

# City of Wilsonville

## A MANUAL FOR THE OPERATION & MAINTENANCE OF PRIVATELY OWNED STORMWATER FACILITIES

March 2012



*Working together...*



*towards a common goal...*



*clean waters and healthy  
rivers.*



City of Wilsonville  
Natural Resources Program  
(503) 682-4960  
[www.ci.wilsonville.or.us](http://www.ci.wilsonville.or.us)



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# CARING FOR YOUR STORMWATER FACILITY

## THANK YOU

As the owner of a stormwater management facility, you are making a meaningful contribution to the health of Wilsonville's streams, wetlands and the Willamette River. This handbook will help you maintain your facility to make sure it performs the work it is designed to accomplish.



## WHAT ARE STORMWATER FACILITIES?



Stormwater facilities are any combination of landscape and structural features that slow, filter, or infiltrate (absorb) runoff on your property after a rainfall. Types of facilities include vegetated systems (planters, swales, ponds, created wetlands, etc.), and structural systems (ecoroofs, porous pavement and manufactured facilities). Piping, inlets and catch basins are also important components that need adequate maintenance to assure facility function. All of these serve a common purpose: controlling the quality and quantity of stormwater runoff from your site to help safeguard our valuable water resources.

## PROPERTY OWNER RESPONSIBILITIES

Federal, state and local agencies created management regulations and guidelines so as to improve stormwater quality and protect watersheds, rivers, streams and drinking water resources. The City of Wilsonville has a Stormwater Maintenance and Access Easement that includes the following requirements:

- Annual maintenance on storm drainage facilities in conformance with City of Wilsonville's Public Works Standards. For more information go to: [www.ci.wilsonville.or.us/Index.aspx?page=127](http://www.ci.wilsonville.or.us/Index.aspx?page=127) Go to Important Links at the bottom of the page and click on Public Works Construction Standards 2006 (section 301.6.00 Operations and Maintenance Req.)
- Removal of debris, leaves and sediment from manholes, detention outlet structures, and catch basins.
- Disposal of all oils, sediment and debris in an approved dumpsite.
- Replacement of all dead or dying plants in ponds and swales. Maintenance of original plantings.
- Removal of trash from ditches, swales, catch basins, or any stormwater conveyance.

The steps we take today will greatly influence Wilsonville's environmental health and quality of life for years to come. Individual actions can make a big difference. Thank you for the significant part you and your stormwater management facility are playing.

\* For information or questions about your facility, call the Natural Resources Program at (503) 682-4960

# YOUR CONNECTION TO WILSONVILLE'S STREAMS AND THE WILLAMETTE RIVER



## THE PROBLEM WITH STORMWATER RUNOFF

When it rains, the stormwater runs off impervious surfaces (such as roofs and paved areas) instead of soaking into the ground.

Conventional stormwater management directs runoff into drains and pipes that carry it offsite and eventually discharge it into a local stream. This approach has a number of harmful effects:

- Impervious areas generate large volumes of runoff relatively quickly. The increased volume and speed of the runoff can cause flooding and erosion and damage natural habitat.
- The runoff picks up a variety of pollutants including oil, pesticides, metals, chemicals, and sediment that negatively impact water quality and fish habitat.
- During warm weather, the runoff absorbs heat from impervious surfaces. This increases the temperature of the receiving waters, with negative impacts on fish and other aquatic life.
- Less water is able to infiltrate into the ground. This reduces groundwater recharge, which reduces summer flows in streams.



For information on the City's stormwater permitting requirements please visit:

[www.ci.wilsonville.or.us/Index.aspx?page=693](http://www.ci.wilsonville.or.us/Index.aspx?page=693)



## A BETTER WAY TO FLOW

The City of Wilsonville is actively pursuing a variety of measures to reduce stormwater impacts. One important approach is to manage stormwater on the property where it originates. This is commonly referred to as Low Impact Development. It includes the use of vegetated swales, pervious concrete, rain gardens, eco-roofs, etc. Onsite stormwater management uses processes that mimic nature. Onsite facilities allow runoff to soak into the ground, help filter out pollutants, and slow the flow rate of runoff leaving your site. This significantly reduces the volume and pollution levels in stormwater leaving your property and ending up in local streams and the Willamette River.

