Homeowners Guide to Stormwater BMP Maintenance

What You Need to Know to Take Care of Your Property

Purpose

- Provide homeowners with information and tools to properly maintain stormwater Best Management Practices (BMPs) on their property.
- Provide information to builders and realtors so that they are better able to service their clients.

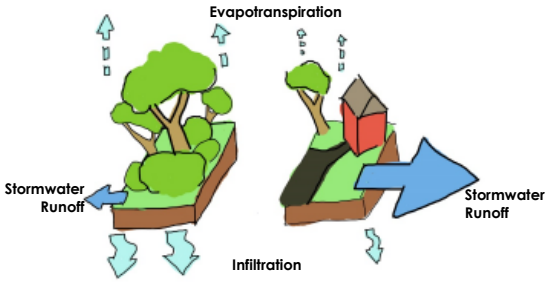
Outline

- Background on stormwater and stormwater management
- The information a builder/developer must provide to the homeowner
- Homeowner's legal responsibilities under PA Code, Chapter 102
- Description of BMPs commonly used on-lot
  - What is it?
  - How does it work?
  - Operations and maintenance practices

What is Stormwater?

- **Stormwater is the water that runs off the land after precipitation**
- Rain or snow can:
  - Drain down into the soil (infiltration),
  - Evaporate back into the atmosphere,
  - Be used by plants, or
  - **Flow into streams or water bodies (stormwater runoff)**

Pre- and Post-Development



Why should you care about Stormwater Management?

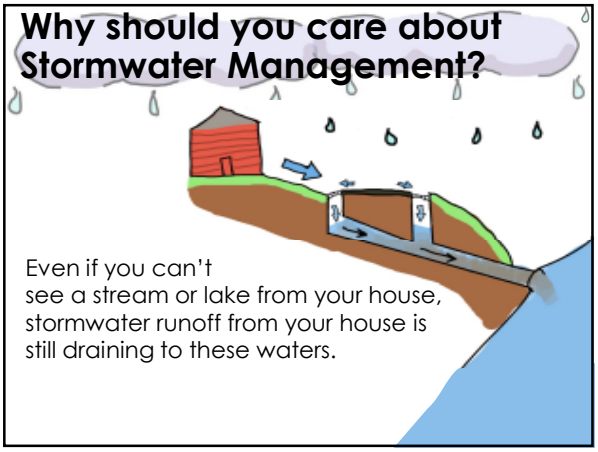
- Negative impacts of stormwater runoff
  - flooding,
  - erosion of streams,
  - sediment build up in lakes, and
  - pollution of streams and lakes.

Why should you care about Stormwater Management?

- Stormwater moves much faster over impervious surfaces than pervious areas
- Faster water picks up more pollutants:
  - sediment,
  - fertilizers (nitrogen & phosphorus),
  - pesticides,
  - bacteria,

  and carries the pollutants to streams and lakes

Why should you care about Stormwater Management?



Even if you can't see a stream or lake from your house, stormwater runoff from your house is still draining to these waters.

Why should you care about Stormwater Management?

- Stormwater causes stream erosion & instability
- Increases in stormwater runoff can cause streams to get:
  - wider,
  - deeper,
  - straighter,
  - decrease habitat
  - hotter
    - Warmer water holds less dissolved oxygen

BMPs: What are they?

- **BMP = Best Management Practice**
  - Both the designed "things" like detention basins and the non-engineered approaches like protecting open space to manage stormwater
- **SCMs = Stormwater Control Measure**
  - Engineered facilities that are designed and constructed to manage stormwater

BMPs: What do they do?

- The goal of BMPs or SCMs is to reduce the impact of development on downstream streams, rivers, and lakes by:
  - **minimizing** the amount of runoff,
  - **slowing** down the runoff,
  - **infiltrating** runoff,
  - **evapotranspiring** runoff,
  - **filtering** runoff

→
  - Reduce **volume**
  - Reduce **rate**
  - Improve **water quality**

BMPs: Use of Vegetation

- Many BMPs or SMCs will use vegetation for their ability to
  - use water,
  - put water back into the atmosphere, and
  - help water infiltrate into the ground

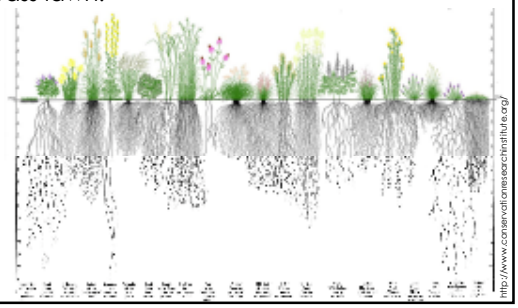
rather than allow it to become runoff.

