

# Healthy Yards → Clean Streams

## Sustainable Practices for Homeowners

Fact Sheet #

# 1

**Low impact development**, or LID, is an environmentally responsible approach to managing rainfall runoff on your property. When it rains, water flows from rooftops, lawns, and driveways, to streets, gutters, and storm drains, and ultimately to our streams and coastal waters. LID designs are simple and effective ways to stop, slow, or spread the flow of storm water on your property. Altering the flow reduces flooding, gives the water a chance to soak into the ground, or gives you a chance to reuse the water for a healthy yard. By reducing the volume of water runoff, you can also decrease the amount of pollutants washed into our streams and the ocean.

### Be an Everyday Clean Water Hero!

Consider LID for your home and yard to:

- reduce storm water runoff from your property,
- reduce flooding on your property and in your neighborhood,
- reduce erosion,
- allow rain to replenish our ground water supply,
- prevent pollutants from reaching our streams and the ocean,
- conserve our precious drinking water by reusing runoff to irrigate your yard, and
- save money on your water bill.

### Examples of LID designs to consider:



Rain garden



Permeable hardscape



Downspout with a splash block



Mulch groundcover



Rain barrel



# Healthy Yards → Clean Streams

## Sustainable Practices for Homeowners

The below listed fact sheets provide additional information you will need to build LID designs into your home:

Fact Sheet #	Title	Description	Cost	Installation Difficulty	Regular Maintenance
			\$, \$\$, \$\$\$	Easy, Medium, or Complex	Easy, Moderate, or High
2	<b>Downspout Disconnection</b> 	Some downspouts may be connected directly to the storm drainage system. By detaching the downspouts you can help reduce the volume of water that reaches the streams.	\$	Easy	Easy
3	<b>Downspout Outlet Protection</b> 	Downspout outlet protection is a structure at the base of the downspout that reduces the initial impact of the runoff before it hits the ground.	\$\$	Easy–Medium	Easy
4	<b>Ground Covers</b> 	Ground covers are temporary or permanent means of protecting and stabilizing the soil to prevent soil erosion.	\$\$	Easy	Easy–Moderate
5	<b>Permeable Hardscape</b> 	Permeable hardscapes allow water to soak into the ground while also reducing the amount of runoff leaving your property.	\$\$–\$\$\$	Medium–Complex	Moderate–High
6	<b>Rain Gardens</b> 	Rain gardens are depressed planted areas where rain water can collect and soak into the soil.	\$\$	Easy–Medium	Easy
7	<b>Planter Boxes</b> 	Planter boxes are elevated containers with plants that collect and filter rain water. Disconnected downspouts can be redirected to planter boxes to help irrigate the plants.	\$\$	Easy–Medium	Easy
8	<b>Rain Barrel</b> 	A rain barrel is a catchment system that collects runoff from your roof for reuse to water your lawns and other plants.	\$\$	Complex	Easy–Moderate
9	<b>Native Plants</b>	A listing of native plants to use as ground cover, in rain gardens, and planter boxes.	\$–\$\$	Easy–Medium	Easy–Moderate



For more Information call the City's Environmental Concern Line at 768-3300, or visit us online at [www.cleanwaterhonolulu.com](http://www.cleanwaterhonolulu.com).

### *What is downspout disconnection?*

If the downspouts (the vertical pipes) from your roof gutters disappear into the ground, they may be directly connected to the City's storm drainage system. Downspout disconnection is detaching a downspout from the storm drain system thereby reducing the volume of water entering the system.

### *Why is downspout disconnection good for the environment?*

Rain water discharged onto a permeable area soaks into (infiltrates) the ground, which helps to replenish our ground water supply. Infiltration can also help to filter out sediment



Disconnected downspout with an extension directing water away from the house

and nutrients from the water, which decreases the amount of pollutants washed into our streams and the ocean.

### *Why is downspout disconnection good for me?*

Disconnected downspouts are easier to maintain than those that connect to underground pipes—clogs are easier to reach, and damaged or leaking pipes are easier to inspect and replace. Disconnecting your downspout can also give you the opportunity to harvest the rainwater for reuse in your yard, which can help to lower your water bill.

