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P.O. Box 1837
Tacoma, WA 98401-1837
www.portoftacoma.com

Port of Tacoma

BMP Playbook

December 2021

Introduction

The Port of Tacoma (Port) constructs, operates, and maintains stormwater facilities on Port-owned properties on the Tacoma Tideflats and parts of unincorporated Pierce County. The Port and Port tenants are required to reduce the discharge of pollutants, protect water quality, and meet the requirements of the Clean Water Act as mandated through the National Pollutant Discharge Elimination System (NPDES) permits. In the state of Washington, NPDES permits are issued and managed by the Washington State Department of Ecology (Ecology). The Port is identified as a secondary permittee under the Phase I Municipal Stormwater permit for municipal separate storm sewer systems (MS4). Portions of Port properties are also covered under the Industrial Stormwater General Permit (ISGP). The Port manages ISGPs for Port-operated terminals; however, most tenants manage their own ISGPs.

Facilities at the Port under the ISGP or an individual NPDES permit are required to conduct stormwater discharge monitoring and to carry out corrective actions when results fail the benchmark values outlined in the permit. To comply with the requirements of the ISGP or MS4, minimize pollutants in stormwater, and meet benchmarks, stormwater best management practices (BMPs) must be implemented. BMPs are defined as schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices, that when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington State. The Port BMP Playbook provides guidance on BMPs that can be implemented at Port facilities to prevent or reduce the release of pollutants and help meet applicable benchmarks. The types of BMPs that this Playbook refers to are:

- Operational Source Control BMPs;
- Structural Source Control BMPs; and
- Treatment BMPs.

Operational Source Control BMPs are non-structural practices that prevent or reduce pollutants from entering stormwater. Examples include formation of a pollution prevention team, good housekeeping practices, preventive maintenance procedures, spill prevention and cleanup, street sweeping, employee training, inspections of pollutant sources, and record keeping. They can also include process changes, raw material and/or product changes, and recycling of wastes.

Structural Source Control BMPs are physical, structural, or mechanical devices intended to prevent pollutants from entering stormwater. Examples include erecting a roof over storage and working areas, physically segregating the pollutant source from contact with stormwater, and directing contaminated water to appropriate treatment BMPs using a device.

Treatment BMPs refer to BMPs that are installed for the purpose of removing pollutants from stormwater runoff by simple gravity settling, centrifugal separation, filtration, biological uptake, media or soil adsorption, or flocculation and removal. The pollutants of concern that can be reduced with treatment BMPs include sand, silt, and other suspended solids; metals such as copper, lead, and zinc;

nutrients (e.g., nitrogen and phosphorous); and organics such as petroleum hydrocarbons and pesticides.

When evaluating which BMPs to implement or install at a facility, it is important to conduct an assessment of the facility structures and operations to identify potential pollutant discharge sources. A facility assessment will reveal locations where facility activities or structures may be contacting or generating pollutants. A facility assessment includes identifying activities or structures exposed to stormwater; collecting an inventory of materials; identifying areas where leaching, spills, or leaks may occur; and determining whether any non-stormwater discharges are present. Activities at industrial facilities that are common pollution sources include:

- Loading and unloading operations;
- Outdoor storage;
- Outdoor process activity;
- Dust or particulate generating activities;
- Illicit connections and non-stormwater discharges; and
- Waste management.

In addition to identifying facility operations, the direction of stormwater flow through and from the facility should be assessed. Stormwater collection infrastructure (e.g., catch basins), discharge points, and conveyance systems should be documented or mapped. Stormwater or pollutants from neighboring businesses or properties have the potential to comingle with on-site stormwater, therefore off-site flow should be taken into consideration when identifying potential pollutant sources.

For each facility operation or activity, multiple BMPs may be applicable. It generally takes several BMPs and BMP types to mitigate stormwater impacts. To simplify BMP selection and because it may be impracticable to review all the potentially applicable BMPs, different types of Port operations have been categorized into 10 operational categories in this document. The facility operational categories are as follows:

- **Breakbulk Operations**: includes stevedoring (e.g., loading and unloading) of large individually stored products and materials such as machinery, equipment, and scrap metals;
- **Bulk Facilities**: includes log yards; refineries; and concrete, cement, aggregate, and grain facilities;
- **Commercial Facilities**: includes leased buildings, parking facilities, and office buildings;
- **Foundries**: includes metal casting;
- **Maintenance Facilities**: includes boat, automotive, and equipment maintenance;
- **Manufacturing Facilities**: includes chemical wholesalers, wood product, and asphalt-shingle manufacturing;
- **Railroad Yards**: includes paved and unpaved rail and sort yards;
- **Recycling, Hazardous Waste, and Treatment, Storage, and Disposal (TSD) Facilities:** includes scrap metal recycling and solid waste disposal facilities;
- **Warehousing and Transload Facilities**: includes refrigerated warehouse and shipping facilities; and
- **Wheeled Operations**: includes intermodal yards, auto warehousing, trailer chassis operations, transload truck and container services.

Depending on facility category, pollutants of concern and pollutant concentrations may differ. For example, metals concentrations in stormwater at a scrap metal recycling facility will most likely be greater than at an indoor manufacturing facility. Attached Tables 1A and 1B display typical ranges for pollutant loading for parameters monitored under the ISGP at Port facilities.

Best Management Practices at the Port

Specific BMPs are required to be implemented at all facilities per the ISGP, and most are operational and/or structural source control BMPs. These preventive source control BMPs are the foundation of stormwater pollution prevention.

If source control BMPs alone do not or cannot prevent or control pollutant loading in stormwater, implementation of stormwater treatment BMPs may be necessary. However, source control BMPs should be fully implemented and properly maintained to realize optimum performance of treatment BMPs. Without proper implementation and maintenance of all BMPs, the effectiveness of treatment BMPs will diminish, and potentially be ineffective. To assist with selection of BMPs for specific operational facility categories, a comparison of treatment BMPs installed or implemented at Port facilities and additional city-owned port facilities in Washington was completed for each operational facility category. Treatment BMP effectiveness was determined by the number of times a facility with a certain treatment BMP exceeded the ISGP benchmark values. Comparison findings are summarized in Table 2. Potential maintenance costs per year were estimated for treatment BMP types and are also summarized in Table 2. For additional information on treatment BMPs, a preferred treatment BMPs list is provided in the Port of Tacoma Stormwater Management Guidance Manual.

While a facility with no or few exceedances suggests the treatment BMP is effective, and a facility with many exceedances suggests the treatment BMP is not effective, it is important to note variability between treatment BMPs can be related to how effectively source control BMPs are maintained. The variability between treatment performance at facilities with the same or similar treatment is commonly due to a variance in pollutant loading concentrations, stormwater treatment system sizing, and/or BMP operation and maintenance practices. Pollutant loading concentrations can also vary depending on facility operations, as shown in Table 1, and in stormwater volume, stormwater conveyance, facility location, and ground cover. The treatment system must be sized appropriately to handle stormwater flow rate and volume. Treatment system operation and maintenance can impact the treatment system's ability to treat stormwater. Operating and maintaining treatment BMPs in accordance with guidelines outlined by the vendor or manufacturer is crucial to optimize treatment performance.

BMP maintenance costs will also vary between treatment systems and facilities. The age of the treatment system and installation and design quality may also impact performance.

Determining Treatment BMPs

There are numerous treatment BMPs, and no one single treatment will be applicable to all pollutants. The types of treatment to be implemented are dependent on the pollutants that are of most concern at a facility. For example, oil-water separators will effectively remove oil from stormwater but will not reduce metal concentrations. Treatment BMP vendors and manufacturers can provide guidance on their systems and which pollutants of concern are applicable.

To understand which pollutants are present at a facility and what operations or structures are generating that pollutant, conduct source sampling and testing. This is often referred to as source evaluation. Source evaluations involve identifying potential contaminant generating sources and collecting stormwater that contacts those potential areas. Stormwater is collected from a distinct point or area where contamination is suspected such as stormwater runoff from outdoor storage areas, vehicle maintenance and parking areas, product storage areas, roof drains, unpaved areas, operational areas, or galvanized structures.

There are many benefits to conducting a source evaluation. Contaminant sources can be pinpointed and appropriate treatment BMPs sized and implemented, often addressing small areas instead of the entire site and reducing the cost of treatment construction and ongoing maintenance. For example, roof drain treatment systems can be installed on a building with galvanized structures to treat stormwater prior to leaving the building footprint. An oil-water separator can be used to capture oil-laden stormwater running from a vehicle maintenance area and treating it prior to entering the large stormwater system. A biofiltration system can be staged to address a 25-percent portion of a site instead of the entire site, thus reducing the size of the actual treatment system. It even may identify a structure or activity that can be modified such that no treatment is necessary, requiring only implementation of operational changes.

To help with assessing whether a potential treatment BMP will be effective for a specific contaminant parameter, the Port provides a tool that generates a percent-exceedance/attainment curve. Water quality effluent data collected from the proposed treatment BMP can be inputted into a table and the table will then generate a percent-exceedance curve, allowing estimation of the likelihood and frequency at which a benchmark could be exceeded while using the treatment system. The effluent data can come from existing studies or bench scale testing of the treatment system. The Port requires that benchmarks be achieved at least 80 percent of the time. For more information on and access to the percent-exceedance/attainment curve tool, see the resources section on the Port website <https://www.portoftacoma.com/environment/water-quality>.

To improve and/or maintain BMP effectiveness for both treatment and source control BMPs, adaptive management should be practiced. Adaptive management combines BMP monitoring with progressive introduction and education of emerging technologies to continuously improve management strategies over time. BMPs should be maintained or altered as improved technology becomes available, facility operations change, or new stormwater issues are discovered. To help prepare for unforeseen factors like those previously mentioned, it is beneficial to think about how to build in flexibility when implementing or installing a new BMP. BMP vendors and manufacturers can provide guidance on BMP design that will allow for future changes.

Operational Facility Category BMP Guidance Sheets

Stormwater BMP Guidance Sheets were developed for each operational facility category at the Port. Each BMP Guidance Sheet summarizes BMPs that may be applied at each type of operational facility category to help minimize stormwater pollution. The BMP Guidance Sheets are to be used as a resource and do not provide a comprehensive list of BMPs that can be implemented.

