City of Los Angeles
Rainwater Harvesting Program

A Homeowner's "How-To" Guide

November 2009 · 1st Edition

CITY OF LOS ANGELES
SANITATION
DEPARTMENT OF
PUBLIC WORKS

STORMWATER
PROGRAM
CITY OF LOS ANGELES

City of Los Angeles Rainwater Harvesting Program

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Introduction

Background

The City of Los Angeles Rainwater Harvesting Program is designed to help homeowners learn to capture rainwater for beneficial use, and reduce the amount of rainwater flowing from their roofs into the storm drain system. The Program calls for disconnecting downspouts that discharge to impervious areas and redirecting them to areas where rainwater can percolate into the soil, or collect into rain barrels.

Due to heavy groundwater usage in Southern California, approximately 3.2 million-acre feet of space are available for groundwater recharge. That is equal to 12,000 Rose Bowls filled to the top with water. A recent study described soil conditions in most of the Southern California region as highly permeable, allowing for rapid infiltration into groundwater basins[1]. The rainwater harvesting process described in this "How-To" Guide will help increase local water resources by promoting groundwater recharge.

What is Rainwater Harvesting?

Many residential and commercial properties in the City of Los Angeles are fitted with downspouts. When it rains, water runs off roofs, through these downspouts and usually onto an impervious surface such as a sidewalk, driveway or parking lot.

Rainwater harvesting is the process of intercepting rainwater from a roof (or other surface) and putting it to beneficial use. By implementing the harvesting techniques in this guide, homeowners gain an extra water supply while simultaneously reducing the pressure on our limited water supplies.

Who Should Use this Manual?

This guidance manual will help homeowners implement the first steps of harvesting rainwater. It contains "How-to" information for the homeowner interested in disconnecting downspouts to capture and use rainwater. By following the step-by-step instructions homeowners can: (1) disconnect existing downspouts; (2) extend downspouts to areas that can infiltrate rainwater; (3) install a rain barrel; and (4) construct a rain garden or other infiltration mechanism. Homeowners looking to implement additional rainwater harvesting methods, or seeking supplemantal "How-to" or troubleshooting information should refer to Additional Resources provided in this guide. The program website (**www.LARainwaterHarvesting.org**) will be updated with useful information as well.

[1] Natural Resource Defense Council Technical Report. A Clear Blue Future: How Greening California Cities Can Address Water Resources and Climate Challenges in the 21st Century. August 2009.

Why Harvest Rainwater?

To Protect Our Bays and Ocean

When rainwater flows from a downspout onto our sidewalks, driveways and streets, it collects a variety of pollutants. By capturing rainwater that falls on roofs, landowners help reduce the amount of runoff ultimately reaching the Santa Monica or San Pedro Bays, and thus aid in improving the quality of our local surface waters.

To Reduce Energy Demands

The State of California Energy Commission reported that water-related energy consumption in California accounts for nearly 20% of the State's electricity, 30% of its natural gas, and requires about 88 billion gallons of diesel fuel every year [2]. One inch of rain falling on 1,000 square feet of rooftop produces more than 600 gallons of water. If homeowners replaced this amount of potable water with captured rain water, energy consumption in the State should be reduced.

To Practice Water Conservation

California has entered an era of increasing water scarcity, coupled with projections of increased temperatures up to 10 degrees Fahrenheit by the end of this century.[1]

[2] The State of California Energy Commission. California's Water-Energy Relationship Final Staff Report. November 2005. (http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF)

Using rainwater to water plants helps conserve dwindling drinking water supplies.

To Recharge Groundwater Supplies

Approximately 40% of Southern California's drinking water comes from groundwater. Harvesting rain water and allowing it to infiltrate into the ground replenishes our groundwater supplies.

Overview of Rainwater Harvesting

Redirection Options

The City suggests redirecting stormwater runoff from downspouts to either a rain barrel or an on-site pervious area such as a flower bed or rain garden as "first-steps" in the rainwater harvesting process. There are many more features that can be implemented on a residential property to capture and utilize rainwater. Please refer to the Sections: Other Rainwater Harvesting Options and Additional Resources for more rainwater harvesting ideas.

What is a Rain Barrel?

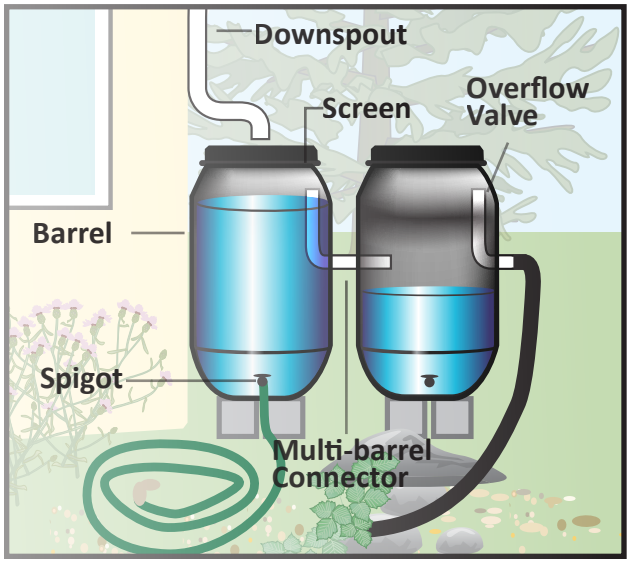
Rain barrels store rainwater from roofs for reuse in landscape irrigation. Rain barrels are containers typically made of a heavy duty plastic and can range in size from the standard 55 gallons to more than 80 gallons. Eco-friendly rain barrels assembled from recycled food barrels or manufactured from recycled plastics are available to consumers.

Key components of a rain barrel include the following:

- A screen to keep debris and mosquitoes out
- A spigot
- An overflow
- A connector for linking multiple rain barrels (if desired).

Rain barrels are typically placed below downspouts and must meet the following requirements:

- Rain barrels should not allow UV light penetration in order to prevent algae growth;
- Rain barrels must be covered and any openings must be screened to prevent mosquito breeding; and
- Rain barrels must be accessible for periodic cleaning.



A typical rain barrel set up

Information on where to purchase a rain barrel and rain barrel pricing can be found on the City's website at:
www.LARainwaterHarvesting.org

What is a Rain Garden?