For more information about ways to harvest and reuse water from your disconnected downspout, check out other Fact Sheets in this Sustainable Practices for Homeowners Series, including:

- Fact Sheet #6: Rain Gardens
- Fact Sheet #7: Planter Boxes
- Fact Sheet #8: Rain Barrels

### **DOWNSPOUT DISCONNECTION**

**Cost:** LOW

**Installation:** EASY

**Maintenance:** EASY

#### **Equipment and Materials:**

- hacksaw
- tape measure
- hammer
- screw driver
- pliers
- sheet metal screws
- downspout elbow
- downspout extension
- rubber standpipe cap
- downspout outlet protection



# Healthy Yards → Clean Streams

## Sustainable Practices for Homeowners: DOWNSPOUT DISCONNECTION



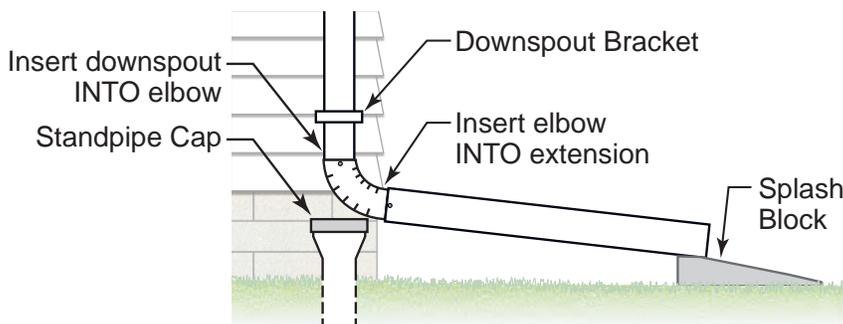
Downspout connected to standpipe

**Check for Connections:** Identify where your downspouts are located around your house, and see if they disappear into an underground connection. In some cases, you may notice an outlet at the curb or property line that discharges runoff to the street when it rains.

**Assess the Area:** The easiest and most common disconnections direct runoff into the adjacent vegetated area. If the downspout is located within an impervious area, you will need additional materials to extend the outlet, or consider adding a planter box or rain barrel to capture the runoff for reuse.

### Create an Outlet to Your Yard:

1. Using a hacksaw, cut the existing downspout approximately 9 inches from where the downspout enters the underground connection, reattach downspout bracket as needed, and remove the lower portion of the downspout.
2. Cap the standpipe (the portion of the underground system remains on the ground).
3. Crimp the bottom of the downspout with pliers and insert the downspout INTO the elbow (if you put the elbow into the downspout, it will leak). Connect the elbow to the downspout using sheet metal screws. It might be necessary to pre-drill the holes.
4. Insert the elbow into the extension and secure it with sheet metal screws, if necessary.
5. The rainwater should discharge at least five feet away from the house, so direct the extension accordingly. A splash block or other outlet protection can help direct water farther from the house and minimize erosion.



**Protect Your Building:** Direct the water onto a permeable surface and away from existing structures to avoid damage to the foundation. Do not alter runoff patterns from your property by directing more flow onto your neighbor's property.

**Protect the Ocean:** Check for existing downspout outlets that are directed toward an impervious surface that carries runoff and pollutants directly into the storm drain system and out to the stream or ocean. Redirect such outlets to discharge to a permeable area, or capture the water for reuse.

**Maintain Downspouts and Outlets:** Clean your gutters and downspouts at the beginning of the rainy season and inspect after severe storms. Use a plumber's or electrician's snake to clean out any obstructions. Adjust or replace the outlet protection (splash block, gravel, etc.) as needed to prevent erosion at the outlet.



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[www.cleanwaterhonolulu.com](http://www.cleanwaterhonolulu.com).

### *What is downspout outlet protection?*

Downspouts are the pipes that direct the rain water from your roof to the ground, and downspout outlet protection is a structure at the outlet of the downspout that reduces the initial impact of the runoff before it hits the ground. Common examples include splash blocks and rock dissipaters.



Splash block

If your downspout connects directly into a storm drain system, consider disconnecting your downspouts and adding an outlet to a permeable surface (see Fact Sheet #2 of the Sustainable Practices for Homeowners Series). You can also consider directing the flow to a rain garden (Fact Sheet #6), planter box (Fact Sheet #7), or rain barrel (Fact Sheet #8).

### *Why is downspout outlet protection good for the environment?*

Downspout outlet protection slows down the flow of runoff from your roof and/or spreads it out so it can soak into the ground. Impeding the flow helps to filter out the sediment and nutrients that were washed off your roof and decreases the amount of pollutants carried into our streams and the ocean. Increasing the amount of rain water that soaks into the ground also helps to replenish our ground water supply.



