

NATIONAL  
GREEN  
INFRASTRUCTURE  
CERTIFICATION  
PROGRAM

ngicp

Presented by:

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# Outline

- ▶ Background and partners
- ▶ What is NGICP?
- ▶ Overview of what the program covers
- ▶ Overview of the curriculum
- ▶ What's Next for NGIP



Initiated under the leadership of DC Water and the Water Environment Federation, the National Green Infrastructure Certification Program (NGICP) sets national certification standards for green infrastructure (GI) construction, inspection, and maintenance workers. Designed to meet international best-practice standards, the certification advances the establishment of sustainable communities by promoting GI as an environmentally and economically beneficial stormwater management option, supporting the development of proficient green workforces, and establishing a career path for skilled GI workers.

# National Green Infrastructure Certification Program (NGICP)

## Summary:

- ▶ Sets national certification standards for construction, inspection and maintenance workers
- ▶ Designed to meet international best practice standards
- ▶ Aims to advance the establishment of sustainable communities by promoting green infrastructure (GI)
- ▶ Support the development of proficient green workforce
- ▶ Establish a career path for skilled GI workers

# Background



Pittsburgh  
Water & Sewer  
Authority



San Francisco  
Water Power Sewer  
Services of the San Francisco Public Utilities Commission



Metropolitan Water  
Reclamation District  
of Greater Chicago



DEPARTMENT OF  
ENVIRONMENTAL  
PROTECTION  
MONTGOMERY COUNTY • MARYLAND



# What is NGICP?



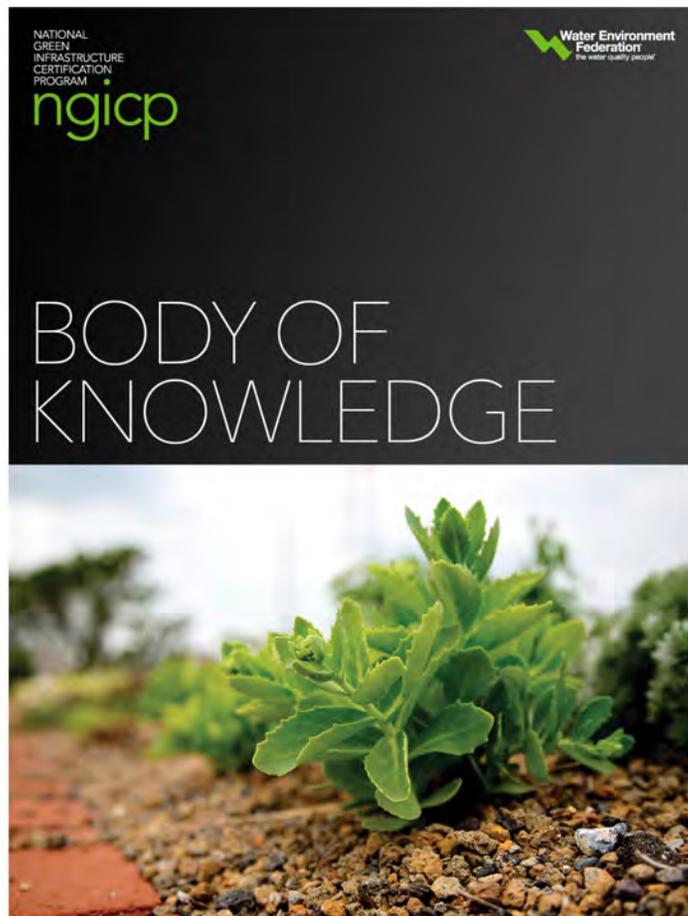
- ▶ An entry level GI certification that validates that candidates possess the foundational knowledge that supports proper GI **construction, inspection and maintenance**
- ▶ National credential for individuals
- ▶ Developed in accordance with ANSI accreditation guidelines
- ▶ Supports the development of proficient green workforce
- ▶ Establish a career path for skilled GI workers

# Who is it for?

- ▶ Construction and maintenance workers
- ▶ High school diploma/GED
- ▶ 35 hour minimum training
- ▶ Chronically un- and under-employed\*



# Body of Knowledge



- ▶ Existing GI educational materials
- ▶ Publications/manuals/technical bulletins
- ▶ Brochures/factsheets/forms/checklists, videos/webcasts
- ▶ Books
- ▶ [http://ngicp.org/wp-content/uploads/2016/07/NGICP\\_Body-of-Knowledge-1.pdf](http://ngicp.org/wp-content/uploads/2016/07/NGICP_Body-of-Knowledge-1.pdf)