BMPs: Use of Vegetation

- **Photosynthesis**
  - Plants use the sun's energy to create their own food
- **Interception**
  - Water is trapped on plants
  - never even makes it to the ground where it could be infiltrated or become runoff
- **Evapotranspiration**
  - Water collected on or used by plants

BMPs: Use of Vegetation

- Plants with broader leaves and deeper roots intercept and evapotranspire more water than a grass lawn.



What do BMPs do?

Your whole community has been designed with stormwater management in mind.
All of the homes in your community drain to a stream or lake. All homeowners need to do their part to maintain stormwater BMPs in their own yard to protect streams and lakes for everyone.

Stormwater Regulations

- When a property is developed, permits require management of stormwater
  - **Erosion and Sediment Control (E&S) BMPs**
    - Used during construction to prevent soil from running off the site and polluting down stream waters
  - **Post-Construction Stormwater Management (PCSM) BMPs**
    - Used when the construction period is over
    - Manage the increase in runoff from the increase of impervious area from development

Stormwater Regulations

- When a project is finished, the developer turns over the maintenance responsibilities for BMPs to someone else:
  - conservation district
  - a nonprofit organization
  - the local municipality
  - an authority
  - a private company
  - an HOA
  - the homeowner

What does the Developer need to Provide to the Homebuyer?

- **Plan for the PSCM BMPs** that must include:
  - **Location** and how to **access** to the PCSM BMPs
  - **Long-term operation and maintenance** schedule,
  - Schedule for **inspection** of PCSM BMPs
    - includes the repair, replacement, or other routine maintenance of the PCSM BMPs to ensure proper function and operation
- Plan will be recorded with the property deed
- PA Code, Title 25, Chapter 102 www.pacode.com

What does the Developer need to Provide to the Homebuyer?

- If there are any on-lot PCSM BMPs, the developer must record them with each property's deed:
  1. identify the PCSM BMPs,
  2. provide for access to the BMPs for maintenance and inspection purposes, and
  3. provide notice that the responsibility for long-term O&M of the PCSM BMP is a legal requirement that runs with the property.

What's the Homeowner's Legal Responsibility?

- **If you are the person designated as the responsible-party for operation and maintenance**, you must ensure that the BMP continues to function properly and follow the maintenance schedule provided by the developer and recorded with the deed.
  - Routine maintenance activities
  - Inspection after large rain events
  - Cost of plants or material for upkeep or replacement
- You can't remove any BMPs.

What's the Homeowner's Legal Responsibility?

- **If responsibility has been transferred to someone else, the homeowner must:**
  - Provide access for maintenance and inspection
  - Can't make changes without approval

What's the Homeowner's Legal Responsibility?

- **If you're not doing the necessary maintenance**
  - May be billed by your municipality for the cost of having someone else do the work
  - Could face a summary offense and daily fine until the maintenance work is complete

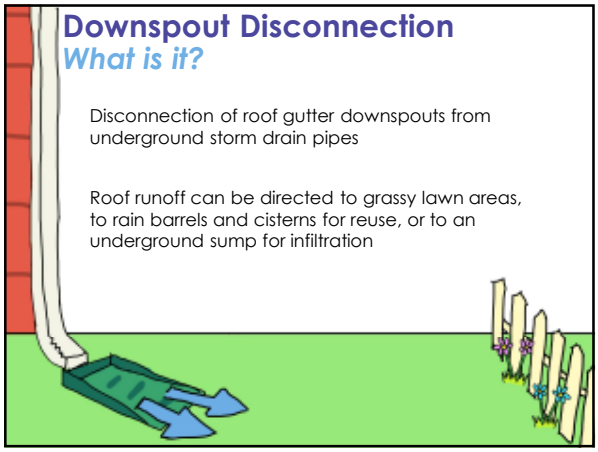
BMP Maintenance Requirements

Downspout Disconnection

What is it?