Downspout extension directs water flow to the lawn

### **DOWNSPOUT OUTLET PROTECTION**

**Cost:** LOW to MODERATE

**Installation:** EASY to MODERATE

**Maintenance:** EASY

#### **Types:**

- 💧 Vegetation
- 💧 Splash Block
- 💧 Flexible/Retractable Extension
- 💧 Rock Dissipator
- 💧 Rain Chain

### *Why is downspout outlet protection good for me?*

Downspouts can sometimes produce concentrated, high velocity runoff that creates ruts and puddles in your yard. Protecting the ground at the outlet of your downspout helps to minimize erosion and damage on your property.



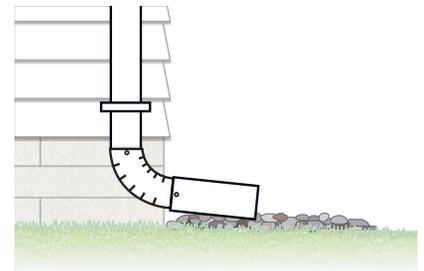
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## Sustainable Practices for Homeowners: DOWNSPOUT OUTLET PROTECTION

**Site Selection:** ALL outlets on your property.

**Choose wisely.** When selecting a downspout outlet protection for your home, consider the amount of runoff, space requirements and visual impact:

- VEGETATION:** Thick, well-established grass may be adequate for infrequent, low-velocity flows on relatively level ground that slopes away from the building. Concentrated, higher velocity flows may result in erosion. Shade or sun exposure should be considered when selecting the vegetation.
- SPLASH BLOCK:** A rectangular wedge made of concrete, metal, or plastic, where the lower, wider portion of the wedge faces away from the building to divert water away from the structure. For areas with frequent, heavy rains, choose a splash block with a broad base to spread the runoff over a wider area. The force of the water may cause the block to shift, so inspect splash blocks occasionally and adjust or re-level as needed.
- FLEXIBLE/RETRACTABLE EXTENSION:** A plastic pipe or tube used to redirect water away from the outlet. Flexible extensions can be angled around corners or into rain catchments like rain gardens, rain barrels, or planter boxes. Retractable extensions occupy less space during dry conditions and automatically unroll to discharge runoff at the beginning of the rain event. Prevent tripping hazards and avoid placing downspout extensions across walkways.
- ROCK DISSIPATOR:** Recommended option for concentrated, high velocity runoff. Rocks must be properly sized to prevent movement; smaller rocks are more likely to be washed away. Angular rocks, such as gravel, are recommended for high velocity flows because they lock in place and will slow down the water more than smoother stones. Provide a layer of rock at least 2 inches deep. Direct the water away from the building to prevent damage to the structure and/or its foundation. Inspect and adjust rocks as needed; stagnant water can breed mosquitoes.
- RAIN CHAIN:** A decorative feature used in place of a downspout to slow the flow of water from the gutter. The base of the chain should be secured to the ground and surrounded by vegetation or rocks to minimize erosion.



Rock dissipator



This rain chain directs water to a rain barrel.

**Take out the trash.** Clean your gutters and downspouts at the beginning of the rainy season and inspect after severe storms. Use a plumber's or electrician's snake to clean out any obstructions.

**Prevent damage and floods.** Direct the water away from the building to prevent damage to the structure and/or its foundation. Do not alter runoff patterns from your property by directing more flow onto your neighbor's property.

**Double down.** Do more for yourself and the environment with your downspout outlet protection by combining it with another sustainable practice! Rain gardens, planter boxes, and rain barrels can be designed to capture runoff from multiple outlets; read more about these ideas in Fact Sheets #6, #7, and #8 in this series.



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## Sustainable Practices for Homeowners: GROUND COVERS

### What is a ground cover?

Ground covers are temporary or permanent means of protecting and stabilizing the soil. Ground covers include vegetation, gravel, wood chips, erosion control mixes (ECMs), and mulches.

### Why are ground covers good for the environment?

Ground covers can be used to protect areas of bare soil and prevent erosion on your property. They can also slow down the flow of rain water along the ground and filter out sediment and nutrients. Slowing the flow helps to decrease the amount of pollutants washed into our streams and ocean.

### Why are ground covers good for me?

Ground covers help to retain moisture in the soil by promoting infiltration and slowing evaporation. Higher soil moisture means less irrigation and you conserve water. Ground covers can also help to prevent weed growth and reduce erosion of soil. Install ground covers on your property to address areas of bare soil or to simply beautify your yard.

#### GROUND COVERS

**Cost:** LOW to MODERATE  
**Installation:** EASY  
**Maintenance:** EASY to MODERATE



This rain garden at Punahou School's K-1 campus utilizes several types of ground cover.