References

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Attachments

Table 1A: Ranges of Pollutant Loading at POT Facilities from 2010-2014

	Pollutant Ranges							
Facility Category	**Zinc (µg/L)**	**Copper (µg/L)**	**Total Petroleum Hydrocarbons (mg/L)**	**Turbidity (NTU)**	**pH**	**Lead (µg/L)**	**Total Suspended Solids (mg/L)**	**COD (chemical oxygen demand) (mg/L)**
Breakbulk Operations	5- 577	<0.5- 11	N/A	2- 290	6.7- 7.8	N/A	N/A	N/A
Bulk Facilities	<0.5- 1,000	<0.5- 72	N/A	11- 1000	4.8- 6.34	N/A	4- 1,200	76- 3,200
Foundries	0.5- 146	1- 29	0.1- 0.5	8- 24	5.0- 7.6	0.5- 5	N/A	N/A
Manufacturing Facilities	5- 727	<0.5- 46	N/A	1- 41	6.0- 8.2	N/A	N/A	N/A
Maintenance Facilities	5- 725	<0.5- 10	N/A	0.2- 19	6.5- 7.8	N/A	N/A	N/A
Railroad Yards	26- 488	<0.5- 27	N/A	7- 216	6.8- 7.8	N/A	N/A	N/A
Recycling, Hazardous Waste, and Treatment, Storage, and Disposal (TSD)	2- 1,700	1- 270	0.1- 9	0.7- 250	5.9- 8.8	0.1- 340	3- 760	5- 150
Warehousing and Transload Facilities	6- 1,200	5- 50	N/A	2- 67	5.0- 7.2	N/A	N/A	N/A
Wheeled Operations	0.5- 297	0.5- 30	N/A	0.7- 70	5.1- 8.6	N/A	N/A	N/A
ISGP Benchmark*	**117**	**14**	**10**	**25**	**5-9**	**64.6**	**30**	**120**

*Benchmark values may vary by site.

Unit legend:

µg/L: microgram per liter

mg/L: milligram per liter

N/A: parameter is not tested for at the facilities investigated

ND: pollutant non-detect at the method reporting limit

NTU: nephelometric turbidity units

Table 1B: Ranges of Pollutant Loading at POT Facilities from 2015-2020

	Pollutant Ranges							
Facility Category	**Zinc (µg/L)**	**Copper (µg/L)**	**Total Petroleum Hydrocarbons (mg/L)**	**Turbidity (NTU)**	**pH**	**Lead (µg/L)**	**Total Suspended Solids (mg/L)**	**COD (chemical oxygen demand) (mg/L)**
Breakbulk Operations	ND- 721	ND- 31	ND- 1	6- 181	5.2-8.0	N/A	<0.5- 125	N/A
Bulk Facilities	1- 1,760	0.2- 130	ND- 1	0.3- 487	4.9- 7.60	N/A	<0.5- 100	ND- 62
Foundries	5- 80	0.2- 13	0.1- 2	7- 24	6.9- 8.8	0.2- 2	ND- 54	N/A
Manufacturing Facilities	4- 1,820	0.2- 487	0.1- 0.5	0.4- 380	1.8- 9.4	N/A	0.5- 530	N/A
Maintenance Facilities	14- 865	<0.5- 14	ND- 2	0.6- 20	4.2- 8.8	N/A	ND- 63	N/A
Railroad Yards	4- 87	<0.4- 19	ND- 11	1- 18	6.1- 9.0	N/A	2- 19	N/A
Recycling, Hazardous Waste, and Treatment, Storage, and Disposal (TSD)	3- 369	0.3- 141	0.1- 7	0.5- 830	5.5- 8.3	0.2- 219	1- 590	6- 1,200
Warehousing and Transload Facilities	6- 1,220	ND- 51	0.05- 0.5	0.3- 76	5.0- 9.4	N/A	ND- 66	N/A
Wheeled Operations	11- 590	0.9- 46	ND- 4	3- 95	6.9- 8.8	N/A	ND- 47	N/A
ISGP Benchmark*	**117**	**14**	**10**	**25**	**5-9**	**64.6**	**30**	**120**

*Benchmark values may vary by site.

Unit legend:

µg/L: microgram per liter

mg/L: milligram per liter

N/A: parameter is not tested for at the facilities investigated

ND: pollutant non-detect at the method reporting limit

NTU: nephelometric turbidity units

Table 2: Treatment BMP Effectiveness and Maintenance Costs for Operational Facility Categories

X = No exceedances for parameter (effective) XX = Few exceedances for parameter (less or equal to 5 since treatment implemented) XXX = Many exceedances for parameter (more than 5 since treatment implemented, seemingly not effective)			$ = Low maintenance: ≤ $10, 000 per year $$ = Moderate maintenance: $10,000 to $25,000 per year $$$ = High maintenance: $25,000 to $50,000 per year $$$$ = Very high maintenance: > $50,000 per year	Blue denotes ISGP sampling requirements applicable to all facilities						
Facility Operational Category	**Treatment Type**	**Treatment System Manufacturer/ Name**	**Maintenance Costs***	**Zinc**	**Copper**	**Oil & Grease/TPH**	**Turbidity**	**pH**	**Lead**	**TSS**
Breakbulk Operations										
	OWS, bioretention/filtration, media filtration	Detention pond, Jellyfish Contech filter system	$$	X	XX	X	XX	X	-	-
Bulk Facilities										
	None. Operational BMPs		$	XX	XXX	X	-	XX	-	XXX
	Bioretention/filtration, catch basin inserts, media filtration	Sediment settling chamber and modular wetland, Contech Stormfilter with ZPG media	$$$	XXX	XX	X	XX	X	-	XX
	Catch basin inserts, bioretention/filtration	Catch basin filters or hay surrounding, retention pond, bioswale	$$	X	X	X	X	X	-	-
	Downspout/roof treatment	Filters at the end of rain gutters	$$	XXX	XXX	X	X	XXX	-	-
	Bioretention/filtration, media filtration, chemical treatment	Drainage ditches, retention pond, turbidity curtain, pH adjustment	$$$	XX	XX	X	XX	X	-	-
	Hydrodynamic separation, media filtration	Settling basin and four large multimedia filters	$$$	X	X	X	X	X	-	-
Commercial Buildings										
	Catch basin inserts, bioretention/filtration	Biowale, rain garden	$$	-	-	-	-	-	-	-
Foundries										
	Catch basin inserts	Metal-absorbent peat pellets in catch basin inserts	$	X	X	X	X	X	-	-
Maintenance Facilities										
	Chemical filtration	CESF system	$$$$	XX	XXX	X	XX	X	-	-
	Media filtration	Treatment bags on roof drains	$$	X	X	X	X	X	-	-
Manufacturing Facilities										
	Catch basin inserts, hydrodynamic separation, chemical filtration	Solids filter, Cleanway basin insert with MetalZorb.	$$	X	X	X	X	X	-	-
	Catch basin inserts, chemical and media filtration	Cleanway basin insert with MetalZorb, chemical coagulation with pre-settling and sand filtration	$$$$	XX	X	X	X	X	-	X
	Catch basin inserts, media filtration	Contech Stormfilter with ZPG media, Cleanway catch basin inserts with MetalZorb	$$	X	XX	X	X	X	-	-
	Catch basin inserts	Cleanway catch basin inserts with MetalZorb	$$	XXX	XXX	X	X	X	-	-
	Bioretention/filtration, catch basin inserts	Biochar and MetalZorb catch basin inserts and bioswale	$$	XXX	XXX	X	XX	X	-	-
	Hydrodynamic separation, wastewater treatment	Grit chamber/ settling basin and a wastewater oxygen activated sludge system	$$$	X	X	X	X	X	-	-
	Bioretention/filtration	Bioswales	$	X	X	X	X	X	-	-
	Bioretention/filtration	Drainage ditches	$	XXX	XXX	XX	XXX	X	-	-
	Bioretention/filtration, catch basin inserts	Drainage ditches, catch basin filters	$$	X	X	XXX	XXX	X	-	-
Railroad Yards										
	OWS, hydrodynamic separation, media filtration	Flow splitter and overflow weir, Imbrium Jellyfish Filter	$$	X	XX	X	X	X	-	-
	OWS, hydrodynamic separation, media filtration	Flow splitter and overflow weir, Imbrium Jellyfish Filter	$$	X	X	X	X	X	-	-
Recycling; Treatment; Storage; Disposal										
	OWS, hydrodynamic separation, media filtration	Stormwater Rx Aquip and settling tanks	$$$	X	XXX	X	X	X	XX	-
	Bioretention/filtration, electrocoagulation	Detention ponds, electrocoagulation system	$$$$	X	X	XX	X	X	X	-
Warehousing and Transload Facilities										
	Media filtration and hydrodynamic separation	StormwaterRx Aquip and grit chamber/settling basin	$$$	XXX	XX	X	X	X	-	-
	Operational BMPs	Housekeeping, sweeper	$	XX	XXX	X	XXX	XX	-	XXX
Wheeled Operations										
	OWS, media filtration, bioretention/filtration	StormFilter underground media filtration, modular wetlands	$$$	XXX	X	X	XX	X	-	XX
	OWS, chemical filtration	CESF system	$$$$	X	X	X	X	X	-	-
	OWS, bioretention/filtration	Bioswale	$$	XX	X	X	X	XX	-	-
	OWS, catch basin inserts, bioretention/filtration	Detention pond	$$	XXX	XXX	X	XXX	X	-	XXX

Key:

- Denotes no sampling data

* Maintenance costs include labor, disposal costs, contractor costs, and assumes annual media replacement.