Disconnection of roof gutter downspouts from underground storm drain pipes

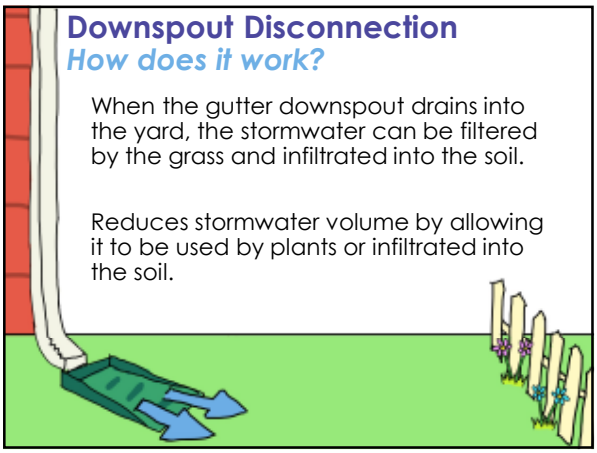
Roof runoff can be directed to grassy lawn areas, to rain barrels and cisterns for reuse, or to an underground sump for infiltration



Downspout Disconnection
How does it work?

When the gutter downspout drains into the yard, the stormwater can be filtered by the grass and infiltrated into the soil.

Reduces stormwater volume by allowing it to be used by plants or infiltrated into the soil.



Downspout Disconnection
Maintenance

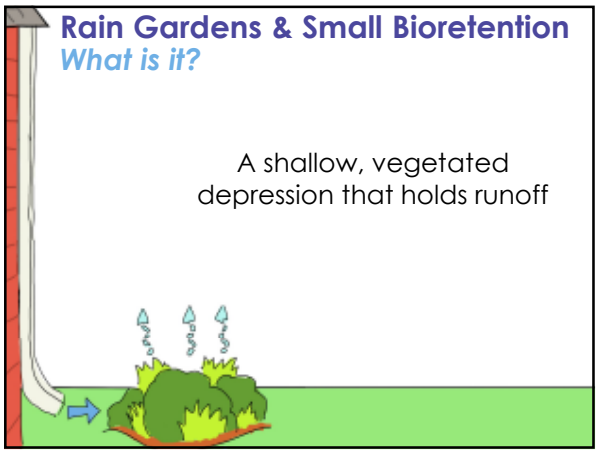
- **Regularly**
  - Maintenance for a downspout draining to a lawn area is generally part of the typical yard maintenance.
  - Mow the lawn in this drainage area at the same time interval that the rest of the yard is mowed.
  - Check for bare spots and reseed if needed.

Downspout Disconnection
Maintenance

- **Additional Note**
  - A splash guard or small pile of rocks may be needed at the location where the water leaves the drain to slow the water down and prevent erosion.

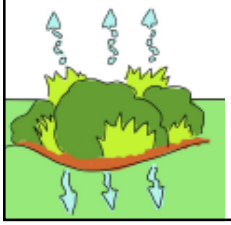
Rain Gardens & Small Bioretention
What is it?

A shallow, vegetated depression that holds runoff



Rain Gardens & Small Bioretention
How does it work?

- As the water pools in the depression, it can infiltrate deeper into the soil, or be used by the vegetation through evapotranspiration



- Even if the rain garden overflows, runoff is still filtered through the vegetation removing pollutants

Rain Gardens & Small Bioretention
Maintenance

- **Twice a year**
  - Vegetation needs to be checked to make sure that it's healthy. Any bare spots need to be replanted.
  - Check the inflow area to make sure that there isn't any sediment building up. Remove any accumulated sediment.
  - Mulch should be re-spread when erosion is evident and be replenished as needed.

Rain Gardens & Small Bioretention
Maintenance

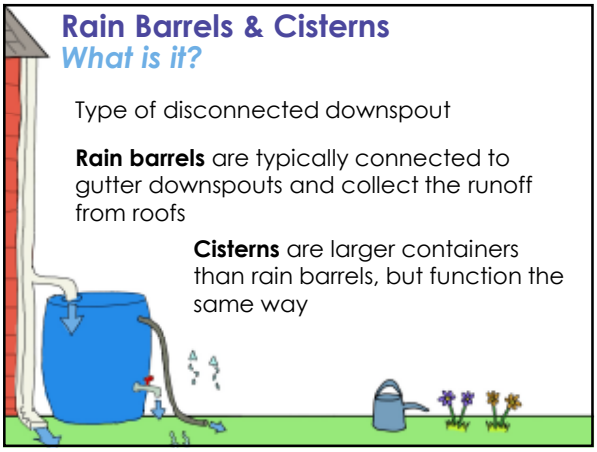
- **Annually**
  - Perennial plants should be cut back if needed by species type and any dead vegetation should be removed at the end of the growing season.
- **Every Three Years**
  - Apply mulch in the spring as needed to cover soil. Mulch should be 1-3 inches deep. Do not use mulch to "fill-in" the depression of the rain garden.