Free mulch is available from the City and County of Honolulu. [http://www.opala.org/solid\\_waste/media/Graphics\\_Library/Recycled\\_Products/pages/Free%20Mulch\\_.jpg.htm](http://www.opala.org/solid_waste/media/Graphics_Library/Recycled_Products/pages/Free%20Mulch_.jpg.htm)

### GROUND COVERS

Vegetation	Organic Mulches	Erosion Control Mixes	Inorganic Mulches
Grasses and other low-lying plants.	Grass clippings, wood chips, bark mulch, etc.	Mulch mixture composed of wood fragments, sand, gravel, and stone.	Gravel, stones, brick chips, recycled glass, etc.
			

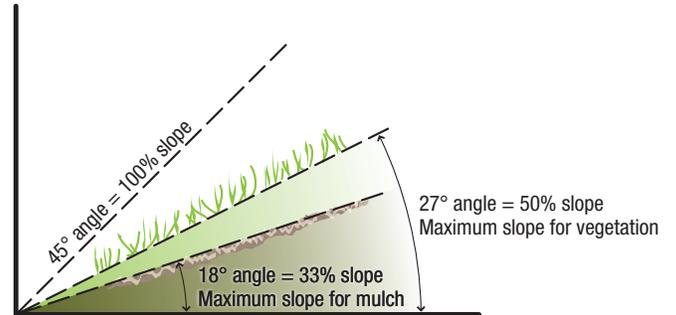


# Healthy Yards → Clean Streams

## Sustainable Practices for Homeowners: GROUND COVERS

### Things to Consider Before Choosing Your Ground Cover:

- Maintenance Depends on Location and Use:** Decorative ground covers in level landscaping are easy to maintain, but on slopes and in higher-traffic areas, like footpaths or driveways, they require regular inspection and maintenance.
- Slopes:** Vegetation and erosion control mixes are a good choice for areas with less than a 50% slope. Mulches typically work best in areas with less than a 33% slope. Terraced steps should be considered for steeper areas.
- Don't Get Washed Away!** Inorganic mulches (stones, gravel) and certain types of vegetation can withstand larger amounts of runoff, but some organic mulches are easily washed away on slopes. Do not use mulches in areas with concentrated water flows.



Vegetation and mulch ground cover

- Go Green:** Vegetation is usually the most visually appealing option. Native plants (Fact Sheet #9) are a great option because they are adapted to the climate and often require less fertilizer than other plants. Check with your local garden shop or plant nursery for recommendations.
- Recycle:** Your yard can be a good source for grass clippings and leaves. Organic mulch is also available from the City; for more information, contact the City's Recycling Office at 768-3200 or [info@opala.org](mailto:info@opala.org).

- Go Organic:** Organic mulch will slowly decay and may need to be replaced annually. Keep organic materials at least 6 inches away from building siding to prevent transfer of fungus growth or other unwanted pests.

- Rake'n'Replace:** Inorganic mulch should be raked regularly to prevent buildup of organic materials. Inorganic mulch may need to be replaced every few years if they tend to work down into the soil.

Mulch Material	Depth	Life Span of Material
Grass clippings	1–2 inches	1–3 months
Compost	3–4 inches	6–8 months
Wood chips	3–4 inches	6–9 months
Macadamia husks	3–4 inches	8–10 months
Gravel	3–4 inches	1–2 years



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## Sustainable Practices for Homeowners: PERMEABLE HARDSCAPE

### What is permeable hardscape?

Permeable hardscape is a hard surface that allows water to soak into the ground, unlike traditional non-permeable hardscapes that result in increased storm water runoff. Turf blocks, porous pavers, and porous pavement are different types of permeable hardscapes that can be used for terraces, walkways, driveways, and overflow parking.

### Why is permeable hardscape good for the environment?

Permeable hardscapes can slow down the flow of runoff from rooftops, sidewalks, and driveways and filter out sediment and nutrients. Slowing down the flow helps to decrease the amount of pollutants washed into our streams and the ocean. Permeable hardscapes also increase the amount of rain water that soaks into the ground, which helps to replenish our ground water supply.

### Why is permeable hardscape good for me?

Permeable hardscape can be an environmentally responsible and aesthetically pleasing alternative to traditional pavements like concrete and asphalt. Permeable hardscape can also help to stabilize soil, eliminate puddles, or minimize erosion on your property.