BMP = best management practice

TSS= total suspended solid

Treatment Types:

Bioretention/Filtration
Downspout / Roof Treatment
Catch Basin Inserts
Hydrodynamic Separation
Media Filtration
Oil-Water Separator (OWS)
Filtration
Chemical
Electrocoagulation

BMPs Guidance Sheet #1 – Breakbulk Operations

Description of Pollutant Sources: Breakbulk operations at the Port include stevedoring (e.g., loading and unloading) of large individually stored products and materials such as machinery, equipment, and scrap metals. The following table includes applicable operations at breakbulk facilities and the associated potential pollutant sources and stormwater contaminants:

Applicable Operations	Potential Pollutant Sources	Associated Stormwater Contaminants
Loading and unloading.	Accumulated debris in loading/unloading areas.	Turbidity, total suspended solids (TSS), zinc, and copper.
Outside material storage.	Outdoor storage of machinery, equipment, and scrap metals.	Turbidity, TSS, zinc, copper, and leached pollutants.
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.
Fueling areas.	Drips and spills from fueling equipment and vehicles.	Oil and grease.
Maintenance and repair activities.	Drips and spills from equipment repair and maintenance.	Oil and grease, antifreeze, diesel, gasoline, turbidity, and TSS.
Waste management.	Waste materials associated with containers, vehicles, and equipment; washing, and maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper, oil and grease, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.
Illicit discharges.	Improper connection of floor, sink, or process wastewater drains to storm sewers.	Dependent on source.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper and sediment and solids in stormwater at breakbulk operation facilities.

Applicable Operational BMPs:

Good Housekeeping and Preventive Maintenance:

- Maintain clean and orderly material and equipment storage areas.
- While not in use, containers of liquids should be secured with lids.
- Sweep paved areas where loading and unloading occur to remove loose material that could be picked up by stormwater.
- Sweep paved areas temporarily covered after removal of the containers, or other material covering the ground.
- Do not pour/convey wash water, liquid waste, or other pollutants into storm drains or to surface water.
- Inspect incoming vehicles, parts, and equipment that will be stored temporarily outside for leaks.
- Promptly repair cracked or damaged paved drainage areas subject to leaks or spills.
- Maintain and replace catch basin inserts, and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

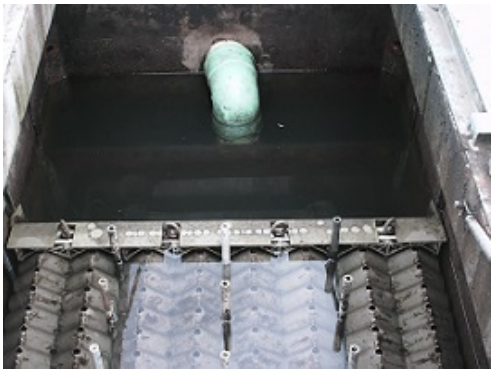
- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.
- Prevent precipitation from accumulating in containment areas.
- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.
- Ensure immediate cleanup of liquid/solid spills in the loading and unloading area.
- Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;
    - An absorbent containment boom;
    - A non-metallic shovel; and
    - Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Report spills to surface water immediately	**The National Response Center at 1-800-424-8802** **Washington Emergency Management Division at 1-800-258-5990** **Ecology Regional Office, Bellevue (NWRO) 425-649-7000**

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans should be used when making and breaking connections.
- Immediately repair or replace leaking connections, valves, pipes, hoses, and other equipment that may cause the contamination of stormwater.
- Facility-dedicated equipment should be inspected weekly for leaks.
- Park large mobile equipment in a designated contained area.
- During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:



- Properly handle wastes generated from large-scale equipment cleaning, such as wash water from pressure washing.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items within secondary containment.
- If drums must be kept outside, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting on lids.
- Direct spill containment pans and trays to an oil-water separator where feasible for treatment.

Applicable Structural Source Control BMPs:

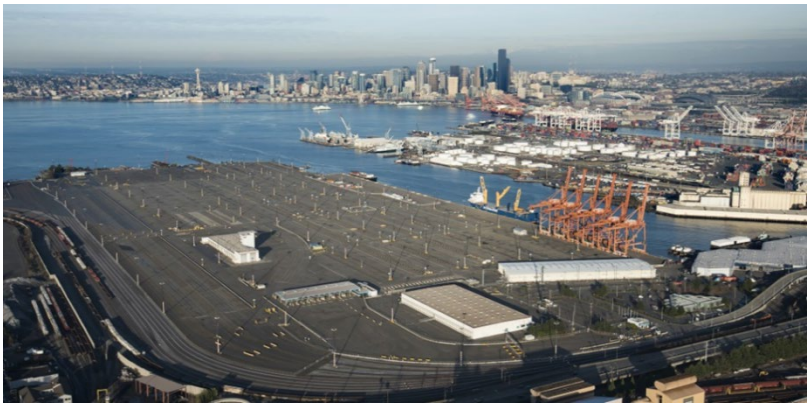
- Berm, dike, and/or slope the loading and unloading area to prevent run-on of stormwater and to prevent the runoff or loss of any spilled material from the area.
- Place curbs along the edge of the shoreline or slope the edge of operational areas such that the stormwater can flow to an approved treatment BMP. Avoid draining stormwater directly to the surface water from operational areas and loading areas.
- When possible, conduct unloading or loading operations of solids and liquids in a building or under cover.

Applicable Treatment BMPs:

- Install catch basin inserts with metal- and oil-absorbent media to collect excess sediment and debris and treat metal pollutants and oil as necessary. Inspect and maintain catch basin inserts on a quarterly basis to ensure they are working correctly.
- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment such as an oil-water separator or other treatment.

- Store large materials that cannot be stored in covered areas because of their size, volume, and/or weight in locations where stormwater runoff is managed, controlled, and directed to a treatment BMP.

BMPs Guidance Sheet #2 – Bulk Facilities



Description of Pollutant Sources: Bulk facilities at the Port include log yards; refineries; and concrete, cement, aggregate, and grain facilities. The following table includes applicable operations at bulk facilities and the associated potential pollutant sources and stormwater contaminants:

Applicable Operations	Potential Pollutant Sources	Associated Stormwater Contaminants
Loading and unloading.	Accumulated debris in loading and unloading areas.	Turbidity, total suspended solids (TSS), zinc, and copper.
Outside bulk material storage.	Outdoor storage of solid raw materials, by-products, gravel, sand, salts, topsoil, logs, sawdust, wood chips, lumber, concrete, and metal products.	Turbidity, TSS, zinc, copper, leached pollutants, and organics.
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.
Fueling areas.	Drips and spills from fueling equipment and vehicles.	Oil and grease.
Maintenance and repair activities.	Drips and spills from equipment repair and maintenance.	Oil and grease, antifreeze, diesel, gasoline, turbidity, and TSS.
Waste management.	Waste materials associated with containers, vehicles, and equipment; washing, maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper, oil and grease, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.
Illicit discharges.	Improper connection of floor, sink, or process wastewater drains to storm sewers.	Dependent on source.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper, and sediment and solids in stormwater at bulk facilities.

Applicable Operational BMPs:

Good Housekeeping and Preventive Maintenance:

- Maintain clean and orderly material and equipment storage areas.
- Do not hose down the contained stockpile area to a storm drain or a conveyance to a storm drain, or to a receiving water.
- Do not pour/convey wash water, liquid waste, or other pollutants into storm drains or to surface water.
- While not in use, containers of liquids should be secured with lids.
- Sweep paved areas where loading and unloading occur to remove loose material that could be washed off by stormwater.
- Sweep paved areas temporarily covered after removal of the containers, logs, or other material covering the ground.
- Inspect incoming vehicles, parts, and equipment that will be stored temporarily outside for leaks.
- Promptly repair cracked or damaged paved drainage areas subject to leaks or spills.
- Maintain and replace catch basin inserts and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.
- Prevent precipitation from accumulating in containment areas.
- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.
- Ensure immediate cleanup of liquid/solid spills in the loading and unloading area.
- Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;

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- An absorbent containment boom;
- A non-metallic shovel; and
- Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans will be used when making and breaking connections.
- Immediately repair or replace leaking connections, valves, pipes, hoses, and other equipment that may cause the contamination of stormwater.
- Facility-dedicated equipment should be inspected weekly for leaks.
- Park large mobile equipment in a designated contained area.
- During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:

- Properly handle wastes generated from large-scale equipment cleaning, such as wash water from pressure washing.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items within secondary containment.
- If drums must be kept outside, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting on lids.
- Direct spill containment pans and trays to an oil-water separator where feasible for treatment.

Applicable Structural Source Control BMPs:

- Place curbs along the edge of the shoreline or slope the edge of operational areas such that the stormwater can flow to an approved treatment BMP. Avoid draining stormwater directly to the surface water from operational areas and loading areas.
- Store materials in a building or paved and bermed covered area as shown on Figure IV-5.6.
- Place temporary plastic sheeting over stockpiled materials, as shown on Figure IV-5.7.

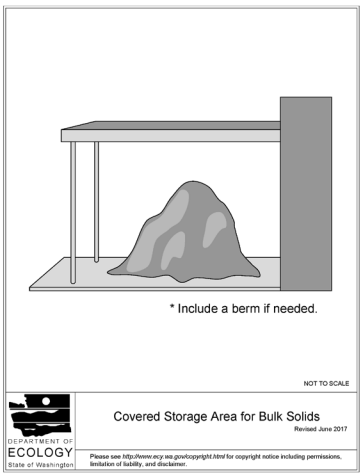

Figure IV-5.6: Covered Storage Area for Bulk Solids

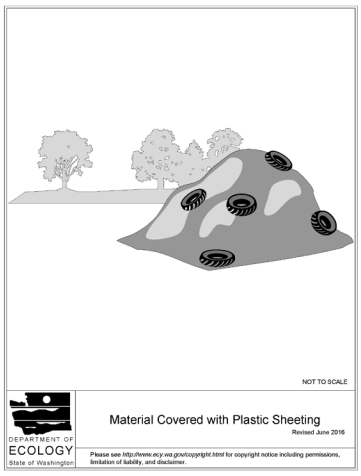

Figure IV-5.7: Covered Storage Area for Bulk Solid

- Pave the area and install a 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, etc.
- For large, uncovered stockpiles, implement containment practices at the perimeter of the site and at any catch basins as needed to prevent erosion and discharge of the stockpiled material 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.
- When possible, conduct unloading or loading operations of solids and liquids in a building or under a roof.

