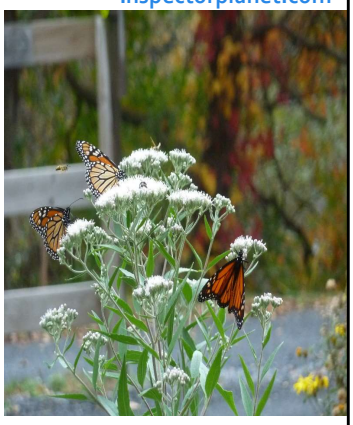
AN INTRODUCTION

Homeowners Guide To Sustainable Living

Water - Land - Wildlife Conservation



@inspectorplanet

Inspectorplanet.com

This program covers a wide range of topics that the homeowner can use to make their home and property more sustainable.

Each section header contains a "Notes" section with additional information regarding the topic. This additional information includes instructions and details about the subject.

If you are presenting a topic, the NOTES will aid you in preparing your lecture. The PowerPoints are an outline to help your home project or presentation.

Rain Barrels

Harvesting Stormwater for Garden Use

@inspectorplanet
Inspectorplanet.com

Informational Articles: Rain Barrels
https://extension.psu.edu/rain-barrels

https://extension.psu.edu/rain-barrels-in-the-home-garden
Rain Barrel Info (EPA)
https://www.epa.gov/soakuptherain/soak-rain-rain-barrels

Rain Barrels: Benefits

Inspectorplanet.com

Harvesting rainwater can save you money and help the environment at the same time. You can collect a substantial amount of rainwater with a simple system!

- Summer water use increases by as much as 30%, due to outdoor water use.
- Rain Barrels can save 1300 gallons of water during peak summer months & lowers homeowners water bills.
- By utilizing rainwater, you reduce the demands of municipal water sources and help the environment.
- Rain Barrels reduce storm water runoff, reducing water pollution.
- How much water will you collect?
  - 1,000 sq ft of roof x ½ inch of rainfall = 300 gallons!!

Rain Barrel: Uses

Inspectorplanet.com

- Watering Flowers & Garden
- Lawn Watering
- Used with Soaker Hoses
- Can use with Vegetable Gardens by drip irrigation ***ONLY*** (SEE INSTRUCTION SHEET)
- Washing Vehicles, Walkways and Home
- **DO NOT Use Rain Barrel Water for drinking, cooking or bathing!!!**

Courtesy: gardeners.com

Rain Barrels: Features

Inspectorplanet.com

Rain Barrels can be purchased -OR- Built from various containers.

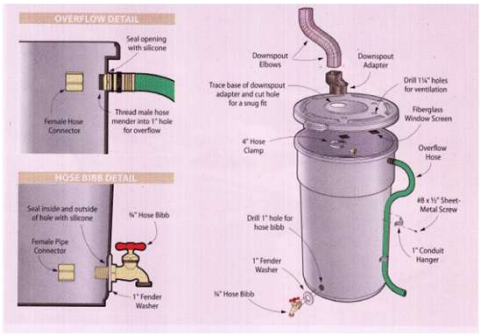
- **Child & Animal Proof** with a lid that cannot be easily removed
- **Mesh Screen** to filter out debris. Either at the top of the rain barrel or at the downspout
- **Overflow Valve** connected to a hose to allow flow away from your house when the barrel(s) are full
- **Elevated Stand** to place the rain barrel on
- **Multiple Barrel Connections** to allow multiple rain barrels in series.

Courtesy: instructables.com

Rain Barrels: Instructions

Inspectorplanet.com

- Choose the downspout closest to where the collected water will be used
- Select the type of rain barrel(s) you will use.
- Prepare the raised pad that the rain barrel will rest on.
- Place the rain barrel in position, and connect garden hose for watering & overflow hose (or diverter valve)
- Overflow water must be directed away from the foundation of the home.