## WHAT ELSE IS THE CITY DOING?

Onsite management, through the use of Low Impact Development, is just one component of a comprehensive citywide program to limit stormwater runoff impacts. Here are some other steps the City is taking:

- The City requires onsite stormwater management for new construction and redevelopment on public and private property.
- Adhering to and updating the procedures outlined in the Stormwater Master Plan.
- Natural areas, especially riparian areas adjacent to rivers and streams, help filter out pollution, control erosion, and provide shade, food, and habitat for fish and wildlife. The City uses a variety of measures to preserve these critical areas including development and land use zoning requirements and enhancement and restoration efforts.
- In partnership with numerous other organizations, the City provides education and technical assistance aimed at reducing stormwater impacts and promoting watershed health.



# INSPECTING AND MAINTAINING YOUR FACILITY

## PROTECTING YOUR RESOURCES

It is essential to maintain your facility so it functions as intended and limits off-site environmental impacts. You are required to inspect your facility at a minimum of once a year to determine maintenance needs. Routine inspection and maintenance can help keep overall maintenance costs low by detecting problems early and avoiding large repair or replacement costs. This section identifies general guidelines on what to look for and how to maintain your facility. It also notes non-routine maintenance that may require professional assistance. **If you are unsure of what type of facility you have, call the City of Wilsonville's Natural Resources Program at (503) 682-4960.**



## LEGAL REQUIREMENTS: OPERATIONS AND MAINTENANCE PLAN

As a property owner, you are legally required to follow all of the maintenance tasks and schedules outlined in your recorded maintenance and access easement. An Annual Inspection and Maintenance Report must be submitted to the City of Wilsonville no later than May 1 each year (see sample form on page 7). Pictures included with the report are very helpful. Include copies of invoices of work performed by contractors. While inspecting your facility, please keep in mind that it will be necessary for you to refer to your landscape plan in order to maintain your facility as it was originally designed.

## INSPECTION SCHEDULE: HOW OFTEN

It is recommended that you inspect your facility at least::

- Quarterly for the first two years
- Once a year there after, and
- Within 48 hours of major rainfall events (more than one inch of rain over a 24-hour period).



### SAMPLE REPORTING FORM

#### Stormwater Annual Inspection and Maintenance Report

- The owner(s) or owner's designee shall be responsible for having inspections conducted and maintenance performed on the above private stormwater facilities annually, in conformance with Section 301.6.00, "Operation and Maintenance," of the City of Wilsonville Public Works Standards. All oils, sediment and debris will be removed and deposited in an approved waste disposal site. Any damaged equipment will be repaired promptly.
- Particular attention will be given to sedimentation and pollution control manholes, and stormwater facility inlet and outlet structures. All debris shall be removed to assure proper functioning.
- The grates of all catch basins shall be kept free of debris and leaves.
- The stormwater facility outlet structure(s) shall be checked to assure that sediment accumulation has not encroached on the required stormwater facility volume. Sediment shall be removed as necessary to maintain that required volume.
- The outlet control manhole shall be inspected to assure that all parts are intact and the orifice is free of any debris that could cause malfunction.
- Inspect all stormwater facilities for survival and viability of plantings. Replace all dead or dying plants with in-kind plantings, and remove sediments and debris. **Maintain all original landscaping in swales, ponds, etc.**
- This includes all stormwater facilities including but not limited to: catch basins, pipes, treatment manholes, manholes, trash racks, and structural controls.

The above inspection and maintenance activities shall be documented annually by sending a signed original letter format report of what was completed to the City of Wilsonville at the mailing address below. **The Annual Inspection and Maintenance Report must be submitted no later than May 1 each year.**

City of Wilsonville  
Stormwater Management Coordinator  
29799 SW Town Center Loop  
Wilsonville, OR 97070

(Stormwater facilities Maintenance Plan Exhibit B Stormwater Maintenance and Access Easement)

\_\_\_\_\_  
**Name of Development**

**Contact** \_\_\_\_\_  
Telephone \_\_\_\_\_  
Mailing Address \_\_\_\_\_

**Location**  
Tax Lot \_\_\_\_\_  
Street Address \_\_\_\_\_

**Facilities to be maintained**  
\_\_\_\_ Trapped catch basin(s) (number of each)  
\_\_\_\_ Pollution control manhole(s) (number of each)  
\_\_\_\_ Outlet control manhole(s) (number of each)  
\_\_\_\_ Detention pond(s); \_\_\_\_ tank(s) (number of each)  
\_\_\_\_ WQ pond(s) swales; \_\_\_\_ MH(s); \_\_\_\_ vault(s); \_\_\_\_  
All other facilities as described on plans \_\_\_\_\_

**Inspection Date** \_\_\_\_\_

**Describe inspection, maintenance, repair or replanting** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Attach invoices for work performed) (Continue above on additional sheet if needed)

**Owner, Owners or their Representative Signature** \_\_\_\_\_  
**Date** \_\_\_\_\_

# SEDIMENT REMOVAL AND DISPOSAL

## FACILITIES AND SYSTEM COMPONENTS THIS APPLIES TO

**Vegetated Facilities:** ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

**Structural Facilities:** catch basins, curb cuts, inlets, manufactured facilities, piping, sedimentation manholes, and vaults.

