RUTGERS UNIVERSITY
Water Resources Program
New Jersey Agricultural Experiment Station

Stormwater and Green Infrastructure:

How we can all play a part in reducing stormwater runoff and improving water quality in our community

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Rutgers Cooperative Extension

Rutgers Cooperative Extension (RCE) helps the diverse population of New Jersey adapt to a rapidly changing society and improves their lives through an educational process that uses science-based knowledge.

Water Resources Program

Our mission is to identify and address water resources issues by engaging and empowering communities to employ practical science-based solutions to help create a more equitable and sustainable New Jersey.

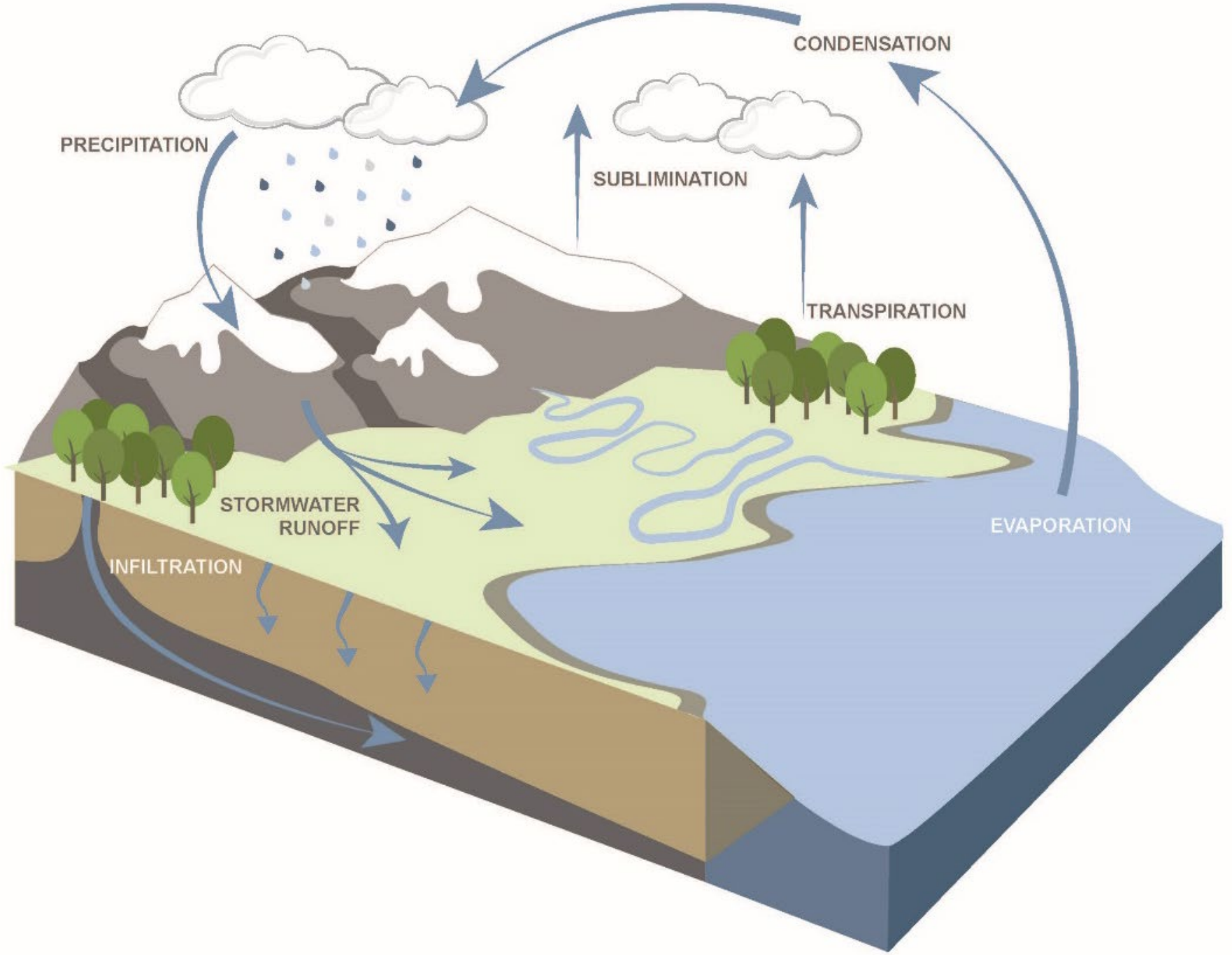
New Jersey

- Most densely populated state
- 21 counties, 565 municipalities
- 95% of our waterways are impaired
- 21 Combined Sewer Communities
- Harmful Algal Blooms (HABS) in many of our lakes
- Hammered by Ida, Henri, Sandy, and a bunch of nor'easters
- Climate change is real – more severe storms and sea level rise