Homeowners can maximize both environmental and economic benefits by installing a rain garden in place of a grassy or impervious area. A rain garden is a shallow depression that captures rainwater and allows it to soak into the ground. Plants help to filter the rainwater as it moves through the soil layer. A rain garden is most often planted with native species creating a natural ecosystem on properties where birds, butterflies, and beneficial insects thrive. Rain gardens also capture sediments carried by rainwater, preventing them from clogging the stormdrains. Incentives for creating rain gardens are provided by the Los Angeles Department of Water and Power (LADWP) through their Residential Drought Resistant Landscape Incentive Program. Also called the cash-for-grass program, LADWP pays single family residential customers $1 for each square foot of grass removed and replaced with drought tolerant plants, mulch and pervious areas. The program is dependent on budget availability. For more information about the cash-for-grass program, call LADWP (888) 376-3314.

A swale directs water from the downspout to the rain garden. Many swales use rocks that create a dry creek bed look.

How to Harvest Rainwater on Your Own

Assess Your Site

Preparing a site sketch will help to determine downspouts to disconnect. Begin by drawing an outline of the home from a bird's eye view. Walk the perimeter and mark the location of all downspouts on your sketch. Note which downspouts are connected to rain gutters; these downspouts are candidates for disconnection. Draw in roof lines, and estimate the square footage of the roof area (**Figure 1**).

Redirection Criteria Checklist and Safety Considerations

It is suggested that the following list of conditions are met in order to safely redirect a downspout from a roof to a pervious area without damaging building foundations, or flooding a basement or neighboring properties.

As a guideline, direct downspouts:

- To gently sloped areas (preferably 10% slopes or less – See How to measure a slope);
- To areas sloping away from buildings;
- To rain gardens (See How to Build a Rain Garden);
- Never above septic tanks;
- Never to areas that experience ponding;
- Never to fill areas.

As a guideline, locate downspouts:

- At least 3 feet away from public sidewalks;
- At least 5 feet away from property lines;
- At least 5 feet away from house foundations and crawl spaces, assuring at least a 2% slope away from the home;
- At least 6 feet away from basement walls.

How to measure a slope:

Tie a level string to two stakes pounded into the ground. Make certain that the string attached to the uphill stake is at ground level. Measure the distance between the stakes. This is considered the width. Measure the distance from the string on the downhill stake to the ground. This is the height. Make certain that the height and width are the same units. Divide the height by the width to get the slope. Multiply this by 100 to obtain the percent slope. (**Figure 2**)

Example of Slope Calculation:

Height = 6 inches = 0.5 feet

Width = 10 feet

0.5 feet ÷10 feet= 0.05

0.05 ×100 = **5% Slope**

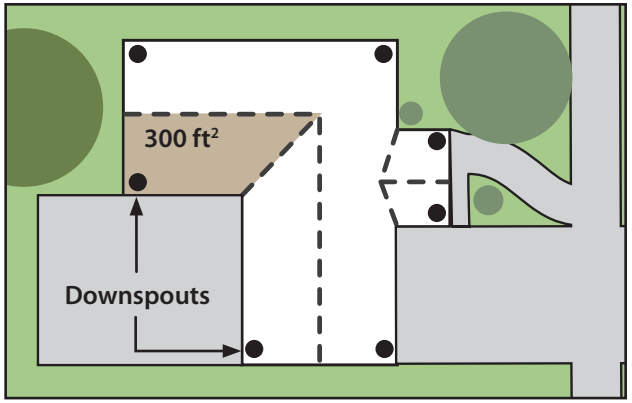


Figure 1: Example sketch of site

Example of Roof Area Calculation:

L^r = 25 ft L^t = 10 ft

W_r, W_t = 10 ft

Roof Area = (Lr x Wr) + 1/2(Lt x Wt) =
250 (square feet) + 50 (square feet) =
300 (square feet)

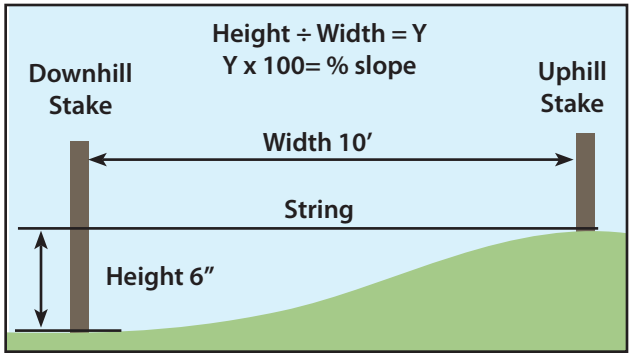


Figure 2: How to measure a slope

How to Redirect a Downspout to a Pervious Area

Before you Begin

Prepare all of the tools and materials that you need. It is best to use durable, gutter-grade materials, such as ABS Schedule 40 plastic options. Other materials such as corrugated black plastic, PVC pipe, or dryer hose can be used but tend to be less durable. Consult a home and garden specialist when purchasing materials for further assistance. See the list below and Figure 3 for tools and materials you will need. Be sure to wear safety glasses.

Tools:

- Hacksaw
- Tin snips
- Drill
- Needle-nose pliers or crimpers
- Tape measure
- Screwdriver or nut driver
- Safety glasses

Materials:

