harm fish and wildlife.

6.1.1 Suggested BMPs

Away from Home (preferred option)

- Consider not washing your car at home. Take it to a commercial car wash that has a recycle system and discharges wastewater to the sanitary sewer for treatment.

At Home

- Wash your car directly over your lawn or make sure the washwater drains to a vegetated area. This allows the water and soap to soak into the ground instead of running off into a local water body.

- Ideally, no soaps or detergents should be used, but if you do use one, select one without phosphates.

- Commercial products are available that allow you to clean a vehicle without water. These were developed for areas where water is scarce, so a water saving benefit is realized, as well as reduced pollution.

- Use a hose nozzle with a shutoff valve to save water.

- Do not wash your car if rain is expected. Rain events will rapidly wash chemicals and cleaning products from your property into the stormwater system (and to downstream waters).

- Pour the bucket of soapy, dirty washwater down your sink. This way the water will not pollute surface water. Instead, it will be treated at the wastewater treatment plant.

6.2 Automobile Maintenance

Many of us are "weekend mechanics." We enjoy the cost savings of changing our own oil and antifreeze, topping off the battery with water, and generally making our car perform its best. There is a lot of potential for stormwater pollution associated with these activities; however, the following BMPs will help you minimize pollution while servicing your vehicle.

6.2.1 Required BMPs

- Recycle all oils, antifreeze, solvents, and batteries. Many local car parts dealers and gas stations accept used oil. Identify organizations that can accept specific hazardous waste materials using the Thurston County solid waste web site www.co.thurston.wa.us/solidwaste/garbage/garbage-warc.html

- The Household Hazardous Waste facilities at the Thurston County Waste and Recovery Center accept oil, oil filters, antifreeze, solvents, batteries and more. See their web site for more information: www.co.thurston.wa.us/solidwaste/hazardous/haz-home.htm.

- Old batteries can actually be worth money. Search for local battery recycling businesses to find out if any offer to buy used batteries. Additional contact resources are provided in Chapter 8.

- Never dump new or used automotive fluids or solvents on the ground, in a storm drain or street gutter, or in a water body. Eventually, it will make its way to local surface waters or groundwater, including the water we drink.

- Do not mix wastes. The chlorinated solvents in some carburetor cleaners can contaminate a huge tank of used oil, rendering it unsuitable for recycling. Always keep your wastes in separate containers that are properly labeled and store them out of the weather.

6.2.2 Suggested BMPs

- Fix all leaks, to keep the leaky material off streets and out of surface water.
- To dispose of oil filters, punch a hole in the top and let drain for 24 hours. This is where a large funnel in the top of your oil storage container will come in handy. After draining, wrap in 2 layers of plastic and dispose of in your regular garbage or recycle by taking it to the Thurston County Waste and Recovery Center. Call the Thurston County Solid Waste Hotline at 360-867-2491 for up-to-date information on the appropriate disposal of consumer products.
- Use care in draining and collecting antifreeze to prevent accidental spills. Spilled antifreeze tastes sweet and can be deadly to animals that ingest it.
- Perform your service activities on concrete or asphalt or over a plastic tarpaulin to make spill cleanup easier. Keep a bag of cat litter on hand to absorb spills. If there is a spill, sprinkle a good layer on the spill, let it absorb for a little while and then sweep it up. Place the contaminated litter in a plastic bag, tie it up, and dispose of it in your regular garbage. Take care not to leave cat litter out in the rain; it will form a sticky goo that is hard to clean up.
- If you are doing body work outside, be sure to use a tarpaulin to catch material resulting from grinding, sanding, and painting. Dispose of this waste by double bagging in plastic and placing in your garbage.

6.3 Storage of Solid Wastes and Yard Wastes

Improper storage of recycling, yard waste, and trash at residences can lead not only to water pollution problems, but problems with neighborhood pets and vermin as well. Following the BMPs listed below can help keep your property a clean and healthy place to live.

6.3.1 Suggested BMPs

- All recycling and waste containers kept outside should have lids (Figure 3.1). If your lid is damaged, you should repair or replace it as soon as possible. If your container is supplied by your hauler, please call to have the lid repaired or replaced. The Thurston County web site lists haulers for your neighborhood: http://www.co.thurston.wa.us/solidwaste/recycling/recycling-curbside.html.
- Leaking containers should be replaced. If your container is supplied by your hauler, contact the hauler to have damaged containers replaced.
- Store containers under cover if possible, or on grassy areas.
- Inspect the storage area regularly to pick up loose scraps of material and dispose of them properly.

- Tips for reducing waste:
    - Recycle as much as you can. Most Tumwater residents have access to curbside pickup for yard waste and recyclable materials. Also, look under "recycling" in the phone book or online for firms that take other recyclables.
    - Purchase products that have the least amount of packaging materials.

Figure 6.1. Recycling Cart with Properly Sealed Lid.

- Compost biodegradable materials such as grass clippings and vegetable scraps instead of throwing them away. Your flowerbeds will love the finished compost, and you'll be helping to conserve limited landfill space. Call Thurston County Public Works Department Solid Waste Program at 360-867-2491 for more information on composting or information on yard waste collections. See the section on composting for BMP**s** relating to that activity.

6.4 Composting

Composting is an earth-friendly activity as long as some common-sense rules, outlined below, are followed. If you choose to compost, the following BMPs should be utilized. More information can be found on-line at: http://extension.wsu.edu/thurston/gardening/composting/.

6.4.1 Suggested BMPs

- Compost piles must be located on an unpaved area where runoff can soak into the ground or be filtered by grass and other vegetation. Compost piles should be located in an area of your yard not prone to water ponding during storms, and they should be kept well away from wetlands, streams, lakes, and other drainage paths.

- Compost piles must be maintained and turned over regularly to work properly. Large piles of unattended compost may create odor and vermin problems.

- Avoid putting hazardous, inorganic, plastics or metal waste in the pile.

- Cover the compost pile (Figure 6.2) for two reasons:

    1. To keep stormwater from washing nutrients into waterways.

    2. To keep excess water from cooling down the pile, which will slow down the rate of decomposition.

(Photo courtesy of Green Culture)

Figure 6.2. Covered Compost Bin.

- Build bins of wood, chicken wire, or fencing material to contain compost so it cannot be washed away.

- Building a small earthen dike around your compost pile is an effective means of preventing nutrient-rich compost drainage from reaching stormwater paths.

6.5 Yard Maintenance and Gardening

This section deals with the normal yard maintenance activities we all perform at our homes. Overwatering, over fertilizing, improper herbicide application, and improper disposal of trimmings and clippings can all contribute to serious water pollution problems. Following the BMPs listed below will help alleviate pollutant runoff.

6.5.1 Required BMPs

- Follow the manufacturer's directions exactly for mixing and applying herbicides, fungicides, and pesticides, and use them sparingly. Never apply when it is windy or when rain is expected. Never apply over water, within 100 feet of a well head, or adjacent to streams, wetlands, or other water bodies. Triple-rinse empty containers, using the rinsate for mixing your next batch of spray, and then double-bag and dispose of the empty container in your regular garbage. Never dispose of grass clippings or other vegetation in or near storm drains, streams, lakes, or Puget Sound.

6.5.2 Suggested BMPs

- Use natural, organic soil amendments to improve organic matter content, aid water retention, and add nutrients while reducing the potential for nutrients moving into surface or groundwater.

- Follow manufacturer's directions when applying fertilizers. More is not better, either for your lawn or for local water bodies. Never apply fertilizers over water or adjacent to ditches, streams, or other water bodies. Remember that organic fertilizers have a slow release of nitrogen, and less potential to pollute then synthetic fertilizers.

- Save water and prevent pollution problems by watering your lawn sensibly. Lawns and gardens typically need the equivalent of 1 inch of rainfall per week. You can check on how you're doing by putting a wide mouth jar out where you're sprinkling, and measure the water with a small plastic ruler. Overwatering to the point of runoff can carry polluting nutrients to the nearest water body.

- Consider planting a vegetated buffer zone adjacent to streams or other water bodies on your property. Call the Thurston Conservation District at 360-754-3588 for advice and assistance in developing a planting plan. The Stream Team program 360-357-2491 at the city may even be able to help you plant it!

- Reduce the need for pesticides and fertilizers on lawns by improving the health of the soil. Aerating, thatching, and topdressing with compost will improve soil health and help desired grasses compete with weeds and moss.

- Make sure all fertilizers and pesticides are stored in a covered location. Rain can wash the labels off bottles and convert 50 pounds of boxed fertilizer into either a solid lump or a river of nutrients.

- Use a mulching mower and mow higher to improve soil/grass health and reduce or eliminate pesticide use.

- Compost all yard clippings, or use them as mulch to save water and keep down weeds in your garden. See section 6.4, Composting, for more information.

- Practice organic gardening and virtually eliminate the need to use pesticides and fertilizers. Contact Thurston County Cooperative Extension at 360-786-5445 for information and classes on earth-friendly gardening.

- Pull weeds instead of spraying and get some healthy exercise, too. If you must spray, use the least toxic formulations that will get the job done. The Master Gardener program listed above can help advise you on which spray to use.

- Work fertilizers into the soil instead of letting them lie on the ground surface exposed to the next rain storm.

- Plant native vegetation that is suited to Northwest conditions; it requires less water and little to no fertilizers and pesticides.

- Contact your local waste disposal company for curbside pickup and recycling of yard waste.

6.6 Swimming Pool and Spa Cleaning and Maintenance

Even though we immerse ourselves in it, the water from pools and spas is far from chemically clean. Nutrients, pH, and chlorine can adversely affect fish and wildlife in water bodies. Following these BMPs will ensure the cleanliness of your pool and the environment.

6.6.1 Required BMPs

- Pool and spa water must be dechlorinated to 0.1 milligram per liter (mg/L) if it is to be emptied into a ditch or to the stormwater drainage system. Contact your pool chemical supplier to obtain the neutralizing chemicals you will need. The rate of flow into the ditch or stormwater drainage system must be regulated so that it does not cause problems such as erosion, surcharging, or flooding. Water discharged to the ground or a lawn must not cross property lines and must not produce runoff.

- If pool and spa water cannot be dechlorinated, it must be discharged to the sanitary sewer. Prior to draining, your local wastewater treatment plant must be notified to ensure they are aware of the volume of discharge and the potential

effects of chlorine levels. A pool service company can help you determine the frequency of cleaning and backwash of filters.

