INNOVATION *inspired by* NATURE: An Overview

This campus is a real life example of how nature-inspired ways are used to minimize impacts to water quality and water resources due to urbanization. This 9.4-acre campus has a series of low impact development (LID) features to clean, harvest, and reuse stormwater to help restore and improve the health of our community and the environment.

KEY OBJECTIVES

- To improve water quality of the streams and the ocean by removing 95% of the pollutants from stormwater runoff
- To reduce local flooding risk by keeping 85% of stormwater on site
- To conserve water resources by harvesting stormwater for groundwater recharge, onsite irrigation reuse, and by using smart irrigation and native, drought tolerant plants
- To demonstrate feasibility and performance of various LID features
- To conduct research on stormwater and LID

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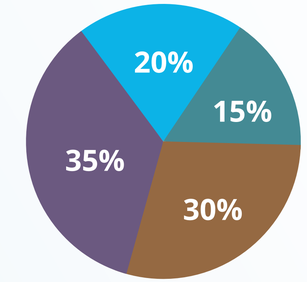
INNOVATION *inspired by* NATURE: Low Impact Development (LID)

Before this project, rainfall would hit the impervious surfaces (rooftop, asphalt, concrete) and run off the site, carrying pollutants straight into the storm drain and the ocean. Now, strategically placed LID features filter the runoff for on-site infiltration and harvesting to reduce pollution, replenish groundwater, and conserve potable water.

With the implementation of innovative low impact development features, rainwater will be:



WATER BALANCE

- Stored in cisterns for irrigation
- Seeped into the ground
- Evaporated naturally
- Cleansed of pollutants before entering the storm drain

LEGEND

A. Cistern
B. Flow-Through Planter
C. Permeable Pavement
D. Bioswale
E. Tree Box
F. Pervious Concrete
G. Porous Asphalt
H. Irrigation
I. Underground Cistern
J. Vortex Separator
K. Modular Wetland
L. Modular Pervious Concrete
M. Dry Well
N. Catch Basin
O. Storm Drain

IRRIGATION PIPES
STORM DRAIN PIPES

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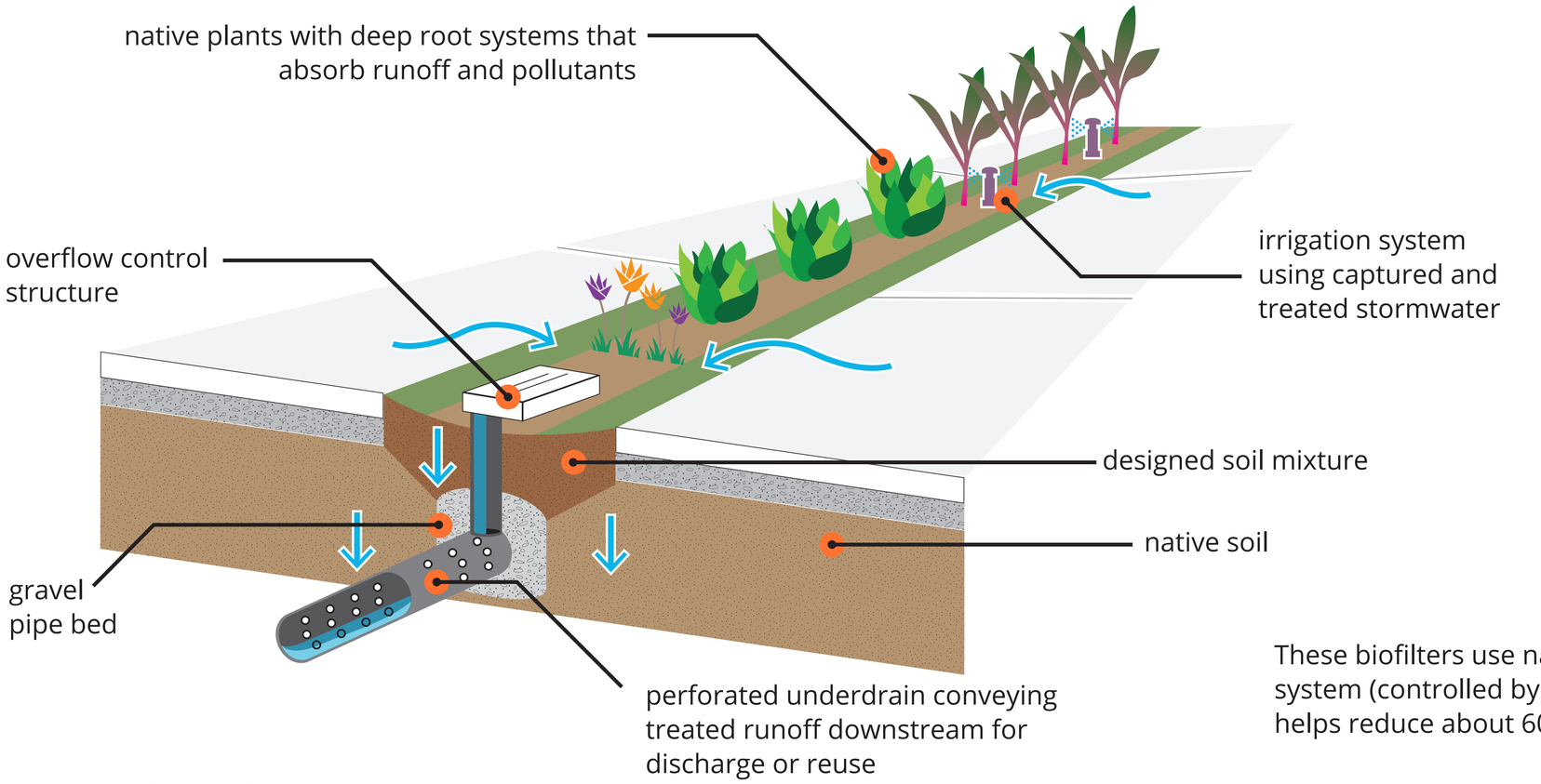
INNOVATION *inspired by* NATURE: Biofiltration

A biofilter (bioinfiltration or rain garden) is a vegetated below-grade area that collects, filters, and infiltrates stormwater.