Applicable Treatment BMPs:

- Install catch basin inserts with metal and oil absorbent media to collect excess sediment and debris and treat metal pollutants and oil as necessary. Inspect and maintain catch basin inserts on a quarterly basis to ensure they are working correctly.
- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment such as an oil-water separator or other treatment.
- Store large materials that cannot be stored in covered areas because of their size, volume, and/or weight in locations where stormwater runoff is managed, controlled, and directed to a treatment BMP.

BMPs Guidance Sheet #3 – Commercial Facilities

Description of Pollutant Sources: Roofs and sides of commercial facilities at the Port can be sources of pollutants caused by leaching of roofing materials, paints, caulking, building vents, and other air emission sources. The following table includes applicable operations at commercial facilities and the associated potential pollutant sources and stormwater contaminants:

Applicable Operations	Potential Pollutant Sources	Associated Stormwater Contaminants
Employee parking	Drips and spills from vehicles.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, total suspended solids (TSS), zinc, and copper.
Roof/building runoff.	Leaching of roofing materials, paints, caulking, building vents, and other air emission sources.	Metals, solvents, acidic/alkaline pH, biological oxygen demand (BOD), polychlorinated biphenyls (PCBs), and organics.
Washing/steam cleaning building structures.	Wash water from cleaning activities.	Oil and grease, suspended solids, heavy metals, soluble organics, soaps, and detergents.
Waste management.	Waste materials associated with containers, vehicles, and equipment; washing and maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper, oil and grease, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.
Illicit discharges.	Improper connection of floor, sink, or process wastewater drains to storm sewers.	Dependent on source.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper, and sediment and solids in stormwater at commercial buildings.

Applicable Operational Source Control BMPs

Good Housekeeping and Preventive Maintenance:

- If leachates and/or emissions from buildings are suspected sources of stormwater pollutants, sample and analyze the stormwater draining from the building.
- Sweep the area routinely to remove any residual pollutants.
- 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.

- For cleaning of roof/building sides, the preferred approach is to cover and/or contain the cleaning activity to separate the uncontaminated stormwater from the wash water sources. Convey wash water to a sanitary sewer after approval by the local sewer authority or have it disposed of off the site. Provide temporary storage before proper disposal, or recycling. Under this preferred approach, no discharge to the ground, to a storm drain, or to surface water should occur.
- Inspect incoming vehicles, parts, and equipment that will be stored temporarily outside for leaks.
- Promptly repair cracked or damaged paved drainage areas subject to leaks or spills.
- Maintain and replace catch basin inserts and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.
- Prevent precipitation from accumulating in containment areas.
- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.

Report spills to surface water immediately	**The National Response Center at 1-800-424-8802** **Washington Emergency Management Division at 1-800-258-5990** **Ecology Regional Office, Bellevue (NWRO) 425-649-7000**

- Ensure immediate cleanup of liquid/solid spills in the loading and unloading area.
- Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;
    - An absorbent containment boom;
    - A non-metallic shovel; and
    - Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as under employee vehicles.
- Conduct maintenance in designated areas.
    - During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:

- Properly handle wastes generated from building and roof cleaning, such as wash water from pressure washing.

Applicable Structural Source Control BMPs:

- Paint/coat the galvanized surfaces as described in *Suggested Practices to Reduce Zinc Concentrations in Industrial Stormwater Discharges* dated June 2008, prepared by Ecology.
- Install gutters and downspouts to convey stormwater to appropriate treatment.
- Conduct washing and collect wash water in an enclosure or drain to the sanitary sewer.
    - Obtain all necessary permits for installing, altering, or repairing on-site drainage and side sewers. Restrictions on certain types of discharges may require pretreatment before they enter the sanitary sewer.

Applicable Treatment BMPs:

- Install a passive treatment system such as a Grattix Box at the bottom of roof downspouts to remove stormwater pollutants such as zinc and copper.
- Install catch basin inserts with metal and oil absorbent media to collect excess sediment and debris and treat metal pollutants and oil as necessary. Inspect and maintain catch basin inserts on a quarterly basis to ensure they are working correctly.
- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment such as an oil-water separator or other treatment.

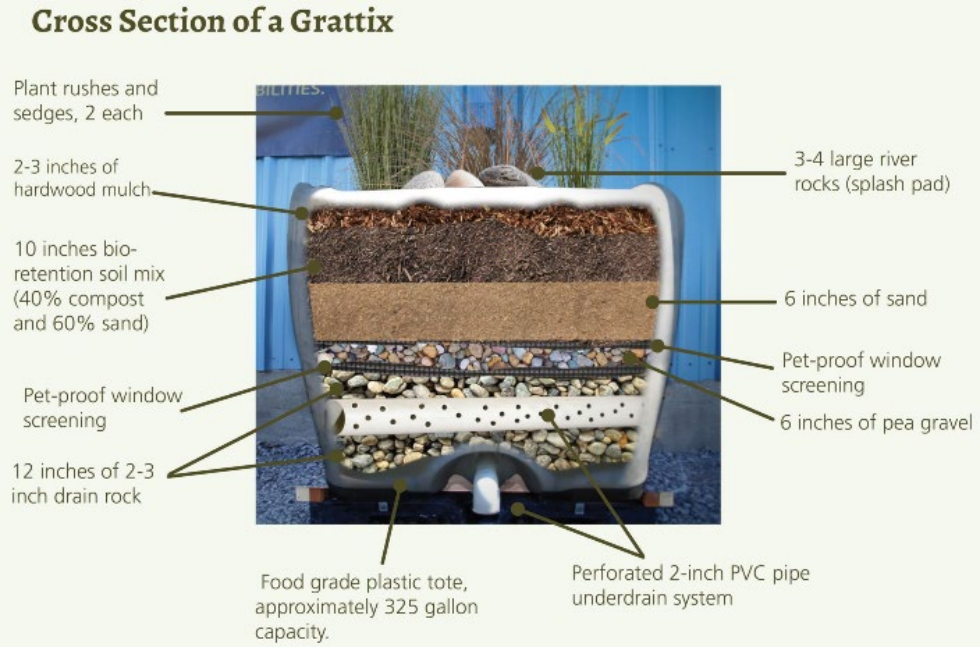

Photo: Port of Vancouver, Grattix Rain Garden in a Box (portvanusa.com)

BMPs Guidance Sheet #4 – Foundries

Description of Pollutant Sources: Foundry operations at the Port include melting scrap metals, pouring melt into prefabricated molds, cooling and finishing product, and loading and unloading and shipping product to consumers. These operations are mainly conducted inside buildings or under cover, except for shipping processes and outdoor storage of materials. The following table includes applicable operations at foundries and the associated potential pollutant sources and stormwater contaminants:

Applicable Operations	Potential Pollutant Sources	Associated Stormwater Contaminants
Loading and unloading.	Accumulated debris in loading and unloading areas.	Turbidity, total suspended solids (TSS), zinc, and copper.
Roof/building runoff.	Leaching of roofing materials, paints, caulking, building vents, and other air emission sources.	Metals, solvents, acidic/alkaline pH, BOD, PCBs, and organics.
Outside material storage.	Outdoor storage of solid by-products, gravel, sand, and metal products.	Turbidity, TSS, zinc, copper and other heavy metals, PCBs, leached pollutants, and organics.
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.
Maintenance and repair activities.	Drips and spills from equipment repair and maintenance.	Oil and grease, antifreeze, diesel, gasoline, turbidity, and TSS.
Waste management.	Waste materials associated with smelting by-products, containers, vehicles, and equipment; washing, maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper and other heavy metals, oil and grease, PCBs, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.
Illicit discharges.	Improper connection of floor, sink, or process wastewater drains to storm sewers.	Dependent on source.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper, and sediment and solids in stormwater at foundries.

Applicable Operational BMPs:

Good Housekeeping and Preventative Maintenance:

- Maintain clean and orderly material and equipment storage areas.
- Do not hose down the contained stockpile area to a storm drain or a conveyance to a storm drain, or to a receiving water.
- Do not pour/convey wash water, liquid waste, or other pollutants into storm drains or to surface water.
- While not in use, containers of liquids should be secured with lids.
- Sweep paved areas where loading and unloading occur to remove loose material that could be washed off by stormwater.
- Inspect incoming vehicles, parts, and equipment that will be stored temporarily outside for leaks.
- Promptly repair cracked or damaged paved drainage areas subject to leaks or spills.
- Maintain and replace catch basin inserts and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.
- Prevent precipitation from accumulating in containment areas.
- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.
- Ensure immediate cleanup of liquid/solid spills in the loading and unloading area.
- Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;
    - An absorbent containment boom;
    - A non-metallic shovel; and
    - Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Report spills to surface water immediately	**The National Response Center at 1-800-424-8802** **Washington Emergency Management Division at 1-800-258-5990** **Ecology Regional Office, Bellevue (NWRO) 425-649-7000**

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans will be used when making and breaking connections. Regularly check loading and unloading equipment such as valves, pumps, flanges, and connections for leaks and repair as needed.
- Promptly repair leaking connections, pipes, hoses, and valves that can contaminate stormwater.
- During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:

- Properly handle wastes generated from equipment cleaning, such as wash water from pressure washing.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items within secondary containment.
- If drums must be kept outside, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting on lids.

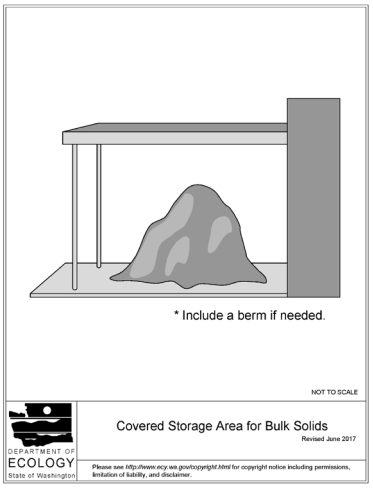

Figure IV-5.6: Covered Storage Area for Bulk Solids

Applicable Structural Source Control BMPs:

- Store materials in a building or paved and bermed covered area as shown on Figure IV-5.6.
- Place temporary plastic sheeting over stockpiled materials. as shown on Figure IV-5.7.
- Pave the area and install a 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 such as metal byproducts.
- If possible, conduct unloading or loading operations of solids and liquids in a building or under a roof.