**Pervious Pavement:** porous concrete or asphalt, permeable pavers.

## IMPACT ON FACILITY PERFORMANCE

The purpose of a stormwater treatment facility is to remove pollutants, including suspended solids, by capturing sediment. Sediment can include dirt, leaves, and litter. These materials can restrict or clog the facility. Timely removal of sediment will improve infiltration rates, water quality, and help prevent clogging and flooding.

## WHAT TO LOOK FOR

Check the depth of accumulated sediments. Sediment markers can be placed in the facility to help identify depths. Remove sediment when:

### Vegetated Facilities:

- Sediment is 4" deep,
- Sediment depth is damaging or killing vegetation, or
- Sediment is preventing the facility from draining within a 24-48 hour period.

### Structural Facilities:

- At least once a year, or
- When the basin is half full of sediment.

### Pervious Pavement:

- Sediment is preventing the facility from draining in 24 hours.



## WHAT TO DO

Often sediment can be removed by hand. Large facilities and underground facilities will need to be cleaned with heavy equipment by trained professionals.

- Remove sediment during dry months when it is easier to remove, weighs less, and creates fewer secondary environmental impacts (such as wet sediment running off the site).

**NOTE: It is illegal to hose sediments through your system.**

### *Doing it yourself*

#### Vegetated Facilities:

- Use rakes and shovels to dig out accumulated sediment.
- Avoid damage to existing vegetation.
- If sediment is deep, plants may need to be removed in order to excavate sediment.
- Reseed and mulch disturbed areas to prevent erosion.
- Excavate sand or gravel and clean or replace.

*Doing it yourself (continued)***Structural Facilities, Dispersion Trenches and Pervious Pavement:**

- Catch Basins: Clean debris off the grate and bars. Lift the grate and use a bucket to remove water and a shovel to dig out sediment.
- Curb cuts, piping and other conveyance facilities: Use a shovel, router, air hose or other dry method to clear sediment and debris.
- Dispersion Trenches: Excavate sand or gravel and clean or replace.
- Pervious Pavement: Remove accumulated sediment from the surface with a dry broom, vacuum system, or other hand tools.

*Hiring Professionals*

Cleaning certain facilities will require professional assistance.

- Underground facilities such as manholes, and manufactured facilities must be cleaned by a vactor truck. Do not enter these facilities. They are defined by the Oregon Occupational Safety and Health Division as confined spaces and require proper certification to enter.
- Certain components such as collection basins, piping or pervious pavement systems may require vacuuming with a vactor truck or street sweeping equipment.

**DISPOSAL**

When deciding how to dispose of sediment, you need to consider the types of activities and pollutants on site. Sediment from commercial or industrial sites is usually not considered hazardous waste. However, as the generator of this waste you are responsible for deciding how to properly manage the removed solids.

*Contaminated Water and Sediment*

Catch basins and stormwater facilities in areas used for chemical or hazardous waste storage, material handling or equipment maintenance may collect the chemicals used in these activities from spills or via stormwater runoff. If you observe an oily sheen, odors, discoloration, or other signs of pollution, hire a professional laboratory or sampling firm to assess whether the material needs specialized hauling, treatment or disposal to comply with Oregon State Department of Environmental Quality (DEQ) rules. If you need assistance deciding whether the solids should be managed as hazardous waste, contact DEQ.

*Non-Contaminated Water and Sediment*

If the pollutant load is non-hazardous, water may be spread across vegetation onsite. Let the solids dry out, then properly dispose of them. Temporary erosion control measures may be needed to contain the material onsite. Dry materials may be reused elsewhere on your site, may be eligible for reuse by others, or can be disposed of at a designated solid waste facility.

## REDUCING SEDIMENT ACCUMULATION AND POLLUTION IN YOUR FACILITY

- Minimize outside sources of sediment, such as eroding soil upstream of your facility.
- Sweep paved areas on your property regularly.
- Make sure chemical and waste storage areas are not exposed to rainfall and stormwater runoff.
- Don't let water from washing vehicles or equipment drain to your stormwater facility.