# Exam Blueprint

- ▶ Watershed fundamentals: 6-10%
- ▶ Practices: 19-23%
- ▶ Methods and materials: 50-54%
- ▶ Functionality/appearance: 17-21%



# (Green) Workforce Development



- ▶ Top priority for WEF/partners
- ▶ Part of a larger workforce development program

# NGICP goes to high school



- ▶ Woodson STEM High School, Ward 7, DC
- ▶ Incorporating curriculum into capstone program
- ▶ Test post-graduation
- ▶ Partner with DC Water and other city agencies for job placement
- ▶ Kick-off September 2018





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# INTRODUCTION

## Green Infrastructure (GI)

- ▶ Green infrastructure is an approach to stormwater management that protects, restores, or mimics the **natural water cycle**

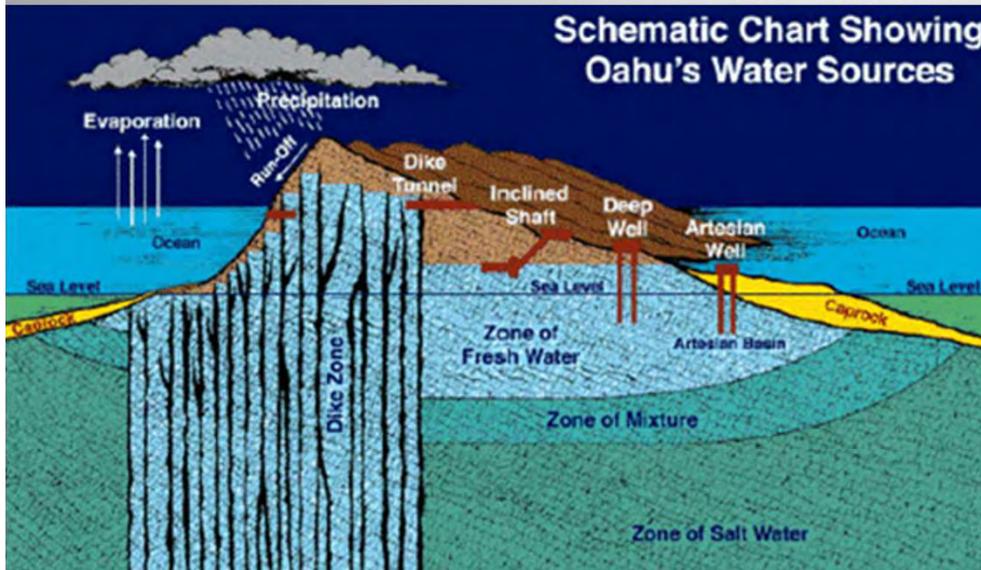


# The Rain Follows the Forest

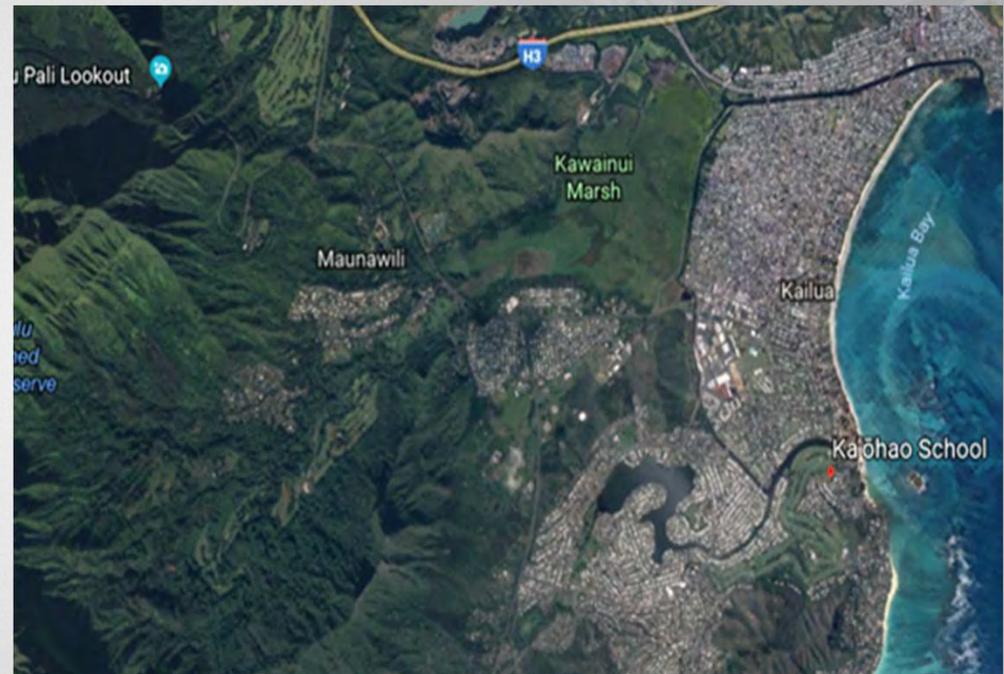
*'Hahai no ka ua i ka ulula'au*

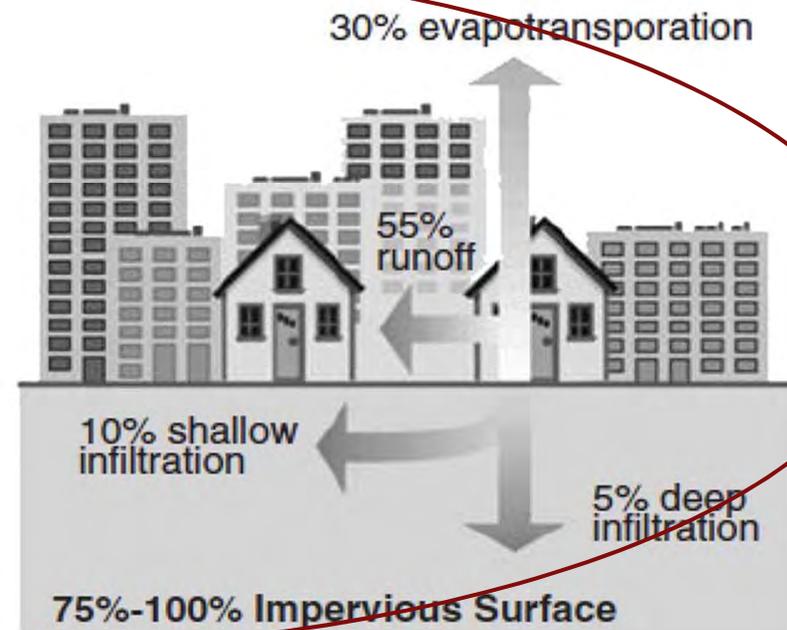
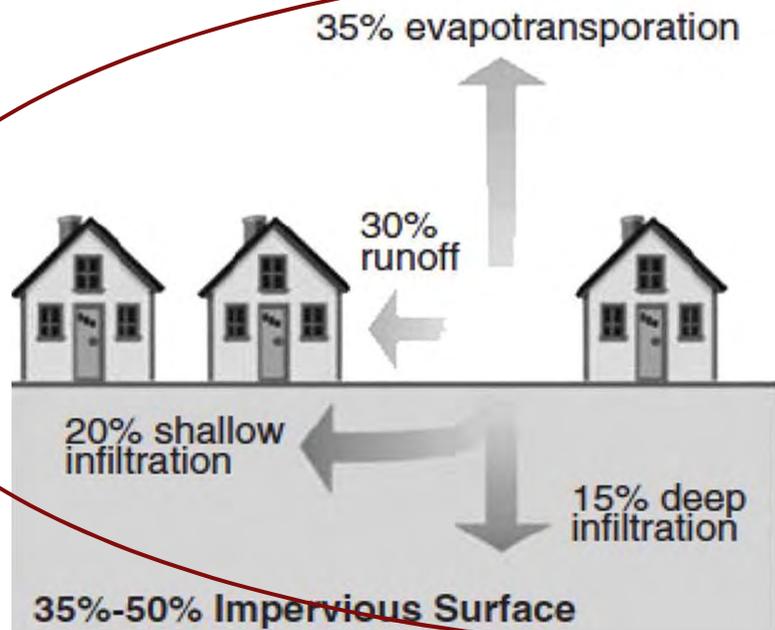
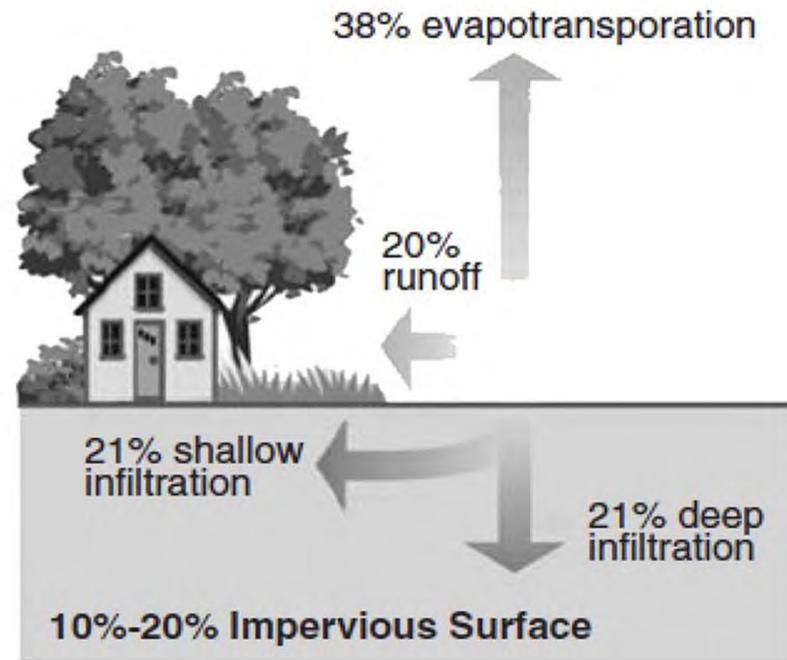
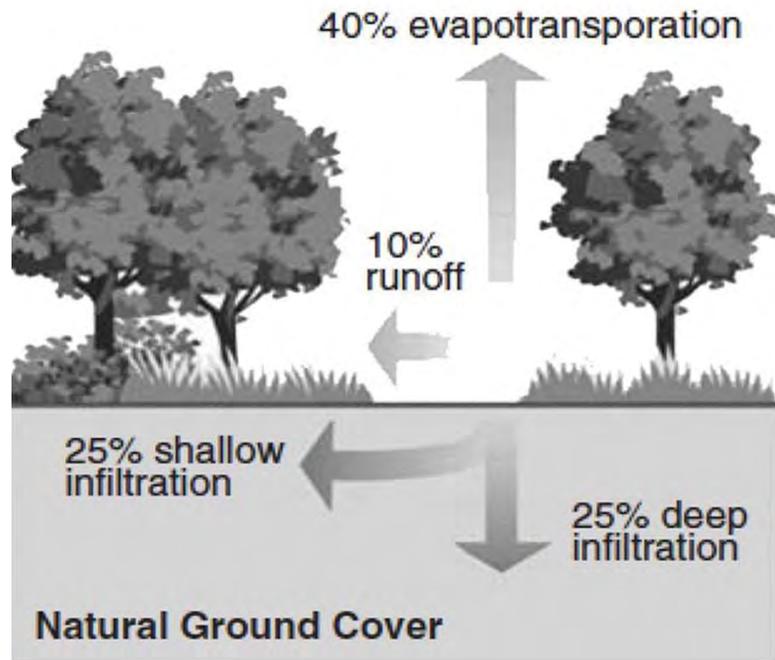