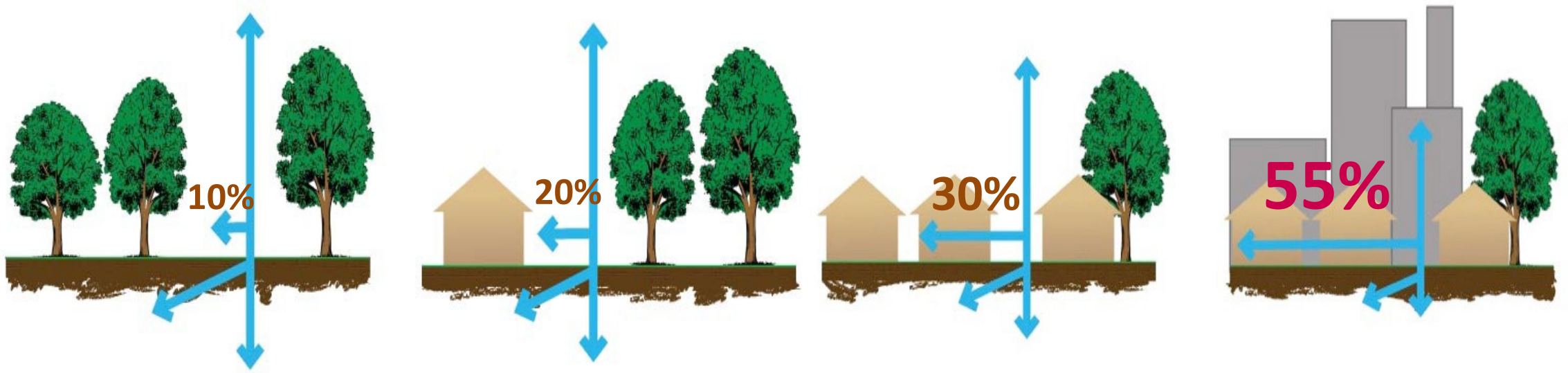
What is stormwater?

Stormwater is the water from rain or melting snow that can become "runoff," flowing over the ground surface and returning to lakes and streams.