- Diatomaceous earth used in pool filters cannot be disposed of in surface waters, on the ground, or into stormwater drainage systems or septic systems. Dry it out as much as possible, bag it in plastic, and dispose of at the landfill.

6.6.2 Suggested BMPs

- Hire a professional pool service company to collect all pool water for proper disposal. Make sure to ask them where they will dispose of it and the kind of permits they hold to do so.

6.7 Household Hazardous Material Use, Storage, and Disposal

Once we really start looking around our houses, the amount of hazardous materials we have on site is a real eye-opener. Oil-based paints and stains, paint thinner, gasoline, charcoal starter fluid, cleaners, waxes, pesticides, fingernail polish remover, and wood preservatives are just a few hazardous materials that most of us have around the house.

When products such as these are dumped on the ground or in a storm drain, they can be washed directly to receiving waters where they can harm fish and wildlife. They can also infiltrate into the ground and contaminate drinking water supplies. The same problem can occur if they are disposed of with your regular garbage; the containers can leak at the landfill and contaminate groundwater. The same type of contamination can also occur if hazardous products are poured down a sink or toilet into a septic system. Don't pour them down the drain if you're on municipal sewers, either. Many compounds can "pass through" the wastewater treatment plant without treatment and contaminate receiving waters, or they can harm the biological process used at the treatment plant, reducing overall treatment efficiency.

With such a diversity of hazardous products present in all homes in Tumwater, a large potential for serious environmental harm exists if improper methods of storage, usage, and disposal are employed. Using the following BMPs will help keep these materials out of our soils, sediments, and waters.

6.7.1 Required BMPs

- Hazardous Materials must be used in accordance with the manufacturer recommendation or guidelines as shown on the label.

- Always store hazardous materials in properly labeled containers, never in food or beverage containers that could be misinterpreted by a child as something to eat or drink.

- Dispose of hazardous materials and their containers properly. Never dump products labeled as *poisonous*, *corrosive*, *caustic*, *flammable*, *inflammable*,

volatile, *explosive danger*, *warning*, *caution*, or *dangerous* outdoors, in a storm drain, or into sinks, toilets or drains. Call the Thurston County Department of Water and Waste Management at 360-357-2491 for information on disposal methods, collection events, and alternative products. Household hazardous wastes from Tumwater residents and non-residents are accepted at the HazoHouse, at the Thurston County Waste and Recovery Center in Hawks Prairie at 2418 Hogum Bay Road NE.

6.7.2 Suggested BMPs

- Check hazardous material containers frequently for signs of leakage. If a container is rusty and has the potential of leaking soon, place it in a secondary container before the leak occurs and prevent a cleanup problem.

- Hazardous materials should be stored out of the reach of children**.**

- Store hazardous materials containers under cover and off the ground. Keep them out of the weather to avoid rusting, freezing, cracking, labels being washed off, etc.

- Keep appropriate spill cleanup materials on hand. Kitty litter is good for many oil-based spills.

- Ground cloths and drip pans must be used under any work outdoors that involves hazardous materials such as oil-based paints, stains, rust removers, masonry cleaners, and others bearing label warnings as outlined above (Figure 6.3).

Figure 6.3. Drip Pan for Capturing Spills and Drips During Engine Repair and Maintenance.

- Latex paints are not a hazardous waste, but are not accepted in liquid form at the landfill. See the Thurston County household hazardous waste web site for latex paint disposal options: www.co.thurston.wa.us/solidwaste/hazardous/haz-paint.htm.

- Use less toxic products whenever possible. Ecology maintains a hotline at 1-800-RECYCLE, and the Washington Toxics Coalition at 206-632-1545 have information detailing alternatives to toxic products or see information online at: www.toxicfreefuture.org.

- If an activity involving the use of a hazardous material can be moved indoors out of the weather, then do so. However, make sure you can provide proper ventilation.

- Follow manufacturer's directions in the use of all materials. Over-application of yard chemicals, for instance, can result in the washing of these compounds into receiving water bodies. Never apply pesticides when rain is expected.

- When hazardous materials are in use, place the container inside a tub or bucket to minimize spills and store materials above the local base flood elevation.

6.8 Pet Waste Management

Pet waste that washes into lakes, streams or Puget Sound begins to decay, using up oxygen and releasing ammonia. Low oxygen levels and ammonia combined with warm water can kill fish. Pet waste also contains nutrients that encourage weed and algae growth in waters we use for swimming, boating and fishing. Most importantly pet waste can carry diseases and bacteria that could make water unsafe for contact and lead to beach closures or affect shellfish harvest. These include:

- Campylobacteriosis – bacterial infection

- Salmonellosis – bacterial infection

- Toxocariasis – roundworm infection

- Toxoplasmosis – protozoan parasite infection

- Giardiasis – protozoan parasite infection

- Fecal Coliform – bacteria in feces; indicates contamination

- *E. coli* – bacteria in feces; may cause disease

Cleaning up after your pet can be as simple as taking a plastic bag or pooper scooper along on your next walk. Then choose one of the following:

6.8.1 Suggested BMPs

- **Bag it.** Put waste in a securely closed bag and deposit it in the trash. Do not put it in your yard waste container because pet waste may carry diseases, and yard waste treatment may not kill disease organisms.

- **Bury it.** Bury waste at least 1 foot deep and cover with soil in your yard or garden (not in food-growing areas).

- **Flush it.** Only flush pet wastes if your home is served by a sanitary sewer that goes to a sewage treatment plant. Water from your toilet goes through a treatment process that removes pollutants before it is discharged into the environment.

- To prevent plumbing problems, do not flush debris or cat litter. Cat feces may be flushed, but used litter should be put in a securely closed bag in the trash. Septic systems are not designed to accommodate the high pollutant load of pet waste. To prevent premature failure or excessive maintenance costs, do not flush pet wastes to your septic system.

- **Compost it.** Waste from small animals **other than dogs and cats** (rabbits, rodents, etc.), can be put in your compost bin.

6.9 On-Site Sewage Maintenance and Operation

The city is responsible for ensuring that stormwater discharged from its stormwater management system does not harm or impair the use of the receiving waters (streams, rivers, lakes, groundwater, or Puget Sound) it discharges into. Sample tests of stormwater discharges and receiving water occasionally indicate high levels of fecal coliform bacteria.

One potential source of bacteria is malfunctioning onsite sewage systems (septic systems). Septic system failures have been documented on private property in Tumwater.

Septic systems vary widely in their design and complexity. Owners of septic systems should contact Thurston County Public Health and Social Services, Environmental Health Division, at 360-786-5490 to request an as-built plan of their system. As-built requests are also available at the Environmental Health Division's Development Review counter at 2000 Lakeridge Drive SW, Olympia. More information is available at: www.co.thurston.wa.us/permitting.

In its simplest design the septic tank is the first stage of a private sewage disposal system. The septic tank is a water-tight tank below ground that is usually made of concrete but may be fiberglass, plastic or steel. Septic tanks have one or two access ports for inspection and maintenance, which are usually buried a few inches below the ground.

The septic tank receives household wastewater through an inlet pipe at one end, settles out larger material to the bottom, breaks down waste material with bacteria present in the

tank, and delivers the partially treated wastewater out another pipe on the opposite end of the tank to the disposal field.

The disposal field is the second stage of the private sewage disposal system and completes the final breakdown of wastewater with organisms in the soil.

The disposal field consists of narrow trenches filled with gravel and perforated pipes that distribute the wastewater to the field. With proper maintenance, a well-designed system can last a long time; however, disposal fields will clog if forced to handle large particles that should settle out in the bottom of the septic tank.

6.9.1 Required BMPs

Regular Inspection and Maintenance

Owners of septic systems must follow all the requirements of Thurston County Health and Social Services, Environmental Health Division. Septic systems are required to be inspected on a routine basis. The frequency of inspection is based on the type of septic system being used and is spelled out in the Thurston County Board of Health Rules and Regulations related to the Sanitary Code for Thurston County Article IV.

The inspection should cover each component of the septic system from the septic tank through the final disposal field. Measuring accumulated sludge and scum in the septic tank is an important part of the overall inspection process. Pumping frequency of the septic tank can vary depending on tank size, family size and garbage disposal use. Inspection of the entire system and conducting needed maintenance can find and correct problems before they become major, thereby saving the homeowner in potential high repair cost. Contact Thurston County Public Health and Social Services, Environmental Health Division at 360-867-2673 for further information and specific requirements applicable to your system.

Eliminate or Restrict Garbage Disposal Use

Eliminating or restricting garbage disposals can significantly reduce the loading of solids to the septic tank thus reducing the pumping frequency.

Reduce and Spread Water Use Out Over the Day

Septic systems are limited in their ability to handle large amounts of wastewater discharged at one time. Excessive wastewater flow can cause turbulence in the tank that may flush accumulated solids into the disposal field. Over time this will impair the ability of the disposal field to function. Limit water-using appliances to one at a time. Do one load of clothes a day rather than several in one day. Practice water conservation at home. For more water saving tips and incentives, contact City of Tumwater Water Resources and Sustainability Department at 360-754-4140.

Chemical Use

Septic systems are to be used for the disposal of household wastewater only. Never dispose of excess or unwanted chemicals into the septic system. Occasional use of household cleaners in accordance with the manufacturer's recommendations should not harm your septic system. Avoid using septic tank additives that advertise their use as septic system cleaners or a substitute for pumping.

For additional information on proper operation of your septic system or to report a failing septic system in your neighborhood, contact Thurston County Public Health and Social Services, Environmental Health Division at 360-867-2673.

6.10 Activities in Wetlands and Wetland Buffers

Wetlands and associated buffers are vegetated ecosystems through which water passes. These areas characteristically have a high water table and are often subject to periodic flooding. Wetlands can be very effective in removing sediments, nutrients and other pollutants from stormwater.

Maintaining wetlands and associated buffers helps to slow stormwater runoff, trap sediments and other pollutants, and reduce the volume of runoff by allowing infiltration to occur. Reducing the velocity of runoff reduces soil erosion and increases contact time with soil and vegetation. Increasing contact of stormwater with soils and vegetation in a wetland or riparian area can be effective in removing sediments, nutrients and other pollutants from stormwater runoff.

Buffer areas are important to both the wetland and the upland areas as habitat for aquatic wetland-dependent wildlife and as buffers during extreme weather events. Other functions of buffer areas that contribute to water quality include shading, flood attenuation and shoreline stabilization.