# Hawaii's Watersheds



# Hawaii's Watersheds





# Impacts of Stormwater





# Stormwater



## What is stormwater?

“Stormwater is water that originates during precipitation events. When rain hits a surface such as a roof, road, or other surface it becomes stormwater.”

## What is stormwater runoff?

“Stormwater runoff is excess precipitation that is not retained by vegetation, surface depressions, or infiltration, and thereby collects on the surface and drains into a surface water body.”

## Name some pollutants in stormwater runoff?

Sediment, oil, pesticides, fertilizer, trash, paint chips, tire treads....

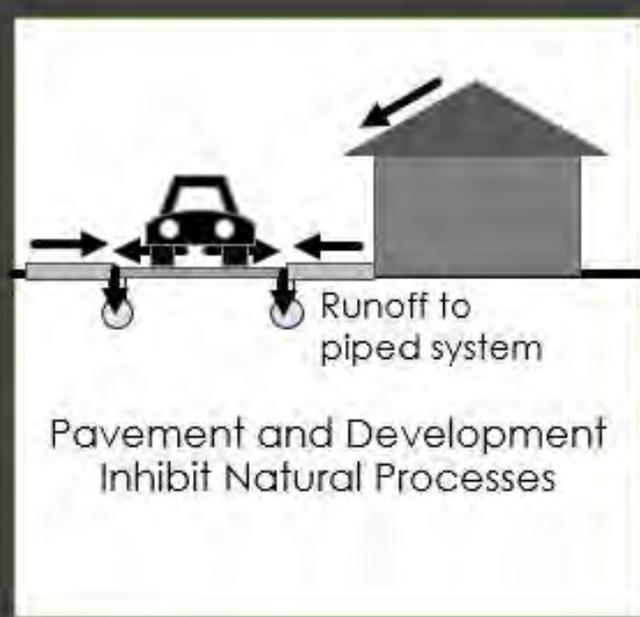
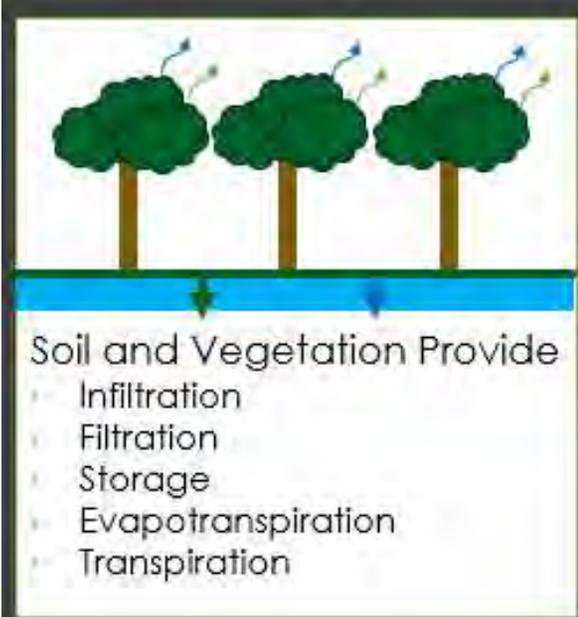


# GI Mimics Natural Processes

Natural Process

Developed Process

GI Process





**INTEGRATED LANDSCAPE AND BUILDINGS**

Green screens, planters, and other elements can provide landscape on building facades, helping to cool buildings and the urban environment and increase biodiversity.



**ECO-BLOCK DEVELOPMENT**

Decentralized water and energy infrastructure while building community resiliency, and reducing the development's carbon and water footprints.



**PERMEABLE PAVER**

Stormwater runoff percolates through or around pavers to either infiltrate or be collected and directed to storm drain line. Added depth of subbase can retain stormwater.



**PERMEABLE CONCRETE/POROUS ASPHALT**

Stormwater percolates through pavement to either infiltrate or be collected and directed to storm drain line. Added depth of subbase can retain stormwater.



**BOARDWALK**

Allows stormwater to percolate through boards. Allow different look and provides structural support to bridge over green infrastructure or stormwater runoff storage areas.



**GREEN ROOF**

Provide cool roof and enhanced amenity to residents, employees, and visitors.



**DISCONNECTED DOWNSPOUT**

Collects and treats rainfall from rooftops.



**CONSTRUCTED WETLAND**

Engineered wetlands for stormwater or wastewater treatment and habitat restoration.



**BIORETENTION/GREEN INFRASTRUCTURE**

Captures and treats stormwater runoff with natural processes.

