
Lawn Be
GONE
Swale
Swale
LA DWP
Los Angeles Department of Water & Power

Los Angeles Department of Water & Power

This Guidebook provides landscape design tips, and step-by-step guidelines for transforming your yard from lawn to sustainable garden.

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carollo
Engineers...Working Wonders With Water®

This book written and designed by

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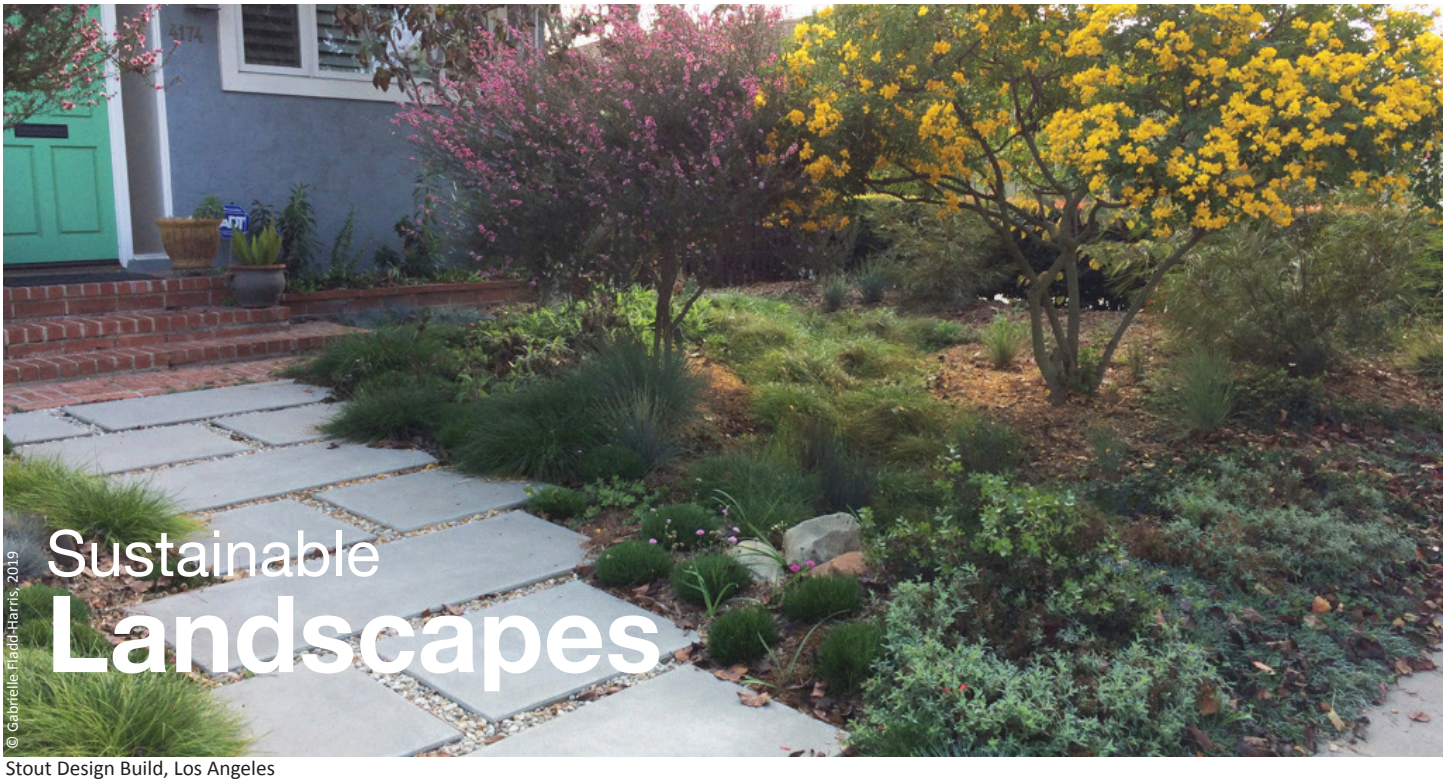
Stout Design Build, Los Angeles