Rain Gardens

Preventing Runoff of Stormwater

@inspectorplanet

Inspectorplanet.com

Informational Articles: Rain Gardens
https://www.groundwater.org/action/home/raingardens.html

https://www.epa.gov/soakuptherain/soak-rain-rain-gardens

Rain Gardens

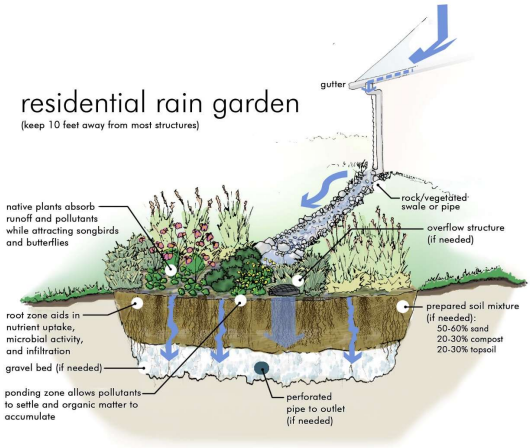
Inspectorplanet.com

What is a Rain Garden?

A rain garden is a planted depression that soaks up rainwater runoff from roofs, driveways, walkways, and compacted lawn areas

Water that would otherwise carry pollutants directly to our streams.

Rain gardens soak up 30 percent more water than an equivalent patch of lawn.



Courtesy: City of Vienna, WV

Rain Gardens

Inspectorplanet.com

Where Do You Put A Rain Garden?

- Choose an area where you want to soak up rainwater at least 10 feet from the house. Rain gardens can drain water from downspouts or catch water that drains off roads and walkways. Avoid areas over septic systems.
- Do not place a rain garden in areas that are consistently wet. Rain gardens should drain completely within 24 hours

Courtesy: State College, PA

Courtesy: Edge of the Woods Native Plant Nursery

Rain Gardens

Inspectorplanet.com

How Big Should a Rain Garden Be?

- The size of a rain garden depends on:
- Size of the roof or lawn area to be drained
- Type of soil on your site (how well it drains)
- How deep you would like your garden to be

Courtesy of everettwa.gov

Things to Know (Planning)

- Before you dig, call the toll-free "before you dig" number for your area. They will mark underground utilities.
- Use string or garden hose to outline the shape. Oval shapes are best.
- Remove turf. Dig the garden to the desired depth. Make sure the bottom is level.
- Gardens on a slope require more digging to create a flat bottom. Use the extra soil to build a berm on the downhill side.
- Refill the depression with soil, adding compost or decayed leaves to loosen clay soils.
- Consider including an overflow outlet for unusually heavy rains.

Rain Gardens

Inspectorplanet.com

Choosing the Right Plants for Your Location

- Your rain garden will have areas that range from very wet to dry. Choose **native plants** suited for those areas and plant them close together. Observe your newly dug rain garden after a storm to determine which areas stay wet the longest. Mark these areas with string or plant markers.
- Plants on or near the berm will be dry most of the time.
- Plants with semi-evergreen leaves will help control erosion during the winter months.
- Choose plants with a variety of shapes, colors, and bloom times to provide maximum pollinator and wildlife habitat.
- Top-dress with 2 inches of mulch to keep weeds out and moisture in.
- Native Plant Resources: (SEE Next Section) https://edgeofthewoodsnursery.com/helpful-links

Courtesy: emswcd.org

Native Plant Facts, Information and How to Obtain (NOTE: See Plants for YOUR area of the United States!

Audubon Why Natives?

https://www.audubon.org/content/why-native-plants-matter

Edge of the Woods Native Plant Nursery (Very Complete Information on Natives. Nursery has plants for Northeast U.S.)

https://edgeofthewoodsnursery.com/

Databases and Plant Selection Guides

Here are just a few databases that will help you select native species based on your site criteria and location.