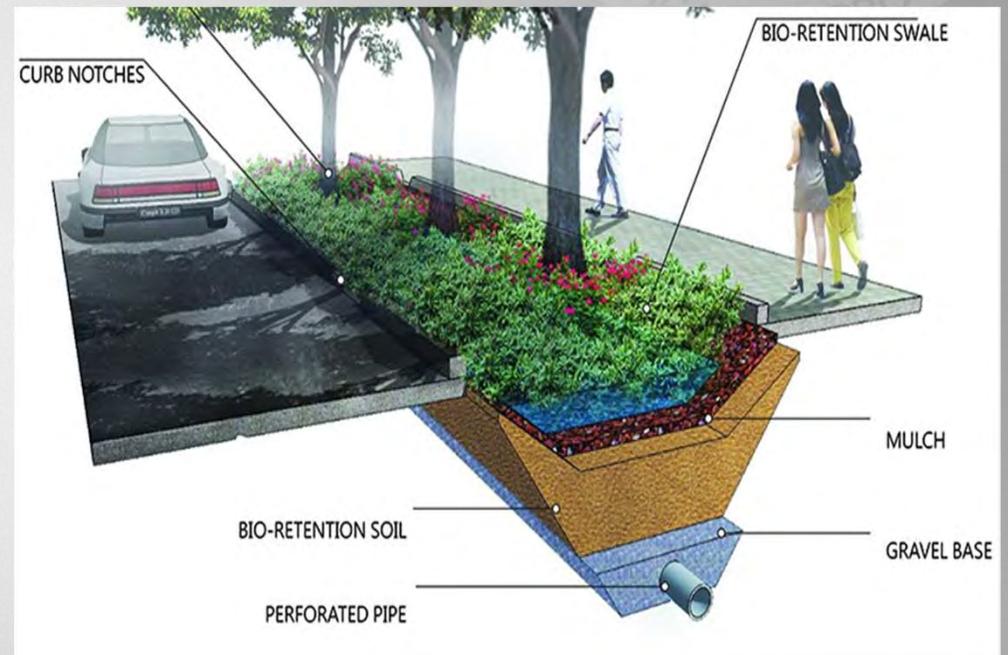


**STORMWATER TREE**

Captures and treats stormwater runoff with natural processes. May be "linked" to other trees for increased runoff storage.

# Green Infrastructure- How does it work?

- ▶ GI provides **filtration, infiltration, sedimentation, evapotranspiration, and phytoremediation**
- ▶ Reduce stormwater runoff volume by reducing the surface flow and increasing groundwater recharge
- ▶ The time of concentration of runoff is increased and peak flows reduced → Runoff is slower and lessened



# Green Infrastructure or Low Impact Development (LID)?

- ▶ GI typically is broader term to cover other types of infrastructure (besides stormwater) that are also natural-systems based
- ▶ LID systems are generally “smaller” scaled Best Management Practices for stormwater that incorporate GI principles (EPA)
- ▶ NGICP program focuses only on stormwater green infrastructure (= LID)



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# Module 2: GI Materials





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# Module 3: Vegetation in GI



# Considerations of materials, construction sequencing, inspection & maintenance





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# Module 4: Safety Around GI Sites





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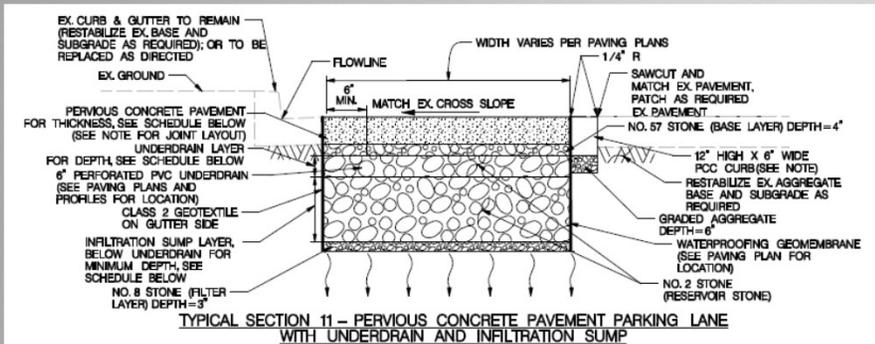
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# Module 5: Site Management



**APWA UNIFORM COLOR CODE**

- WHITE - Proposed Excavation
- PINK - Temporary Survey Markings
- RED - Electric Power Lines, Cables, Conduit and Lighting Cables
- YELLOW - Gas, Oil, Steam, Petroleum or Gaseous Materials
- ORANGE - Communication, Alarm or Signal Lines, Cables or Conduit
- BLUE - Potable Water
- PURPLE - Reclaimed Water, Irrigation and Slurry Lines
- GREEN - Sewers and Drain Lines

**TYPICAL MARKING**

LARGE PIPE OR MULTIPLE DUCTS

SMALL PIPE OR CABLES

REFER TO TEXT ON FRONT OF CARD





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# Module 6: Bioretention Practices

- ▶ Bioretention cells and swales.
- ▶ Rain gardens.
- ▶ Vegetated curb extensions.
- ▶ Bioswales/ vegetated swales.
- ▶ Planter boxes
- ▶ Tree trenches.



Functions	
✓	Infiltration (where allowed)
✓	Water quality treatment
✓	Storage
✓	Evapotranspiration
✓	Transpiration
Additional Benefits	
✓	Aesthetics
	Habitat



# Considerations of materials, construction sequencing, inspection & maintenance





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# Module 7: Permeable Pavement

- ▶ Porous asphalt.
- ▶ Pervious concrete.
- ▶ Permeable pavers.
- ▶ Open-celled grid systems (also called reinforced turf).