Rain Barrels & Cisterns
What is it?

Type of disconnected downspout

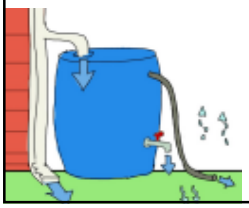
Rain barrels are typically connected to gutter downspouts and collect the runoff from roofs

Cisterns are larger containers than rain barrels, but function the same way



Rain Barrels & Cisterns
How does it work?

- Capture runoff, hold it for a period of time and allow the water to be used for different purposes
- Should have an overflow or slow release to allow it to drain during heavy rainfall



- Typically a screen on the top of the barrel or cistern where the water enters the barrel to keep out leaves and other debris.

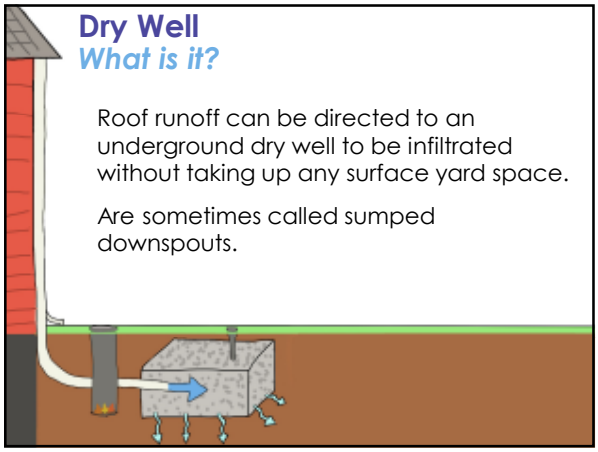
Rain Barrels & Cisterns
Maintenance

- **After Rain Events**
  - Clean the screen by removing any leaves that could block the flow of water into the barrel/cistern.
  - Use the water in the barrel/cistern so that it's empty and ready to collect runoff from the next rain.
- **Annually**
  - Clean gutters to remove leaf debris that could clog the barrel/cistern.

Safety note! The water in a rain barrel or cistern is **not safe for consumption** without prior treatment.

Rain Barrels & Cisterns
Maintenance

- **Special Winter Needs**
  - Empty the rain barrel/cistern before the water could freeze.
  - Rinse out the barrel/cistern to remove any accumulated sediment.
  - Do not reconnect the barrel/cistern until spring. During the winter months, connect a piece of flexible gutter to the end of the downspout and direct the outlet to a grassy area of the yard.



Dry Well
What is it?

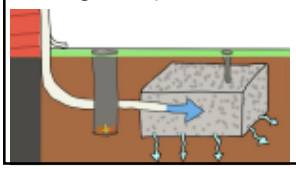
Roof runoff can be directed to an underground dry well to be infiltrated without taking up any surface yard space.

Are sometimes called sumped downspouts.

Dry Well
How does it work?

- Water held in underground storage facility & then drains slowly into the surrounding soil
- Either a gravel filled pit or a prefabricated plastic or concrete tank.

There may be a sump located before the gravel pit or tank.



Sump collects leaves and other debris to prevent clogging of the dry well.

Dry Well
Maintenance

- **After storms with larger than 1 inch of rain**
  - There is typically a screen where the downspout enters the dry well. Clean the screen by removing any leaves that could block the flow of water into the dry well.
  - Inspect the sump for accumulation of sediment, trash, or any other material. Remove any material that is in the sump to prevent it from clogging the dry well.

Dry Well
Maintenance

- **Quarterly**
  - There should be an above ground cap that allows access to the dry well. Four times a year, view down the access pipe to make sure that the dry well is not accumulating sediment, trash or other material.
- **Annually**
  - Clean gutters to keep leave debris out of the sump and dry well

Dry Well
Maintenance

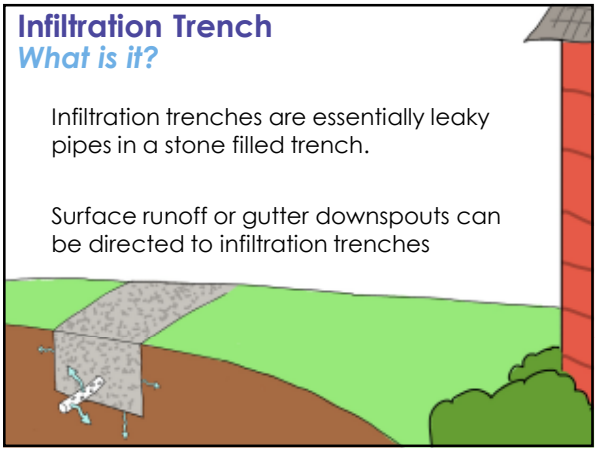
- **Additional Information**
  - After large rain events, check the access pipe to ensure that the dry well is draining within 72 hours. If the drain times are more than 72 hours, the dry well may need to be cleaned out or replaced.