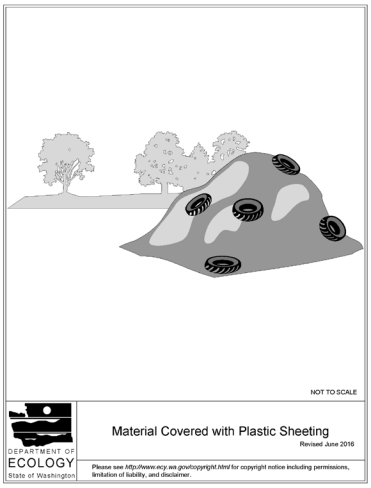

Figure IV-5.7: Covered Storage Area for Bulk Solids

Applicable Treatment BMPs:

- Install catch basin inserts with metal and oil absorbent media to collect excess sediment and debris and treat metal pollutants and oil as necessary. Inspect and maintain catch basin inserts on a quarterly basis to ensure they are working correctly.
-

- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment such as an oil-water separator or other treatment.
- Store large materials that cannot be stored in covered areas because of their size, volume, and/or weight in locations where stormwater runoff is managed, controlled, and directed to a treatment BMP.

BMPs Guidance Sheet #5 – Manufacturing Facilities

Description of Pollutant Sources: Manufacturing facilities at the Port include chemical wholesalers, wood product manufacturing, and asphalt/shingle manufacturing. The following table includes applicable operations at manufacturing facilities and the associated potential pollutant sources and stormwater contaminants:

Applicable Operations	Potential Pollutant Sources	Associated Stormwater Contaminants
Loading and unloading.	Accumulated debris in loading and unloading areas	Turbidity, total suspended solids (TSS), zinc, and copper.
Outside material storage.	Outdoor storage of solid raw materials, by-products, gravel, sand, salts, asphalt/shingles, logs, sawdust, wood chips, lumber, concrete, and metal products.	Turbidity, TSS, zinc, copper, leached pollutants, and organics.
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.
Maintenance and repair activities.	Drips and spills from equipment repair and maintenance.	Oil and grease, antifreeze, diesel, gasoline, turbidity, and TSS.
Waste management.	Waste materials associated with containers, vehicles, and equipment; washing and maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, and copper, oil and grease, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.
Illicit discharges.	Improper connection of floor, sink, or process wastewater drains to storm sewers.	Dependent on source.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper, and sediment and solids in stormwater at bulk facilities.

Applicable Operational BMPs:

Good Housekeeping and Preventive Maintenance:

- Maintain clean and orderly material and equipment storage areas.
- Do not pour/convey wash water, liquid waste, or other pollutants into storm drains or to surface water.
- While not in use, containers of liquids should be secured with lids.
- Sweep paved areas where loading and unloading occur to remove loose material that could be washed off by stormwater.
- Sweep paved areas temporarily covered after removal of the materials covering the ground.
- Inspect incoming vehicles, parts, and equipment that will be stored temporarily outside for leaks.
- Promptly repair cracked or damaged paved drainage areas subject to leaks or spills.
- Maintain and replace catch basin inserts and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.
- Prevent precipitation from accumulating in containment areas.
- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.
- Ensure immediate cleanup of liquid/solid spills in the loading and unloading area.
- Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;
    - An absorbent containment boom;
    - A non-metallic shovel; and
    - Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Report spills to surface water immediately	**The National Response Center at 1-800-424-8802** **Washington Emergency Management Division at 1-800-258-5990** **Ecology Regional Office, Bellevue (NWRO) 425-649-7000**

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans will be used when making and breaking connections. Regularly check loading and unloading equipment such as valves, pumps, flanges, and connections for leaks and repair as needed.
- Promptly repair leaking connections, pipes, hoses, and valves that can contaminate stormwater.
- During fueling, use automatic shut-off nozzles for dispensing the fuel. Replace automatic shut-off nozzles as recommended by the manufacturer.
- During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:

- Properly handle wastes generated from equipment cleaning, such as wash water from pressure washing.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items within secondary containment.
- If drums must be kept outside, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting on lids.
- Direct spill containment pans and trays to an oil-water separator where feasible for treatment.

Applicable Structural Source Control BMPs:

- If possible, enclose the manufacturing activity in a building (see Figure IV-7.1: Enclose the Activity).
- Cover the activity and connect floor drains to a sanitary sewer, if approved by the local sewer authority.
- Berm or slope the floor as needed to prevent drainage of pollutants to outside areas. (See Figure IV-7.2: Cover the Activity)
- If possible, conduct unloading or loading operations of solids and liquids in a building or under a roof.

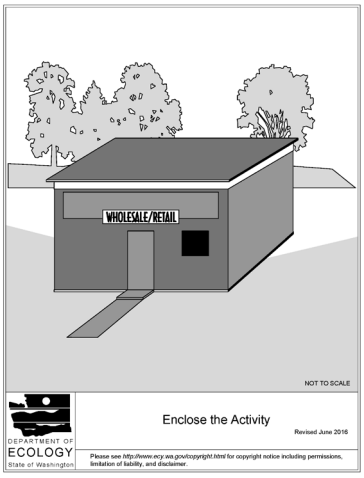

Figure IV-7.1: Enclose the Activity

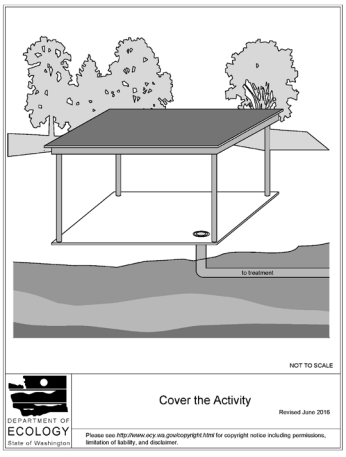

Figure IV-7.2: Cover the Activity

Applicable Treatment BMPs:

- Install catch basin inserts with metal and oil absorbent media to collect excess sediment and debris and treat metal pollutants and oil as necessary. Inspect and maintain catch basin inserts on a quarterly basis to ensure they are working correctly.
- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment such as an oil-water separator or other treatment.
- Store large materials that cannot be stored in covered areas because of their size, volume, and/or weight in locations where stormwater runoff is managed, controlled, and directed to a treatment BMP.

BMPs Guidance Sheet #6 – Maintenance Facilities

Description of Pollutant Sources: Maintenance facilities at the Port include the building, repair, and maintenance of boats and ships, vehicles, and equipment. The following table includes applicable operations at maintenance facilities and the associated potential pollutant sources and stormwater contaminants:

Applicable Operations	Potential Pollutant Sources	Associated Stormwater Contaminants
Outside material handling and storage.	Outdoor handling and storage of solid raw materials, by-products, sand, salts, concrete, metal products, and liquid storage drums.	Turbidity, total suspended solids (TSS), zinc and copper, leached pollutants, organics, and oil and grease.
Surface preparation/sanding/ painting/paint removal.	Spent abrasive grits, solvents, oils, ethylene glycol, wash water, paint over-spray, cleaners/detergents, anti-corrosion compounds, paint chips, scrap metal, welding rods, resins, glass fibers, dust.	Turbidity, TSS, zinc, copper, leached pollutants, and organics.
Pressure washing.	Wash water.	Turbidity, TSS, zinc, copper, and other heavy metals.
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.
Maintenance and repair activities.	Drips and spills, oil filters, air filters, batteries, spent coolant, and degreasers from equipment repair and maintenance.	Oil and grease, antifreeze, diesel, gasoline, turbidity, and TSS.
Waste management.	Waste materials associated with containers, vehicle, and equipment; washing, maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper, oil and grease, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.
Illicit discharges.	Improper connection of floor, sink, or process wastewater drains to storm sewers.	Dependent on source.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper, and sediment and solids in stormwater at maintenance facilities.

Applicable Operational BMPs:

Good Housekeeping and Preventive Maintenance:

- Clean regularly all accessible work, service, and storage areas to remove debris, spent sand-blasting material, and any other potential stormwater pollutants.
- Sweep rather than hose debris. Collect and convey hose water to treatment if hosing is unavoidable.
- Maintain clean and orderly material and equipment storage areas.
- While not in use, containers of liquids should be secured with lids.
- Sweep paved areas where loading and unloading occur to remove loose material that could be picked up by stormwater.
- Do not pour/convey wash water, liquid waste, or other pollutants into storm drains or to surface water.
- Inspect incoming vehicles, parts, and equipment that will be stored temporarily outside for leaks.
- Promptly repair cracked or damaged paved drainage areas subject to leaks or spills.
- Maintain and replace catch basin inserts and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.
- Perform paint and solvent mixing, fuel mixing, etc., on or in containment.
- Prevent precipitation from accumulating in containment areas.

Report spills to surface water immediately	**The National Response Center at 1-800-424-8802** **Washington Emergency Management Division at 1-800-258-5990** **Ecology Regional Office, Bellevue (NWRO) 425-649-7000**

- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.
- Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;
    - An absorbent containment boom;
    - A non-metallic shovel; and
    - Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans will be used when making and breaking connections.
- Immediately repair or replace leaking connections, valves, pipes, hoses, and other equipment that may cause the contamination of stormwater.
- During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:

- Properly handle wastes generated from equipment maintenance and cleaning, such as wash water from pressure washing, greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers to comply with state and federal environmental regulations.
- Consider recycling paint, paint thinner, solvents, used oils, oil filters, pressure wash wastewater, and any other recyclable materials.
- Collect spent abrasives regularly and store them under cover to await proper disposal.
- Drain oil filters before disposal or recycling.
- Do not dump or pour waste materials down floor drains, sinks, or outdoor storm drain inlets that discharge to surface water. Plug floor drains connected to storm drains or to surface water. If necessary, install a regularly operated sump pump.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items within secondary containment.
- Direct spill containment pans and trays to an oil-water separator where feasible for treatment.

Applicable Structural Source Control BMPs:

- Berm, dike, and/or slope the loading and unloading area to prevent run-on of stormwater and to prevent the runoff or loss of any spilled material from the area.
- Perform maintenance activities under cover or in an enclosed building.
- If possible, conduct unloading or loading operations of solids and liquids in a building or under a roof.