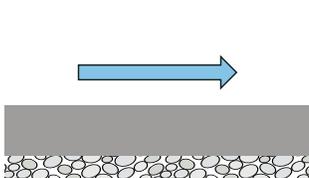
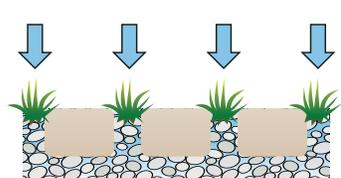
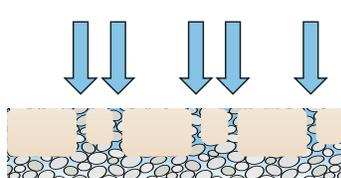
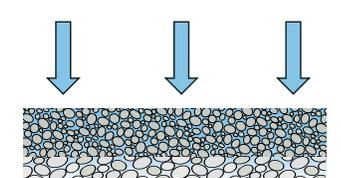


Turf block driveway

### PERMEABLE HARDSCAPE

- Cost:** MODERATE to HIGH
- Installation:** MODERATE to COMPLEX
- Maintenance:** MODERATE to HIGH

**Site Selection:** Permeable hardscapes work best over sandy or well-drained soils that are relatively flat. They are not suitable for areas near or downslope of loose or eroded materials, as sediment may clog the soil layers.

PERMEABLE HARDSCAPE			
Traditional Hardscape	Turf Blocks	Porous Pavers	Porous Pavement
Asphalt concrete (AC) pavement or concrete pavement	Interlocking concrete or plastic cells that are filled with soil and planted with grass or ground cover. Rain water soaks into the ground in the planting spaces.	Pavers come in various shapes and materials and interlock to create a variety of geometric patterns. Rain water can soak into the ground in the spaces between the pavers.	Porous pavement appears to look like traditional pavement but contains pore spaces that allow rain water to soak into the ground.
			



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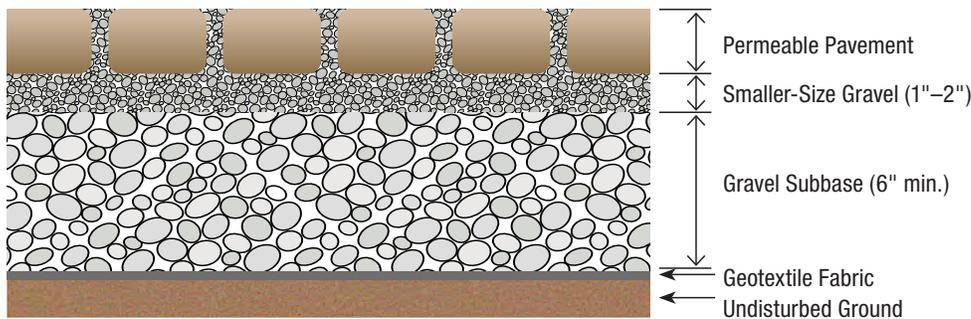
## Sustainable Practices for Homeowners: PERMEABLE HARDSCAPE

### SUBBASE LAYER

The stone or gravel subbase under the permeable hardscape collects rain water before it is soaked into the ground. Two types of gravel are used; the upper layer uses small-sized gravel to stabilize the hardscape, and the bottom layer uses gravel to store the storm water. Refer to the manufacturer's instructions for recommended depths and types of gravel.

### GEOTEXTILE FABRIC

The non-woven geotextile fabric is installed below the subbase layer. The fabric provides a barrier to prevent fine soil particles from migrating up into the subbase layer and clogging it.



Cross section of permeable hardscape layers



Turf blocks



Permeable paver stones



This person is standing at the edge of traditional asphalt, above, and permeable asphalt, below.

Where to use permeable hardscapes	Limitations
On relatively flat slopes, less than 10% grade	Plants in the turf blocks require irrigation
On sandy soils that absorb water quickly	Higher construction costs than traditional pavement
Away from erosion-prone areas that could clog the surface	Porous pavers and pavement require regular sweeping and occasional vacuuming to prevent clogging
Away from where hazardous materials are stored or handled	Proper installation is required; hire a licensed contractor to install these products
Away from areas where groundwater can be found at shallow depths, 5–6 ft. below the surface	



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### *What is a rain garden?*

A rain garden is a planted area within a natural or man-made depression in the ground where rain water runoff can collect and soak into the soil. Rain gardens can be designed in any shape, and plants can be selected for areas in the shade or with full sun exposure.