- Downspout extension
- Sheet metal screws
- Elbow
- Bracket
- Splash guard

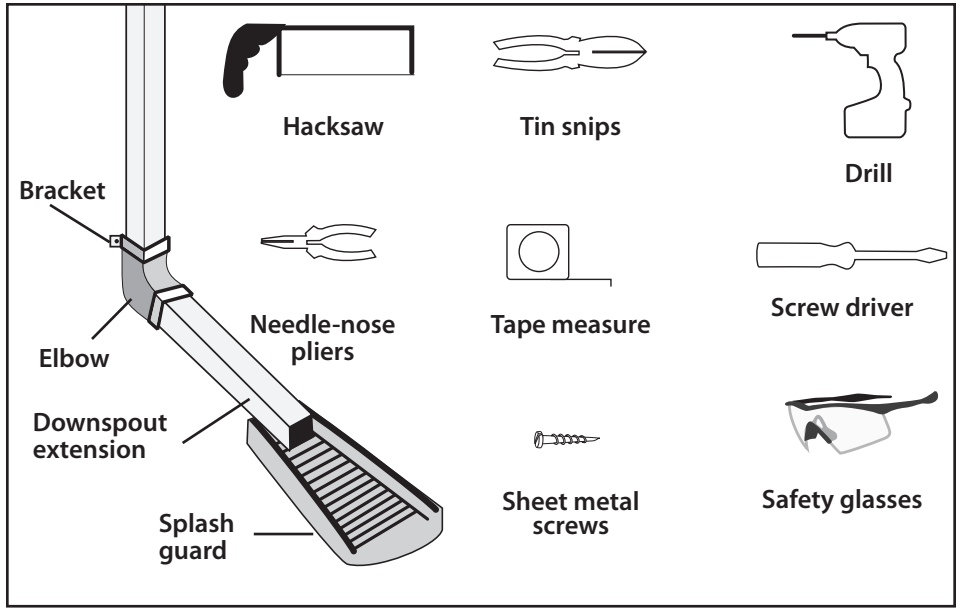


Figure 3: Materials and tools for redirecting the downspout

Select downspouts to disconnect that are connected to a rain gutter **(Figure 4)**. Some homes in the City of Los Angeles are not fitted with rain gutters. If a home does not have rain gutters along the perimeter of the roof, homeowners might consider installing them. This guidance manual does not provide information on how to install rain gutters because these tasks involve roof seals and require professional expertise.

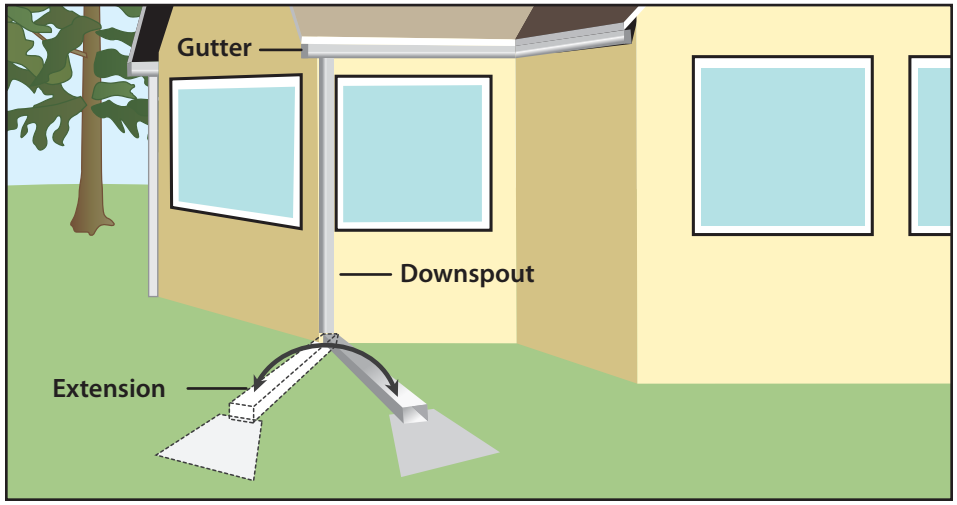
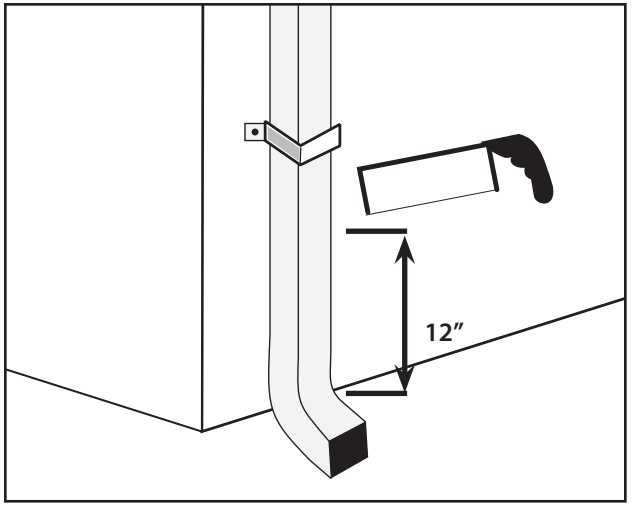
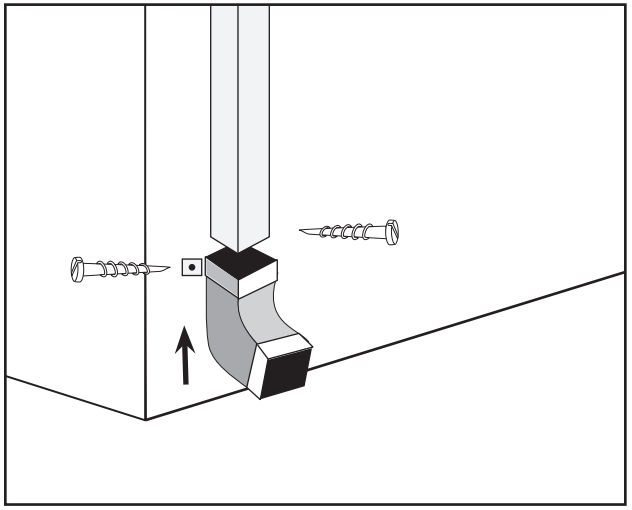


Figure 4: Rain gutter and downspout



Steps 1-2



Step 3

Redirection Procedure

Redirecting a downspout to a pervious area is a simple procedure.

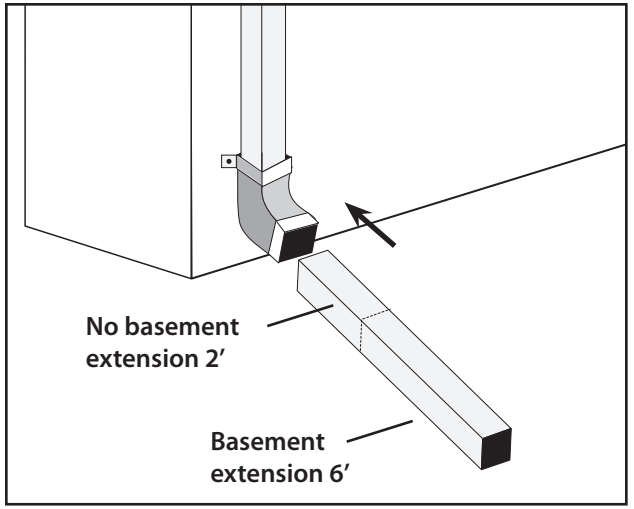
Step 1: Mark approximately 12 inches from the ground to the downspout. This height should work for up to a 6 foot extension. Cut the downspout higher for longer extensions.