Persons responsible for maintenance of wetland areas are encouraged to call City of Tumwater Community Development Services at 360-754-4180 prior to performing work in wetlands or their buffers.

6.10.1 Required BMPs

- Removal by hand of manmade litter and control of noxious weeds that are included on the state noxious weed list (Washington Administrative Code [WAC] 16-750) or invasive plant species as identified by the County is required. Control may be conducted by clipping, pulling, over-shading with native tree and shrub species, or non-mechanized digging. Alternative methods such as mechanical excavation, barrier installation, or herbicide use may be allowed upon approval by the city and acquisition of any necessary permits per TMC Title 16.

- Tree and vegetation protection requirements for wetlands, wetland buffers and all other areas in Tumwater are defined by city ordinance per TMC Chapter 16.28 *Wetland Protection Standards* and 16.08-*Protection of Trees and Vegetation*.

Vegetation management in wetlands and wetland buffers performed in accordance with best management practices is allowed for general maintenance of structures, utilities, rights-of-way and emergencies. These ordinances should be reviewed to obtain specific requirements on replanting or other mitigation requirements. Hazard trees may be cut provided the criteria for exemption found in TMC 16.08.080, specifically sections (A) and (E), are followed.

6.10.2 Suggested BMPs

- To prevent possible contamination limit fertilizer and herbicide around wetlands and their buffers.

- Limit access to wetlands and their buffers. To avoid compaction, do not establish trails within the wetland areas.

Chapter 7 – Regulations and Requirements

The information in this chapter is provided to help you comply with additional city and Washington State water quality regulations that may apply to your project, industry, or business in terms of protecting water quality. Some of the state regulations are summarized for your convenience. Because of the continuing modification of statutes, regulations, and ordinances, a listing of relevant regulations is provided but should be verified. It is your responsibility to obtain the current version of any ordinances, statutes, or regulations that apply to your project.

7.1 City of Tumwater Codes and Ordinances

The following is a partial list of selected city codes and ordinances that may apply to land development and stormwater management in Tumwater. A complete list of all Tumwater ordinances is available at: <http://www.codepublishing.com/wa/tumwater/>.

Title 12 Streets, Sidewalks and Public Places

Title 13 Public Services

Title 14 Development Code Administration

Title 15 Buildings and Construction

Title 16 Environment

Title 17 Land Division

Title 18 Zoning

7.2 State, Federal, and Other Regulations and Requirements

R.1 Ecology requirements for the discharge of process wastewaters directly to surface waters

R.2 Ecology requirements for generators of dangerous (hazardous) wastes

R.3 Ecology stormwater NPDES permit requirements

R.4 Ecology requirements for underground and aboveground storage tanks

R.5 U.S. EPA and Ecology requirements for spill-control and prevention plans

R.6 Washington State Department of Agriculture (WSDA) pesticide regulations

R.7 Puget Sound Air Pollution Control Agency (PSAPCA) air quality regulations

R.8 Requirements of Native American Tribes

R.1 Washington State Department of Ecology Requirements for the Discharge of Process Wastewaters Directly to Surface Waters

If a public sanitary sewer is not available, process wastewater may be discharged, after suitable treatment, to a surface water body like a lake or stream, or to a drainage field. If the discharge is to a surface water body, Ecology must be contacted to obtain approval of the type and design of the treatment system, as well as the design and location of the outfall and the need for an NPDES permit. If a septic tank and drainfield are used for treatment, requirements of the Thurston County Environmental Health Division will also apply; contact the On-Site Sewage Program directly at 360-357-2490 for more information.

Ecology's requirements can be found at WAC Chapter 173-240. Some of the specific requirements include:

1. An engineering report must be prepared describing the proposed project. The general contents of the engineering report are specified by Ecology (WAC Chapter 173-240). The report is reviewed and approved by Ecology.

2. The treatment system must be designed in accordance with Criteria for Sewage Works Design, August 2008, by Ecology.

3. The outfall must be designed in accordance with specific dilution zone dimensions (WAC Chapter 173-201A-100).

4. The quality of the discharge into the receiving water must be treated and diluted (according to the dilution criteria noted above) so as to not result in a violation of water quality standards (WAC Chapter 173-201A).

5. The treatment plant must be properly maintained and operated by a certified operator (WAC Chapter 173-230).

R.2 Ecology Requirements for Dangerous Waste Generators

The state dangerous waste regulations (WAC Chapter 173-303) cover accumulation, storage, transportation, treatment, and disposal. Of interest to this volume is the temporary accumulation of waste until taken from the site to a permitted disposal site. Only portions of those regulations that apply to temporary storage are summarized here.

Permitted Generators

Businesses that generate 220 pounds or more of waste, either per batch or in the aggregate, over 1 month must comply with the storage specifications outlined below:

If placed in containers:

1. If the container is not in good condition (for example, severe rusting or apparent structural defects) or if it begins to leak, the owner must replace the container.
2. The container must be labeled as to its contents.
3. The container must be lined with a material that does not react with the waste.
4. The container must be kept closed except when adding or removing waste.
5. The container must not be opened, handled, or stored in a manner that may cause a rupture or leak.
6. At least weekly, examine the containers for leakage.
7. Containers storing reactive or ignitable waste must meet requirements of the International Fire Code.
8. Incompatible wastes must be stored separately.
9. Ecology may require secondary containment of the storage area. Specifically, the storage area must:
    a. Be capable of collecting and holding spills and leaks
    b. If uncovered, be capable of handling a 25-year recurrence interval storm
    c. Have a base that is free of cracks or gaps and is sufficiently impervious to leaks, spills, and rainfall
    d. Be sloped or designed so that liquids can drain to a point for removal
    e. Have positive drainage control (e.g., a valve) to ensure containment until any liquid is removed, which must occur in a timely manner

f. Have a holding capacity equal to 10 percent of the volume of all containers or the volume of the largest container, whichever is greater

g. Not allow run-on of rainfall from areas adjacent to the storage area

If the waste does not contain free liquids, the above requirements need not be met, provided the area is sloped or the containers are elevated.

If placed in tanks:

1. The tank must be lined with a material that does not react with the waste.

2. The tank, tank area, and its ancillary equipment must be inspected according to a written schedule.

3. If retired, the tank is to be cleaned of all contents, and those contents properly disposed of.

4. Tanks storing reactive or ignitable waste must meet the International Fire Code.

5. Incompatible wastes must be stored separately.

The generators must have a designated employee on site or on call with the responsibility for coordinating all emergency response measures. Spills are to be contained and cleaned up as soon as practicable.

Small-Quantity Waste Generators

These are businesses that generate less than 220 pounds of dangerous waste per month or per batch (or 2.2 pounds of extremely hazardous waste). Small-quantity generators still fall under Ecology regulations to the extent that the materials must be properly stored on site until shipment. The wastes must be moved from the property whenever the accumulated quantity equals or exceeds 220 pounds or whenever the material has resided on site for 180 days. The waste must be disposed of at an approved facility. If the business is in compliance with these requirements, they are also considered solid waste generators, and are regulated by Thurston County Environmental Health Division. For technical assistance and site visits, contact Thurston County Environmental Health 360-786-5461 or the Thurston County Department of Water and Waste Management at 360-357-2491. Regulations governing small-quantity generators are currently being reviewed to possibly raise the accumulation limit. Call the Hazardous Waste Line at 1-800-287-6429 for the most up-to-date information.

Dangerous Waste Spill Plans

A recent state law established the requirement that generators of dangerous wastes in excess of 220 lbs/month (2,640 lbs/year) prepare a waste reduction plan, called a spill plan, not to be confused with the SWPPP (see R.4). The required content of the plan is set forth in *Pollution Prevention Planning – Guidance Manual*, January 1992, publication No. 91-2, for WAC Chapter 173-307.

Many of the actions described in these plans may benefit stormwater quality and thus should be integrated into any decisions about the selection of the BMPs described in Chapters 4 and 5 of this volume.

See WAC Chapters 173-303 and -307 for further details, as well as the above-named publication.

R.3 Ecology Stormwater NPDES Permit Requirements

The NPDES program requires industries or industrial-type activities to obtain permits for stormwater discharge.

Coverage is under Ecology's Industrial Stormwater General Permit for each regulated facility. A business must obtain permit coverage if its primary activity falls under one of the categories listed in the permit or its fact sheet. The permit and fact sheet may be viewed on Ecology's web site at: www.ecy.wa.gov/programs/wq/permits/index.html.

The program requires the preparation of a SWPPP. An NPDES permit is required for certain categories of industries and municipalities for discharge to surface water, or a storm drain that discharges to surface water or to surface water and groundwater.

R.4 Ecology Requirements for Underground and Aboveground Storage Tanks

Underground Storage Tanks

Underground storage tanks (USTs) that contain fuel and other petroleum products are regulated by Ecology under WAC Chapter 173-360 Underground Storage Tank Regulations. This law applies to USTs that have a capacity of greater than 110 gallons. USTs that store federally listed or otherwise regulated hazardous waste, heating fuel on the premises where used, farm or residential USTs less than 1,100 gallons in size and other types are exempt from these regulations (WAC Chapter 173-360-110).

The state UST regulations require permits for USTs in use after July 1991. Specific performance criteria such as design, integrity testing, inventory control, UST performance monitoring, spill control, and reporting for new USTs are outlined in this regulation. USTs in existence prior to adoption of this regulation in 1990 must meet the upgrade criteria or new UST requirements by 1998 or complete closure of the system.

USTs that have been closed or taken out of service after December 1988 must complete closure (removal or in-place closure) in accordance with WAC Chapter 173-360. Requirements for UST closure with Ecology include submittal of a 30-day notice of closure, site assessment, and completion of any applicable cleanup actions. A report of the closure actions must be submitted to Ecology.

Aboveground Storage Tanks

Aboveground storage tanks (AST) which store dangerous wastes are regulated under WAC Chapter 173-303, Dangerous Waste Regulations, which is administered by Ecology. Underground storage tanks that store dangerous wastes must also meet the criteria for tanks in this regulation. Businesses that store, handle or generate dangerous wastes are regulated under this regulation based on the volume of dangerous waste generated. The Dangerous Waste Regulations have specific requirements for AST integrity, corrosion protection, secondary containment, leak detection, and use and management criteria, in addition to general requirements for businesses that have dangerous wastes.

For ASTs that contain other types of materials such as petroleum products or raw materials, Ecology guidance document *Guidelines to Prevent, Control, and Contain Spills from the Bulk Storage of Petroleum Products* is available for technical guidance.