Rain garden

### RAIN GARDENS

- Cost:** LOW to MODERATE
- Installation:** EASY to MODERATE
- Maintenance:** EASY (typical yardwork)
- Materials:**
- 💧 **Native or non-invasive plants** with different soil moisture tolerances
  - 💧 **Garden tools:** shovels, rakes, etc.
  - 💧 **Soil amendments** (sand, mulch, compost) to improve drainage
  - 💧 **Downspout extensions** and **splash blocks**, as needed
  - 💧 Optional: **border/edging materials** for the perimeter of your rain garden (permeable pavers, stones, etc.)

### *Why is a rain garden good for the environment?*

Rain gardens can slow down the flow of runoff from rooftops, sidewalks, and driveways and filter out sediment and nutrients, decreasing the amount of pollutants washed into our streams and the ocean. Rain gardens also increase the amount of rain water that soaks into the soil, which helps to replenish our ground water supply.

### *Why is a rain garden good for me?*

Rain gardens can be a beautiful addition to your yard. A properly designed rain garden can also help to eliminate puddles or minimize erosion on your property.



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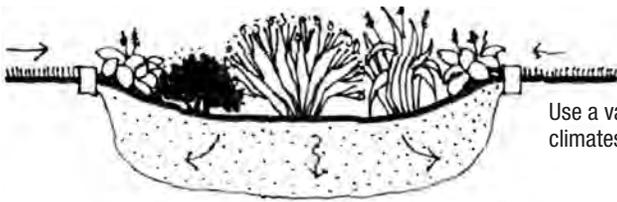
## Sustainable Practices for Homeowners: RAIN GARDENS

**Site Selection:** Locate your rain garden away from buildings and ensure that any overflow will be directed away from them to avoid damage to the foundation. Do not alter runoff patterns from your property by directing more flow onto your neighboring parcels.

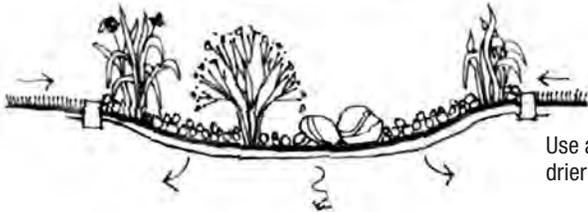
**Plant Selection:** Native plants (Fact Sheet #9) are a great option because they are adapted to the climate and often require less fertilizer than other plants. Choose moisture-tolerant plants for the lowest portion of the garden and drought-tolerant plants for the upper edges of the garden. Check with your local garden shop or plant nursery for recommendations.



Rain Garden at Punahou School's K-1 campus



Use a variety of native plants for wetter climates or larger runoff volumes.



Use a combination of plants and rocks for drier climates or smaller runoff volumes.



On a slope, create a depression on the upper side and a mound on the lower side.

<http://greenowu.wordpress.com/category/rain-gardens>

**If you have to dig:** The lowest point of the garden should be no more than 6 inches below the surrounding land, but you may need to dig deeper to install a sublayer of coarser soil for improved drainage. Be careful not to cut or damage any utility lines.

**It's not a wastewater garden!** Use your rain garden to collect storm water only. Never reroute water from your sinks, toilets, dishwasher, or laundry washer into a rain garden. Disposal of non-rain water sources could be a violation of regulations related to ground water and wastewater.



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# Healthy Yards → Clean Streams

## Sustainable Practices for Homeowners: PLANTER BOXES

Fact Sheet #

7

### *What is a planter box?*

A planter box is an elevated container of plants that collects and filters rain water. Planter boxes can be used as part of a downspout disconnection system to treat and reuse roof runoff. Planter boxes can be prefabricated containers or constructed in place.

### *Why is a planter box good for the environment?*

Planter boxes use rain water for irrigation. They should be considered to address ponding in an impervious or poorly drained area. As part of a downspout disconnection system, planter boxes can slow down the flow of runoff from your rooftop and filter out sediment and nutrients, decreasing the amount of pollutants washed into our streams and the ocean.



Planter container

### **PLANTER BOX**

**Cost:** LOW to MODERATE

**Installation:** EASY to MODERATE

**Maintenance:** EASY

#### **Materials:**

- Prefabricated container or construction materials—wood, concrete, brick, etc.
- Soil
- Gravel
- Geotextile fabric
- Native or non-invasive plants with different moisture tolerances
- Garden tools: shovels, rakes, etc.
- Optional: Downspout disconnection/modification materials (see Fact Sheet #2) and Downspout outlet protection (see Fact Sheet #3)

### *Why is a planter box good for me?*

Planter boxes can be a beautiful addition to your yard or patio. Rerouting excess runoff into a planter box can also help to eliminate puddles or minimize erosion on your property.