Overtime the accumulation of sediment or trash may need to be vacuumed or may require excavation. Contact the county conservation district for guidance on cleaning out or replacing a dry well.

Infiltration Trench
What is it?

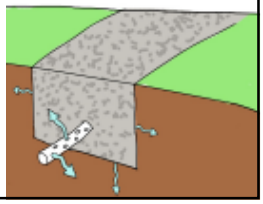
Infiltration trenches are essentially leaky pipes in a stone filled trench.

Surface runoff or gutter downspouts can be directed to infiltration trenches



Infiltration Trench
How does it work?

- An infiltration trench contains a perforated pipe in a stone trench.
  - Stormwater runoff is directed into a perforated pipe that is surrounded by gravel.
  - Water drains out of the perforated pipe into the gravel trench and eventually into the surrounding soil



Infiltration Trench
Maintenance

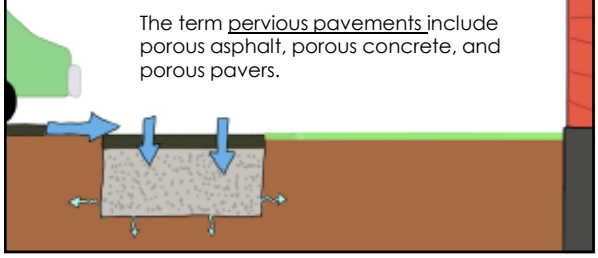
- **Protection**
  - Be careful to not regularly drive over an infiltration trench so as to not cause compaction or crush the perforated pipe.
- **Annually**
  - If the trench has an access pipe, it should be checked annually to make sure that the trench isn't clogged.

Additional Note:
Ponding of water on the surface over the trench indicates that there is a problem with the trench. It may need to be replaced

Pervious Pavement
What is it?

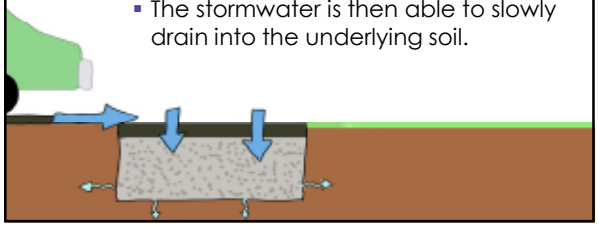
Pervious pavements is a modification to typical pavement that allows water to drain through the surface rather than run off it.

The term pervious pavements include porous asphalt, porous concrete, and porous pavers.



Pervious Pavement
How does it work?

- Stormwater drains through the pervious surface and is temporarily held in the voids spaces of the stone bed.
- The stormwater is then able to slowly drain into the underlying soil.



Pervious Pavement
Maintenance

- **Protection**
  - Prevent the surface from getting clogged.
  - Planted areas near the pervious pavement should be well maintained to prevent soil from washing into the pavement.
  - If soil washes onto the pavement, it should be immediately cleaned off
  - Never apply a sealing coat.
- **Biannually**
  - Vacuumed twice a year with a commercial cleaning unit to remove fine particles from the surface.

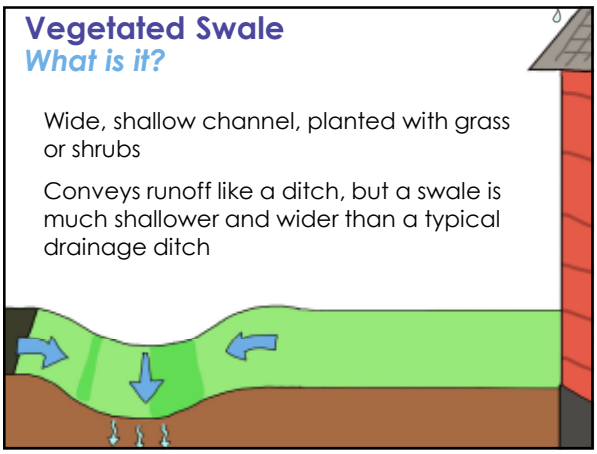
Pervious Pavement
Maintenance

- **Special Winter Needs**
  - Sand or cinders should not be used with pervious pavement.
  - Snow shoveling and plowing is fine, but be careful not to scrape the surface.