Inquiries about business-specific requirements and permitting for USTs and ASTs should be directed to Ecology, Southwest Regional Office at 360-407-6300.

R.5 U.S. EPA and Washington State Department of Ecology Emergency Spill Cleanup Requirements

USEPA – Spill Prevention Control and Cleanup Plans (40 CFR 112)

This federal regulation requires that owners or operators of facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, or consuming oil and oil products are required to have a Spill Prevention and Control and Cleanup Plan (SPCC), provided that the facility is not transportation related; and, that the aboveground storage of a single container is in excess of 660 gallons, or an aggregate capacity greater than 1,320 gallons, or a total below ground capacity in excess of 42,000 gallons.

The plan must:

1. Be well thought out in accordance with good engineering
2. Achieve three objectives – prevent spills, contain spills that occur, cleanup spills
3. Identify name, location, owner, and type of facility
4. Have date of initial operation and oil spill history
5. Designate the person responsible
6. Be approved and certified by the person in authority
7. Contain a facility analysis
8. Tanks must have secondary containment and leak detection.

Ecology Dangerous Wastes (WAC 173-303-350)

The regulations state that generators must have a contingency plan that must include:

1. Actions taken in the event of a spill
2. Descriptions of arrangements with local agencies
3. Identification of the owner's emergency coordinator
4. List of emergency equipment
5. Evacuation plan for business personnel

See federal regulation 40 CFR 112 and WAC 173-303-350 for further information.

R.6 Washington State Department of Agriculture Pesticide Regulations

Washington State pesticide laws are administered by the state's Department of Agriculture, under the Washington Pesticide Control Act (RCW Chapter 15.58), Washington Pesticide Application Action (RCW Chapter 17.21), and regulations in WAC Chapter 16.228. The requirements relevant to water quality protection are:

1. Persons who apply pesticides are required to be licensed **except**:

    a. People who use general-use pesticides on their own or their employer's property

    b. Grounds maintenance people using only general use pesticides on an occasional basis not amounting to a regular occupation

    c. Governmental employees who apply general use pesticides without utilizing any kind of motorized or pressurized apparatus

    d. Employees of a commercial applicator or a government agency who are under direct onsite supervision by a licensed applicator

2. Licensed applicators must undergo 40 hours of continuing education to keep the license

3. No person shall pollute streams, lakes, and other water supplies in pesticide loading, mixing, and application.

4. No person shall transport, handle, store, load, apply, or dispose of any pesticide, pesticide container, or apparatus in such a manner as to pollute water supplies or waterways, or cause damage or injury to land, human beings, desirable plants, or animals.

See WAC Chapter 16.228 for further details.

R.7 Olympia Region Clean Air Agency Air Quality Regulations

Tumwater is under the jurisdiction of regional air quality authorities that, in turn, must function under Washington State and federal air quality regulations. The Olympic Region Clear Air Agency (ORCAA) is the regulatory agency for air quality in Tumwater.

The air authority requires registration of and regulates sources of air emissions, including:

- Spray painting
- Asphalt plants
- Rock crushers
- Non-road engines
- Incinerators
- Fuel storage tanks and reservoirs
- Dry-cleaners
- Soil and groundwater remediation
- Composters
- Auto body repair and painting
- Outdoor burning
- Building demolition and asbestos removal

Other air emission sources are exempt from registration but are still required to comply with applicable air pollution requirements. A list of these sources can be found in the ORCAA regulations.

ORCAA requires that reasonable and appropriate precautions be taken to prevent fugitive particulate material from becoming airborne when handling, loading, transporting, or storing particulate material or when constructing, altering, repairing or demolishing a building, road, or untreated open area. Reasonable precautions include: the paving of parking lots and storage areas; housekeeping measures to minimize the accumulation of mud and dust and prevent its tracking onto public roads; and stabilizing storage piles with water spray, chemical stabilizers, tarps, or enclosure.

ORCAA regulations prohibit the release of an air contaminant or water vapor, including an air contaminant whose emission is not otherwise prohibited if the air contaminant or

water vapor causes detriment to the health, safety, or welfare of any person, or causes damage to property or business. It also prohibits installation of any device that would conceal or mask an emission of an air contaminant that would otherwise violate ORCAA's Regulations or WAC 173-400.

ORCAA regulations may be viewed on the agency's web site at: www.orcaa.org.

R.8 Requirements of Native American Tribes

Three tribes are located in the Tumwater vicinity: the Squaxin Island Tribe, the Nisqually Indian Tribe, and the Confederated Tribes of the Chehalis Reservation. Tribal staff review federal, state, and local permits for projects on tribal lands or projects on non-tribal lands that may affect treaty-reserved resources or areas. All three tribes have lands and continuing treaty interests in natural resources. Check with the respective tribes for more information on the treaty rights and the permit review role of the tribe.

Chapter 8 – Quick Reference Phone Numbers and Web Sites

Environmental Protection Agency (U.S. EPA), Region X	800-424-4372
City of Tumwater	
Illicit Discharge Hotline	360-754-4150
Community Development Services	360-754-4180
Water Resources and Sustainability	360-754-4140
Transportation and Engineering	360-754-4140
Operations and Maintenance	360-754-4150
Thurston County	
Department of Water and Waste Management	360-357-2491
Thurston County Waste Line (automated information)	360-786-5494
LOTT Alliance Industrial Pretreatment Program	360-528-5708
Development Services – Permits	360-786-5490
Weed Control/ Noxious Chemical Use	360-786-5576
Thurston County Public Health and Social Services Department	360-754-4111
University of Washington Center for Urban Water Resources	206-543-6272
Washington State Department of Agriculture	360-902-2010 877-301-4555
Washington State Department of Ecology	360-407-6000
Southwest Regional Office	360-407-6300
Dangerous/Hazardous Waste	360-407-6300
NPDES Stormwater or Wastewater Permits	360-407-6400
Spill Reporting	800-424-8802
Recycling	800-732-9253
Groundwater Quality and Protection	360-407-6400
Underground and Aboveground Storage Tanks	360-407-7170
Washington State University/Thurston County Cooperative Extension	253-798-7180
Industrial Materials Exchange	206-296-4899
Olympic Region Clean Air Agency (ORCAA)	800-422-5623
Underground Utility Locate “Call Before You Dig”	800-424-5555

Washington State Departments

Washington State Department of Health
<http://www.doh.wa.gov/>

Washington Department of Fish and Wildlife
<www.wdfw.wa.gov>

Washington State Government Information and Services
<<www.access.wa.gov>

Washington State Department of Ecology – Flood Information
https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Hazards/Floods-floodplain-planning

Washington State Department of Ecology – Digital Coastal Atlas
<https://apps.ecology.wa.gov/coastalatlas/tools/Map.aspx>

Washington State Department of Ecology – Stormwater Home Page
<http://www.ecy.wa.gov/programs/wq/stormwater/index.html>

Federal Departments

Federal Emergency Management Agency (FEMA)
<https://www.fema.gov/>

FEMA Response to Endangered Species Act
<https://www.fema.gov/flood-maps/change-your-flood-zone/esa>

U.S. EPA Office of Water, Academy 2000
<https://www.epa.gov/aboutepa/about-office-water>

U.S. Geological Survey (USGS) Departments

USGS Historical Water Resource Data
<http://wa.water.usgs.gov/realtime/historical.html>

USGS National Water Information System (NWISWeb)
<http://water.usgs.gov/nwis/>

TerraServer (zoom in on USGS aerial photos anywhere in the USA)
<http://www.webgis.com/terraserver.html>

Water Quality and NPDES

Natural Resources Conservation Service (NRCS) and U.S. Department of Agriculture (USDA)
< https://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/>

Washington Stormwater Center
<www.wastormwatercenter.org>

Center for Urban Waters
<www.urbanwaters.org>

Weather and Flood Information

National Weather Service Seattle Office
<water.weather.gov/ahps>

National Centers for Environmental Information
< https://www.ncdc.noaa.gov/cdo-web/>

National Weather Service Hydrologic Forecasts (River Flooding)
< https://water.weather.gov/ahps2/forecasts.php?wfo=sew>

U.S. Geological Survey (USGS) Real Time Gauge Info
<http://wa.water.usgs.gov/realtime/current.html>

U.S. Army Corps of Engineers Real Time Gauge Info
<https://www.nwd.usace.army.mil/CRWM/Water-Control-Data/Gage-Data/>

The Central Puget Sound Water Suppliers' Forum
< https://www.watersupplyforum.org/home/about-water-supply-forum.html>

City of Tumwater

City of Tumwater Homepage
< https://www.ci.tumwater.wa.us/>

City of Tumwater Water Resources and Sustainability
< https://www.ci.tumwater.wa.us/departments/water-resources-sustainability>

City of Tumwater Community Development
< https://www.ci.tumwater.wa.us/departments/community-development>

Other Agencies

Thurston County Mapping
< https://www.geodata.org/>

Thurston Conservation District
< https://www.thurstoncd.com/>

Thurston County Public Health and Social Services
< https://www.co.thurston.wa.us/health/>

National Weather Service River Forecast Center – Flood Outlook
< https://water.weather.gov/ahps/forecasts.php>

National Oceanic and Atmospheric Administration (NOAA) Tide and Current Predictions
< https://tidesandcurrents.noaa.gov/>

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Ecology, Model Toxics Control Act (MTCA) Cleanup Regulations, Chapter 173-340 WAC.

Ecology, Solid Waste Handling Standards, Chapter 173-350 WAC.

Ecology, Techniques for Dust Prevention and Suppression, publication #96-433, 1996.

Ecology, Vehicle and Equipment Washwater Discharges, Best Management Practices Manual pub. WQ-R-95-56, June 1995, Revised 9/2007.

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Serdar, Dave, Ecology, Contaminants in Vactor Truck Wastes, April 1993.

Sutherland, Roger, High Efficiency Sweeping as an Alternative to the Use of Wet Vaults for Stormwater Treatment, 1998.

Thurston County Environmental Health Division, (Environmental Health Division-Unpublished data), 1993.

Thurston County Environmental Health Division, Report on Street Facility Monitoring, Grant Tax No. 91-129, April 1993.

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Ecology, Analytical Methods for Petroleum Hydrocarbons, publication No. ECY 97-602, June 1997.

Ecology, Discussion Draft – Recommendations for Management of Street Waste, June 1999.

Ecology, Guidance for Remediation of Petroleum Contaminated Soils, pub. 91-30, 1994.