Functions	
✓	Infiltration (where allowed)
✓	Water quality treatment
✓	Storage
	Evapotranspiration
	Transpiration
Additional Benefits	
	Aesthetics
	Habitat



# Considerations of materials, construction sequencing, inspection & maintenance





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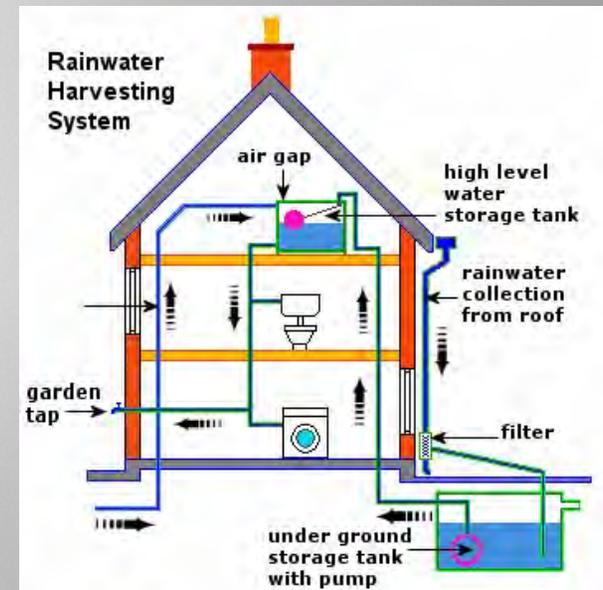
Basics of Managing GI for Long-Term Performance

# Module 8: Rainwater Harvesting

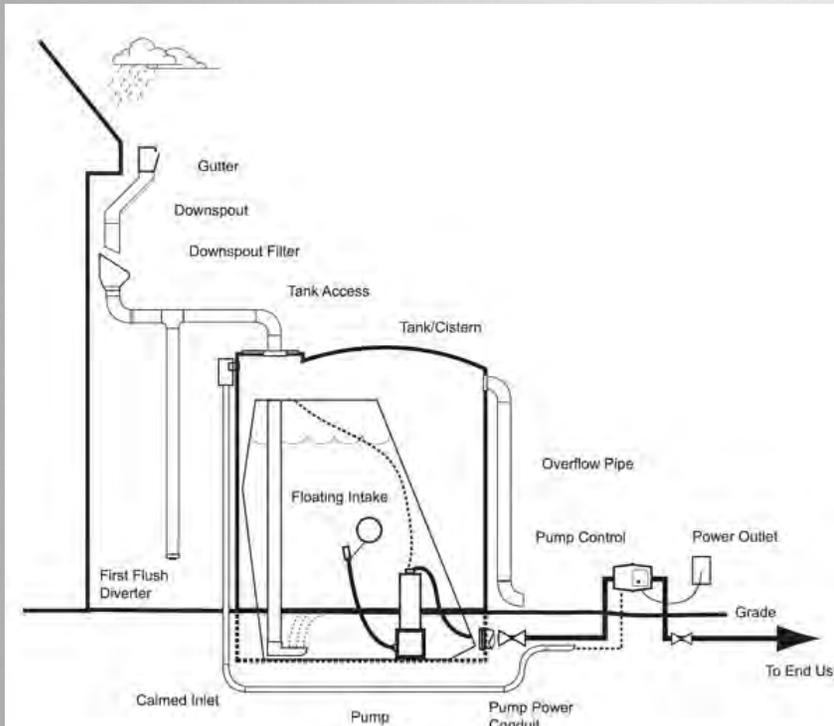
- ▶ Rain barrels
- ▶ Cisterns



Functions	
	Infiltration (where allowed)
	Water quality treatment
✓	Storage
	Evapotranspiration
	Transpiration
Additional Benefits	
	Aesthetics
	Habitat



# Considerations of materials, construction sequencing, inspection & maintenance





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# Module 9: Rooftop Practices



Functions	
	Infiltration (where allowed)
✓	Water quality treatment
✓	Storage
✓	Evapotranspiration
✓	Transpiration
Additional Benefits	
✓	Aesthetics
✓	Habitat
✓	Roof longevity
✓	Urban heat island mitigation