Step 2: Using a hacksaw, cut the downspout at the mark. Remove the cut piece. You may need tin snips to smooth the material.

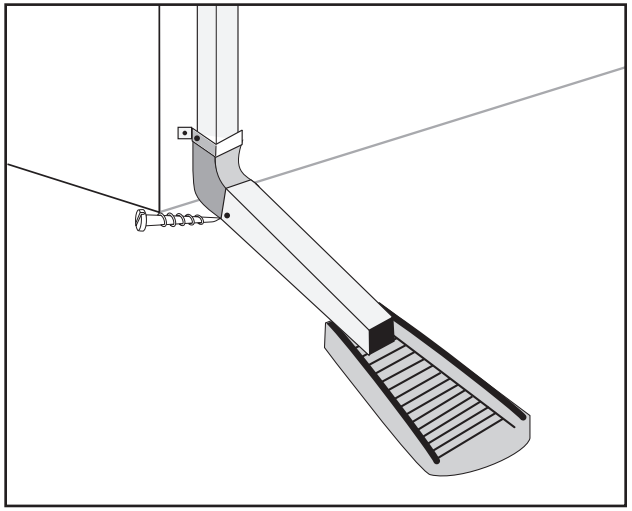
Step 3: Attach the elbow over downspout. If the elbow does not fit over the downspout, use crimpers or needle-nose pliers to crimp the ends of the cut downspout and slide it inside the elbow. Attach the elbow to the downspout with screws; it might help to pre-drill holes. For additional stability, consider securing the elbow to the building with a bracket.

Step 4: Measure and cut the downspout extension to the desired length. Attach the extension to the elbow by slipping the extension over the end of the elbow.

Step 5: Use screws to attach the extension to the elbow; it might help to pre-drill holes. For additional stability consider resting the extension on a support like a cinder block. To prevent erosion, place a splash guard at the end of the downspout or direct the extension to a swale.



Step 4



Step 5

How to Redirect a Downspout to a Rain Barrel

Before you Begin

Make a list of the tools and materials needed. The installation of a rain barrel requires materials for the downspout disconnection, and materials to build a platform that the barrel can sit on, such as wood or cinder blocks. Homeowners may also need an additional strap to secure the barrel. Be sure to wear safety glasses.

Tools:

- Hacksaw
- Tin snips
- Drill
- Needle-nose pliers or crimpers
- Tape measure
- Screwdriver or nut driver
- Level
- Safety glasses

Materials:

- Downspout extension
- Sheet metal screws
- Elbow
- Bracket
- Splash guard
- Wood/cinder blocks
- Securing strap

You can transfer water from the rain barrel to a garden by filling a watering can, connecting a garden hose, or installing a manual drip irrigation system. Water pressure at the rain barrel spigot will depend on the level of the water in the rain barrel. The higher the water level, the greater the amount of pressure. You can also improve flow through a hose attached at the rain barrel spigot by elevating the barrel.

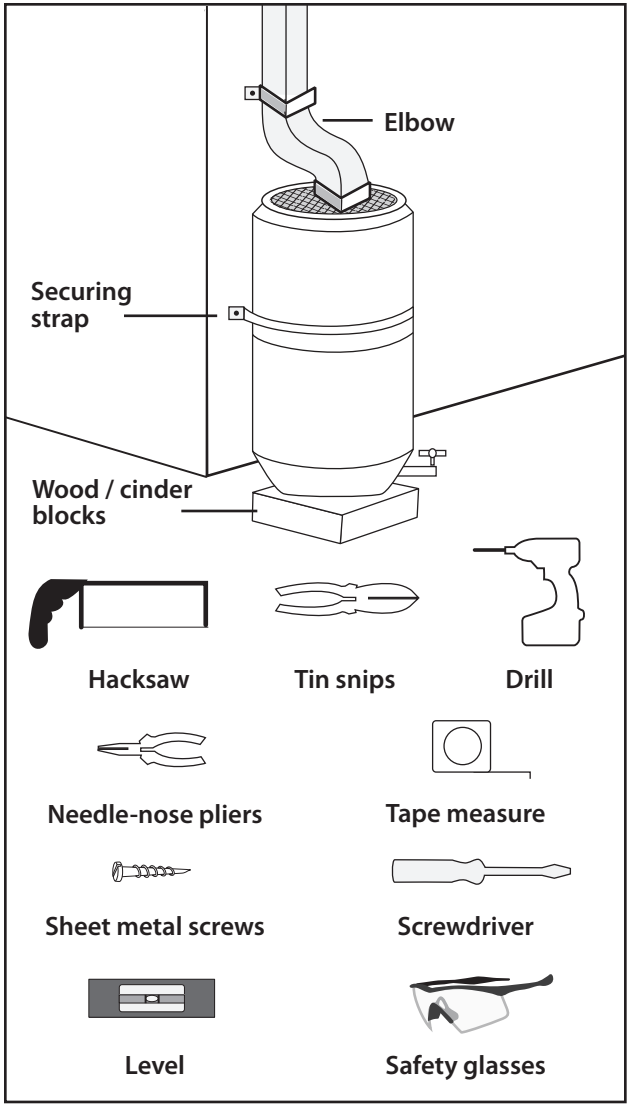


Figure 5: Materials and tools needed for installing a rain barrel

Redirection Procedure

Redirecting a downspout to a rain barrel is a relatively simple procedure.

Step 1: Decide where to locate a rain barrel. The best place is either directly under or a few feet from the disconnected downspout. By attaching a hose to the spigot, a homeowner can transport water from the barrel to another area of the yard.

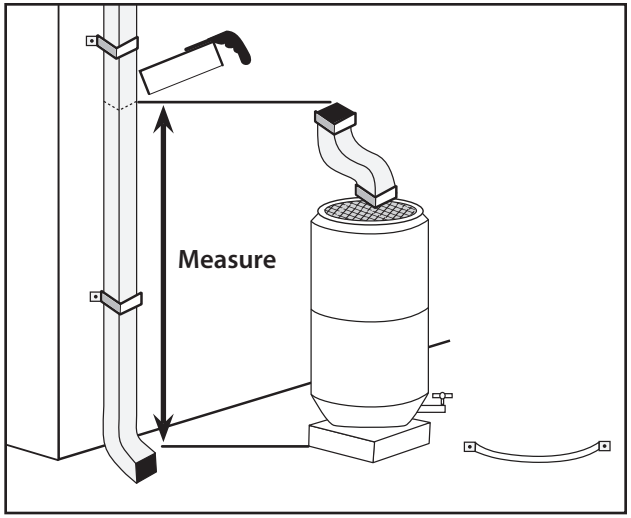
Step 2: Estimate how high the barrel will rest under the downspout. Be sure to include the height of the cinder blocks or platform for the barrel. Mark where the downspout will be cut. Make sure to make your cut just high enough above the rain barrel to accommodate attaching an elbow.