Applicable Treatment BMPs:

- Install catch basin inserts with metal and oil absorbent media to collect excess sediment and debris and treat metal pollutants and oil as necessary. Inspect and maintain catch basin inserts on a quarterly basis to ensure they are working correctly.
- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment such as an oil-water separator or other treatment.
- Store large materials that cannot be stored in covered areas because of their size, volume, and/or weight in locations where stormwater runoff is managed, controlled, and directed to a treatment BMP.

BMPs Guidance Sheet #7 – Railroad Yards

Description of Pollutant Sources: Railroad yard facilities at the Port can be paved but commonly consist of unpaved surfaces.

Applicable Operations	Potential Pollutant Sources	Associated Stormwater Contaminants
Outside material storage.	Outdoor storage of solid raw materials, by-products, sand, salts, concrete, and metal products.	Turbidity, total suspended solids (TSS), zinc, copper, leached pollutants, and organics.
Loading and unloading.	Accumulated debris in loading and unloading areas.	Turbidity, TSS, zinc, and copper.
Fueling areas.	Drips and spills from fueling equipment and vehicles.	Oil and grease.
Locomotive sanding.	Loading traction sand on locomotives.	Turbidity and TSS.
Locomotive, railcar, and vehicle cleaning areas.	Parts cleaning.	Chlorinated solvents, oil, heavy metals, and acid/alkaline wastes.
	Waste disposal of oil filters, oily rags, hydraulic fluids, transmission fluids, radiator fluids, and degreasers.	Oil, heavy metals, chlorinated solvents, acid/alkaline wastes, and ethylene glycol.
	Spills of oil, degreasers, hydraulic fluids, transmission fluid, radiator fluids.	Oil, arsenic, heavy metals, organics, chlorinated solvents, and ethylene glycol.

	Fluids replacement, including oil, hydraulic fluids, transmission fluid, and radiator fluids.	Oil, arsenic, heavy metals, organics, chlorinated solvents, and ethylene glycol.
	Washing or steam cleaning.	Oil, detergents, heavy metals, chlorinated solvents, phosphorus, salts, and TSS.
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.
Maintenance and repair activities.	Drips and spills, oil filters, air filters, batteries, spent coolant, and degreasers from equipment repair and maintenance.	Oil and grease.
Waste management.	Waste materials associated with containers, vehicles, and equipment; washing, maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper, oil and grease, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper, and sediment and solids in stormwater at railroad yard operations.

Applicable Operational BMPs:

Good Housekeeping and Preventive Maintenance:

- Store any metal scrap generated from metal punching or other mechanical operations out of contact with stormwater.
- Place track mats under each rail and flange lubricator that is in service.
- Store creosote-treated railroad ties so they do not come into contact with stormwater.
- Install track mats at designated engine tie-up and/or outdoor locomotive parking locations where locomotives are unattended and idle for extended periods of time.
- Inspect and replace track mats, as necessary. Routinely inspect all track mats for tears or saturation and replace, as necessary.
- Maintain clean and orderly material and equipment storage areas.
- Sweep paved areas where loading and unloading occur to remove loose material that could be picked up by stormwater.
- Do not pour/convey wash water, liquid waste, or other pollutants into storm drains or to surface water.
- Inspect incoming vehicles, parts, and equipment that will be stored temporarily outside for leaks.
- Maintain and replace catch basin inserts and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

Report spills to surface water immediately	**The National Response Center at 1-800-424-8802** **Washington Emergency Management Division at 1-800-258-5990**

- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.
- Install spill containment pans, trays, or track mats at designated locomotive and railcar maintenance facilities and fixed fueling areas to reduce environmental impacts from potential spills under locomotives and other track equipment. Direct spill containment pans and trays to an oil-water separator where feasible for treatment or to collect spilled chemicals for proper disposal.
- Prevent precipitation from accumulating in containment areas.
- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.
- Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;
    - An absorbent containment boom;
    - A non-metallic shovel; and
    - Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- When undergoing routine maintenance, discharge locomotive cooling systems only after the locomotive has stopped and at a location where the coolant can be collected, managed, and then disposed of properly.
- During maintenance, do not discard debris or waste liquids along the tracks or in railroad yards.
- Do not conduct heavy and/or major locomotive engine repairs on the rail line. Conduct heavy and/or major engine repairs at an established railroad maintenance facility.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans should be used when making and breaking connections.
- Immediately repair or replace leaking connections, valves, pipes, hoses, and other equipment that may cause the contamination of stormwater.
- Facility-dedicated equipment should be inspected weekly for leaks.
- Park large mobile equipment in a designated contained area.
- During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:

- Establish protocols to reduce the possibility of mishandling materials or equipment and training employees in good housekeeping techniques. Common areas where good housekeeping practices should be followed include trash containers and adjacent areas, material storage areas, vehicle and equipment maintenance areas, and loading docks.
- Properly handle wastes generated from equipment maintenance and cleaning, such as wash water from pressure washing, greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers to comply with state and federal environmental regulations.
- Drain oil filters before disposal or recycling.
- Convey sanitary sewage to pump-out stations, portable on-site pump-outs, commercial mobile pump-out facilities, or other appropriate onshore facilities.
- Do not dump or pour waste materials down floor drains, sinks, or outdoor storm drain inlets that discharge to surface water. Plug floor drains connected to storm drains or to surface water. If necessary, install a regularly operated sump pump.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items within secondary containment.
- Direct spill containment pans and trays to an oil-water separator where feasible for treatment.

Applicable Structural Source Control BMPs:

- Berm, dike, and/or slope the loading and 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 of operational areas such that the stormwater can flow to an approved treatment BMP. Avoid draining stormwater directly to the surface water from operational areas and loading areas.

Applicable Treatment BMPs:

- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment.
- Store large metal scrap and materials that cannot be stored in covered areas because of their size, volume, and/or weight (for example rail and tie plates) in locations where stormwater runoff is managed, controlled, and directed to a treatment BMP.

BMPs Guidance Sheet #8 – Recycling, Hazardous Waste, and Treatment, Storage, and Disposal Facilities

Description of Pollutant Sources: Recycling facilities at the Port include reclamation, recycling, and temporary storage of various materials, such as ferrous and nonferrous scrap metal. Hazardous waste, and treatment, storage, and disposal (TSD) facilities at the Port include facilities that treat store and dispose of various hazardous waste. The following tables include applicable operations at recycling facilities and at hazardous waste and TSD facilities, and the associated potential pollutant sources and stormwater contaminants:

Recycling Facilities		
Applicable Operations	**Potential Pollutant Sources**	**Associated Stormwater Contaminants**
Outside material storage.	Outdoor storage of solid raw materials, by-products, and metal products.	Turbidity, total suspended solids (TSS), heavy metals such as zinc, copper, lead, chromium, cadmium, PCBs, and leached pollutants.
Material processing: Stationary scrap processing facilities (balers, briquetters, shredders, shearers, compactors, engine block/cast iron breakers, wire chopper, turnings crusher).	Leaks from hydraulic reservoirs, hose and fitting connections, worn gaskets, spills or leaks from fuel tanks, particulates/residue from scrap processing, malfunctioning pumps and motors (e.g., leaking gaskets, seals or pipe connections, leaking oil-filled transformer casings, etc.).	Turbidity, TSS, heavy metals such as zinc, copper, lead, chromium, cadmium, PCBs, and oil and grease.
Material processing: Hydraulic equipment and systems, balers/briquetter, shredders, shearers, compactors, engine block/cast iron breaker, wire chopper, turnings crusher.	Particulate/residue from material processing, spills and/or leaks from fuel tanks, spills/leaks from oil/hydraulic fuel reservoirs, faulty/leaking hose connections/fittings, leaking gaskets.	
Material processing: Torch cutting.	Residual/accumulated particulates.	Turbidity, TSS, heavy metal fragments such as zinc, copper, lead, chromium, and cadmium.
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.

Maintenance and repair activities.	Drips and spills, oil filters, air filters, batteries, spent coolant, and degreasers from equipment repair and maintenance.	Oil and grease, antifreeze, diesel, gasoline, turbidity, and TSS.
Waste management.	Waste materials associated with containers, vehicle, and equipment; washing, maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper, oil and grease, and organics.
Vehicle and equipment cleaning and washing.	Washing and steam cleaning.	Solvent cleaners, oil/lubricants/additives, and antifreeze (ethylene glycol).
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.
Illicit discharges.	Improper connection of floor, sink, or process wastewater drains to storm sewers.	Dependent on source.

Hazardous Waste and TSD Facilities		
Applicable Operations	**Potential Pollutant Sources**	**Associated Stormwater Contaminants**
Loading/unloading.	Accumulated debris in loading and unloading areas.	Turbidity, total suspended solids (TSS), zinc, and copper.
Bulk liquid/solid transfer.	Spills during transfer of chemicals between aboveground storage tanks and drums or other containers.	Acids, solvents, ammonia, hydroxides, detergents, oil and grease, and fuels.
	Spills or leaks of hazardous materials used for operations.	Turbidity, TSS, chemical oxygen demand (COD) pH, biological oxygen demand (BOD), heavy metals such as zinc, copper, and lead, and oil and grease.
	Outdoor storage or handling of chemicals.	
	Unloading of chemicals and other hazardous materials.	
	Leaks and spills of acids or solvents from drums or tanks.	
Hazardous material storage.	Spills or leaks.	Turbidity, TSS, COD, pH, BOD, heavy metals such as zinc, copper, and lead, and oil and grease.
	Residual hazardous material due to poor housekeeping.	
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.
Maintenance and repair activities.	Drips and spills, oil filters, air filters, batteries, spent coolant, and degreasers from equipment repair and maintenance.	Oil and grease, antifreeze, diesel, gasoline, turbidity, and TSS.
Waste management.	Waste materials associated with containers, vehicles, and equipment; washing, maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper, oil and grease, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.
Illicit discharges.	Improper connection of floor, sink, or process wastewater drains to storm sewers.	Dependent on source.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper, lead, and sediment and solids in stormwater at recycling, hazardous waste, and TSD facilities.