The Natural Hydrologic (Water) Cycle

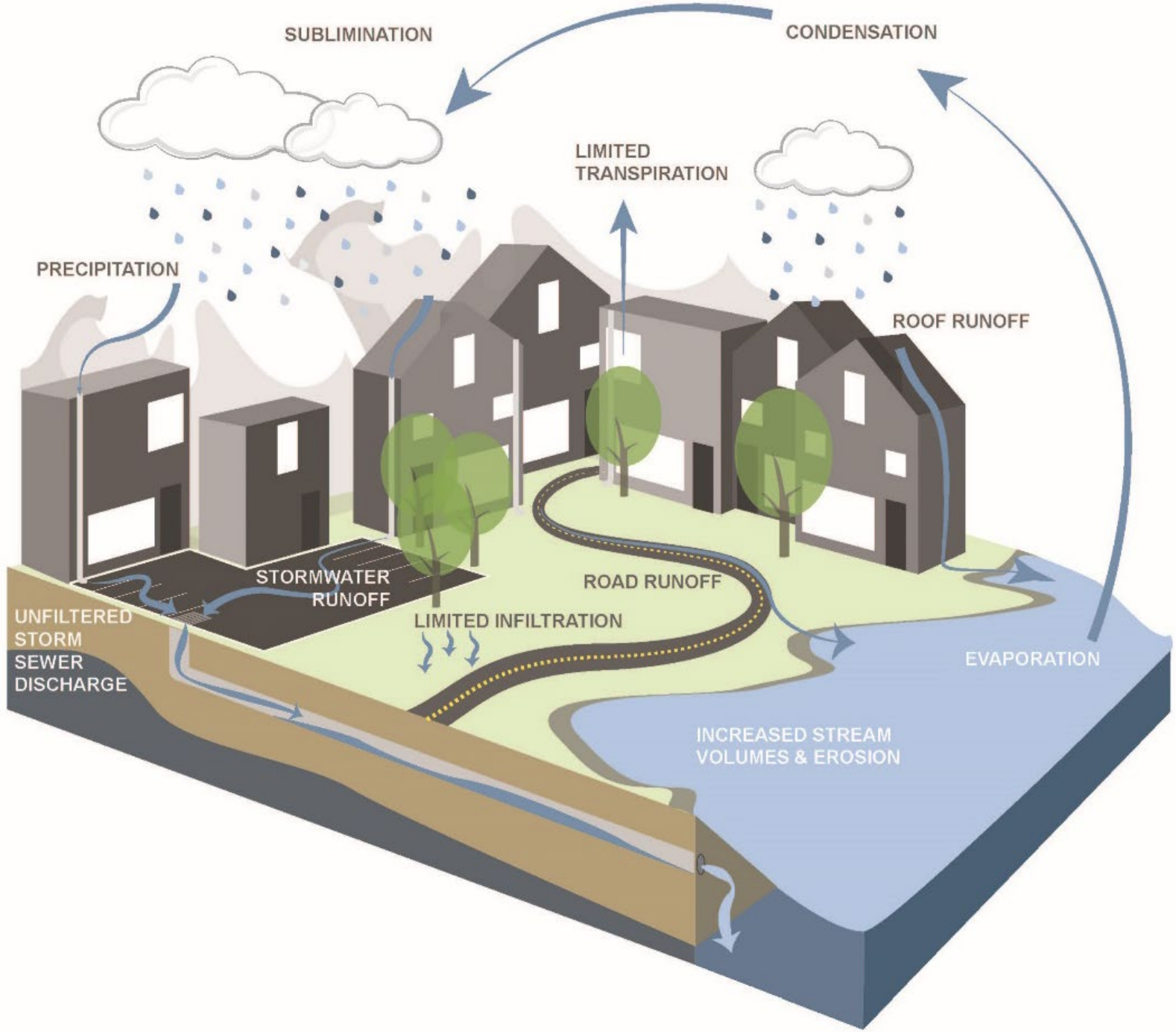


The Impact of Development on Stormwater Runoff



More development → *More impervious surfaces* → *More stormwater runoff*

The Urban Hydrologic (Water) Cycle



Examples of Nonpoint Source Pollutants

- Oil and grease from cars
- Fertilizers
- Animal waste
- Grass clippings
- Septic systems
- Sewage leaks
- Household cleaning products
- Litter
- Agriculture
- Sediment

Insight to current problem

- Stringent stormwater regulations on new development has not improved water quality
- We must retrofit existing older development with stormwater management to improve the health of our waterways and reduce flooding
- Green infrastructure is a great tool to retrofit existing older development

GREEN INFRASTRUCTURE IN NEW JERSEY

Green infrastructure is ...

…an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly.

Green infrastructure projects:

- capture,
- filter,
- absorb, and
- reuse

stormwater to restore the natural water cycle.

Green Infrastructure

Stormwater management practices that protect, restore, and mimic the native hydrologic condition by providing the following functions:

- Infiltration
- Filtration
- Storage
- Evaporation
- Transpiration

Green Infrastructure Practices

Bioretention Systems

- Rain Gardens
- Bioswales
- Stormwater Planters
- Curb Extensions
- Tree Filter Boxes