Step 3: Cut the downspout with a hacksaw so that the elbow will be inserted just above the rain barrel inlet. You may need tin snips to smooth the material.

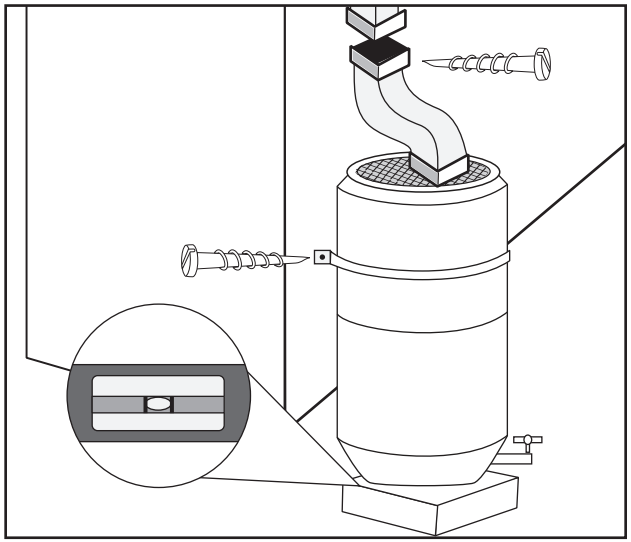
Step 4: Assemble the rain barrel platform. Make sure it is level.

Step 5: Attach the elbow over the downspout with a screw. Secure the downspout to the house with the bracket.

Step 6: Place the barrel beneath the elbow, making certain that the barrel overflow valve is positioned in an appropriate location and away from the home. Secure the barrel to the house with a strap.



Steps 1-3



Steps 4-6

How to Build a Rain Garden

Before you Begin

Design and build a rain garden before disconnecting a downspout. Helpful video instructions for installing a rain garden are available by Metro Blooms at www.metroblooms.org. Remember, the removal of grass to build a rain garden will likely qualify homeowners for the LADWP Residential Drought Residential Landscape Incentive Program. Please call Dig Alert at (888) 376-3314 to obtain an application package before building a rain garden.

The construction of a rain garden will potentially result in the redistribution of soil on a property. As a consequence, underground utilities are a concern. Before digging, call 1-800-227-2600 to acquire the location of potential underground utilities. Constructing a rain garden may be an issue if you live on a designated landslide or hillside area. Visit the Navigate LA website for a hillside area map or the Zone Information and Map Access System (Z1 MAS) websites for area maps (See Additional Resources). Permits are not required for typical residential landscaping projects. If you plan on making major landscaping modifications such as moving more than 50 cubic yards of soil or altering 1 acre or more, contact the Los Angeles Building and Safety Department at (866) 452-2489 for further assistance.

Assess Potential Rain Garden Sites

Locate rain gardens where they can intercept and collect roof runoff. Potential rain garden sites are down slope of a downspout, or adjacent to an impervious surface. The following factors must be considered when siting a rain garden:

- Build a rain garden in a relatively flat area.
- Build a rain garden in a naturally low lying area with good drainage.
- Remove grass or paved surfaces to create space for a rain garden.
- Do not site rain gardens underneath the canopy of existing trees.
- Do not site rain gardens above septic systems.
- Do not site a rain garden where potential overflow will run onto neighboring properties.

As a guideline, site the edge of a rain garden:

- At least 3 feet away from public sidewalks;
- At least 5 feet away from property lines;
- At least 5 feet away from house foundations, assuring at least a 2% slope away from the home.

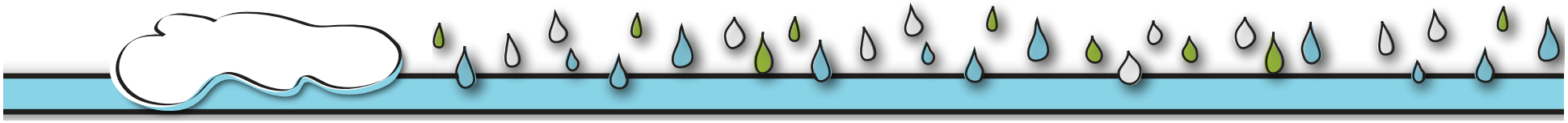
Design

Size your garden: It is easy to size a rain garden to capture a common 3/4" storm event. There are three key elements which are discussed in depth on the next page:

A rain garden in bloom

1. Perform a simple soils infiltration test to calculate the drainage rate of the potential rain garden site.
2. Calculate the rainfall that will run off the portion of the roof that will be directed to the rain garden.
3. Use the example calculations to estimate the size of your rain garden.

The rain garden sizing methodology is helpful for maximizing the volume of runoff captured from a typical storm event. However, rain gardens smaller than the calculated size, or with slow infiltration, can also make a difference.



Remember, you should always incorporate an overflow in your rain garden such that any excess water, from larger storm events, will flow into another infiltration area, or to the storm drain system and away from the home's foundation or neighboring property.

Perform a Soils Infiltration Test

The following is a list of tools and materials you will need to conduct a soils test:

- Measuring tape
- Garden spade
- Empty gallon container
- A watch

Step 1: Dig a square hole two feet deep and one foot wide in the deepest section of the potential rain garden. This size works best for the equation provided in this "How-To" Guide.

Step 2: Fill the hole with water and let it drain completely. Fill the hole again with 5 gallons of water and monitor how fast the water drains. Record how many hours it takes to drain the hole. **[T = ____ (hours)]**

Step 3: Consider digging more holes in the potential rain garden site to determine if drainage is uniform. If drainage is too slow to measure, improve the drainage by tilling in a mixture of two-thirds sandy loam topsoil and one-third compost to a depth of 18 inches.