Stout Design Build, Los Angeles

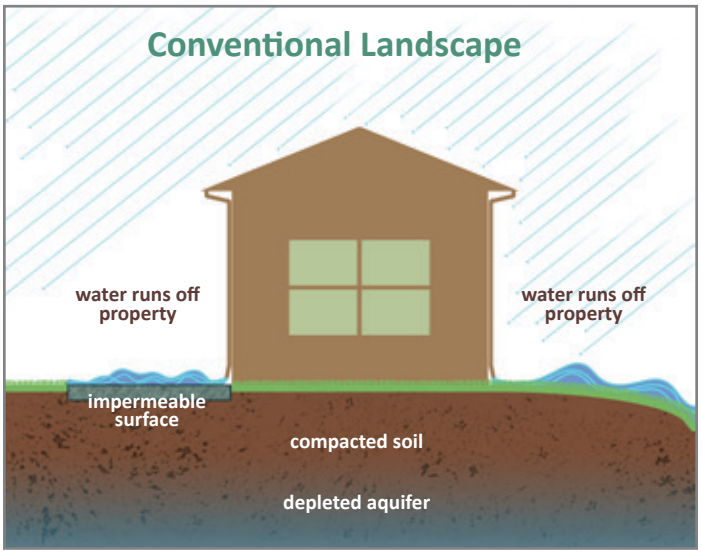
These **Beautiful** gardens...

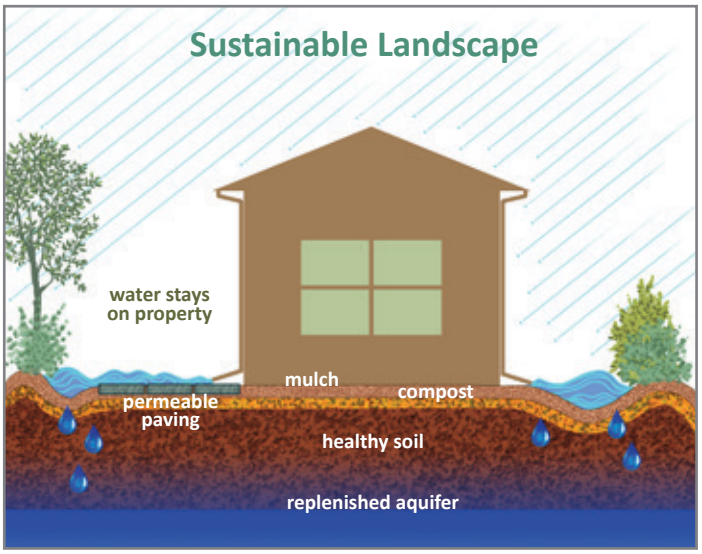
require less water, but don't look dry; they are attractive, lush and evergreen because they were transformed from grassy yards using the principles of sustainable landscaping.

While some conventional landscapes may waste water by allowing water to run off the property, watershed wise landscapes are designed to hold on to rainwater and reduce the demand for supplemental irrigation. In the pages that follow, you'll see inspirational gardens that allow us to continue enjoying Los Angeles' varied and amazing climate and outdoor lifestyle, while conserving valuable natural resources and creating a diverse habitat of plants and insects.

If we want Los Angeles landscapes that are truly resilient to changes in climate and ecosystems, we need to go beyond sustainable and water wise principles to begin managing each property as though it were a mini-watershed. By paying attention to the design of the garden, building soil and keeping rain on our properties, selecting climate-appropriate plants and managing supplemental irrigation, we transform our grass-covered landscapes into abundant watershed wise enhancements to our properties and neighborhoods.

Now dig in!





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In three **Easy Steps**

Stout Design Build, Cheviot Hills

Healthy soil is made by adding compost, covering your garden with mulch, and by avoiding soil disturbance as much as possible. Compost boosts soil organisms that reduce diseases and pests. There's no need for adding fertilizers or pesticides on sustainable gardens.

Maintaining 3" of small-size organic mulch on top of every open space in the landscape keeps the garden looking clean while slowly building the soil. The mulch holds in water, so less irrigation is required (*see p. 32*).

When downspouts are directed to these landscapes, the soil becomes a giant sponge that helps keep plants healthy and happy, whether it's raining or we're in a drought.