## RESOURCES

**City of Wilsonville Public Works Standards:** [www.ci.wilsonville.or.us/Index.aspx?page=127](http://www.ci.wilsonville.or.us/Index.aspx?page=127)

Go to *Important Links* at the bottom of the page and click on *Public Works Construction Standards 2006* (section 301.6.00 Operations and Maintenance Req.)

**Environmental Protection Agency:** [www.cfpub.epa.gov/npdes/home.cfm?program\\_id=6](http://www.cfpub.epa.gov/npdes/home.cfm?program_id=6)

**Department of Environmental Quality:** [www.oregon.gov/DEQ](http://www.oregon.gov/DEQ)

**Private Maintenance Companies** (listed below are just a few examples of companies that provide maintenance services, more companies are available)

- Clearwater Environmental Services in Wilsonville (503) 582-1951
- River City Environmental in Portland (503) 252-6144
- Bravo Environmental NW in Portland (503) 261-9800



**Stormwater runoff has substantial impacts on the water quality and habitat that fish depend on. By reducing those impacts, we are taking direct action on behalf of threatened species as well as other fish and wildlife that are under stress.**

# VEGETATION MANAGEMENT

## FACILITIES THIS APPLIES TO

**Vegetated Facilities:** ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

## IMPORTANCE TO FACILITY PERFORMANCE

Plants play an important role in stormwater facilities. They absorb water, improve infiltration rates of soil, prevent erosion by stabilizing soil, cool water, and capture pollutants. Plants create habitat for birds and other wildlife and provide aesthetic value to a property. Proper maintenance of vegetation improves the appearance and performance of your facility. Your facility must be kept in accordance with the original landscape design.

## WHAT TO LOOK FOR

When identifying maintenance needs it is helpful to have a copy of your landscape plan, this shows the plants you are required to have in your facility. Facilities should be checked for maintenance needs quarterly for the first two years and once a year after that.

*Facility needs maintenance when:*

- Areas of soil are bare.
- Vegetation is buried by sediment.
- Vegetation appears unhealthy or has died.
- Nuisance and invasive plants are present.
- Vegetation is compromising the facility's structure by blocking inlets or outlets, or roots are intruding into a component of the facility.
- Dropped leaves and other debris are contributing to sediment accumulation or are blocking inlets or outlets.



## WHAT TO DO

Maintenance activities can easily be incorporated into existing site landscape maintenance contracts. Vegetation can be maintained with a formal or more natural appearance depending on your preference.

*General Maintenance*

- Remove dropped leaves, dead plants, and grass and other plant clippings. Plant debris adds nutrient pollution as it breaks down, and can clog facility piping and reduce infiltration.
- Avoid using fertilizers, herbicides, or pesticides in the facility. These products add to the pollution problems the facilities are designed to remedy.
- Use mulch to inhibit weed growth, retain moisture, and add nutrients. Replenish when needed. Ensure mulch does not inhibit water flow.
- Irrigate all new plantings as needed for the first two years.

*Caring for wanted vegetation*

Facility owners are responsible for maintaining healthy vegetation and must replace any plants that have died or been removed.

- You are required to maintain vegetation to the density approved on your landscape plans or specified in the City's Public Works Standards.
- Replant with vegetation approved for use in the original planting plan or from the recommended plant list in the City's Public Works Standards.

### *Caring for wanted vegetation (continued)*

- Plant in late fall or early spring so plant roots can establish during the cool, rainy seasons, before summer.
- Amend and aerate compacted soils before replanting by adding compost to increase nutrients and enhance soil texture.
- If plants are not surviving, determine the reason for the plant die-off. Survivability may be improved by planting vegetation better suited for the site conditions or by irrigating more. You may need to test planting bed soils for pH, moisture, and other factors such as nutrient levels, soil structure, and organic matter content.



### *Mowing*

- Grassy facilities are designed for routine mowing. Mow at least twice a year.
- Grass should be mowed to keep it 4" to 9" tall. Grass that is at least 4" tall captures more pollutants and is hardier. Do not allow grass to become a fire hazard.

### *Nuisance and unwanted vegetation*

- Remove nuisance and invasive vegetation, such as Himalayan blackberry, English ivy and reed canarygrass, before it goes to seed in the spring. Do additional weeding in the fall. A list of nuisance plants can be found in the Portland Plant List (see below).
- Immediately remove vegetation that is clogging or impeding flow into the facility.
- Remove potentially large and deep-rooted trees or bushes when they might impede the flow path or compromise facility structures.
- Provide ground cover on any dirt exposed by vegetation removal.