Calculate Runoff and Rain Garden Size

Step 4: Estimate the total roof area (RA) that will drain to your potential rain garden. Note that rooftop runoff from multiple downspouts can be used to support one rain garden. **[R_A = ___ (square feet)]**

Step 5: Multiply the roof area by a factor of 0.65 to determine the volume of rooftop runoff that will flow to your rain garden. **[V = R_A x 0.65 = ___ (gallons)]**

Step 6: Plug the numbers into the equation below to determine the required size of the rain garden. If the calculated rain garden size is too big for the property, improve drainage by the tilling method and recalculate the rain garden size. Smaller gardens can be installed with an overflow. **[(hours) x (gallons) x 0.008 = _____ square footage area of rain garden]**

Example:

Optimal Area of Rain Garden:
T x V x 0.008 = 26 (square feet)

Where,
T = 10 (hours)
R_A = 500 (square feet)
V = R_A x 0.65 = 325 (gallons)

Direct water flow

A splash guard, followed by a grassed channel or swale, directs water from the end of a downspout extension to the rain garden site (Page 3). Make sure that the swale is lined with an impermeable material, such as a geotextile, if it located in the vicinity of buildings. To prevent erosion and create a dry creek bed look, add different sized river rocks to the swale. When the rain garden is filled with water and begins to overflow, direct excess water flows away from buildings and neighboring properties.

Choose your plants

There are a variety of plants that can be used in a rain garden. Diversity in plant selection will add an aesthetic quality to your garden. Consider native and drought tolerant species that adjust well to seasonal rainfall patterns, and require minimal supplemental irrigation. If a rain barrel is installed, the captured water can be used for watering plants.

There are several resources available for the selection of rain garden plants native to Southern California. Native plant nursery professionals or garden clubs can provide assistance. The Rancho Santa Ana Botanic Gardens provides native plant palette lists and offers native plant gardening workshops. Please visit their website at **www.rsabg.org** . Other groups include the Water Conservation Garden at Cuyamaca College, the California Native Plant Society,

The Garden Spot (bewaterwise), The Los Angeles and San Gabriel Rivers Watershed Council, the Surfrider Foundation Ocean Friendly Gardens, and the Green Garden Group (G3). See the Additional Resources section for more information.

Avoid using invasive plant species in your rain garden. Lists of invasive species can be found at the California Invasive Plant Council, Southern California region website: **www.cal-ipc.org** . Some trees are protected by the City and require a special permit for removal. These include: all native Oak species, Black Walnut, California Bay, and California Sycamore. Contact the Los Angeles Department of Public Works Bureau of Street Services Urban Forestry Division at (213) 847-3077 for more information.

Plants for Southern California

A few of the many plants available to you are described below. Photography is courtesy of Ken Gillard from the Theodore Payne Foundation **www.theodorepayne.org**

California Buckwheat

California Lilac - "Concha"

Bush Anemone – Shrub. Likes full sun and well drained soil. Does best with minimum care. Produces white flowers with yellow center in the spring. Attracts butterflies and birds.

California Buckwheat – Groundcover. Likes sun to partial sun and dry to semi-dry soils. Hardy and shrubby with tiny pink and white flowers. Attracts butterflies, bees and birds.

California Lilac "Concha" - Shrub. Fragrant with bright blue flowers. Likes semi-dry soil, grows to be 6-8' tall. Attracts hummingbirds.

California Poppy – Annual Wildflower. Likes full sun and dry to semi-dry soils. Thrives everywhere with brilliant orange flowers. Attracts butterflies and birds.

California Poppy

Deer Grass

Rose Sage

Woolly Blue Curls

Deer Grass – Grass. Likes full sun and dry to semi-dry soil. Mixes well with wildflowers. Source of nesting materials for birds.

Coyote Bush – Shrub. Likes full sun and dry soils. Hardy and fast growing. Attracts birds and butterflies.

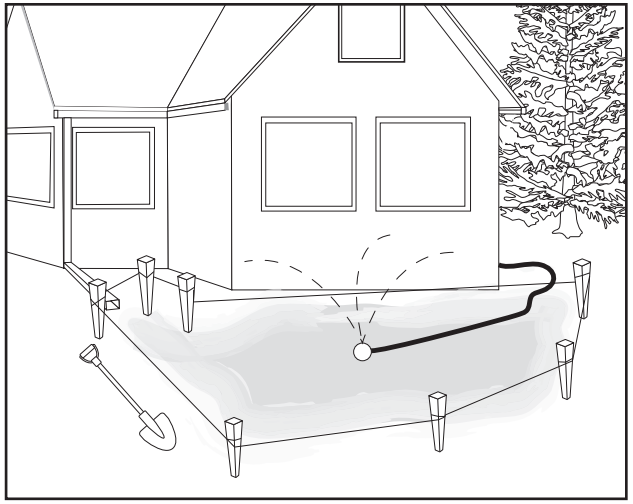
Elegant Clarkia – Wildflower. Likes sun and dry to semi-dry soils. Easy to grow and long-lasting showy flowers in pink, red or purple. Attracts hummingbirds and butterflies.

Purple Needle Grass – Grass. Likes sun to partial sun and semi-dry soils. Hardy and showy with purple seed heads. Attracts songbirds.

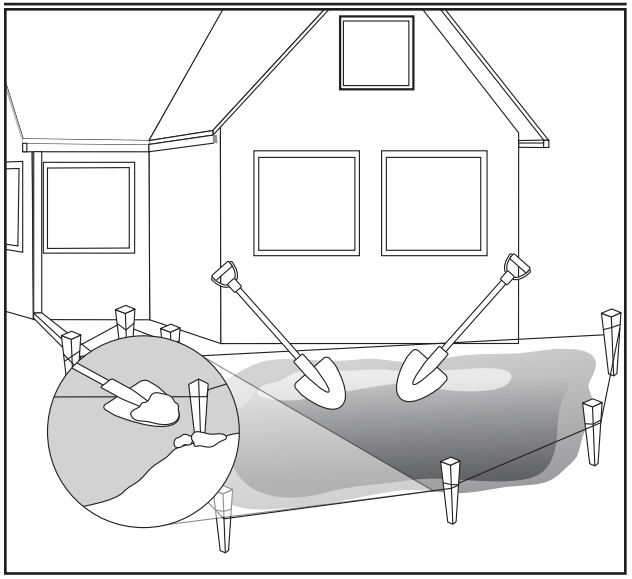
Rose Sage –Shrub. Likes sun to partial sun and dry soil. Compact and scented with rose and blue colored flowers. Attracts hummingbirds, songbirds, butterflies, bees and lizards.