Plants for Birds – Enter your Zip Code

Which Plant for Which Bird Audubon Society Database

Enter Site Criteria and Your State for a List of Plants

Plant Picker (Missouri Based)

Database of plants – Enter Sunlight and Soil

Another Plant Selection Database – enter your criteria

Find the best native plants to help wildlife — based on the research of Dr. Doug Tallamy

Native Plants

Inspectorplanet.com

What is a Native Plant

- Native plants occurred in the region before settlement by Europeans. They are uniquely adapted to the soil and climate of the area, and play an important role in plant and animal communities.
- Since they evolved here, they evolved with native insects, birds, butterflies, and wildlife. They evolved together. They all depend on each other for survival.

Video: Native Plant Advantages
By daymarksproductions.com

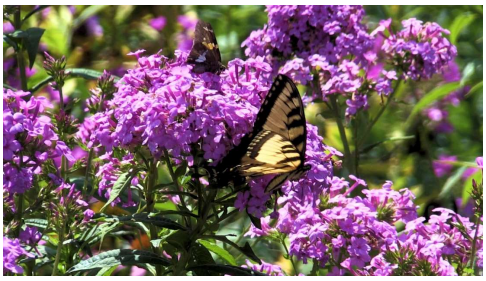
Native Plants

Inspectorplanet.com

What Does a Native Plant Garden Do For You & Wildlife?

- **Habitat**
  Native plant gardens provide important food and shelter for beneficial insects, songbirds and wildlife.
- **Support Pollinators**
  The vast majority of pollination is done by wild insects. Native insects rely on native plants for survival. Pollinating insects are essential to our own survival. One-third of all the food we eat has been created with the help of a pollinator.
- **Adapted to the Climate and Soils**
  Native plants were living here long before we arrived with our fertilizers, pesticides and pruners. There are native plants adapted to thrive in any naturally occurring condition from wet, soggy clay to dry, gravelly soil, and from hot sun to full shade.

  If you choose the right plant for the right place, they will not require supplemental watering, fertilizer or pesticides once established.



Native Plants

Inspectorplanet.com

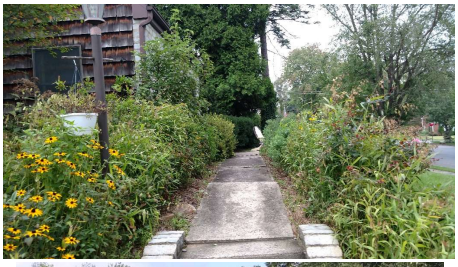
Native Plants: Beauty

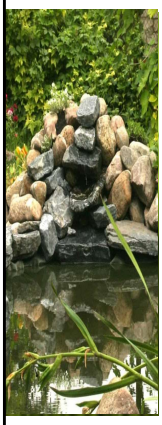
- Native plants provide four seasons of visual pleasure in your landscape. Flowers in the spring, berries in the summer, brilliant colors in the fall and interesting bark and twig patterns in the winter. The non-stop show of visiting butterflies, birds and beneficial insects is added entertainment.

NATIVE PLANTS ARE NOT WEEDS!

Where to Get Native Plants

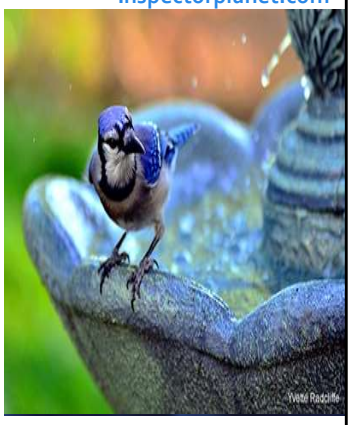
- There are nurseries that specialize in native plants and most nurseries have a mix of native and non-native plants. Go to a reputable nursery where the staff has knowledge and information to assist you.
- You should select native plants that are rated for your region of the United States.
- See our list provided in the "NOTES" view of this program –or- Go Here: https://edgeofthewoodsnursery.com/helpful-links