# Considerations of **materials,** **construction sequencing, inspection &** **maintenance**





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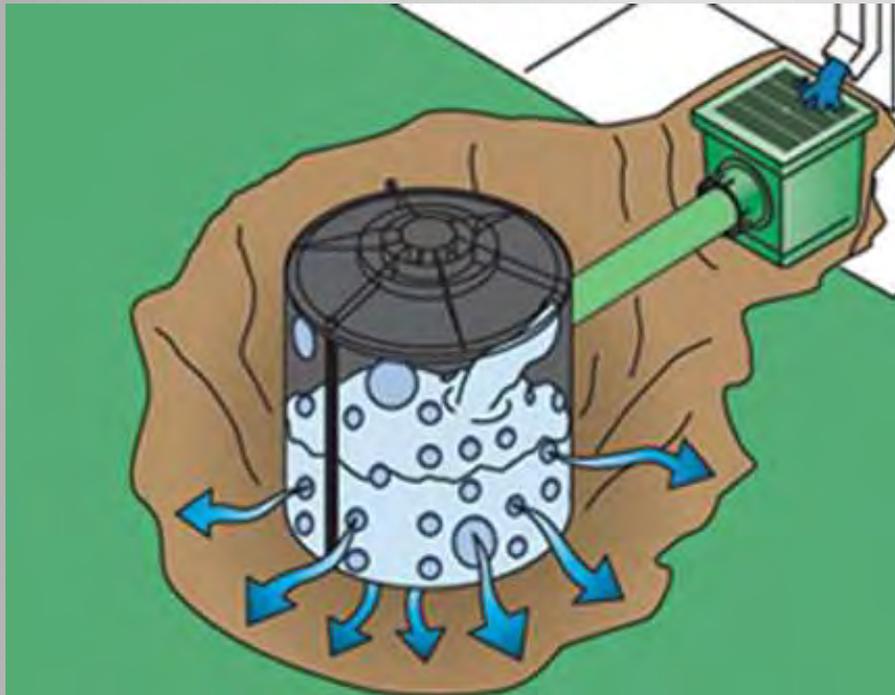
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# Module 10: Dry Wells



Functions	
✓	Infiltration (where allowed)
✓	Water quality treatment
	Storage
	Evapotranspiration
	Transpiration
Additional Benefits	
	Aesthetics
	Habitat

# Considerations of **materials**, **construction sequencing**, **inspection** & **maintenance**





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# Module 11: Stormwater Wetlands



Functions	
✓	Infiltration (where allowed)
✓	Water quality treatment
✓	Storage
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Additional Benefits	
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✓	Habitat

# Considerations of **materials**, **construction sequencing**, **inspection** & **maintenance**





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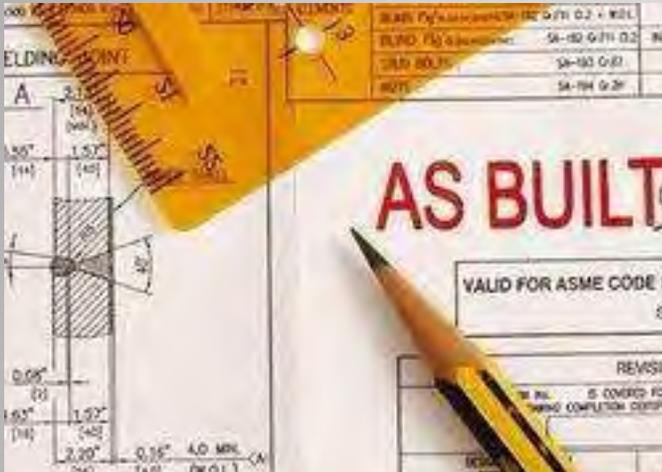
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# Module 12: GI Long-Term Performance



# What's Next with NGCIP?

- ▶ **More trainings: ongoing**
- ▶ New partners: ongoing
- ▶ **NRPA partnership: on-going**
- ▶ Computer-based testing: Fall 2018
- ▶ Online modules: Fall 2018
- ▶ **NGICP goes to high school: Fall 2018**
- ▶ ANSI Accreditation application submission: January 2019
- ▶ Canadian roll-out of NGICP: Spring 2019
- ▶ Anticipated ANSI Accreditation award: Summer 2019
- ▶ Research projects
  - ▶ Return on investment quantification: kickoff Fall 2018
  - ▶ Performance improvement quantification

# Questions?



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