White Sage – Shrub. Likes sun to partial sun and dry soils. Flower stalks are long and arching with white flowers. Attracts butterflies, bees, birds, lizards and nectar-loving insects.

Woolly Blue Curls – Shrub. Likes sun to partial sun and dry soils. Native to Santa Monica Mountains and requires no water in the summer. Blue and pink woolly flowers bloom in the spring and fall. Attracts hummingbirds and butterflies.



Steps 1-2



Step 3

Build a Garden

Use the following steps as a guide for building a rain garden:

Step 1: Outline the rain garden area with string and stakes.

Step 2: If the soil is too hard to dig, moisten it with a garden hose. Allow the water to seep in overnight. Dig up existing grass and plants. Set aside any native plants that can be used in the garden.

Step 3: Dig the rain garden 18 inches deep. Frame the rain garden with the sides sloped to about 20%. To minimize the risk of erosion, consider lining the side slopes with stones or plant vegetation. If the rain garden is on a slight slope, add a berm on the downhill slope to hold in rainwater.

Step 4: Plant the rain garden. Use a variety of species. After planting, add compost to provide nutrients to the plants. Compost or soil amendments can be purchased at most garden supply stores. The City of Los Angeles also offers free compost at the Griffith Park Composting Facility. See Additional Resources for more information.

Step 4

Other Rainwater Harvesting Options

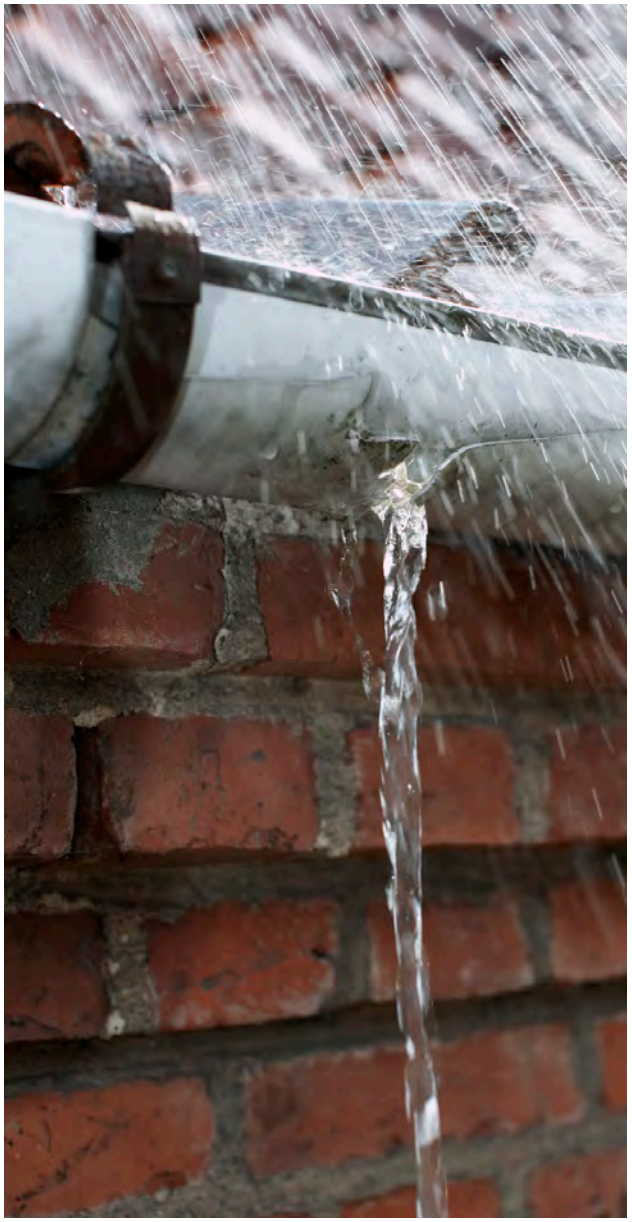
In addition to rain barrels and rain gardens, additional rain water harvesting features can be installed at a residential property. Visit local demonstration gardens, take a workshop, and review references provided in the Additional Resources section of this "How-To" Guide to gather ideas. Consider consulting a contractor or a landscape designer to address site specific needs. Some noteworthy rainwater harvesting applications include installation of dry wells (also known as French drains) or infiltration basins, and replacing paved surfaces with permeable paving.

A dry well is a trench or basin completely filled with coarse media, such as angular gravel, to create a porous layer for infiltrating runoff. Dry wells are suitable for foot-traffic, and are typically placed between a driveway or patio and a vegetated area, where runoff from the paved surfaces is used to soak deep into the roots of adjacent plants. Dry wells are not suitable for areas that would generate sediment or silt-laden runoff.

A rain garden is a type of infiltration basin. There are several additional infiltration basin designs that can accommodate existing contours and vegetation on your property. For instance depressions extending beyond the canopy of a tree can be created to catch and infiltrate runoff. Terraced infiltration basins can be formed on sloped properties.

Impervious walkways and driveways can be removed and replaced with permeable paving such as "pavers". Pavers are brick-like materials that are manufactured in a variety of shapes. Pavers fit together like tiles and are set with small gaps between them creating grooves for water to infiltrate the soil below. Other materials such as broken pieces of recycled concrete can also be used. Paved walkways can also be removed and replaced with gravel or mulch.

Specifications for infiltration projects provided by the Los Angeles Department of Building and Safety and the Bureau of Sanitation Watershed Protection Division can be used as guidelines. (See Additional Resources)



Rainwater Harvesting System Maintenance

Perform the following activities to maintain your rainwater harvesting system:

Rain Gutters

- Clean gutters at least twice a year, and more often if you have overhanging trees.
- Make sure gutters are pitched to direct water to downspouts.
- Repair leaks and holes.
- Look for low spots or sagging areas along the gutter line, and repair with spikes or place new hangers as needed.