Applicable Operational BMPs:

Good Housekeeping and Preventive Maintenance:

- Schedule regular pickup and disposal of garbage and waste materials and routine inspections of drums, tanks, and containers for leaks and structural conditions. Practices also include containing and covering garbage, waste materials, and debris.
- Sweep paved areas where loading and unloading occur to remove material that could be washed off by stormwater.
- Conduct unloading or loading operations of solids and liquids in a building or under a roof to the extent practicable.
- Promptly repair leaking connections, pipes, hoses, and valves that can contaminate stormwater.
- Promptly repair cracked or damaged paved drainage areas subject to leaks or spills.
- Regularly sweep building floors to prevent particulate transfer to the wheels of the forklifts and other equipment, and regularly sweeping paved surfaces of the facility.
- When possible, conduct equipment maintenance indoors.
- Maintain and replace catch basin inserts and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.

Report spills to surface water immediately	**The National Response Center at 1-800-424-8802** **Washington Emergency Management Division at 1-800-258-5990**

- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans will be used when making and breaking connections. Regularly check loading and unloading equipment such as valves, pumps, flanges, and connections for leaks and repair as needed.
- Place tight-fitting lids on containers.
- Prevent precipitation from accumulating in containment areas.
- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.
- Locate spill kits so they are readily accessible on all piers and docks. Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;
    - An absorbent containment boom;
    - A non-metallic shovel; and
    - Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans will be used when making and breaking connections.
- Immediately repair or replace leaking connections, valves, pipes, hoses, and other equipment that may cause the contamination of stormwater.
- Facility-dedicated equipment should be inspected weekly for leaks.
- Park large mobile equipment in a designated contained area.
- During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:

- Establish protocols to reduce the possibility of mishandling materials or equipment and training employees in good housekeeping techniques. Common areas where good housekeeping practices should be followed include trash containers and adjacent areas, material storage areas, vehicle and equipment maintenance areas, and loading docks.
- Properly handle wastes generated from equipment maintenance and cleaning, such as wash water from pressure washing, greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers to comply with state and federal environmental regulations.
- Drain oil filters before disposal or recycling.
- Do not dump or pour waste materials down floor drains, sinks, or outdoor storm drain inlets that discharge to surface water. Plug floor drains connected to storm drains or to surface water. If necessary, install a regularly operated sump pump.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items within secondary containment.
- Direct spill containment pans and trays to an oil-water separator where feasible for treatment.

Applicable Structural Source Control BMPs:

- Berm, dike, and/or slope the loading and 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 of operational area such that the stormwater can flow to a storm sewer system that leads to an approved treatment BMP. Avoid draining stormwater directly to the surface water from operational areas and loading areas.
- Store materials in a building or paved and bermed covered area as shown on Figure IV-5.6.

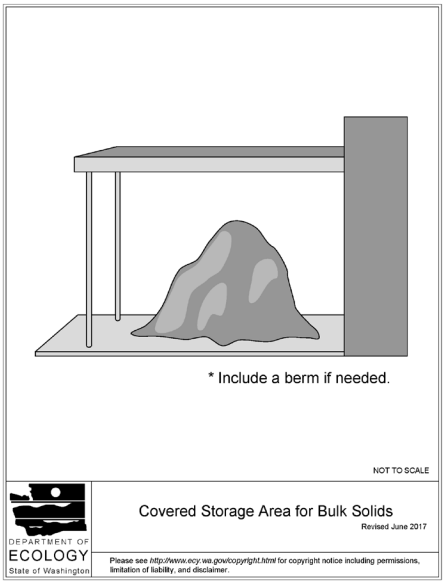

Figure IV-5.6: Covered Storage Area for Bulk Solids

- Place temporary plastic sheeting over stockpiled materials as shown on Figure IV-5.7.
- To the extent practicable, conduct unloading or loading operations of solids and liquids in a building or under a roof. (See Figure IV-6.5: Loading Dock with Overhang).

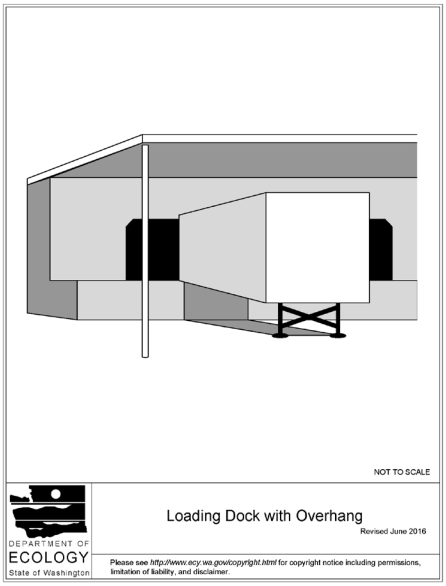

Figure IV-6.5: Loading Dock with Overhang

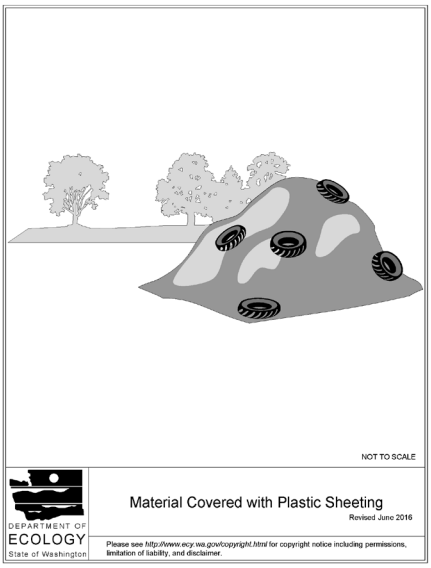

Figure IV-5.7: Covered Storage Area for Bulk Solid

Applicable Treatment BMPs:

- Install catch basin inserts with metal and oil absorbent media to collect excess sediment and debris and treat metal pollutants and oil as necessary. Inspect and maintain catch basin inserts on a quarterly basis to ensure they are working correctly.
- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment such as a sanitary sewer, if approved by the appropriate sewer authority, oil-water separator, or other treatment.
- Store large materials that cannot be stored in covered areas because of their size, volume, and/or weight in locations where stormwater runoff is managed, controlled, and directed to a treatment BMP.

BMPs Guidance Sheet #9 – Warehousing and Transload Facilities

Description of Pollutant Sources: Warehousing and transload facilities at the Port include refrigerated warehousing, storage, and shipping. The following table includes applicable operations at warehousing and transload facilities and the associated potential pollutant sources and stormwater contaminants:

Applicable Operations	Potential Pollutant Sources	Associated Stormwater Contaminants
Outside material storage.	Outdoor storage of solid raw materials, by-products, sand, salts, concrete, and metal products.	Turbidity, total suspended solids (TSS), zinc, copper, leached pollutants, and organics.
Loading and unloading.	Accumulated debris in loading and unloading areas.	Turbidity, TSS, zinc, and copper.
Fueling areas.	Drips and spills from fueling equipment and vehicles.	Oil and grease.
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.
Maintenance and repair activities.	Drips and spills, oil filters, air filters, batteries, spent coolant, and degreasers from equipment repair and maintenance.	Oil and grease.
Waste management.	Waste materials associated with containers, vehicles, and equipment; washing, maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper, oil and grease, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper, and sediment and solids in stormwater at warehousing and transload facilities.

Applicable Operational BMPs:

Good Housekeeping and Preventive Maintenance:

- Maintain clean and orderly material and equipment storage areas.
- Do not pour/convey wash water, liquid waste, or other pollutants into storm drains or to surface water.
- While not in use, containers of liquids should be secured with lids.
- Sweep paved areas where loading and unloading occur to remove loose material that could be washed off by stormwater.
- Sweep paved areas temporarily covered after removal of the materials covering the ground.
- Inspect incoming vehicles, parts, and equipment that will be stored temporarily outside for leaks.
- Promptly repair cracked or damaged paved drainage areas subject to leaks or spills.
- Maintain and replace catch basin inserts and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.
- Prevent precipitation from accumulating in containment areas.
- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.
- Ensure immediate cleanup of liquid/solid spills in the loading and unloading area, if a significant spill occurs, and, upon completion of the loading and unloading activity, or, at the end of the working day.
- Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;
    - An absorbent containment boom;
    - A non-metallic shovel; and
    - Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Report spills to surface water immediately	**The National Response Center at 1-800-424-8802** **Washington Emergency Management Division at 1-800-258-5990** **Ecology Regional Office, Bellevue (NWRO) 425-649-7000**

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans will be used when making and breaking connections. Regularly check loading and unloading equipment such as valves, pumps, flanges, and connections for leaks and repair as needed.
- Promptly repair leaking connections, pipes, hoses, and valves that can contaminate stormwater.
- During fueling, use automatic shut-off nozzles for dispensing the fuel. Replace automatic shut-off nozzles as recommended by the manufacturer.
- During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:

- Properly handle wastes generated from equipment cleaning, such as wash water from pressure washing.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items within secondary containment.
- If drums must be kept outside, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting on lids.
- Direct spill containment pans and trays to an oil-water separator where feasible for treatment.

Applicable Structural Source Control BMPs:

- If possible, enclose the manufacturing activity in a building (see Figure IV-7.1: Enclose the Activity).
- Cover the activity and connect floor drains to a sanitary sewer, if approved by the local sewer authority.
- Berm or slope the floor as needed to prevent drainage of pollutants to outside areas. (See Figure IV-7.2: Cover the Activity.)