STRUCTURE – a biofilter typically has curb cuts or other inlets, perforated underdrain in a gravel base, overflow pipe, and is filled with a designed soil mixture (sand, top soil, compost).

HYDROLOGY – a biofilter works best if stormwater flows down through the filter media. The underdrain collects filtered stormwater downstream for discharge or reuse. An overflow pipe prevents flooding.

BIOLOGY – the 'bio' part of a biofilter is an ecosystem with plants (trees, grasses, bushes), infauna (worms and bugs), and microbes. These work together to remove pollutants and maintain a biofilter's hydrology.



BENEFITS

- Pollutant removal
- Runoff reduction
- Groundwater recharge
- Heat island effect reduction
- Aesthetics
- Wildlife habitat

These biofilters use native and drought tolerant plants. A smart irrigation system (controlled by a soil moisture sensor) uses captured stormwater and helps reduce about 60% of potable water use.

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INNOVATION *inspired by* NATURE: Permeable Paving

Permeable Paving

Different from conventional impervious paving, permeable paving can function as parking lots or walkways while allowing stormwater to drain through the surface into the ground. The subdrains under the permeable paving remove excess water to maintain structural integrity and allow the treated stormwater to be further treated, infiltrated, or used.

There are three types of permeable paving used at this site:

Pervious Concrete

100”-200” per hour

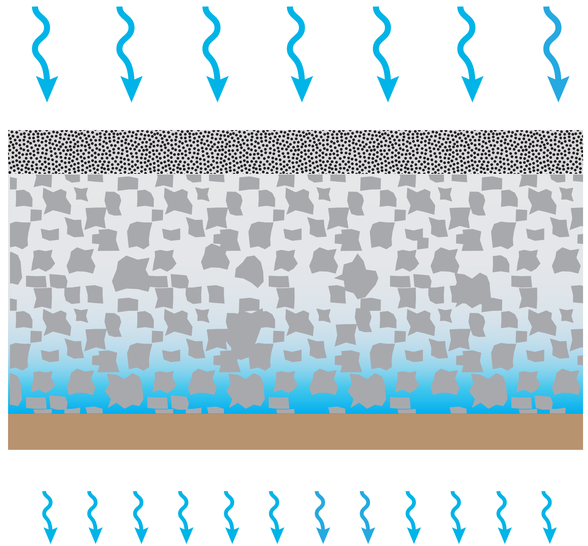
Porous Asphalt

100”-250” per hour

Permeable Pavement

50”-100” per hour

How It Works



Permeable paving consists of three layers:

The surface layer (either pavers, asphalt, or concrete) filters out particles and other pollutants.

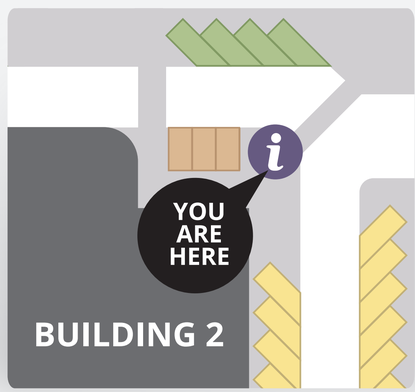
The middle layer consists of crushed rocks and stores excess water for infiltration.

The bottom layer is a permeable fabric that removes pollutants before the water is infiltrated.

BENEFITS & ISSUES

- Captures and infiltrates rain water for groundwater recharge, augmenting local water supply
- Removes pollutants from rain water runoff, reducing negative impacts due to pollution in our local waterways
- Reduces and slows down runoff to prevent localized flooding

Look at the types of permeable paving around you



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INNOVATION *inspired by* NATURE: Quest for Quantity and Quality

In Southern California, we face unique environmental challenges. **OC Public Works is proud to be part of the solution through this low impact development (LID) retrofit.**

CHALLENGES

Southern California regularly faces water shortages and does not generate enough water to sustain itself. This is due in part to the sporadic nature of storms and lack of water capture through infrastructure.

40% of our water is imported

19% of our electricity is used on water transfer

50+ miles of our waterways are impaired by pollution

Runoff from storms, irrigation, and other discharges carries pollutants into creeks and oceans. These pollutants may cause negative impacts.

Pollutants from runoff threaten aquatic life

Excess runoff wastes precious water resources

Excess runoff creates flooding risks

Treatment is expensive and difficult

SOLUTIONS

Use LID's filtration function to improve water quality and protect aquatic life.

Use LID's harvest and reuse function to prevent flooding and augment water supply

Use drought tolerant plants and smart irrigation to conserve potable water

Educate the public about effective and sustainable water management tools

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