Vegetated Swale
What is it?

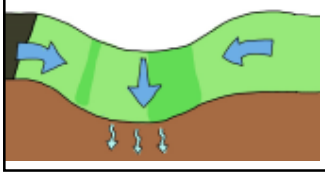
Wide, shallow channel, planted with grass or shrubs

Conveys runoff like a ditch, but a swale is much shallower and wider than a typical drainage ditch



Vegetated Swale
How does it work?

- Vegetated swales slow runoff, promote infiltration, and filter pollutants and sediment in the process of conveying runoff



- Can be used instead of conventional curb and gutter

Vegetated Swale
Maintenance

- **Regularly**
  - If vegetation is grass, mow the swale when mowing the rest of the yard. Mow only when swale is dry to avoid rutting.
  - After rain events look for erosion, damage to vegetation, or sediment accumulation. Reseed bare areas and remove sediment.
- **Twice a Year**
  - If vegetation is larger perennial shrubs and bushes, check to make sure that it's healthy. Any bare spots need to be replanted.
  - Remove any accumulated sediment.

Vegetated Swale
Maintenance

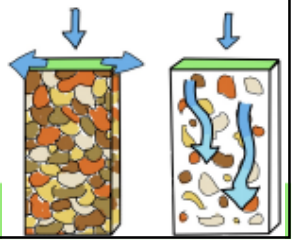
- **Annually**
  - Perennial plants should be cut back if needed by species type and any dead vegetation should be removed at the end of the growing season.

- **Special Winter Needs**
  - After the spring melt, remove any accumulated antiskid material like sand. Replace any damaged vegetation.

Amended Soils
What is it?

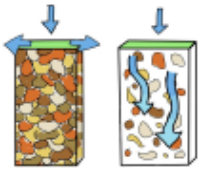
Much of stormwater management relies on the soil to infiltrate runoff

Pore spaces or voids allow water to both be stored in the soil and move through the soil as infiltration



Amended Soils
How does it work?

- Soil can be compacted through development, reducing the pores or void spaces.
- Compaction of soil prevents water from infiltrating.
- Loosening the soil or tilling can reduce compaction and increase the soils' ability to infiltrate runoff.



- Adding organic material such as compost, sand, or manufactured soil media to the soil increases the pore spaces in the soil, which increases its ability to hold water.

Amended Soils
Maintenance

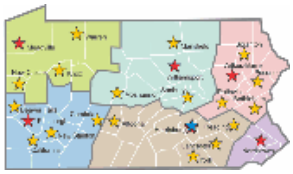
- **Protection**
  - Protect and preserve amended soils.
  - Compaction of the soil should be avoided. Don't use as an extra parking area or storage for a recreational vehicle.
  - Amended soils that are a BMP can't be removed.
    - The area cannot to be converted to a patio or other use that would prevent stormwater infiltration.

When Selecting BMPs

- **Consider who is going to be responsible for long term O&M**
- **Transfer of responsibility needed for NOT**
  - **What happens after NOT?**

Acknowledgements

- Funded by the EPA Chesapeake Bay Regulatory and Accountability Program through the Pennsylvania Department of Environmental Protection.
- This publication was developed under Assistance Agreement No. CB-96317101-5 awarded by the U.S. Environmental Protection Agency. The views expressed in this presentation are solely those of PA DEP/PHRC and EPA does not endorse any products or commercial services mentioned in this publication.



Department of Environmental Protection Headquarters
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101
Phone: (717) 783-2300

Northeast Regional Office
2 Public Square
Wilkes-Barre, PA 18711-0790
24 Hour Emergency Number: (570) 826-2511

North-central Regional Office
208 West Third Street, Suite 101
Williamsport, PA 17701-6448
Main Number & Emergency Response: (570) 327-3636

Northwest Regional Office
230 Chestnut Street
Meadville, PA 16335
Business Hours: (814) 332-6945
After Hours: (800) 373-3398

Southeast Regional Office
2 East Main Street
Norristown, PA 19401
Main and 24-hour emergency number: (484) 250-5900

South-central Regional Office
909 Elmerton Avenue
Harrisburg, PA 17110
Business Hours: (717) 705-4700
Emergency Response (24 hours): (866) 825-0208

Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745
Emergency Notification Number: (412) 442-4000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