### *Wildlife*

Vegetated facilities create habitat, especially for birds. The Migratory Bird Treaty Act protects all native bird species. Birds and other animals will generally adjust to human activity. However, there are simple measures that should be taken to avoid disturbance:

- Avoid maintenance during bird nesting season from early March to late July. Prune and mow during late summer. Many baby birds will spend some time on the ground after leaving a nest.
- Walk the site before you do maintenance. Look for nests, burrows and animals in the facility. Reroute around animal areas by at least a few yards.

## RESOURCES

*Clackamas County Resources:*

**Clackamas County Soil and Water Conservation District:** [www.conservationdistrict.org](http://www.conservationdistrict.org)

*Plant Identification:*

**Native Plant Society:** [www.npsoregon.org](http://www.npsoregon.org)

**Master Gardeners:** [www.extension.oregonstate.edu/mg](http://www.extension.oregonstate.edu/mg)

*Native Plant Nurseries:*

**Native Plant Nursery:** [www.plantnative.org](http://www.plantnative.org)

# EROSION, BANK FAILURE, CHANNEL FORMATION

## FACILITIES THIS APPLIES TO

**Vegetated Facilities:** ecoroofs, infiltration basins, planters, ponds, swales, trees, vegetated filters, and created wetlands.

## IMPORTANCE TO FACILITY PERFORMANCE

Stormwater flowing through a facility can cause erosion. Erosion can increase sediment build up, clog outlets, reduce water quality benefits, add to pollution and cause facility components to fail. Eroded channels create an easy path for water to travel down reducing the ability of the facility to filter pollutants and infiltrate water.

## WHAT TO LOOK FOR

Any area with erosion more than two inches deep needs maintenance. Signs of erosion and common locations:

- The formation of flow restricting channels in the bottom of the facility, around inlet pipes and curb cuts, or at overflows.
- Undercutting, scouring, and slumping along banks or berms.
- Channels and undercutting through check dams. (check dams are small berms built across a facility to slow water and create small areas of ponding).

## WHAT TO DO

- Fill the eroded area with soil, compact it lightly, and cover with mulch, compost, seed, sod, or other erosion prevention materials.
- Plant banks with deep or heavily rooted plants to permanently stabilize soil.
- Install or repair structures designed to dissipate energy and spread flow, such as splash blocks on downspouts, or riprap around inlet pipes and curb cuts. See the City's Public Works Standards for requirements.
- If erosion continues to be a problem, consult a professional to determine the cause and a solution.
- Replant in accordance with the landscape plan.



# STRUCTURAL DEFICIENCIES

## FACILITIES THIS APPLIES TO

Most stormwater facilities have some structural components. Some facilities such as vaults, drywells, and sediment manholes are completely structural. In vegetated facilities, structural components often control how water enters, travels through, or exits a facility.

Common structural components include:

- Inflow and outflow pipes, curb cuts, and trenches.
- Valves, orifices, trash racks, and pipes.
- Concrete, metal, and plastic structures and components such as curbs, retaining walls, and manholes.
- Manufactured devices such as filter cartridges.
- Earthworks such as embankments, check dams, dikes, berms and side slopes.
- Riprap and other flow spreading elements.
- Access roads, gates and signs.



## IMPORTANCE TO FACILITY PERFORMANCE

These elements need to be in good working order to route flows into a facility and for the facility to function properly.

## WHAT TO LOOK FOR

Look at the general condition of these elements. Do they need repair or replacement? Are they still properly aligned? Look for:

- cracks, scratches, dents, rust, or other conditions of wear.
- loose fittings, broken or missing components.
- insufficient oil/grease for moving parts.
- appropriate gravel cover or bedding to support the structures.
- misaligned parts or other impediments to the component's ability to still pass flow.

## MAINTENANCE

- Immediately repair or replace any major damage to prevent catastrophic failure. This includes any structural component that is cracked, loose or askew. You may need to consult a professional engineer or hire a trained contractor to design and perform any repairs. Refer to page 10 for a list of resources.
- Minor damage such as dents, or rust spots may not need immediate replacement but should be monitored.
- Maintain access to the facility by keeping the access route open and structurally sound, fence gates and vault lids oiled and locks functioning. Access must be available in an emergency.

# PONDING WATER

## FACILITIES THIS APPLIES TO

**Vegetated Facilities:** dry ponds, infiltration basins, planters, rain gardens, sand filters, swales, created wetlands, and vegetated filter strips.

**Structural Facilities:** manufactured facilities and pervious pavement.

**NOTE:** Some facilities are specifically designed to always hold water such as: wet ponds, spill control manholes, and sedimentation manholes.