Water for Wildlife

Providing Water for Drinking and Bathing

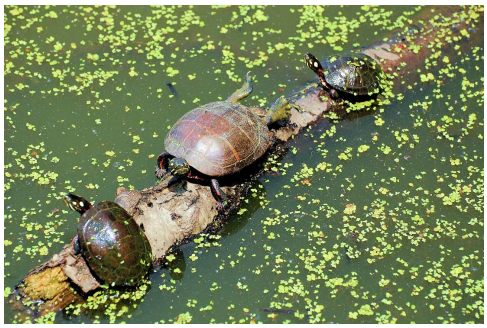


Various projects to provide water for wildlife.
https://www.nwf.org/Garden-For-Wildlife/Water.aspx

https://www.welcomewildlife.com/provide-water-for-wildlife/

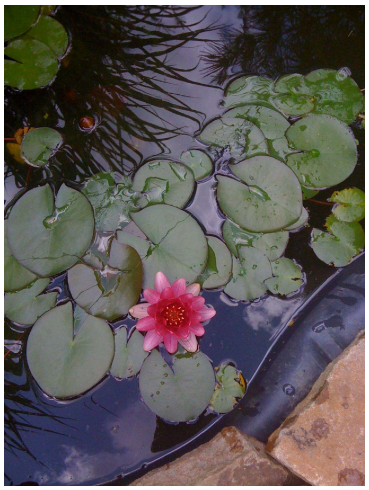
Water For Wildlife

- Wildlife needs clean drinking water to survive.
- Birds need to bathe in order to keep their feathers in good working order.
- Amphibians, insects and other wildlife actually live in water.



Water For Wildlife

- **Water Sources**
  - Birdbaths
  - Container Garden
  - Backyard Pond
  - Backyard Marsh
  - Seasonal Water Source
  - Rain Garden



Energy Conservation Shade Tree Planting Info

https://www.gertens.com/learn/conservation/planting-for-energy-conservation.htm

https://forestry.usu.edu/trees-cities-towns/tree-selection/plant-trees-energy-conservation

https://www.arborday.org/trees/climatechange/summershade.cfm

Energy Conservation Tree Planting

- Planting the right trees in the right places conserves energy and reduces your energy bills, while helping to fight climate change.
- Choose the tree(s) for your climate and location!
  - Consult local nursery or landscape professional.
  - Take photos of your home and note compass directions (N_S_E_W)

Deciduous Tree Shading – South Side

Energy Conservation Tree Planting

General Rules for Tree Planting

- Planting Deciduous Trees Provides:
  - Shade and Cooling in Summer
  - Sunlight and Warmth in Winter
- Planting Conifer Trees Provides
  - Wind block in Winter
- Large deciduous trees planted on the east, west, and south - southwest sides of your home create soothing shade from the hot summer sun and reduce summer air conditioning costs by up to 35%! After the leaves fall, the sun pours through tree branches to warm your home in winter.
- Planting a row of conifer trees on the north and northwest sides of your property creates a wall against cold winter winds - saving your heating costs by up to 30%.

Conifer Stand in N – NW Corner of Property

Energy Conservation Tree Planting

- Don't forget to shade your Heat / Air Conditioning Equipment!

Gardening Without Chemicals

Pesticide and Herbicide Free Gardening

@inspectorplanet
Inspectorplanet.com

Information for Chemical Free Gardening

This site was used to outline the PowerPoint
https://www.growsmartgrowsafe.org/NaturalYardCare/GardenWithoutPesticides

Additional Site
https://www.grow-it-organically.com/how-to-grow-vegetables.html

Gardening Without Chemicals

- **Natural Lawn Care**
  - Overuse of lawn pesticides and fertilizers is contaminating our streams, lakes, and oceans. Those chemicals can harm fish and wildlife.
  - They're not healthy for children or pets either.
  - We use a lot of water on lawns in summer when supplies are scarce, and much of it is wasted.

The Good News

- It's easy to have a healthy, beautiful lawn without pesticides (weed and bug killers), without fertilizer runoff, and without wasting water.
- Landscape professionals and scientists collaborate to develop these practices. You can save money, time, and our environment, and grow a healthy lawn that looks great year 'round.