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## Sustainable Practices for Homeowners: PLANTER BOXES

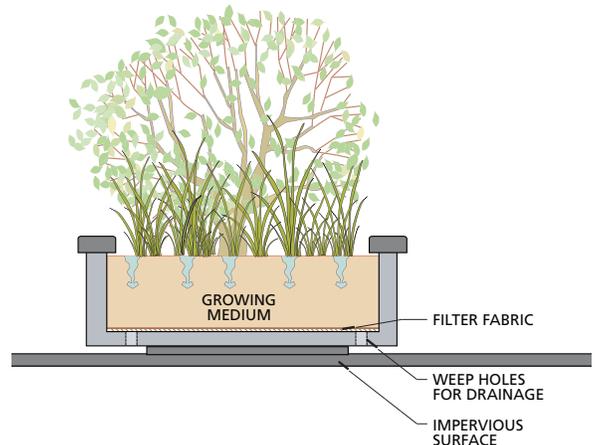
**Site Selection:** Planter boxes can be used in many locations, including on impervious surfaces, areas that do not drain well, or slopes. Ensure that any overflow from your planter box will be directed away from existing structures to avoid damage to the foundation. Do not alter runoff patterns from your property by directing more flow onto your neighbor's property.

**Plant Selection:** Native plants (Fact Sheet #9) are a great option because they are adapted to the climate and often require less fertilizer than other plants. Check with your local garden shop or plant nursery for recommendations. Potted plants may require more water than the same plants growing in the ground.

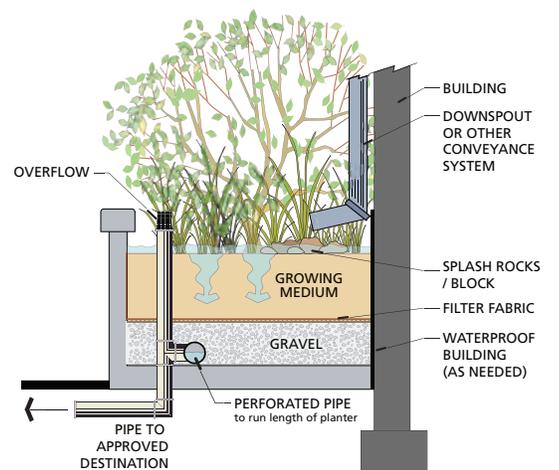
**Rain water, not wastewater:** Use your planter boxes to collect storm water only. Never reroute water from your sinks, toilets, dishwasher, or laundry washer into a planter box; disposal of non-rain water sources could be a violation of regulations related to ground water and wastewater.



Contained planter box  
<http://www.portlandonline.com/bes/index.cfm?a=127472&c=31870>



Planter box with storage and overflow  
<http://www.portlandonline.com/bes/index.cfm?a=127475&c=31870>



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### *What is a rain barrel?*

A rain barrel is a catchment system that collects runoff from your roof for reuse.

### *Why is a rain barrel good for the environment?*

Rain barrels capture runoff that might otherwise flow through your yard, potentially picking up sediment and other pollutants on its way to a stream or the ocean. Rain barrels also conserve water. Stored rain water can be used to water lawns, ornamental gardens, and indoor plants.

### *Why is a rain barrel good for me?*

Rain barrels reduce your use of potable (drinking) water for non-potable uses and lower your water bill. Using a rain barrel in your yard demonstrates your commitment to water conservation.

Materials to build your own rain barrel can be purchased from local vendors or ordered online. The Board of Water Supply also offers workshops on rain barrels at the Hālawa Xeriscape Garden.

Lots of (Re)uses!

- Water your lawn
- Water an ornamental garden
- Water indoor and potted plants
- Wash your car or bike
- Rinse the sand off your feet after a trip to the beach



Rain barrel



Rain barrel

### RAIN BARREL

**Cost:** LOW to HIGH

**Installation:** COMPLEX

**Maintenance:** EASY to MODERATE

#### Tools and Materials:

- Barrel: 55-gallon food grade plastic
- Saw: jig saw or keyhole saw
- Fine-Mesh Screen Material
- Sealant: Caulk, Teflon tape, etc.
- ¾" (or ½") hose bibb (faucet)
- ¾" (or ½") hose adapter
- Downspout elbow joint and extensions, if needed
- Optional: Cinder blocks for the base
- Optional: downspout disconnection supplies (see Fact Sheet #2)



# Healthy Yards → Clean Streams

## Sustainable Practices for Homeowners: RAIN BARRELS

### Site Selection:

- Where are your downspouts? The closer the rain barrel sits to the existing downspout, the easier it will be for you to reroute the outlet to discharge into the barrel.
- Where will you use the water in your yard? A rain barrel is a gravity flow system, so the rain barrel should be higher than the area to be watered.
- Where do you have space to put a rain barrel? A 55-gallon drum will require about 4 square feet of space.