Downspouts

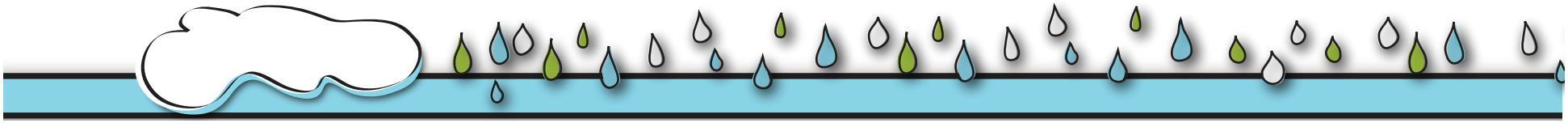
- Check and clear elbows or bends in downspouts to prevent clogging.
- Repair any leaks and holes.
- Each elbow or section of the downspout should funnel into the one below it. All parts should be securely fastened together with sheet metal screws.

Rain Barrels

- Make sure all parts are securely fastened together and the rain barrel is securely fastened to the building.
- Clean out the rain barrel and check for leaks at least once a year.
- Check and clear downspout elbows, rain barrel screening, and overflow to prevent clogging.
- Repair any leaks and holes.
- Make sure the rain barrel remains securely screened to prevent mosquito entry.
- Inspect overflow area to make sure that water will continue to drain away from structures and does not flow onto pavement, sidewalks or neighboring properties.

Rain Gardens (or other landscaping)

- Irrigate deeply once a week during dry months to encourage root growth and keep plants strong, especially while plants are getting established.
- Maintain the garden regularly.
- Inspect your garden after a heavy rain. Remove sediment and debris, watch for erosion, and replace plants as needed.
- If a plant isn't surviving in one area, try moving it to another.



Where Can I Get More Information?

Help can be acquired from several sources. Start with the City of Los Angeles Rainwater Harvesting Program. Explore other resources including local organizations that provide help and information about rain gardens and the use of native plants.

The City of Los Angeles

The City of Los Angeles Rainwater Harvesting Pilot Program
www.LARainwaterHarvesting.org

The City of Los Angeles Standard Urban Stormwater Mitigation Plan
http://www.lacity.org/SAN/wpd/siteorg/businesses/susmp/susmpintro.htm

The City of Los Angeles Griffith Park Composting Facility
5400 Griffith Park Drive
Los Angeles, CA 90027
(323) 913-4166
www.lacity.org/san/srecd

Additional Resources

California Department of Water Resources:
A Guide to Estimating Irrigation Water Needs of Landscape Planting in California. August 2000.
http://www.owue.water.ca.gov/docs/wucols00.pdf

California Invasive Plant Council
http://www.cal-ipc.org/

California Native Plant Society:
Native Plant Nurseries and Local Botanic Gardens
http://lasmmcnps.org/nativenurseries.html

The Garden Spot:
http://www.bewaterwise.com/knowledge01.html

Green Garden Group (G3)
http://www.greengardensgroup.com/

City of Los Angeles Department of City Planning Zone Information & Map Access System (ZIMAS)
http://zimas.lacity.org/

Los Angeles County Department of Public Works, Water Conservation
http://dpw.lacounty.gov/wwd/web/conserve.cfm

The Los Angeles and San Gabriel River Watershed Council
http://lasgrwc2.org/Default.aspx

Metro Blooms (Rain garden installation video and information)
http://metroblooms.org/index.php

Metropolitan Water District of Southern California and The Family of Southern California Water Agencies
http://bewaterwise.com

Rancho Santa Ana Botanic Gardens: California's Native Garden
http://www.rsabg.org

The Surfrider Foundation Ocean Friendly Gardens
http://www.surfrider.org/ofg.asp

The Theodore Payne Foundation for Wildflowers and Native Plants, Inc.
http://www.theodorepayne.org/

TreePeople
http://www.treepeople.org/

The Water Conservation Garden at Cuyamaca College
http://www.thegarden.org/

Publications

Lancaster, Brad. Rainwater Harvesting for Drylands and Beyond: Volume 2 Water-Harvesting Earthworks. Rainsource Press. 2008. ISBN 978-0-9772464-1-0

Los Angeles Waterworks District No. 29. Drought Tolerant Plants
http://dpw.lacounty.gov/wwd/web/booklet/docs/Drought%20Tolerant%20Plants.pdf

The City of Los Angeles Department of Building and Safety Information Bulletin/ Public - Building Code: Guidelines for Stormwater Infiltration. Document No. P/BC 2008-118. Effective 01/01/2008
http://www.ladbs.org/faq/info%20bulletins/building%20code/2008/IB-P-BC%202008-118%20Stormwater%20Infiltn.pdf

The City of Los Angeles Department of Public Works Bureau of Engineering: Hillside Areas Map
http://navigatela.lacity.org/common/mapgallery/pdf/hillsidearea.pdf

The City of Los Angeles Standard Urban Stormwater Mitigation Plan: Infiltration Requirements and Guidelines
http://www.lastormwater.org/Siteorg/download/pdfs/tech_docs/SUSMP_Infiltration_Req.pdf

Metropolitan Water District of Southern California. Plants for Southern California Homes
http://www.ci.glendora.ca.us/Modules/ShowDocument.aspx?documentid=1839

Metropolitan Water District of Southern California and The Family of Southern California Water Agencies. California Friendly Garden Easy Update Weekend Project: Mulch your plant beds
http://www.bewaterwise.com/pdf_weekendMulch.pdf

Glossary of Terms

Berm – A mound of earth used to retain water, such as along the downslope side of a rain garden

Downspout – Pipe that directs stormwater runoff from the roof of a house to the ground.

Impervious – Not allowing water to penetrate. Examples of impervious surfaces include paved driveways, walkways, or roofs.

Pervious – Allowing water to penetrate. Examples of pervious surfaces include flower beds and rain gardens.

Rain Garden -A planted depression that allows rainwater runoff from impervious urban areas like roofs, driveways, walkways and compacted lawn areas to be absorbed into the earth.

Rain gutter – Captures and redirects stormwater runoff from the roof to a downspout. (Figure 3)

Runoff – Water that does not soak into the ground and flows over impervious areas or areas already saturated with water. In the City of Los Angeles runoff from storm events flows into the ocean without being treated.

Swale – A shallow ditch, usually lined with river cobble or vegetation to prevent erosion, which conveys runoff to a certain location, such as a rain garden.

www.LARainwaterHarvesting.org

Program funded by the Safe Neighborhood Parks, Clean Water, Clean Air and Coastal Protection Bond Act of 2000 (Prop 12) through the Santa Monica Bay Restoration Commission and the California Coastal Conservancy

City of Los Angeles • Department of Public Works • Bureau of Sanitation • Watershed Protection Program

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