Gardening Without Chemicals

- **Build healthy soil with compost and mulch.** Soil is alive, and soil life matters.
- **Plant right for your site.** Get to know your yard. Areas of shade, wet or dry soil, or slope all affect which plants will grow well.
- **Practice smart watering.** Many plant problems are caused by overwatering. Water plants deeply to promote deep roots. Let the surface of the soil dry out before watering again.
- **Learn to live with a few insects.** Most bugs in your garden are actually helpful. Killing them all eliminates the beneficial insects too, making the problem worse. Good bugs are a gardener's friend.

  If you have planted Native Plants, you will have many "good bugs" that also pollinate your plants, and indigenous plants that are suited for your conditions!

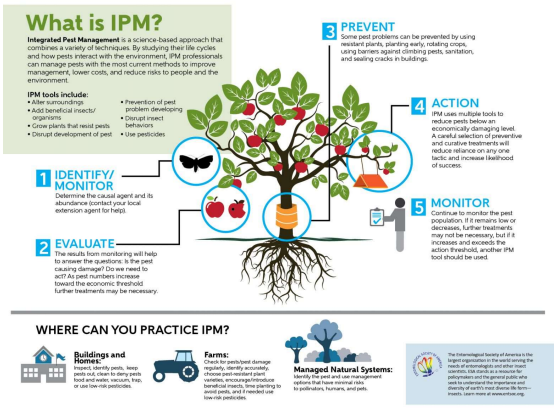
Gardening Without Chemicals

- Practice natural lawn care. (See Previous Slide)
- Use pesticides as a last resort. ...
- Pest problems don't necessarily require pesticides. ...
- If you MUST use Garden Chemicals

Information regarding Integrated Pest Management
https://ipminstitute.org

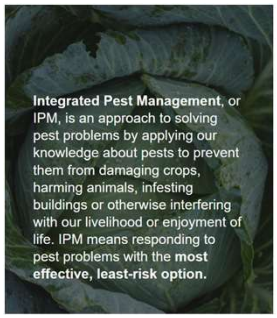
https://www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles

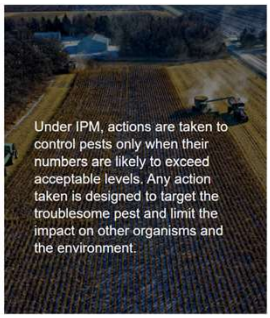
What is IPM?



- Integrated Pest Management (IPM) is a sustainable, science-based, decision-making process that combines biological, cultural, physical and chemical tools to identify, manage and reduce risk from pests and pest management tools and strategies in a way that minimizes overall economic, health and environmental risks.

What is IPM?


Integrated Pest Management, or IPM, is an approach to solving pest problems by applying our knowledge about pests to prevent them from damaging crops, harming animals, infesting buildings or otherwise interfering with our livelihood or enjoyment of life. IPM means responding to pest problems with the **most effective, least-risk option.**


Under IPM, actions are taken to control pests only when their numbers are likely to exceed acceptable levels. Any action taken is designed to target the troublesome pest and limit the impact on other organisms and the environment.


Applying pesticides to crops, animals, buildings or landscapes on a **routine basis**, regardless of need, **is not IPM.** Applications of pesticides are always the last resort in an IPM program.


Anyone can use IPM. Farmers, greenhouse growers, facility managers, grounds maintenance personnel, pest management professionals, homeowners and apartment dwellers can all learn how to apply low-risk solutions to prevent pest trouble or respond to problems when they arise.