### Build-a-Barrel:

1. Buy a new barrel from a local vendor or buy a used one from a local company that uses barrels for food product storage (Note: barrels that were used to hold chemicals or toxins should never be used to build a rain barrel). Wash the barrel, inside and out.
2. Drill a hole in the side wall near the bottom of the barrel for the hose bibb fitting, leaving enough space to fill a watering can or connect a watering hose.
3. Tap the hole, wrap the threads of the hose bibb with the sealant, and screw into the hole.
4. Optional: add an overflow hose near the top of the barrel to connect to a second container or to direct excess water away from your house.
5. Use the saw to cut a hole at the top of the barrel. Cover the hole with a screen to keep debris out of your rain barrel.



Adding a spout to the barrel  
[http://www.boardofwatersupply.com/files/Rain Barrel Placement and Maintenance 2010.pdf](http://www.boardofwatersupply.com/files/Rain%20Barrel%20Placement%20and%20Maintenance%202010.pdf)



Rain enters barrel through a screened opening  
[http://www.boardofwatersupply.com/files/Rain Barrel Placement and Maintenance 2010.pdf](http://www.boardofwatersupply.com/files/Rain%20Barrel%20Placement%20and%20Maintenance%202010.pdf)

6. Level the area where your rain barrel will sit. Cinder blocks can be used to create a raised base, but make sure it is sturdy and level. A 55-gallon barrel, when full, will weigh over 400 pounds!
7. Connect your gutter to the rain barrel by disconnecting or shortening the downspout pipe. Direct the downspout outlet toward the screen-covered hole using an elbow joint and/or extension.

**WARNING: Non-Potable!** Do not drink the water stored in your rain barrel.

**Maintenance:** Clean your gutters and downspouts at the beginning of the rainy season and inspect after severe storms. Check the screen at the top of your rain barrel after each storm to remove debris that can clog or damage the screen. Use a tight-fitting lid to keep children and animals out of the water.

**Mosquitoes:** Keep the lid of your rain barrel sealed to keep mosquitoes from breeding in the standing water.

**Only Rain in the Rain Barrel!** Use your rain barrel to collect storm water only. Never reroute water from your sinks, toilets, dishwasher, or laundry washer into a rain barrel; disposal of non-storm water sources could be a violation of regulations related to ground water and wastewater.



For more Information call the City's Environmental Concern Line at 768-3300, or visit us online at [www.cleanwaterhonolulu.com](http://www.cleanwaterhonolulu.com).

# Healthy Yards → Clean Streams

## Sustainable Practices for Homeowners: NATIVE PLANTS

Fact Sheet #

9

### What are native plants?

A native plant is a plant that arrived in Hawaii by wind, water, or on the wings of birds and survived in the islands prior to human contact. Native plants should be used instead of non-native plants because native plants are best suited for local conditions. There are a variety of native plants available for purchase at most local nurseries and can be used as groundcover (Fact Sheet #4), in rain gardens (Fact Sheet #6), or in planter boxes (Fact Sheet #7).

The following plant list provides some information on native plants suitable for most home landscapes:

GROUNDCOVER		
PLANT NAME	SCIENTIFIC NAME	
'Ae'ae	<i>Bacopa monnieri</i>	 
'Ākulikuli	<i>Sesuvium portulacastrum</i>	
Hinahina	<i>Heliotropium anomalum</i>	
'Ilima papa	<i>Sida fallax</i>	
Pohinahina	<i>Vitex rotundifolia</i>	
SHRUBS/BRUSH		
PLANT NAME	SCIENTIFIC NAME	
'A'ali'i	<i>Dodonaea viscosa</i>	 
'Akia	<i>Wikstroemia uva-ursi</i>	
Pāpala	<i>Charpentiera sp</i>	
'Uki'uki	<i>Dianella sandwicensis</i>	
TREES		
PLANT NAME	SCIENTIFIC NAME	
Bastard Sandalwood	<i>Myoporum sandwicense</i>	
Lonomea	<i>Sapindus oahuensis</i>	
'Ohi'a Lehua	<i>Metrosideros polymorpha</i>	

For additional plant listings see Attachments A-1 and A-2 in the Green Infrastructure Handbook for the State of Hawaii.