## IMPORTANCE TO FACILITY PERFORMANCE

Most facilities are designed to drain in a certain amount of time. This varies from 2 to 48 hours depending on the type of facility. This time is stated in the Operations and Maintenance plan for the type of facility. Ponding water is usually a sign that the facility's outlet is clogged or it is not infiltrating properly.

## WHAT TO LOOK FOR

- clogging of overflows or outlets with debris, trash or other obstructions.
- fine sediments filtering into the soil or other filtration media (like sand or gravel) that can prevent proper infiltration.
- water that has remained ponded for more than 48 hours.

## MAINTENANCE

- For surface facilities, first try raking the top few inches of soil to break up clogged sections and restore water flow.
- Clean out overflows and outlets with hand tools, if possible. Difficult or hard to access blockages may require a professional contractor.
- Identify sources of sediment and debris to prevent them from entering the facility. Simple actions like sweeping a parking lot regularly can keep sediment out of facilities.
- Make sure the facility has enough vegetation. Vegetation absorbs water and roots help keep soil loose so it can infiltrate water.



For more thorough instructions on removing sediment, see the “Sediment Removal and Disposal” section of this handbook. Sediment accumulated in stormwater facilities may be considered hazardous waste and must be handled and disposed of properly.

If ponding still occurs, contact a landscape architect, professional engineer or trained contractor for more assistance.

# PESTS



## FACILITIES THIS APPLIES TO

All types of stormwater facilities

## IMPORTANCE TO FACILITY PERFORMANCE

Mosquitoes can breed in ponded or other stagnant water. Vegetated areas can be attractive habitat for rats, nutria, beaver, and a variety of birds and amphibians. While some species are desirable, others can be public health or nuisance concerns. In particular, mosquitoes and rats can breed quickly and cause a public health hazard if not removed. The presence of pests does not necessarily impact the ability of your facility to treat and manage stormwater but may indicate maintenance needs, such as lack of proper infiltration.

## WHAT TO LOOK FOR

- Check for mosquito larvae in any system with open, slow, or non-moving waters - especially during warmer weather. Larvae look like tiny wiggling sticks floating perpendicular to the water's surface.
- Look for nutria, rat, and other animal droppings year round. Also check for structural indicators such as beaver dams and rodent holes and burrows.

## WHAT TO DO

### Mosquitos

- The best way to avoid breeding mosquitoes is to prevent ponding water. Mosquitoes need standing water to lay their eggs, and for their larvae and pupae to develop. Most stormwater facilities are designed to drain in at least 48 hours. If your facility is not draining properly see the “Ponding Water” and “Sediment Removal and Disposal” sections of this handbook.
- As a temporary control for mosquitoes, the county or other licensed professionals can apply pesticides to kill mosquito larvae in the water or adult insects in the air.

### Rats

Rats need shelter, food and water to survive.

- Remove plant debris that may provide shelter for rats from the facility.
- Remove fruits and nuts that fall to the ground.
- Fill in burrows.
- Trap and remove individual animals.

**Other Wildlife** Other non-native and invasive animal species may take up residence in your facility. Contact the Oregon Department of Fish and Wildlife (ODFW) to help identify these species and suggest removal processes. Permits from ODFW are required to capture and relocate native wildlife. Some common non-native species are:

- Opossum
- Eastern gray squirrel
- Nutria
- Bullfrog
- Fox squirrel
- Eastern cottontail
- Egyptian goose
- Red-eared slider turtle
- Snapping turtle



## PEST RESOURCES

### *Rats and mosquitoes:*

Clackamas County Vector Control (includes Washington County)

[www.clackamas.us/vector](http://www.clackamas.us/vector)

(503) 655-8394

### *Other pest issues:*

Look in yellow pages or on the internet under “Pest Control”

### *Other Wildlife:*

Oregon Department of Fish and Wildlife

[www.dfw.state.or.us/wildlife/](http://www.dfw.state.or.us/wildlife/)

(503) 947-6000 or (800) 720-6339



## POLLUTION YOU CAN SEE OR SMELL

### FACILITIES THIS APPLIES TO

All types of stormwater facilities.

### IMPORTANCE TO FACILITY PERFORMANCE

Stormwater facilities often collect a variety of trash and debris. Trash and debris, especially floating debris, can clog pipes or treatment media. It can also cause odors through decay or by collecting spilled or dumped materials.

Stormwater facilities are designed to help prevent pollutants from entering rivers and streams. Any visible water quality pollutants may wash out of the facility spreading the pollution problem.