Infiltration Trenches

Managing Stormwater

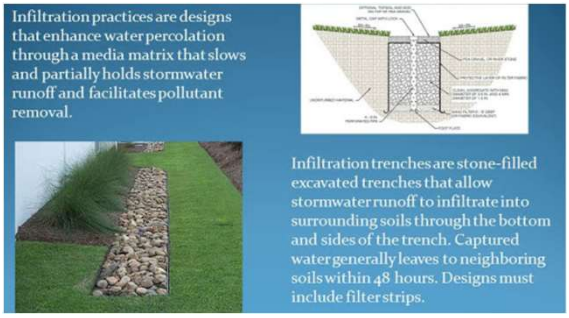
@inspectorplanet
Inspectorplanet.com

Information for Infiltration (Percolation) Trenches
https://www.esf.edu/ere/endreny/GICalculator/index.html

https://www.stormwaterpa.org/assets/media/BMP_manual/chapter_6/Chapter_6-4-4.pdf

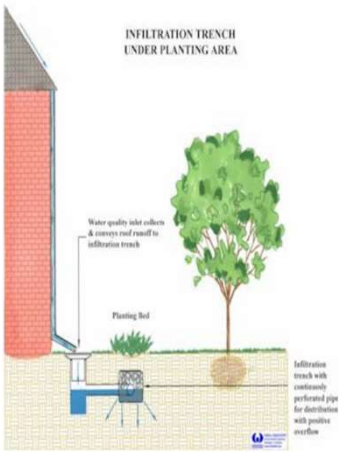
http://www.nebraskah20.org/tag/infiltration-trench/

Infiltration Trenches



- An Infiltration Trench is a linear stormwater best management practice, consisting of a continuously perforated pipe at a minimum slope in a stone-filled trench.
- Usually an Infiltration Trench is part of a conveyance system and is designed so that large storm events are conveyed through the pipe with some runoff volume reduction.
- During small storm events, volume reduction may be significant and there may be little or no discharge. All Infiltration Trenches are designed with a positive overflow

Infiltration Trenches



APPLICATIONS

- Connection of Roof Leaders Roof leaders may be connected to Infiltration Trenches. Roof runoff generally has lower sediment levels and often is ideally suited for discharge through an Infiltration Trench. A cleanout with sediment sump should be provided between the building and Infiltration Trench.
- Connection of Inlets Catch Basins, inlets and area drains may be connected to Infiltration Trenches, however sediment and debris removal should be addressed. Structures should include a sediment trap area below the invert of the pipe for solids and debris. In areas of high traffic or areas where excessive sediment, litter, and other similar materials may be generated, a water quality insert or other pretreatment device is needed.
- In Combination with Vegetative Filters An Infiltration Trench may be preceded by or used in combination with a Vegetative Filter, Grassed Swale, or other vegetative element used to reduce sediment levels from areas such as high traffic roadways. Design should ensure proper functioning of vegetative system.

Information for Permeable Pavements
https://www.epa.gov/soakuptherain/soak-rain-permeable-pavement

https://www.go-gba.org/resources/green-building-methods/permeable-pavements/

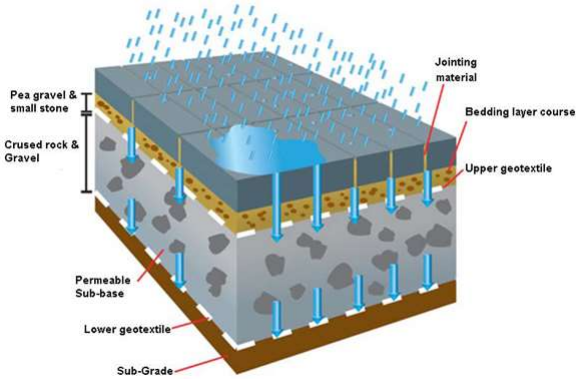
Stormwaterpa.org

Permeable Pavements

Permeable pavement (also known as pervious or porous concrete) is a specific type of pavement with a high porosity that allows rainwater to pass through it into the ground below.