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Jacobson, Michael, Data Summary of Catch Basin and Vactor Waste Contamination in Washington State, Final Report, Center for Urban Water Resources, University of Washington, 1993.

King County, Vactor Waste Disposal Plan, King County Surface Water Management Division, Water Quality Unit, 1994.

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Appendix IV-A – Recycling and Disposal of Vehicle Fluids and Other Wastes

Material	Recommended Management
Antifreeze	Store separately for resale. Separate ethylene glycol from propylene glycol for off-site recycling. If not recyclable, send to Treatment, Storage, and Disposal Facility (TSDF) for disposal.
Batteries	INTACT: Accumulate under cover prior to sale, deliver to recycler or, return to manufacturer. BROKEN: Accumulate acid from broken batteries in resistant containers with secondary containment. Send to TSDF for disposal.
Brake fluid	Accumulate in separate, marked, closed container. Do not mix with waste oil. Recycle.
Fuel	Store gasoline, and diesel separately for use or resale. Mixtures of diesel, gasoline, oil, and other fluids may not be recyclable and may require expensive disposal.
Fuel filters	Drain fluids for use as product. With approval of local landfill operator, dispose of in dumpster, if needed.
Oil filters	Puncture the filter dome and drain it for 24 hours. Put oil drained from filters into a “USED OIL ONLY” container. Keep drained filters in a separate container marked “USED OIL FILTERS ONLY.” Locate a scrap metal dealer who will pick up and recycle filters. With approval of local landfill operator, dispose of drained filters to dumpster.
Paint	Accumulate oil-based and water-based paints separately for use or resale. If not recyclable, send accumulations to TSDF for disposal.
Power steering fluid	Same as for used oils.
Shop towels/oily rags	Use cloth towels that can be laundered and reused. Accumulate used shop towels in a closed container. Sign up with an industrial laundry service that can recycle towels.
Solvents	Consider using less hazardous solvents or switching to a spray cabinet that does not use solvent. Accumulate solvents separately. Consider purchasing a solvent still and recycling solvent on site. Do not mix with used oil. Do not evaporate as a means of disposal.
Transmission oil, differential and rear end fluids	Accumulate in a “USED OIL ONLY” container. Arrange for pickup for off-site recycling.
Used oils; including crankcase oil, transmission oil, power steering fluid and differential/rear end oil	Keep used oil in a separate container marked “USED OIL ONLY.” Do not mix with brake fluid, or used antifreeze. Do not mix with any other waste if burning for heating. Arrange for pickup for off-site recycling.
Windshield washer fluid	Accumulate separately for use or resale. Discharge to onsite sewage disposal, or, if acceptable by the Industrial Pretreatment Program (360-528-5708), discharge to sanitary sewer.

Note: Information in this table was developed by Ecology’s Hazardous Waste Program.

Appendix IV-B – Example of an Integrated Pest Management Program

Integrated pest management (IPM) is a natural, long-term, ecologically-based systems approach to controlling pest populations. This system uses techniques either to reduce pest populations or maintain them at levels below those causing economic injury, or to so manipulate the populations that they are prevented from causing injury. The goals of IPM are to both encourage optimal selective pesticide use (away from prophylactic, broad spectrum use), and to maximize natural controls to minimize the environmental side effects.

For more information on Thurston County's IPM policy, visit the County web site at:

<https://www.co.thurston.wa.us/health/ehipm/index.html>.

A step-by-step comprehensive IPM program is provided below as a guide.

IV-B.1 Introduction

This section provides a sound cultural approach to managing lawns and landscapes and minimizing runoff. Many homeowners or property managers will be able to implement most or all of this approach, others will wish to hire these services out. For the do-it yourselfer, an array of resources is available to assist in the effort. Landscaping businesses, agricultural extensions, local agencies, master gardener programs, local nurseries, and the library can all provide assistance. Landscaping professionals (businesses) are particularly encouraged to practice IPM.

IV-B.2 Definition

Integrated pest management is an approach to pest control that uses regular monitoring to determine if and when treatments are needed, and employs physical, mechanical, cultural, and biological tactics to keep pest numbers low enough to prevent intolerable damage or annoyance. Least-toxic chemical controls are used as a last resort."

True IPM is a powerful approach that anticipates and prevents most problems through proper cultural practices and careful observation. Knowledge of the life cycles of the host plants and both beneficial and pest organisms is also important. The IPM section of this study guide is adapted from *Least Toxic Pest Management for Lawns* by Sheila Daar. Following the IPM process gives you the information you need to minimize damage by weeds, diseases, and pests and to treat those problems with the least toxic approaches.

IV-B.3 The Integrated Pest Management Process

Step One: Correctly identify problem pests and understand their life cycle.

Learn more about the pest. Observe it and pay attention to any damage that may be occurring. Learn about the life cycle. Many pests are only a problem during certain seasons, or can only be treated effectively in certain phases of the life cycle.

Step Two: Establish tolerance thresholds for pests.

Every landscape has a population of some pest insects, weeds, and diseases. This is good because it supports a population of beneficial species that keep pest numbers in check. Beneficial organisms may compete with, eat, or parasitize disease or pest organisms. Decide on the level of infestation that must be exceeded before treatment needs to be considered. Pest populations under this threshold should be monitored but don't need treatment. For instance, European crane flies usually don't do serious damage to a lawn unless there are between 25 to 40 larvae per square foot feeding on the turf in February (in normal weather years). Also, most people consider a lawn healthy and well maintained even with up to 20 percent weed cover, so treatment, other than continuing good maintenance practices, is generally unnecessary.

Step Three: Monitor to detect and prevent pest problems.

Regular monitoring is a key practice to anticipate and prevent major pest outbreaks. It begins with a visual evaluation of the lawn or landscape's condition. Take a few minutes before mowing to walk around and look for problems. Keep a notebook, record when and where a problem occurs, then monitor for it at about the same time in future years. Specific monitoring techniques can be used in the appropriate season for some potential problem pests, such as European crane fly.

Step Four: Modify the maintenance program to promote healthy plants and discourage pests.

A healthy landscape is resistant to most pest problems. Lawn aeration and overseeding along with proper mowing height, fertilization, and irrigation will help the grass out-compete weeds. Correcting drainage problems and letting soil dry out between waterings in the summer may reduce the number of crane-fly larvae that survive.

Step Five: If pests exceed the tolerance thresholds …

Use cultural, physical, mechanical, or biological controls first. If those prove insufficient, use the chemical controls described below that have the least non-target impact. When a pest outbreak strikes (or monitoring shows one is imminent), implement IPM, then consider control options that are the least toxic, or have the least non-target impact. Here are two examples of an IPM approach:

1. **Red thread disease** is most likely under low nitrogen fertility conditions and most severe during slow growth conditions. Mow and bag the clippings to remove diseased blades. Fertilize lightly to help the grass recover, then begin grass-

cycling and change to fall fertilization with a slow-release or natural-organic fertilizer to provide an even supply of nutrients. Chemical fungicides are not recommended because red thread cannot kill the lawn.

2. **Crane fly damage** is most prevalent on lawns that stay wet in the winter and are irrigated in the summer. Correct the winter drainage and/or allow the soil to dry between irrigation cycles; larvae are susceptible to drying out, so these changes can reduce their numbers. It may also be possible to reduce crane fly larvae numbers by using a power de-thatcher on a cool, cloudy day when feeding is occurring close to the surface. Studies are being conducted using beneficial nematodes that parasitize the crane fly larvae; this type of treatment may eventually be a reasonable alternative.

Only after trying suitable non-chemical control methods, or determining that the pest outbreak is causing too much serious damage, should chemical controls be considered. Study to determine what products are available and choose a product that is the least toxic and has the least non-target impact. Refer to the operational BMPs for the use of pesticides below for guidelines on choosing, storing, and using lawn and garden chemicals.

Step Six: Evaluate and record the effectiveness of the control, and modify maintenance practices to support lawn or landscape recovery and prevent recurrence.

Keep records! Note when, where, and what symptoms occurred, or when monitoring revealed a potential pest problem. Note what controls were applied and when, and the effectiveness of the control. Monitor next year for the same problems. Review your landscape maintenance and cultural practices to see if they can be modified to prevent or reduce the problem.

A comprehensive IPM program should also include the proper use of pesticides as a last resort, and vegetation/fertilizer management to eliminate or minimize the contamination of stormwater.

Appendix IV-C – Recommendations for Management of Street Wastes

IV-C.1 Introduction

This appendix addresses waste generated from stormwater maintenance activities such as street sweeping and the cleaning of catch basins and, to a limited extent, other stormwater conveyance and treatment facilities. Limited information is available on the characteristics of wastes from detention/retention ponds, bioswales, and similar stormwater treatment facilities. The recommendations provided here may be generally applicable to these facilities, with extra diligence given to waste characterization.

These recommendations do not constitute rules or regulations, but are suggestions for street waste handling, reuse, and disposal using current regulations and the present state of knowledge of street waste constituents. The recommendations address the liquid and solid wastes collected during routine maintenance of stormwater catch basins, detention/retention ponds, ditches, and similar stormwater treatment and conveyance structures, and street and parking lot sweeping. In addition to these recommendations, end users and other authorities may have their own requirements for street waste reuse and handling.

"Street Wastes" include liquid and solid wastes collected during maintenance of stormwater catch basins and detention/retention ponds, ditches, and similar stormwater treatment and conveyance structures, and solid wastes collected during street and parking lot sweeping.

"Street Wastes," as defined here, does not include solids and liquids from street washing using detergents, cleaning of electrical vaults, vehicle wash sediment traps, restaurant grease traps, industrial process waste, sanitary sewage, mixed process, or combined sewage/stormwater wastes. Wastes from oil/water separators at sites that load fuel are not included as street waste. Street waste also does not include flood debris, landslide debris, and chip seal gravel.

Street waste does not ordinarily classify as dangerous waste. The owner of the stormwater facility and/or collector of street waste is considered the waste generator and is responsible for determining whether the waste designates as dangerous waste. Sampling to date has shown that material from routine maintenance of streets and stormwater facilities does not classify as dangerous waste (see Table C.6 below). However, it is possible that street waste from spill sites could classify as dangerous waste. Street waste from areas with exceptionally high average daily traffic counts may contain contaminants – such as heavy metals, total petroleum hydrocarbons (TPH), and carcinogenic polycyclic aromatic hydrocarbons(c-PAH) – at levels that limit reuse options.