Urban Water Group, Los Angeles

Selecting climate-appropriate plants like those from Mediterranean climates and, even better, from Los Angeles' own native plant communities, makes your garden automatically adapted to the seasonal summer drought, wet winter months, and various Los Angeles basin microclimates (*see p. 6*). Many plants from the five Mediterranean climates, (South Africa, area around the Mediterranean Sea, Chile, Australia, and certain regions of California) are appropriate for our gardens, but the Los Angeles summer is drier than the other Mediterranean climates.

Local native plants benefit the local native birds and insect species by providing food and nesting materials! There are many dry-adapted evergreen and long-flowering California native plants. When you use them in your garden, you get year-long interest and a garden filled with life, on reduced summer irrigation (*see p. 16*).

Flower to the People, Los Angeles

There may be years when there isn't enough winter rain, or you may have plants you love that struggle to thrive in the long, hot, dry summers. In those cases, you want to apply supplemental water through a highly efficient irrigation system.

Efficient irrigation makes sure every drop of water applied to the landscape stays there for the benefit of the plants. By using weather-based "smart" irrigation controllers and drip irrigation that applies water directly to the roots of the plants, you can keep your landscape healthy without wasting water *(see p. 37*).

You also can reduce your irrigation use just by paying closer attention to it. Grab a cup of coffee and get to know your irrigation controller!

Envision your Sustainable landscape

A healthy landscape is one that offers both lasting beauty and practical functions . . . season after season. The homeowners whose garden we use in our examples in this handbook want to remove the lawn without using chemicals and replace it with a low maintenance and low water landscape that uses local California native plants to reflect the lush chaparral-covered hillsides and oak savannahs of Los Angeles. They want to start spending more time in their garden with their family and dog, and attract birds, butterflies, and other beneficial insects. They also want to capture all the rainwater from the roof, even though one downspout puts the water right on the driveway, and keep it in their garden.

Think about the elements of your landscape that are most important to you. Jot down a few ideas that will help you determine your next steps.

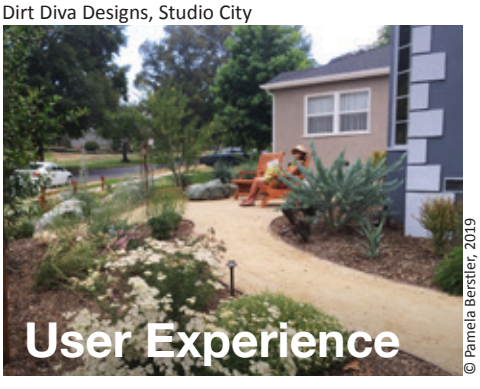
Consider how much maintenance you want to take on. Are you ready to lose the lawn? Would you like fruit trees or edible shrubs? Are you falling in love with California native and California friendly plants?

Consider how you move through the garden. Do you have a patio near the house, or out in the yard? Would a nice wide entry pathway make your home more welcoming? Does enclosing the front yard make the most of a small space and provide needed privacy?

Plan your garden with long-term health and maintenance in mind. Look for opportunities to improve the soil with compost and mulch, shape and contour the land to make the most of rainfall, and select climate-appropriate plants that thrive in the local environment. Think about providing resources for local native insects and fauna, and keeping pollution out of the Los Angeles River.

The art of garden-making draws from the principles of scale, color, texture, and placement of plants and features. Landscapes are living, dynamic performances, and the long-term health and viability of the garden requires knowledge of the science behind what we see with our eyes. A well-designed landscape will continue to grow, change, surprise, and delight for decades.

Dirt Diva Designs, Studio City



A well-executed landscape design, whether you do it yourself or have professional help, not only makes your home more enjoyable, it adds to your useable space. Studies have shown that thoughtfully developed outdoor spaces can increase the value of a home by up to twenty percent. And a well-maintained landscape ensures that you retain that value.

Consider your **Budget**

Scope Your Project

If your budget is limited, you may want to make small improvements first and then bigger changes in a year or two. Working with a professional designer can help you plan these phases. You may start with weed removal and preliminary planting, then add features such as a dry creek bed or a rain garden. **Plan ahead before you lose the lawn**. Like anything, an ounce of prevention is worth a pound of cure. Implementing the basic functionality of a sustainable landscape does not add to your overall installation budget.