Permeable Pavements

Rainwater Harvesting

- Rain Barrels
- Cisterns

Dry Wells

Rooftop Systems

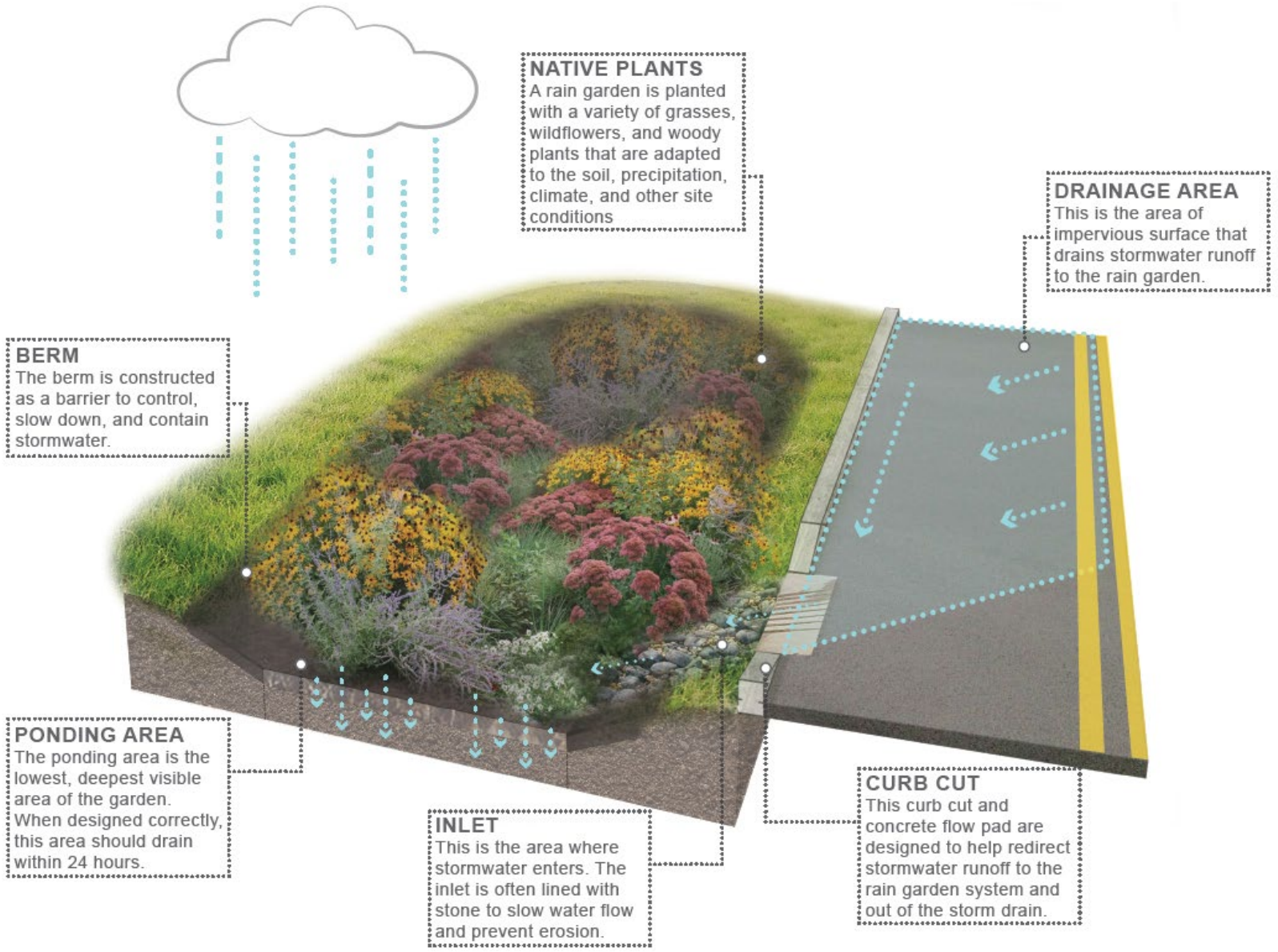
- Green Roofs
- Blue Roofs








Rain Gardens

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NATIVE SO


Welcome
To My
Garden


Rain Garden


Rain Garden

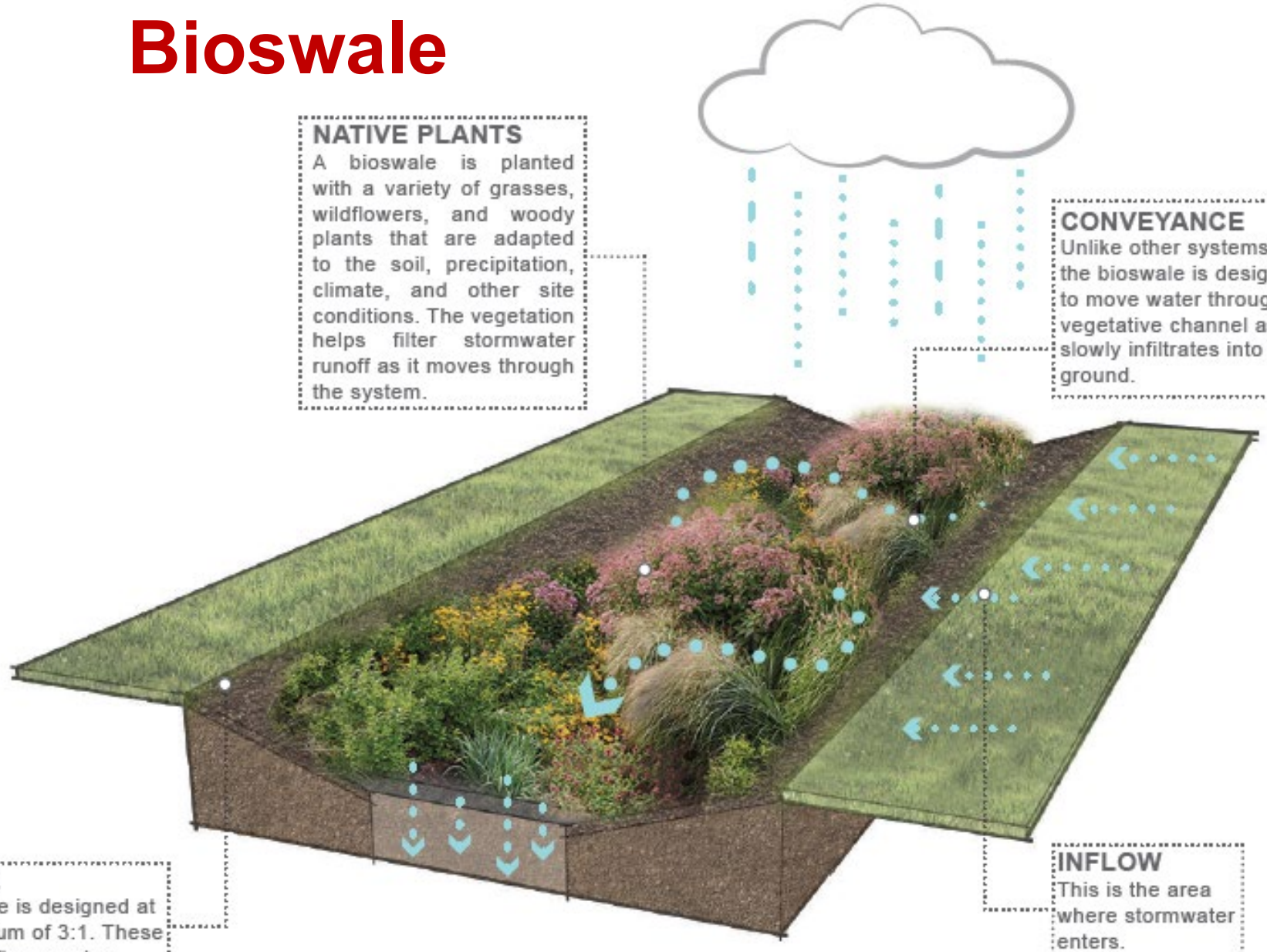

Rain Garden


Rain Garden

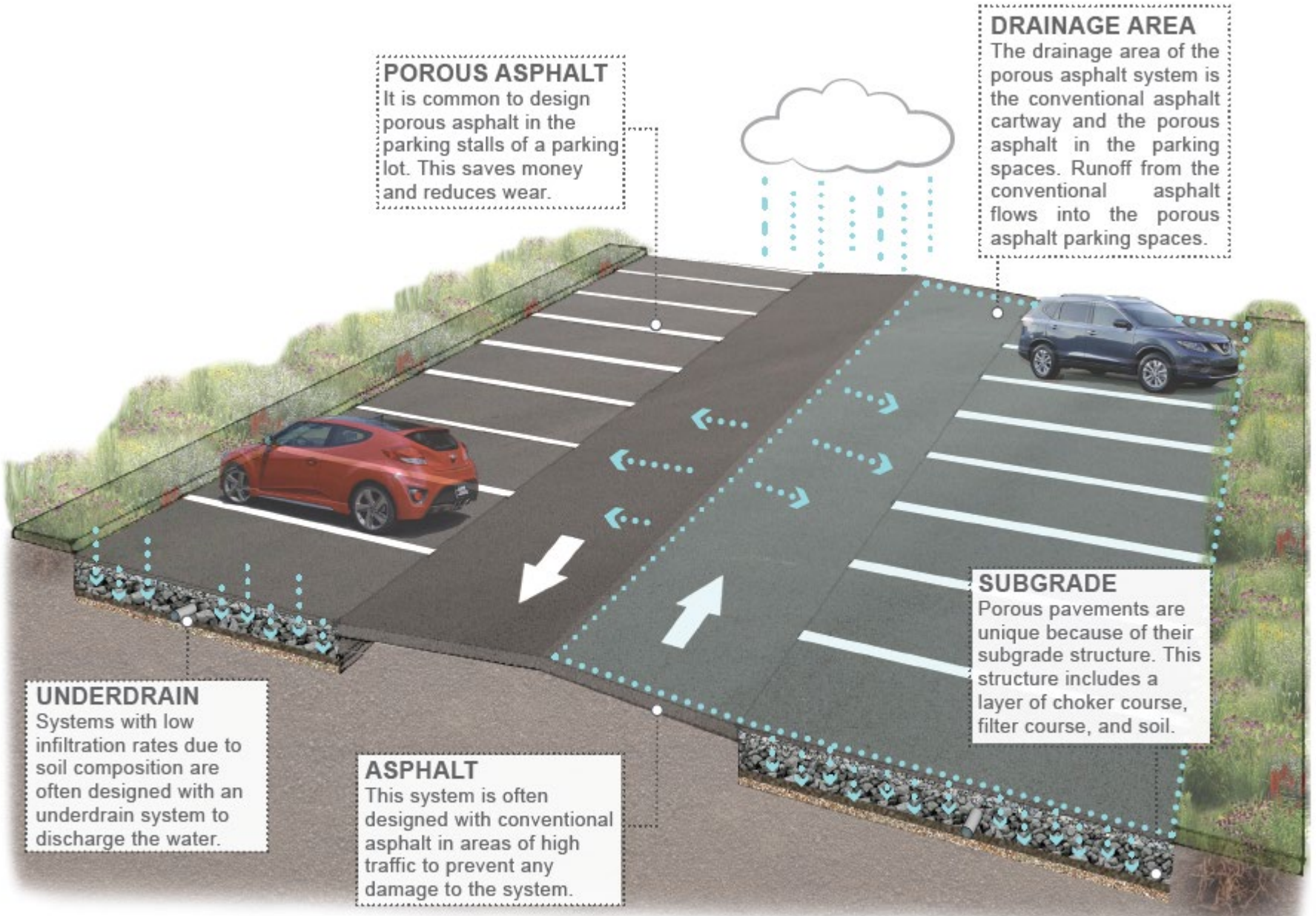

Rain Garden


Rain Garden

Bioswale


NATIVE PLANTS
A bioswale is planted with a variety of grasses, wildflowers, and woody plants that are adapted to the soil, precipitation, climate, and other site conditions. The vegetation helps filter stormwater runoff as it moves through the system.
CONVEYANCE
Unlike other systems, the bioswale is designed to move water through a vegetative channel as it slowly infiltrates into the ground.
SLOPE
The slope is designed at a maximum of 3:1. These slopes often require erosion control materials for stabilization.
INFLOW
This is the area where stormwater enters.