IV-C.2 Contamination in Street Waste Solids

Street waste is solid waste. While street waste from normal street and highway maintenance is not dangerous waste, it is solid waste, as defined under The Solid Waste Management Act (Chapter 70.95 RCW) and under Solid Waste Handling Standards (Chapter 173-350 WAC). The Solid Waste Management Act gives local health departments primary jurisdiction over solid waste management. Street waste solids may contain contaminants at levels too high to allow unrestricted reuse. There are no specific references in the Solid Waste Handling Standards to facilities managing street waste solids, although these facilities will typically fit under the section dealing with Piles Used for Storage and Treatment (Section 320 of the regulation). There are no specific references for reuse and disposal options for street wastes in the Solid Waste Handling Standards because they do not apply to clean soils. Clean soils are defined as "soils and dredged material which are not dangerous wastes, contaminated soils, or contaminated dredged material…" (WAC 173-350-100). Whether or not a soil is a clean soil depends primarily upon the level of contaminants and, to a lesser degree, on the background level of contaminants at a particular location and the exposure potential to humans or other living organisms. Therefore, evaluate both the soil and potential land application sites to determine if a soil is a clean soil.

There is no simple regulatory mechanism available to classify street waste solids for uncontrolled reuse or disposal. Street wastes are not defined simply as solid waste. Local health districts have historically used the Model Toxics Control Act (MTCA) Cleanup Regulation Method A residential soil cleanup levels to approximate "clean" and to make decisions on land application proposals. The MTCA regulation is not intended to be directly applied to setting contaminant concentration levels for land application proposals. However, they may provide human health and environmental threat information and a useful framework for such decisions, when used in conjunction with other health and environmental considerations. In addition to MTCA, Ecological Soil Screening Levels from EPA, ODEQ Risk-based concentrations, Toxicological benchmarks from Oak Ridge National Labs, and natural background levels can be considered. Contact Thurston County Health and Social Services, Environmental Health Division, to determine local requirements for making this determination.

Using the old MTCA regulations, many local health departments have set a criterion of 200 milligrams per kilogram (mg/kg) Total Petroleum Hydrocarbons (TPH) for diesel and heavy fuel oils as a threshold level for clean soil. Using the new MTCA terrestrial ecological evaluation procedures, allowable TPH levels for land application could range from 200 to 460, depending on site characteristics and intended land use. Street waste sampling has historically yielded TPH values higher than 200 mg/kg for hydrocarbons in the diesel and heavy oil range. These values typically reflect interference from natural organic material and, to a lesser extent, relatively immobile petroleum hydrocarbons. The mobile hydrocarbons that are of concern for groundwater protection are generally not retained with street waste solids. Ecology's Manchester Lab has developed an analytical method to reduce the problem of natural organic material being included in the TPH analysis for diesel and heavier range hydrocarbons. This method, called NWTPH-Dx, reduces the background interference associated with vegetative matter by as much as

85 percent to 95 percent. However, even with the new methodology, TPH test results for street waste may still be biased by the presence of natural vegetative material and may still exceed 200 mg/kg. Where the laboratory results report no "fingerprint" or chromatographic match to known petroleum hydrocarbons, the soils should not be considered to be petroleum contaminated soils. Table C.1 at the end of this appendix lists typical TPH levels in street sweeping and catch basin solids.

Street waste solids frequently contain levels of carcinogenic PAHs (c-PAH) that make unrestricted use inappropriate. This is complicated further by analytical interference caused by organic matter that raises practical quantitation or reporting limits. To greatly reduce the level of interference, the use of U.S. EPA Test Method 8270, incorporating the silica gel cleanup step, is recommended. The calculated c-PAH value can vary greatly depending upon how non-detect values are handled. The new MTCA Method A criterion for c-PAH is 0.1 mg/kg (the sum of all seven c-PAH parameters multiplied by the appropriate toxicity equivalency factor) for unrestricted land uses. The MTCA criteria for soil cleanup levels for industrial properties is 2.0 mg/kg. Following this guidance, most sites where street wastes could be reused as soil will be commercial or industrial sites, or sites where public exposure will be limited or prevented. See Table C.2 at the end of this appendix for typical c-PAH values in Street Waste Solids and Related Materials. See Table C.3 for typical metals concentrations in Catch Basin Sediments.

Permitting of street waste treatment and storage facilities as solid waste handling facilities by the Thurston County Public Health and Social Services Department is required. Under the Solid Waste Management Act, local health departments have primary jurisdiction over solid waste management.

Street waste handling facilities are subject to the requirements of the Solid Waste Handling Standards. Specific requirements depend upon the manner in which the waste is managed. Most facilities are permitted under the section dealing with Piles Used for Storage and Treatment (Section 320 of the Solid Waste Management Act).

For most facilities, permit requirements include a plan of operation, sampling, record keeping and reporting, inspections, and compliance with other state and local requirements. The plan of operation should include a procedure for characterization of the waste and appropriate reuse and disposal options, consistent with the recommendations in this document and applicable federal, state, and local requirements.

Ecology suggests a street waste site evaluation (see sample at end of this appendix) for all street waste as a method to identify spill sites or locations that are more polluted than normal. Ecology based the disposal and reuse options listed below on characteristics of routine street waste and are not appropriate for more polluted wastes. The collector of street waste should evaluate it for its potential to be classified as dangerous waste. The collector should also be aware that this waste may not meet end user requirements.

Street waste suspected to be dangerous waste should not be collected with other street waste. Material in catch basins with obvious contamination (unusual color,

staining, corrosion, unusual odors, fumes, and oily sheen) should be left in place or segregated until tested. Base testing activities on probable contaminants. Street waste that is suspected to be dangerous waste should be collected and handled by someone experienced in handling dangerous waste. If collecting potential dangerous waste because of emergency conditions, or if the waste becomes suspect after it is collected, it should be handled and stored separately until a determination as to proper disposal is made. Street waste treatment and storage facilities should have separate "hot load" storage areas for such waste. **Dangerous Waste** includes street waste known and suspected to be dangerous waste. This waste must be handled following the Dangerous Waste Regulations (Chapter 173-303 WAC) unless testing determines it is not dangerous waste.

Spills should be handled by trained specialists. Maintenance and operation crews and private operators conducting street sweeping or cleaning catch basins should have written policies and procedures for dealing with spills or suspected spill materials. Emergency Spill Response telephone numbers should be immediately available as part of these operating policies and procedures.

The end recipient of street waste must be informed of its source and may have additional requirements for its use or testing that are not listed here. This document is based primarily on average street waste's chemical constituents and their potential effect on human health and the environment. There are physical constituents (for example, broken glass or hypodermic needles) or characteristics (for example, fine grain size) that could also limit reuse options. Additional treatment such as drying, sorting, or screening may also be required, depending on the needs and requirements of the end user.

Street waste treatment and storage facilities owned or operated by governmental agencies should be made available to private waste collectors and other governmental agencies on a cost recovery basis. Proper street waste collection and disposal reduces the amount of waste released to the environment. The operators of street waste facilities should restrict the use of their facilities to certified and/or licensed waste collectors who meet their training and liability requirements.

The use of street waste solids under this guidance should not lead to designation as a dangerous waste site, requiring cleanup under MTCA. Exceeding MTCA Method A unrestricted land use cleanup levels in street waste and products made from street waste, does not automatically make the site where street waste is reused a cleanup site. A site is reportable only if "a release poses a threat to human health or the environment" (Model Toxic Control Act). The reuse options proposed below are designed to meet the condition of not posing a threat to human health or the environment.

Testing of street waste solids will generally be required as part of a plan of operation that includes procedures for characterization of the waste. Testing frequency, numbers of samples, parameters to be analyzed, and contaminant limit criteria should all be provided as part of an approved plan of operation. However, street sweepings that consist primarily of leaves, pine needles, branches, and grass clippings do not require testing. Tables C.4 and C.5 below provide some recommended parameters and sampling frequencies for piles of street waste solids from routine street maintenance. These are provided as

guidance only, and are intended to assist the city and the Thurston County Public Health and Social Services Department in determining appropriate requirements. Sampling requirements may be modified, over time, based on accumulated data. When the material is from a street waste facility or an area that has never been characterized by testing, the test should be conducted on a representative sample before co-mingling with other material. Testing in these instances would be to demonstrate that the waste does not designate as dangerous waste and to characterize the waste for reuse. At a minimum, the parameters in Table C.4 are recommended for these cases. Note that it will generally not be necessary to conduct TCLP analyses when the observed values do not exceed the recommended values in Table C.4. Table C.6 illustrates some observed relationships between total metals and TCLP metals values.

For further information on testing methods and sampling plans, refer to:

- SW 846 (U.S. EPA, Office of Solid Waste, Test Methods for Evaluating Solid Wastes, 3rd Edition); and

- Standard Methods for the Examination of Water and Wastewater (American Public Health Association, et al., 18th Edition, 1992).

For street waste not exceeding the suggested maximum values in Table C.4, the following street waste solids reuse and disposal options are recommended:

- Compost street sweepings that consist primarily of leaves, pine needles and branches, and grass cuttings from mowing grassy swales. Remove litter and other foreign material prior to composting or the composting facility must provide for such removal as part of the process. Dispose of the screened trash as solid waste at an appropriate solid waste handling facility.

- It is possible to reuse coarse sand screened from street sweeping after recent road sanding, providing there is no obvious contamination from spills. The screened trash is solid waste and must be disposed of at an appropriate solid waste handling facility.

- Screen roadside ditch cleanings, not contaminated by a spill or other release and not associated with a stormwater treatment system such as a bioswale, to remove litter and separate into soil and vegetative matter (leaves, grass, needles, branches, etc.). The soils from these activities are typically unregulated as solid waste. Ditching material that may be contaminated must be stored, tested, and handled in the same manner as other street waste solids. It is the generator's responsibility to visually inspect and otherwise determine whether the materials may be contaminated.

- Construction street waste (solids collected from sweeping or in stormwater treatment systems at active construction sites) may be placed back onto the site that generated it, or managed by one of the methods listed below, provided that it

has not been contaminated as a result of a spill. For concrete handling at construction sites, refer to Volume II.

- Use screened street waste soils as feedstock materials for topsoil operations. Reserve this option for street waste soils with very low levels of contaminants. Evaluate the allowable level of contaminants based on the proposed use of the soil. At a minimum, the contaminate level in the soil should be below established action levels for in situ soils. Do not dilute street waste soils with clean soils or composted material as a substitute for treatment or disposal. There may be unscreened physical contaminants (for example, glass, metal, nails, etc.) in street waste that cannot be entirely screened from the waste. Where present, these contaminants in street waste could preclude its use as feedstock material for topsoil operations.