When you invest in your landscaping, you are investing in the long-term value of your property. Don't forget to plan an ongoing maintenance budget allocation for keeping the garden healthy over time (*see p. 38*). **Stretch your dollars by taking advantage of rebates and incentives. And remember, always review the program's current project requirements to ensure you qualify for the rebate.**

Landscape = Planting + Infrastructure

Planting includes ground preparation, contouring, and installation of plants. Infrastructure includes irrigation, lighting, and anything that's built on top of the landscape. Consider that the landscape is raw ground to be prepared, graded, etc. Landscape contractors, plumbers and electricians typically work on a landscape. Many people who do it themselves can remove turf, make grade changes and build soil through sheet mulching. Planting also can be accomplished using the techniques outlined in this book. The more you do yourself, work with what you have, or select low cost materials, the more affordable you will make your landscape changes.

There is no such thing as a typical budget for landscape design and installation. While a good **RULE OF THUMB** is to budget 5% - 10% of your home's current market value in a landscape renovation, every site is different, and the situations encountered on that site will dramatically influence the overall budget for the project. Location, expectations of the neighborhood, and aesthetics must be combined with all of the functional requirements discussed in this book to inform the final budget for your landscape. When you take into consideration special site circumstances such as slopes or tricky drainage, expect to spend more on design and installation.

Need help getting the job done?

Building a garden is a collaborative experience. If your property has a slope or you live in a landslide or fire-prone zone, you may need to seek the professional advice of a licensed civil engineer, landscape architect, or other professional before grading and capturing rainwater on existing hillsides. Protect your investment by hiring a licensed arborist for your tree care and licensed contractors for installation.

Invest in Design

The more time you spend researching your options and planning your garden, the better prepared you will be during construction. Measure twice, dig once! Spend the time yourself, or expect to pay 10% - 20% of your budget on professional design assistance.

Invest in Soil

Soil preparation is the single greatest investment you can make in the long term health and beauty of your garden. Buy your compost in bulk, and expect to spend at least 10% of your budget on building healthy soil (*see pp. 26-27, 32-33*).

Invest in Rain

Capturing and holding on to rainfall from the roof and adjacent hard surfaces, helps prepare your garden for the long, dry summer and reduces irrigation demand. Expect to spend up to 20% of your budget on labor for grading for rain detention and materials for drainage (*see pp. 14-15, 28*).

Invest in Stewardship

Plan from the beginning for maintaining the landscape. Select experienced gardeners who are on board with your vision. Expect to see your gardener less frequently for greater periods of time, and expect to pay for sustainable expertise (*see pp. 38, 44*).

Los Angeles
Yard Transformations

Marilee Kuhlmann, Los Angeles

The Los Angeles Region encompasses a huge geographic area and enjoys a wide range of climatic conditions from the immediate coastal area near San Pedro, where the coastal fog and mild temperatures distinguish it from the rest of the County, to the City of Los Angeles and the San Fernando Valley, intensely developed areas with temperatures usually ten to twenty degrees hotter than the coast. Los Angeles lies on a hilly coastal plain, bounded by the Pacific Ocean and Santa Monica and San Gabriel mountain ranges with many canyons and valleys that create microclimates. Annual rainfall varies from 13 inches near the coast to more than 21 inches inland.