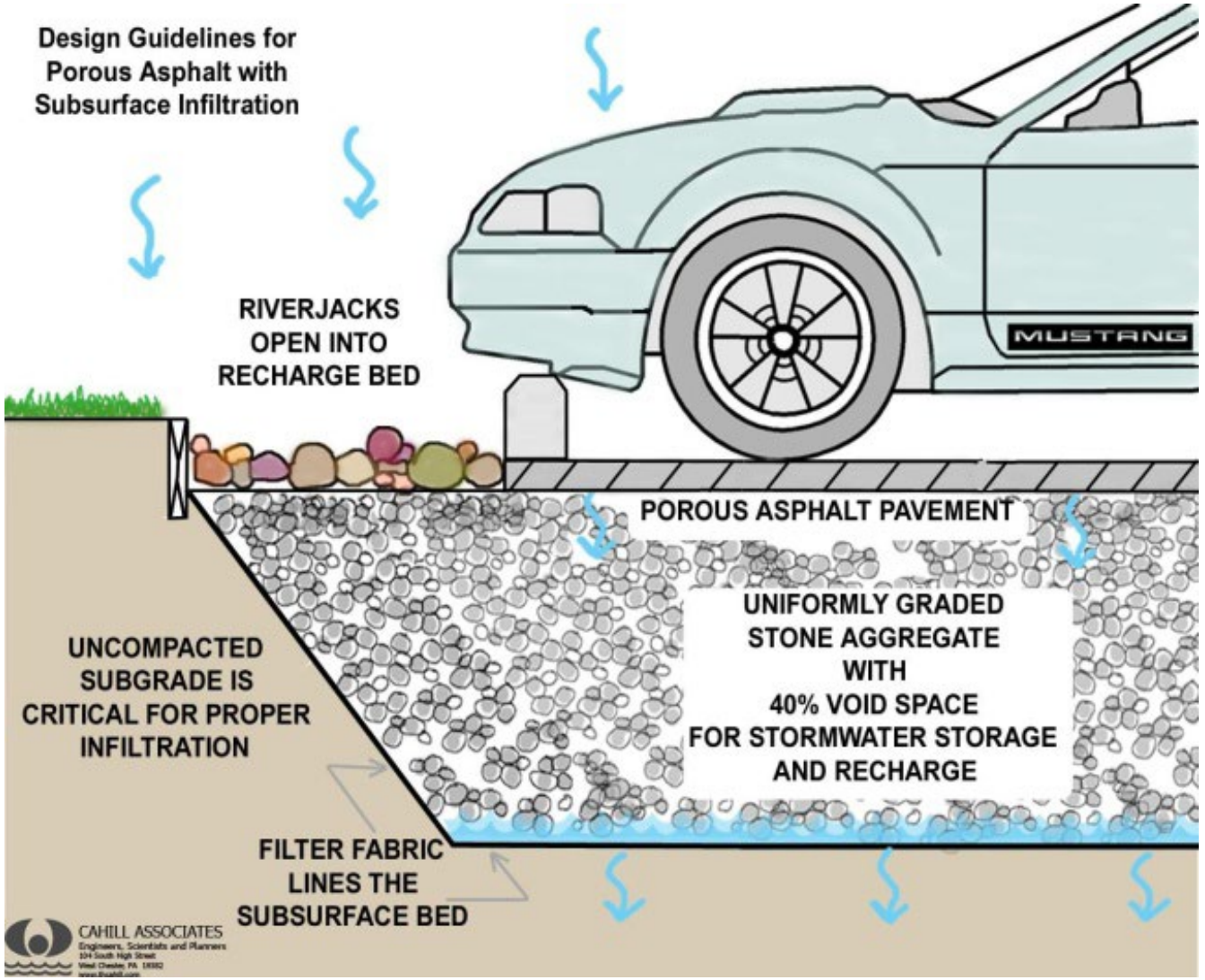
Permeable Pavement



ADVANTAGES

- Manage stormwater runoff
- Minimize site disturbance
- Promote groundwater recharge
- Low life cycle costs, alternative to costly traditional stormwater management methods
- Mitigation of urban heat island effect
- Contaminant removal as water moves through layers of system