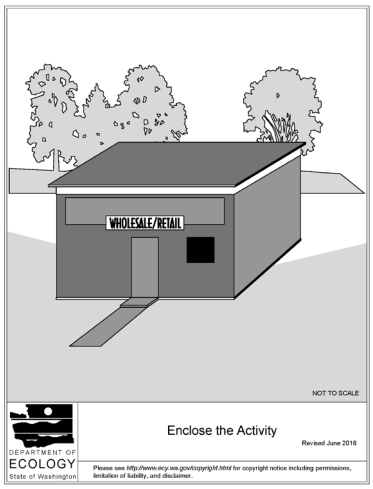

Figure IV-7.1: Enclose the Activity

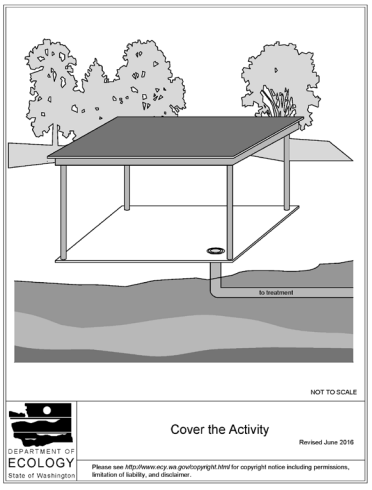

Figure IV-7.2: Cover the Activity

- Isolate and segregate pollutants as feasible. Convey the segregated pollutants to a sanitary sewer, process treatment, or a dead-end sump depending on available methods and applicable permit requirements.
- When possible, conduct unloading or loading operations of solids and liquids in a building or under a roof. (See Figure IV-6.5: Loading Dock with Overhang.)
- Berm, dike, and/or slope the loading and unloading area to prevent run-on of stormwater and to prevent the runoff or loss of any spilled material from the area.

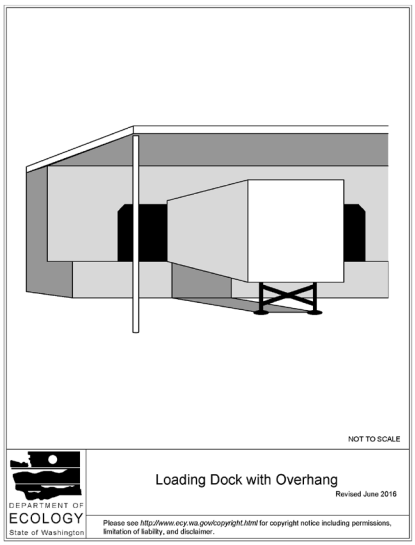

Figure IV-6.5: Loading Dock with Overhang

Applicable Treatment BMPs:

- Install catch basin inserts with metal and oil absorbent media to collect excess sediment and debris and treat metal pollutants and oil as necessary. Inspect and maintain catch basin inserts on a quarterly basis to ensure they are working correctly.
- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment such as an oil-water separator or other treatment.
- Store large materials that cannot be stored in covered areas because of their size, volume, and/or weight in locations where stormwater runoff is managed, controlled, and directed to a treatment BMP.

BMPs Guidance Sheet #10 – Wheeled Operations

Description of Pollutant Sources: Wheeled operations at the Port include intermodal yards, auto warehousing, trailer chassis repair operations, and transload truck/container operations. The following table includes applicable operations at wheeled operation facilities and the associated potential pollutant sources and stormwater contaminants:

Applicable Operations	Potential Pollutant Sources	Associated Stormwater Contaminants
Outside material storage.	Outdoor storage of solid raw materials, by-products, sand, salts, concrete, and metal products.	Turbidity, total suspended solids (TSS), zinc, copper, leached pollutants, and organics.
Loading and unloading.	Accumulated debris in loading and unloading areas.	Turbidity, TSS, zinc, and copper.
Heavy equipment operation.	Drips and spills from equipment.	Oil and grease.
Vehicle/equipment traffic.	Vehicle and equipment tire wear and brake use.	Turbidity, TSS, zinc, and copper.
Maintenance and repair activities.	Drips and spills, oil filters, air filters, batteries, spent coolant, and degreasers from equipment repair and maintenance.	Oil and grease.
Waste management.	Waste materials associated with containers, vehicles, and equipment; washing, maintenance and repair; and drum and container management.	Turbidity, TSS, zinc, copper, oil and grease, and organics.
Facility security fencing.	Galvanized products (e.g., galvanized fencing).	Zinc.

An essential approach to control pollutants is to apply good housekeeping and preventive maintenance practices to control sources of oil and grease, zinc, copper, and sediment and solids in stormwater at wheeled operation facilities.

Applicable Operational BMPs:

Good Housekeeping and Preventive Maintenance:

- Maintain clean and orderly material and equipment storage areas.
- Do not pour/convey wash water, liquid waste, or other pollutants into storm drains or to surface water.
- While not in use, containers of liquids should be secured with lids.
- Sweep paved areas where loading and unloading occur to remove loose material that could be washed off by stormwater.
- Sweep paved areas temporarily covered after removal of the materials covering the ground.
- Inspect incoming vehicles, parts, and equipment that will be stored temporarily outside for leaks.
- Promptly repair cracked or damaged paved drainage areas subject to leaks or spills.
- Maintain and replace catch basin inserts and clean catch basins and stormwater conveyance piping on a regular basis.

Spill Prevention and Control:

- All hazardous substances, petroleum and oil liquids, and other chemical or liquid materials that have potential to contaminate stormwater should be stored on or in containment structures that are capable of containing 10 percent of the total enclosed container or tank volume or 110 percent of the volume contained in the largest container or tank, whichever is greater.
- Prevent precipitation from accumulating in containment areas.
- Ensure that an employee trained in spill containment and cleanup is present during loading and unloading.
- Ensure immediate cleanup of liquid/solid spills in the loading and unloading area, if a significant spill occurs, and, upon completion of the loading and unloading activity, or, at the end of the working day.
- Retain and maintain the following spill clean-up materials on the site for rapid cleanup of material spills:
    - Absorbents capable of absorbing at least 15 gallons of fuel;
    - A storm drain plug or cover;
    - An absorbent containment boom;
    - A non-metallic shovel; and
    - Two 5-gallon buckets with lids or a 55-gallon drum to contain debris and spent absorbent.

Report spills to surface water immediately	**The National Response Center at 1-800-424-8802** **Washington Emergency Management Division at 1-800-258-5990** **Ecology Regional Office, Bellevue (NWRO) 425-649-7000**

Vehicle/Equipment Fueling, and Maintenance:

- When possible, conduct equipment maintenance indoors.
- Place drip pans or other appropriate temporary containment devices at locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles. Drip pans will be used when making and breaking connections. Regularly check loading and unloading equipment such as valves, pumps, flanges, and connections for leaks and repair as needed.
- Promptly repair leaking connections, pipes, hoses, and valves that can contaminate stormwater.
- During fueling, use automatic shut-off nozzles for dispensing the fuel. Replace automatic shut-off nozzles as recommended by the manufacturer.
- During maintenance, do not discard debris or waste liquids on paved surfaces or in catch basins.

Waste Handling:

- Properly handle wastes generated from equipment cleaning, such as wash water from washing operations.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items within secondary containment.
- If drums must be kept outside, store them at a slight angle to reduce ponding of rainwater on the lids to reduce corrosion. Domed plastic covers are inexpensive and snap to the top of drums, preventing water from collecting on lids.
- Direct spill containment pans and trays to an oil-water separator where feasible for treatment.

Applicable Structural Source Control BMPs:

- If possible, enclose the manufacturing activity in a building activity. (See Figure IV-7.1: Enclose the Activity.)
- Cover the activity and connect floor drains to a treatment structure.
- Berm or slope the floor as needed to prevent drainage of pollutants to outside areas. (See Figure IV-7.2: Cover the Activity)

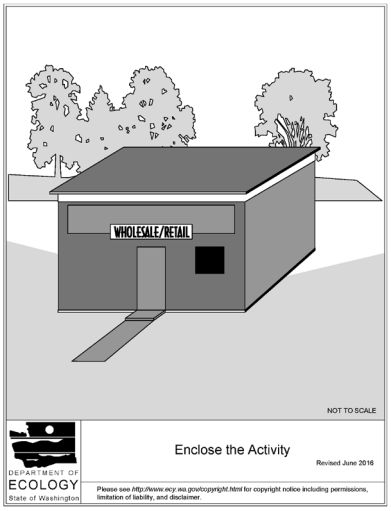

Figure IV-7.1: Enclose the Activity

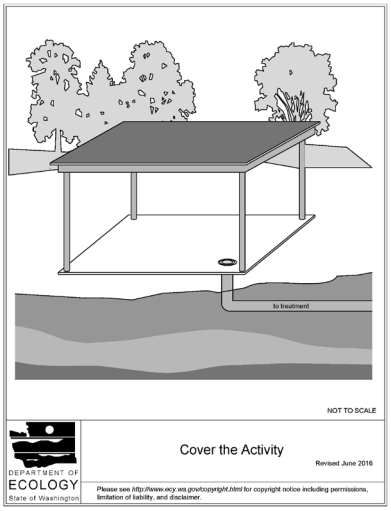

Figure IV-7.2: Cover the Activity

- Isolate and segregate pollutants as feasible. Convey the segregated pollutants to a sanitary sewer, process treatment, or a dead-end sump depending on available methods and applicable permit requirements.

- If possible, conduct unloading or loading operations of solids and liquids in a building or under a roof. (See Figure IV-6.5: Loading Dock with Overhang.)

Applicable Treatment BMPs:

- Install catch basin inserts with metal and oil absorbent media to collect excess sediment and debris and treat metal pollutants and oil as necessary. Inspect and maintain catch basin inserts on a quarterly basis to ensure they are working correctly.
- In areas subjected to leaks and/or spills of oils or other chemicals, convey stormwater to appropriate treatment such as an oil-water separator or other treatment.
- Store large materials that cannot be stored in covered areas because of their size, volume, and/or weight in locations where stormwater runoff is managed, controlled, and directed to a treatment BMP.

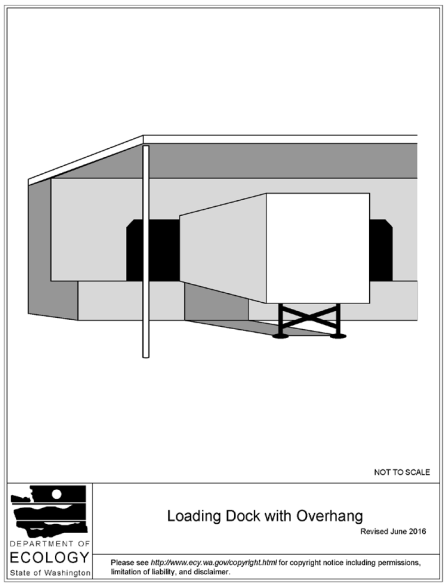

Figure IV-6.5: Loading Dock with Overhang