- Fill in parks, play fields, golf courses, and other recreational settings, where direct exposure by the public is limited or prevented. One way to accomplish is to cover the fill with sod, grass, or other capping material to reduce the risk of soil being ingested. The level of contaminants in the street waste must be evaluated to ensure that the soils meet the definition of clean soils when used in this manner.

- Fill in commercial and industrial areas, including soil or top dressing for use at industrial sites, roadway medians, airport infields, and similar sites where there is limited direct human contact with the soil and stabilize soils with vegetation or other means. Evaluate the level of contaminants in the street waste to ensure that the soils meet the definition of clean soils when used in this manner.

- Top dressing on roadway slopes, road or parking lot construction material, road or parking lot subgrade, or other road fill. Evaluate the level of contaminants in the street waste to ensure that the soils meet the definition of clean soils when used in this manner.

- Daily cover or fill in a permitted municipal solid waste landfill, provided the street waste solids have been dewatered. Street waste solids may be acceptable as final cover during a landfill closure. Thurston County Health and Social Services, Environmental Health Division, and the landfill operator should be consulted to determine conditions of acceptance.

- Treatment at a permitted contaminated soil treatment facility.

- Recycling through incorporation into a manufactured product, such as portland cement, prefabricated concrete, or asphalt. Consult the facility operator should be consulted to determine conditions of acceptance.

- Other end-use as approved by the Thurston County Department of Public Health and Social Services.

- Disposal at an appropriate solid waste handling facility.

For street waste that exceeds the suggested maximum values in Table C.4, the following street waste solids reuse and disposal options are recommended:

- Treatment at a permitted contaminated soil treatment facility.
- Recycling through incorporation into a manufactured product, such as portland cement, prefabricated concrete, or asphalt. The facility operator should be consulted to determine conditions of acceptance.
- Other end-use as approved by the Thurston County Department of Public Health and Social Services.
- Disposal at an appropriate solid waste handling facility.

IV-C.3 Street Waste Liquids

Street waste collection should emphasize retention of solids in preference to liquids. Street waste solids are the principal objective in street waste collection and are substantially easier to store and treat than liquids.

Street waste liquids require treatment before their discharge. Street waste liquids usually contain high amounts of suspended and total solids and adsorbed metals. Treatment requirements depend on the discharge location.

The Industrial Pretreatment Program responsible for operations and maintenance of the system must approve discharges to sanitary sewer and storm sewer systems. Ecology will not generally require waste discharge permits for discharge of stormwater decant to sanitary sewers or to stormwater treatment BMPs constructed and maintained in accordance with Ecology's *Stormwater Management Manual for Western Washington* (see Volume V for further detail).

Follow the following required order of preference for disposal of catch basin decant liquid and water removed from stormwater treatment facilities.

- Discharge of catch basin decant liquids to the municipal sanitary sewer is the preferred disposal option. Discharge to a municipal sanitary sewer requires the approval of the Industrial Pretreatment Program at 360-528-5708. Approvals for discharge to a municipal sanitary sewer will likely contain pretreatment quantity, and location conditions to protect the municipal system. Following the Industrial Pretreatment Program's conditions is a permit requirement. **Discharge of catch basin decant liquids may be allowed into a basic or enhanced stormwater treatment BMP, if option 1 is not available.** Only discharge liquid collected from cleaning catch basins and stormwater treatment wet vaults back into the storm sewer system under the following conditions:
    - The preferred disposal option of discharge to sanitary sewer is not reasonably available.

- The discharge is to a basic or enhanced stormwater treatment facility (see Volume V). If pretreatment does not remove visible sheen from oils, the treatment facility must be able to prevent the discharge of oils causing a visible sheen.

- The discharge is as near to the treatment facility as is practical, to minimize contamination or recontamination of the collection system.

- The storm sewer system owner/operator has granted approval and has determined that the treatment facility will accommodate the increased loading. Part of the approval process may include pretreatment conditions to protect the treatment BMP. Following local pretreatment conditions is a permit requirement.

- Ecology must approve in advance flocculants for the pretreatment of catch basin decant liquids. The liquids must be non-toxic under the circumstances of use.

The discharger shall determine if reasonable availability of sanitary sewer discharge exists, by evaluating such factors as distance, time of travel, load restrictions, and capacity of the stormwater treatment facility.

- **Operators may return water removed from stormwater ponds, vaults, and oversized catch basins to the storm sewer system.** Stormwater ponds, vaults, and oversized catch basins contain substantial amounts of liquid, which hampers the collection of solids and poses problems in hauling the removed waste away from the site. Water removed from these facilities may be discharged back into the pond, vault, or catch basin provided:

  - Operators may discharge clear water removed from a stormwater treatment structure directly to a down gradient cell of a treatment pond or into the storm sewer system.

  - Turbid water may be discharged back into the structure it was removed from if:

    The removed water has been stored in a clean container (eductor truck, Baker tank, or other appropriate container used specifically for handling stormwater or clean water); and

    There will be no discharge from the treatment structure for at least 24 hours.

  - The storm sewer system owner/operator must approve the discharge.

IV-C.4 Site Evaluation

Ecology suggests use of a site evaluation as a method to identify spill sites or locations that potentially contain dangerous wastes.

The site evaluation will aid in determining if waste should be handled as dangerous waste and in determining what to test for if dangerous waste is suspected. The site evaluation will also help to determine if the waste does not meet the requirements of the end users.

There are three steps to a site evaluation:

1. A **historical review** of the site for spills, previous contamination, and nearby toxic cleanup sites and dangerous waste and materials.

   The historical review will be easier if done on an area wide basis prior to scheduling any waste collection. The historical review should be more thorough for operators who never collected waste at a site before. At a minimum, the historical review should include operator knowledge of the area's collection history or records kept from previous waste collections.

   Private operators should ask the owner of the site for records of previous contamination and the timing of the most recent cleaning. Ecology's Hazardous Substance Information Office maintains a Toxic Release Inventory and a "Facility Site" web page, tracking more than 15,000 sites. This information is available through the Internet at <https://ecology.wa.gov/Research-Data/Data-resources/Toxics-Release-Inventory> or by calling a toll-free telephone number (800-633-7585). The web page allows anyone with Internet access to search for facility information by address, facility name, town, zip code, and SIC code, etc. It lists why Ecology is tracking each one (NPDES, Toxic Substances Control Act [TSCA], Resource Conservation and Recovery Act [RCRA], Clean Air Act, etc.), as well as whom to call within Ecology to find out more about the given facility. EPA's toxic release web site is

   <https://www.epa.gov/toxics-release-inventory-tri-program>.

2. An **area visual inspection** for potential contaminant sources such as a past fire, leaking tanks and electrical transformers, and surface stains.

   Evaluate the area around the site for contaminant sources prior to collection of the waste. The area visual inspection may be done either as part of multiple or as single site inspections. If the inspection finds a potential contaminant source, delay the waste collection until the potential contaminant is assessed.

   A second portion of the area visual inspection is a subjective good housekeeping evaluation of the area. Locations with poor housekeeping commonly cut corners

in less obvious places. Inspect these sites in greater detail for illegal dumping and other contamination spreading practices.

3. A **waste and container inspection** before and during collection.

   The inspection of the waste and catch basin or vault is the last and perhaps most critical step in the site evaluation.

   For example, if the stormwater facility has an unusual color in or around it, then there is a strong possibility that someone dumped something into it. Some colors to be particularly wary of are yellow-green from antifreeze dumping and black and/or rainbow sheen from oil and/or grease dumping. In addition, if the inspector observes any staining or corrosion, then a solvent may have been dumped.

   Fumes are also good indicators of potential dangerous waste. Avoid deliberate smelling of catch basins for worker safety, but suspicious odors may be encountered from catch basins thought to be safe. Some suspicious odors are rotten eggs (hydrogen sulfide is present), gasoline or diesel fumes, or solvent odors. If unusual odors are noted, contact a dangerous waste inspector before cleaning the basin. **Finally, operator experience is the best guide to avoid collection of contaminated waste.**

Table C.1. Typical TPH Levels in Street Sweeping and Catch Basin Solids.

Reference	Street Sweeping (mg/kg)	Catch Basin Solid (mg/kg)
Snohomish County[a] (Landau 1995)	390 – 4,300	
King County[a] (Herrera 1995)		123 – 11,049 (Median 1,036)
Snohomish County and Selected Cities[a] (W & H Pacific 1993)	163 – 1,500 (Median 760)	163 – 1,562 (Median 760)
City of Portland[b] (Bretsch)		MDL – 1,830 (Median 208)
City of Seattle – Diesel Range[b] (Herrera 2009)	330-520	780-1,700
City of Seattle – Motor Oil[b] (Herrera 2009)	2,000-2,800	3,500-7,000
Oregon[a] (Collins, ODOT 1998)	1,600 – 2,380	
Oregon[c] (Collins, ODOT 1998)	98 – 125	

[a] Method WTPH 418.1; does not incorporate new methods to reduce background interference due to vegetative material

[b] Method NWTPH-Dx.

[c] Method WTPH – HCID.

Table C.2. Typical c-PAH Values in Street Waste Solids and Related Materials.

Sample Source	City of Everett					WSDOT	
Analyte	Street Sweepings	Soil	3-Way Topsoil	Vactor Solids	Leaf & Sand	Sweepings Fresh	Sweepings Weathered
Benzo(a)anthracene	0.1U	0.076U	0.074U	0.21	0.45	0.56	0.40
Chrysene	0.14	0.09	0.074U	0.32	0.53	0.35	0.35
Benzo(b)fluoranthene	0.11	0.076U	0.074U	0.27	0.52	0.43	0.51
Benzo(k)fluoranthene	0.13	0.076U	0.074U	0.25	0.38	0.39	0.40
Benzo(a)pyrene	0.13	0.076U	0.074U	0.26	0.5	0.41	0.33U
Indeno(1,2,3-cd)pyrene	0.1U	0.076U	0.074U	0.19	0.39	NR	NR
Dibenzo(a,h)anthracene	0.1U	0.076U	0.074U	0.081	0.12	0.39	0.33U
Revised MTCA Benzo(a)pyrene [ND=PQL]	0.215	0.134	0.134	0.388	0.727	0.708	0.597
Benzo(a)pyrene [ND=½ PQL]	0.185	0.069	0.067	0.388	0.727	0.708	0.366
Benzo(a)pyrene [See * below]	0.185	0.069	0	0.388	0.727	0.708	0.366
Benzo(a)pyrene [ND=0]	0.155	0.001	0	0.388	0.727	0.708	0.135

* If the analyte was not detected for any PAH, then ND=0; If analyte was detected in at least 1 PAH, then ND=½PQL; if the average concentration (using ND=½ PQL) is greater than the maximum detected value, then ND=Maximum value.