COMPONENTS



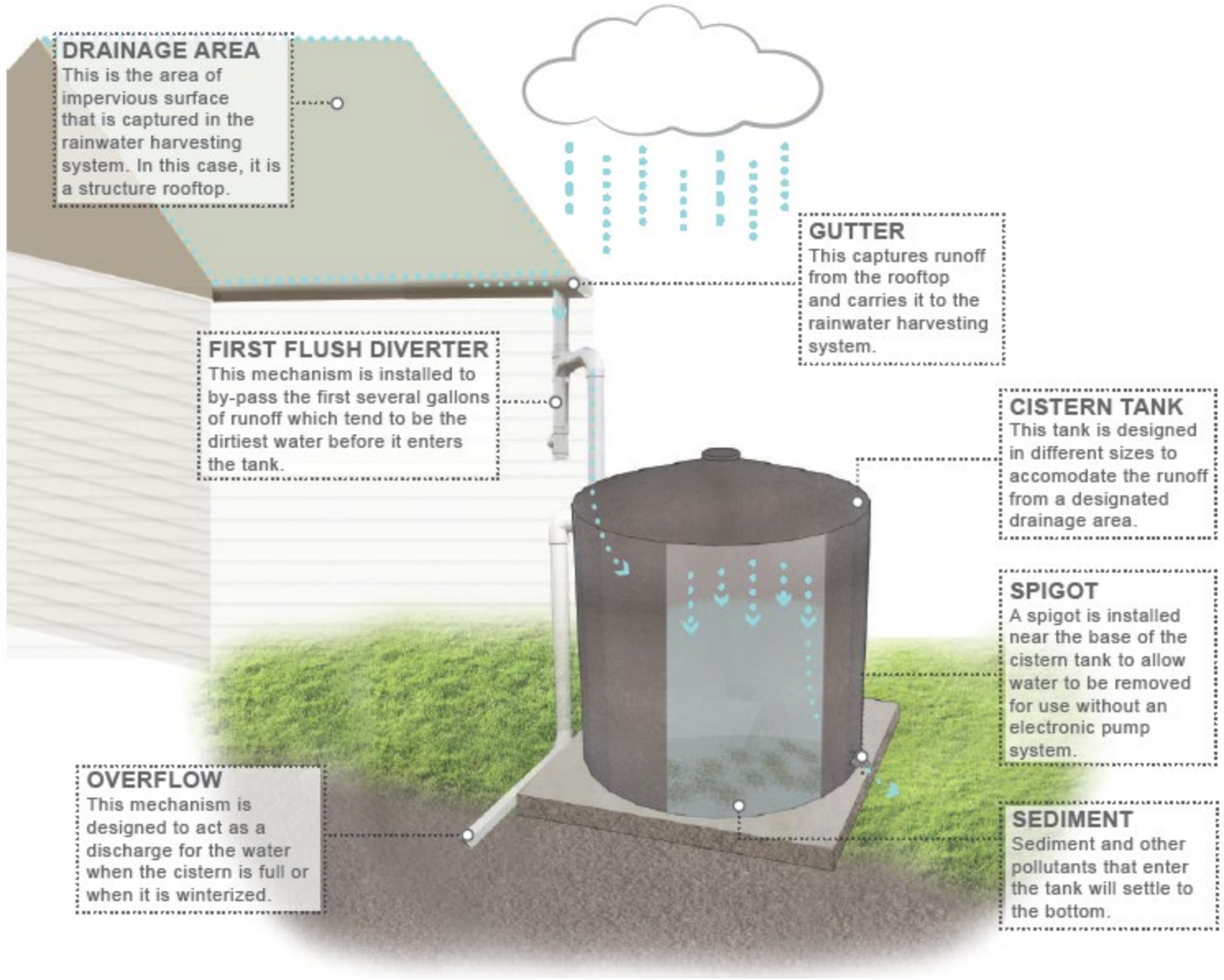
Porous Asphalt


Pervious Concrete


Permeable Pavers

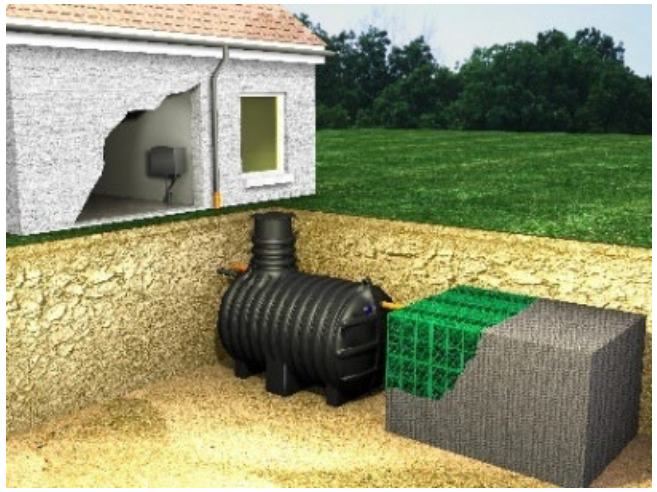

Grass Pavers

Rainwater Harvesting Systems

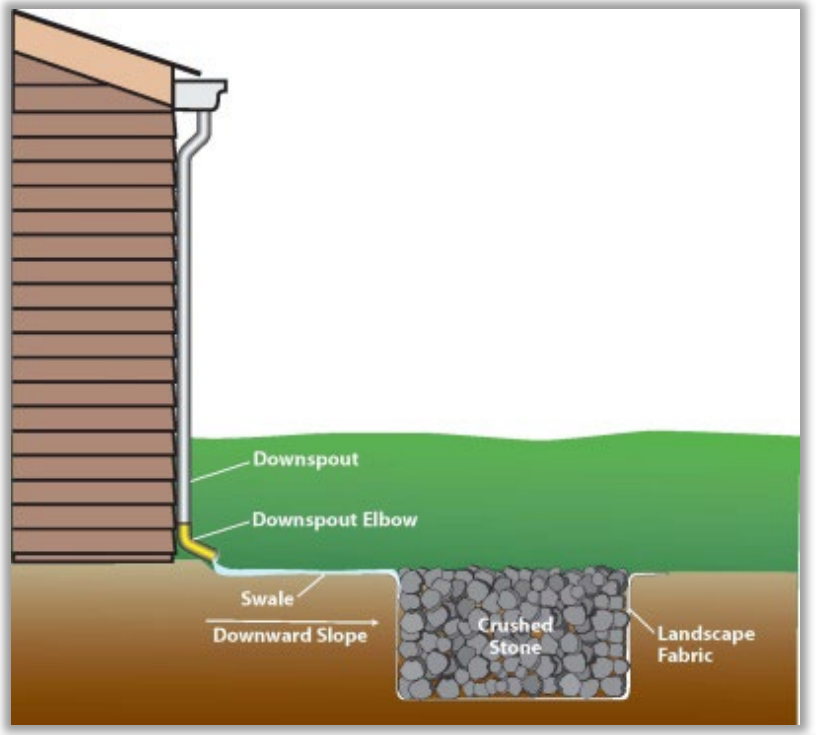


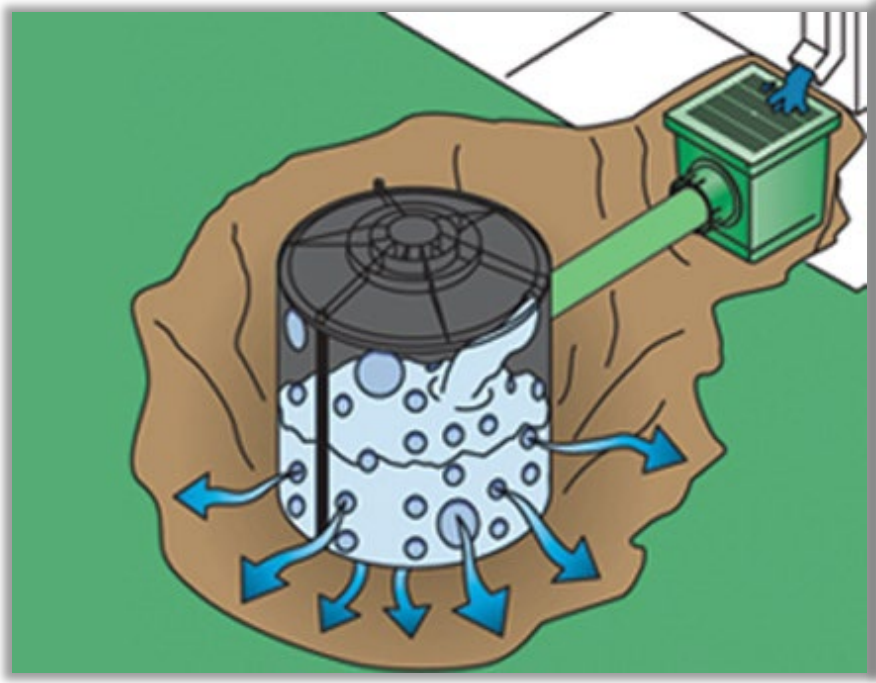
Rain Barrels

Cisterns



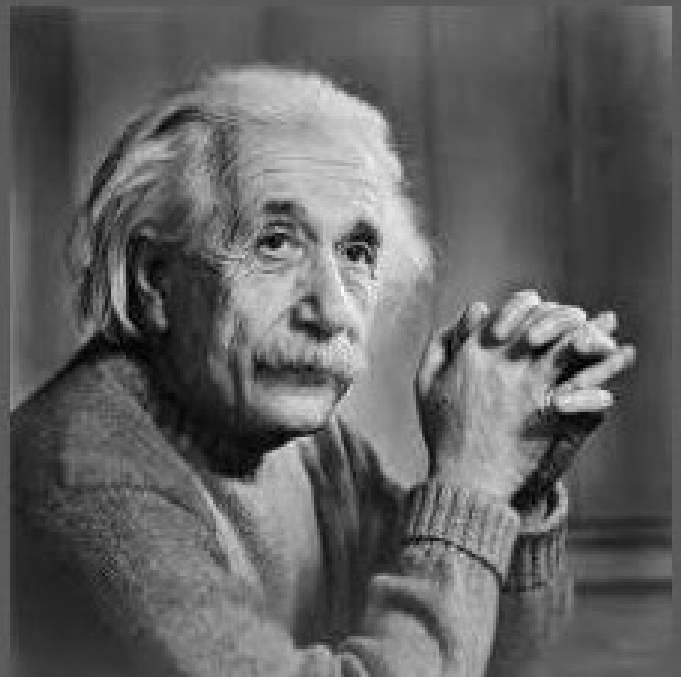
Dry Wells


Downspout
Downspout Elbow
Swale
Downward Slope
Crushed Stone
Landscape Fabric



Thinking about next steps …

Albert Einstein was not a believer in excuses; "Man must cease attributing his problems to his environment, and learn again to exercise his will - his personal responsibility."



President **Barack Obama** called on all American citizens with; "Change will not come if we wait for some other person or some other time. We are the ones we've been waiting for. We are the change that we seek."

Here are some idea …

1. Build a rain garden at your home
2. Install a rain barrel
3. Convert your driveway or patio to permeable pavement
4. Become a Green Infrastructure Champion
5. Join your Green Team or Environmental Commission
6. Participate with local environmental groups – Waterspirit, Clean Ocean Action, NY-NJ Baykeeper
7. Create your own environmental group
8. Work with schools or local business – educate and engage and empower
9. Help your town identify projects for their Watershed Improvement Plan
10. Working with the scouts and other youth groups to install projects

What tools are available to help?

1. Green Infrastructure Champions Training Program (10 two-hour online classes)
2. Rain Garden Commercial – video and/or PowerPoint (15 minutes)
3. Rain Educational PowerPoint Presentation (45 minutes)
4. Rain Garden Design Session (45 minutes)
5. Rain Garden Design Manual
6. Rain Garden App
7. Green Infrastructure Guidance Manual for New Jersey
8. Trained Green Infrastructure Champions

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