Through this movement, pervious concrete mimics the natural process that occurs on the ground's surface, consequently reducing runoff and returning water to underground aquifers. It also traps suspended solids and pollutants, keeping them from polluting the water stream. Pervious concrete has many applications, most commonly:

- low-volume pavements
- residential roads and driveways
- sidewalks
- parking lots
- low-water bridges
- patios
- well linings
- walls (including load-bearing walls)
- swimming pool decks



Permeable Pavements

Benefits

Environmental Benefits

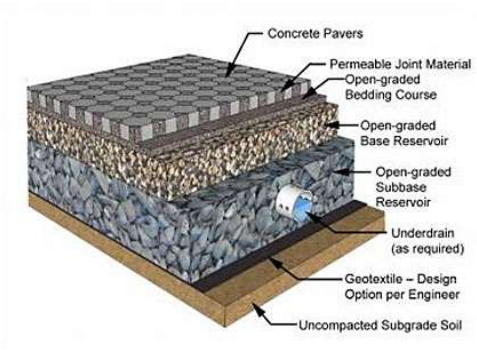
- Eliminates runoff
- Recharges groundwater
- Traps suspended solids and pollutants
- Reduces surface temperatures and, therefore, the heat island effect
- Eliminates the need for retention basins and water collection areas

Financial Benefits

- Eliminates costs for retention basins, curbs, gutters, and other water collection installations
- In winter conditions, typically requires much less salt or other de-icing products than traditional pavement types
- Lower installation costs (no underground piping, storm drains, or sloping/grading needed)
- Low life-cycle costs with an equal life expectancy to that of regular concrete: 20 to 40 years when correctly installed

4 Mile Run Project, Pittsburgh, PA

Permeable Pavements



Factors To Keep In Mind

- Runoff Volumes: A pervious pavement project should be properly designed to accommodate the amount of stormwater runoff that is expected in the area. If not adequately designed, the water table below the pavement can rise, preventing stormwater from being absorbed into the ground.
- Because pervious concrete has such a high void content and its overall strength is generally lower than that of regular concrete, it is not recommended for highways, high-volume streets, potential spill sites (in case of clogging), and heavy loading areas.
- While it is estimated that porous concrete can be two to three times more expensive than regular asphalt or concrete, cost savings are simultaneously achieved as stormwater installations are not necessary.
- Certain types of pervious pavements require frequent maintenance due to the possibility that solids and particles may get trapped and clog pavement pores. If the proper "vacuuming" or flushing is not carried out, pervious concrete will assume the traits of impervious concrete.
- Siting should be a major factor when considering permeable pavements. If the ground surface exceeds a 20% slope, stormwater will run downhill over the permeable pavement as opposed to being absorbed by it as intended.

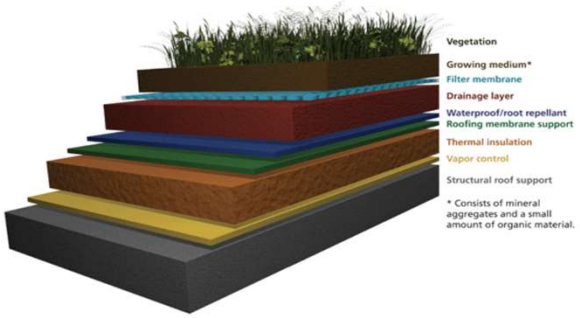
Information for Green Roofs
https://www.nps.gov/tps/sustainability/new-technology/green-roofs/define.htm

Greenroofs.org

Green Roofs

- **What is a Green Roof**

A green roof system is an extension of the existing roof which involves, at a minimum high quality water-proofing, root repellent system, drainage system, filter cloth, a lightweight growing medium, and plants.



Green Roofs

PUBLIC BENEFITS

- AESTHETIC IMPROVEMENTS
- WASTE DIVERSION
- STORMWATER MANAGEMENT
- MODERATION OF URBAN HEAT ISLAND EFFECT
- IMPROVED AIR QUALITY
- NEW AMENITY SPACES
- LOCAL JOB CREATION
-

Private Benefits

- ENERGY EFFICIENCY
- INCREASED ROOFING MEMBRANE DURABILITY
- FIRE RETARDATION
- REDUCTION OF ELECTROMAGNETIC RADIATION
- NOISE REDUCTION
- MARKETING