The new Method A soil cleanup level for unrestricted land use is 0.1 mg/kg for benzo(a)pyrene (WAC 173-340-900, Table 740-1).

The new Method A soil cleanup level for industrial properties is 2 mg/kg for benzo(a)pyrene (WAC 173-340-900, Table 745-1).

Table C.3. Typical Metals Concentrations in Catch Basin Sediments.

Parameter Metals; Total (mg/kg)	Ecology 1993 (Min – Max)	Thurston County 1993 (Min – Max)	King County 1995 (Min – Max)	King County 1995 Mean	City of Seattle 2003 through 2011 Min- Max (Mean)
Arsenic (As)	<3 – 24	0.39 – 5.4	4 – 56	0.250	< 5 – 50 (9.3)
Cadmium (Cd)	0.5 – 2.0	<0.22 – 4.9	0.2 – 5.0	0.5	
Chromium (Cr)	19 – 241	5.9 – 71	13 – 100	25.8	
Copper (Cu)	18 – 560	25 – 110	12 – 730	29	9.1 – 3,280 (166)
Lead (Pb)	24 – 194	42 – 640	4 – 850	80	3 – 3,690 (154)
Nickle (Ni)	33 – 86	23 – 51	14 – 41	23	
Zinc (Zn)	90 – 558	97 – 580	50 – 2,000	130	44 – 4,170 (479)
Mercury (Hg)	0.04 – 0.16	0.024 – 0.193			< 0.03 – 3.8 (0.16)

Table C.4. Recommended Parameters and Suggested Values for Determining Reuse and Disposal Options.

Parameter	Suggested Maximum Value
Arsenic (As), Total	20.0 mg/kg[a]
Cadmium(Cd), Total	2.0 mg/kg[b]
Chromium(Cr), Total	42 mg/kg[c]
Copper (Cu), Total	100 mg/kg[d]
Lead(Pb), total	250 mg/kg[e]
Nickel (Ni)	100 mg/kg[d]
Zinc (Zn)	270 mg/kg[d]
Mercury (Hg) (Inorganic)	2.0 mg/kg[f]
PAHs (Carcinogenic)	0.1 – 2.0 mg/kg[g]
TPH (Heavy Fuel Oil)	2,000 mg/kg[h]
TPH (Diesel)	200 mg/kg[i]
TPH (Gasoline)	100 mg/kg[j]
Benzene	0.03 mg/kg[j]
Ethylbenzene	6 mg/kg[j]
Toluene	7 mg/kg[j]
Xylenes (Total)	9 mg/kg[j]

[a] Arsenic: from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses

[b] Cadmium: from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses

[c] Chromium; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses

[d] Copper, Nickel, and Zinc; from MTCA Table 749-2: Protection of Terrestrial Plants and Animals

[e] Lead; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses

[f] Mercury; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses

[g] PAH-Carcinogenic; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses and Table 745-1, industrial properties, based on cancer risk via direct contact with contaminated soil (ingestion of soil) in residential land use situations and commercial/industrial land uses. Note: The Thurston County Health Department may permit higher levels as part of a Plan of Operation, where they determine that the proposed end use poses little risk of direct human contact or ingestion of soil.

y TPH (Heavy Fuel Oil); from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses

[i] TPH (Diesel): from MTCA Table 749-3: Protection of Terrestrial Plants and Animals.

[j] BETX; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses.

Table C.5. Recommended Sampling Frequency for Street Waste Solids.

Cubic Yards of Solids	Minimum Number of Samples
0 – 100	3
101 – 500	5
501 – 1,000	7
1,001 – 2,000	10
>2,000	10; plus 1 for each additional 500 cubic yards

Modified from Ecology's Interim Compost Guidelines.

Table C.6. Pollutants in Catch Basin Solids – Comparison to Dangerous Waste Criteria.

Parameter Metals	Range of Values in Catch Basin Waste Total Metals (mg/kg)	Range of Values in Catch Basin Waste TCLP Metals (mg/kg)	Dangerous Waste Criteria TCLP values (mg/L)
Arsenic	<3 – 56	<0.02 – 0 .5	5.0
Cadmium	<0.22 – 5	0.0002 – 0.03	1.0
Chromium	5.9 – 241	0.0025 – 0.1	5.0
Copper	12 – 730	0.002 – 0.88	none
Lead	4 – 850	0.015 – 3.8	5.0
Nickel	23 – 86	<0.01 – 0.36	none
Zinc	50 – 2,000	0.04 – 6.7	none
Mercury	0.02 – 0.19	0.0001 – 0.0002	0.2

Data from Thurston County (Thurston County 1993), King County (Herrera 1995) and Ecology (Serdar, Ecology 1993).

Table C.7. Typical Catch Basin Decant Values Compared to Surface Water Quality Criteria.

Parameter Metals	State Surface Water Quality Criteria		Range of Values Reported Total Metals (µg/L)	Range of Values Reported Dissolved Metals (µg/L)
	Freshwater Acute (µg/L – dissolved metals)	Freshwater Chronic (µg/L – dissolved metals)		
Arsenic	360	190	100 – 43,000	60 – 100
Cadmium*	2.73	0.84	64 – 2,400	2 – 5
Chromium (total)			13 – 90,000	3 – 6
Chromium (III)*	435	141		
Chromium (VI)	0.5	10		
Copper*	13.04	8.92	81 – 200,000	3 – 66
Lead*	47.3	1.85	255 – 230,000	1 – 50
Nickel*	1114	124	40 – 330	20 – 80
Zinc*	90.1	82.3	401 – 440,000	1,900 – 61,000
Mercury	2.10	0.012	0.5 – 21.9	

*Hardness-dependent; hardness assumed to be 75 mg/L.

Table C.8. Typical Values for Conventional Pollutants in Catch Basin Decant.

Parameter (values as mg/L, except where stated)	Ecology 1993		King County 1995	
	Mean	(Min – Max)	Mean	(Min – Max)
pH	6.94	6.18 – 7.98	8	6.18 – 11.25
Conductivity (umhos/cm)	364	184 – 1110	480	129 – 10,100
Hardness (mg/L $CaCO_3$)	234	73 – 762		
Fecal Coliform (MPN/100 ml)	3,000			
BOD	151	28 – 1,250		
COD	900	120 – 26,900		
Oil and Grease	11	7.0 – 40	471	15 – 6,242
TOC	136	49 – 7,880	3,670	203 – 30,185
Total Solids	1,930	586 – 70,400		
Total Dissolved Solids	212	95 – 550		
Total Suspended Solids	2,960	265 – 111,000		
Settleable Solids (ml/L/hr)	27	2 – 234	57	1 – 740
Turbidity (NTU)	1,000	55 – 52,000	4,673	43 – 78,000

Table C.9. Catch Basin Decant Values Following Settling.

Parameter: Total Metals in mg/L	Portland – Inverness Site[a] Min – Max	King County – Renton[b] Min – Max	METRO Pretreatment Discharge Limits
Arsenic	0.0027 – 0.015	< MDL – 0.12	4
Cadmium	0.0009 – 0.0150	< MDL – 0.11	0.6
Chromium	0.0046 – 0.0980	0.017 – 0.189	5
Copper	0.015 – 0.8600	0.0501 – 0.408	8
Lead	0.050 – 6.60	0.152 – 2.83	4
Nickel	0.0052 – 0.10	0.056 – 0.187	5
Silver	0.0003 – 0.010	< MDL	3
Zinc	0.130 – 1.90	0.152 – 3.10	10
Settleable Solids; ml/L	No Data	0.02 – 2	7
Nonpolar fat, oil and grease	5.7 – 25	5 – 22	100
pH (std)	6.1 – 7.2	6.74 – 8.26	5.0 – 12.0
Total Suspended Solids	2.8 – 1,310		
Recorded Total Monthly Flow; gallons	Data not available	31,850 – 111,050	
Recorded Max. Daily Flow; gallons	Data not available	4,500 – 18,600	25,000 gpd
Calculated Average Daily Flow; gpd	Data not available	1,517 – 5,428	

[a] Data from the City of Portland, Oregon, Inverness Site (data from 1999–2001); detention times not provided.

[b] Data from King County's Renton Facility (data from 1998–1999); detention times not provided.

Appendix IV-D – Storm Drain Marker Standard and Instructions

Waste materials dumped into storm drain inlets can have severe impacts on receiving waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets. The stencil, affixed sign, or metal grate contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal. Contact Transportation and Engineering Department, Water Resources and Sustainability, or the Administrator to obtain free markers.

Required BMPs:

Label storm drain inlets in residential, commercial, industrial areas, and any other areas where contributions or dumping to storm drains is likely.

Stencil or apply storm drain markers adjacent to storm drain inlets to help prevent the improper disposal of pollutants. Or, use a storm drain grate stamped with warnings against polluting. Place the marker in clear sight facing toward anyone approaching the inlet from either side. Use a brief statement and / or graphical icons to discourage illegal dumping. Examples include:

"No Dumping – Drains to Stream"

"Dump No Waste – Drains to Lake"

"No Dumping – Puget Sound Starts Here"

"Don't Pollute – Flows to Waterways"

Maintain the legibility of markers and signs. Signage on top of curbs tends to weather and fade. Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

When painting stencils or installing markers, temporarily block the storm drain inlet so that no pollutants are discharged from the labeling activities.

Suggested BMPs:

Use a stencil in addition to a storm drain marker or grate to increase visibility of the message. *Reference for this BMP: (CASQA, 2003)*

Instructions for placing storm drainage markers:

1. Obtain a storm drainage marker and adhesive from Transportation and Engineering Department, Water Resources and Sustainability, or the Administrator by calling 360-754-4140.

2. Ensure the application surface is clean, dry, and flat.

3. On the back of the marker, apply a bead of adhesive about 1/8" from the outer edge. Continue the bead in a spiral pattern towards the center of the marker.

4. Place the marker on the application surface and press down hard, forcing adhesive out around the edge of the marker.