### WHAT TO LOOK FOR

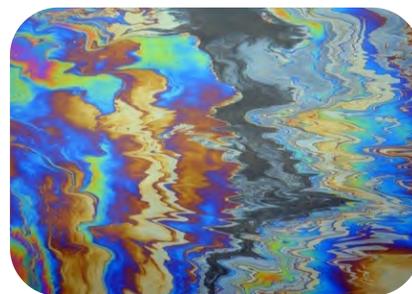
- Check monthly for Trash and debris.

Any unusual or unpleasant smells from sources such as:

- Natural plant decay.
- Dying plants trapped under sediment.
- A spill or a leak (e.g., gasoline or sewage).

Visible pollution such as:

- Sheens
- Turbid (cloudy) water
- Discoloration, or
- Other pollutants on the surface of the water.



*Pollution You Can See And Smell (continued)***WHAT TO DO**

- Regularly remove trash and plant debris.
- Remove accumulated sediment (see “Sediment Removal and Disposal” in this manual).
- Make sure inlets and outlets are not clogged.
- Identify the source of trash, debris or pollutant, such as a spill, leak, or illicit discharge.
- If there is evidence of a spill or leak, contact a professional laboratory or sampling firm to assess whether the material needs specialized removal, treatment, and disposal. Use trained professional staff for any cleanup and remediation.

**SAFETY**

In addition to keeping the facility in good working order, maintenance should also strive to meet safety and aesthetic goals that benefit the community and protect your site workers. Consider establishing maintenance triggers and practices that respond to the following issues below. Keep in mind the safety of both the employees who maintain your facility and the general public.

**WHAT TO LOOK FOR***Site Conditions*

Conditions, such as steep slopes, slick surfaces, and vegetation debris, can create a falling hazard to employees and visitors.

*Public Safety*

Some stormwater facilities, such as ponds and created wetlands, can be “attractive nuisances” attracting undesirable activity, vandalism, or use that could be harmful to public safety. Consider the safety features now in place at your facility.

**WHAT TO DO**

- Use barrier plantings or fencing to bar entry into the facility area.
- Install road bollards, lighting, and signage to discourage illegal dumping.
- Avoid maintaining facilities in wet weather to reduce the risk of injuries from slipping. Always make sure that appropriate safety gear (e.g., harness, gloves, face shields, safety line) is used.
- For underground facilities, avoid entering anything defined as a confined space. Vaults, deep ponds, manufactured facilities or manholes are examples of confined spaces. These areas require special permits, training and entry techniques. Some can be inspected and cleaned from above without entering. Always use caution when working with underground facilities. You are legally required to meet Oregon Occupational Safety and Health Division (OR-OSHA) requirements for such activities.

**RESOURCES**

Confined space entry:

OR-OSHA (confined space entry requirements)

[www.orosha.org/subjects/confined\\_spaces.html](http://www.orosha.org/subjects/confined_spaces.html)

(503) 229-5910



## PAYING FOR MAINTENANCE

Specific maintenance costs depend on the characteristics of the facility, the site, and the area draining to the facility. The general rule of thumb is that annual maintenance costs will be 5 to 10% of the facility's total capital cost. Routine, scheduled maintenance can help keep overall costs down by addressing problems before they require major attention. Contact your stormwater system manufacturer for information about your system.

### FINANCING MAINTENANCE

You need to determine how you will finance your maintenance needs. A facility maintenance fund is recommended for both capital maintenance procedures (e.g., facility replacement and non-routine maintenance, such as sediment removal, facility component repair or replacement, major replanting, or safety structure construction) and operating maintenance procedures (routine activities such as facility inspection, debris removal, and vegetation management). For homeowner associations, this could be a portion of homeowner fees or a specific assessment.

### HOW MUCH TO SAVE

- An average 5 to 10% per year of the facility's capital cost for annual routine maintenance.
- A percentage of the non-routine maintenance costs per year (i.e. for sediment removal, vegetation replacement) based on the needed frequency. For example, if the facility is designed to need mechanical sediment removal every five years, 20% of the total cost should be put aside each year.
- An additional 3 to 5% of the facility's capital cost per year for eventual facility replacement (based on the facility's life expectancy). Most of these facilities have a life expectancy of 25 to 50 years.

### VEGETATED FACILITIES

- Most required routine maintenance (excluding major repair and replacement) is estimated to have an annual cost of \$200 to \$600 dollars per acre of facility, above current landscape maintenance costs. Costs can vary depending on the types and level of maintenance practices used.
- The cost and intensity of maintenance activities are usually higher during the two-year plant establishment period. During this time, plants will need additional watering and plants that die will need to be replaced.



## WHERE TO GET MORE ASSISTANCE



### City of Wilsonville Natural Resources Program

[www.ci.wilsonville.or.us/Index.aspx?page=91](http://www.ci.wilsonville.or.us/Index.aspx?page=91)  
(503) 682-4960

### City of Wilsonville Public Works Standards:

[www.ci.wilsonville.or.us/Index.aspx?page=127](http://www.ci.wilsonville.or.us/Index.aspx?page=127) Go to *Important Links* at the bottom of the page and click on *Public Works Construction Standards 2006* (section 301.6.00 Operations and Maintenance Req.)  
(503) 682-4092

## HIRING CONTRACTORS

### Professional maintenance services phone book/internet references:

#### *Vegetation Management:*

- “Landscape Contractors”

#### *Sediment Removal and Disposal:*

- “Sewage,” or
- “Waste Disposal”

#### *Facility Alterations:*

- “Landscape Architects” or
- “Engineers - Civil”

#### *Manufactured Facilities:*

- Find the specific manufacturer

## CONFINED SPACE ENTRY

Oregon Occupational Safety and Health Division (OR-OSHA):

[www.orosha.org/subjects/confined\\_spaces.html](http://www.orosha.org/subjects/confined_spaces.html)

(503) 229-5910

## PEST RESOURCES

### *Rats and mosquitoes:*

Clackamas County Vector Control (includes Washington County)

[www.clackamas.us/vector](http://www.clackamas.us/vector)

(503) 655-8394

### *Other pest issues:*

Look in yellow pages or on the internet under “Pest Control”

### *Other Wildlife:*

Oregon Department of Fish and Wildlife

[www.dfw.state.or.us/wildlife/](http://www.dfw.state.or.us/wildlife/)

(503) 947-6000 or (800) 720-6339



Portland Audubon Wildlife Care Center

Help with injured animals and animal identification questions:

[www.audubonportland.org](http://www.audubonportland.org)

(503) 292-0304



*The Audubon Wildlife Care Center is the oldest and busiest wildlife rehabilitation facility in Oregon. Each year they treat over 3,000 wild animals for release back to the wild and respond to more than 15,000 wildlife related inquiries.*



## VEGETATION

### *Clackamas County Resources:*

Clackamas County Soil and Water Conservation District:

[www.conservationdistrict.org](http://www.conservationdistrict.org)

### *Plant Identification:*

Native Plant Society:

[www.npsoregon.org](http://www.npsoregon.org)

Master Gardeners:

[www.extension.oregonstate.edu/mg](http://www.extension.oregonstate.edu/mg)

### *Native Plant Nurseries:*

Native Plant Nursery:

[www.plantnative.org](http://www.plantnative.org)



## City of Wilsonville

29799 SW Town Center  
Loop E

Phone: 503-682-4960  
Fax: 503-682-7025

[www.ci.wilsonville.or.us](http://www.ci.wilsonville.or.us)



This brochure was prepared by  
the City of Wilsonville's Natural  
Resources Program staff.

March 2012

NOTE: A considerable amount  
of information was obtained  
from the City of Portland's  
Stormwater Management Facili-  
ties Operations and Mainte-  
nance for Private Property  
Owners guide.

## OTHER WAYS TO PROTECT OUR STREAMS AND THE WILLAMETTE RIVER

### In Your Home or Business

- Use nontoxic cleaners.
- Properly dispose of hazardous materials.
- Conserve energy: switch to compact fluorescent bulbs, turn down the heat, do the laundry with cold water, purchase energy-efficient appliances.
- Use water wisely: fix leaks, use low-flow showerheads, use only the water you need.

### In Your Yard

- Plant native vegetation.
- Consider planting perennials versus annuals.
- Sweep instead of hose.
- Cover bare soil with mulch or plants.
- Compost yard debris.
- Disconnect downspouts (where appropriate).
- Use drip irrigation.

### In and Out of Your Car

- Properly maintain vehicles.
- Wash vehicles where water is recycled.
- Drive less: use transit, bike, walk, or carpool.
- Recycle motor oil.
- Clean up spills or leaks.

### In Your Community

- Volunteer for tree planting, cleanup, stream restoration, or invasive plant species removal projects.
- Report spills and illegal dumping (call 503-823-7180).
- Don't litter, and pick up litter when you see it.
- Pick up pet waste and put it in the garbage or toilet.

### In Parks and Natural Areas

- Stay on designated hiking trails and biking areas.
- Keep dogs on leashes and away from the streambanks and water. Pick up pet

***THANK YOU***

*for helping keep Wilsonville clean, healthy  
and sustainable and for stewarding this  
beautiful place that we all share.*