Urbafloria, Mar Vista

Laura Morton Design, Van Nuys

Urban Water Group, Los Angeles

Stout Design Build, Los Angeles

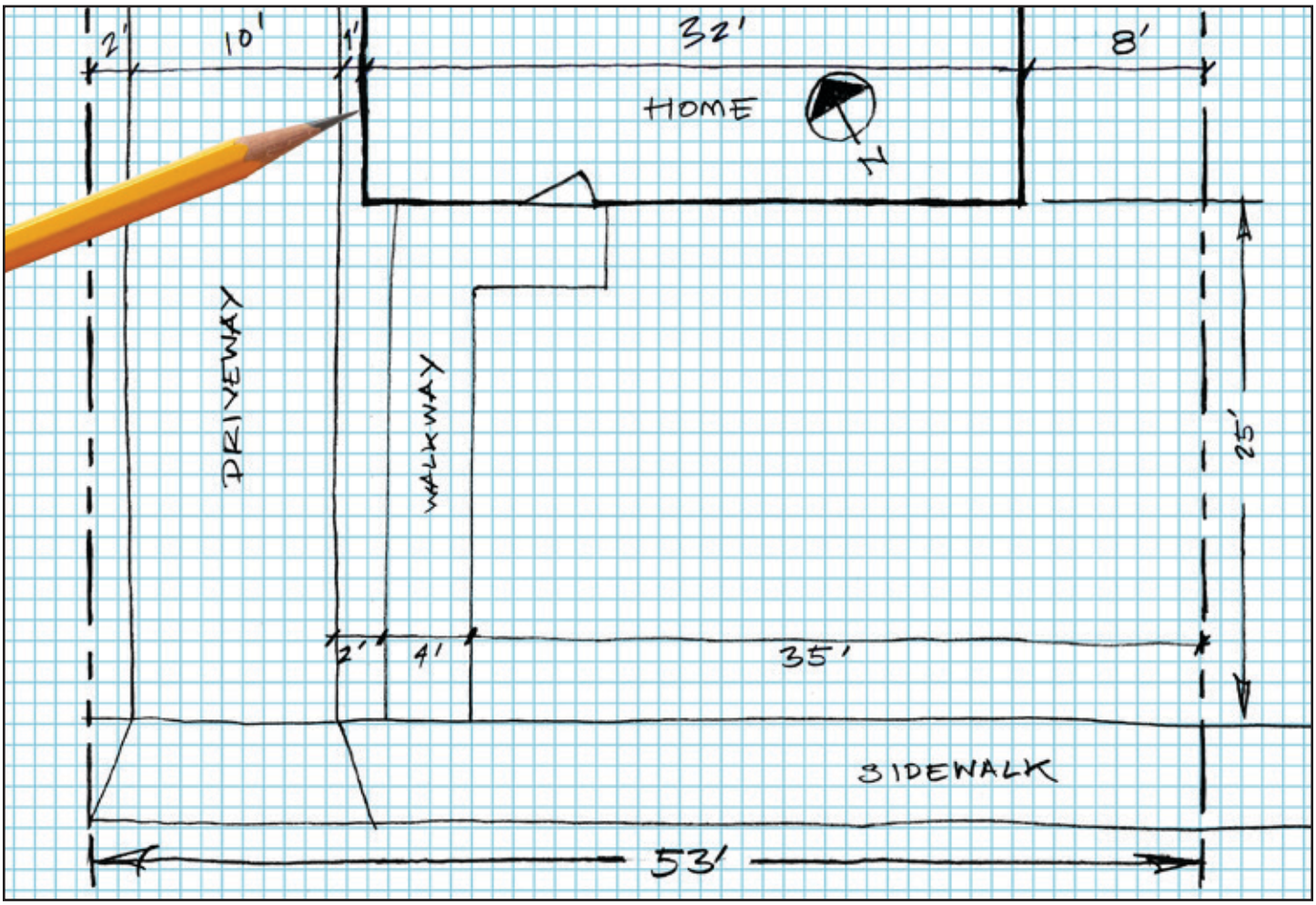
Los Angeles is a Biodiversity Hot Spot, with many people living in the wildland-urban interface or near canyons and slopes. Landscaping in these areas requires consideration of the sensitive ecology of the place; local native plants are recommended for these conditions. Endemic plants are unique to this place. They have evolved over thousands of years within the Los Angeles basin, and are able to tolerate the long, dry summers and cold, wet winters, and even thrive in the face of the Santa Ana winds, extremely dry offshore winds that sweep across the basin from fall to spring.

Dirt Diva Designs, Valley Village

See BEFORE image on p.13

Marilee Kuhlmann, North Hollywood

Start with a **Site Plan**



Make a Basic Plan for Your Project

Measure your site. Once you've got the dimensions, trace the lines cleanly on a sheet of grid paper. Make at least 10 copies that are dark enough to still see the grid. You will use each of these sheets to evaluate and plan the changes for each aspect of your landscape. **Our grass area above is 25' x 35' or 875 sq. ft.**

Depending upon the size of your property, most projects can use a 1/4" = 1' scale. Try using 1 box = 1 foot.

Mark the locations of trees and large shrubs you are unlikely to remove. Always use three reference points to triangulate the location of trees. Label any hard surfaces like driveways and walkways.

Take some photos and mark where they are located on your site plan. Use your smartphone or a compass to find North and also mark it on the plan.

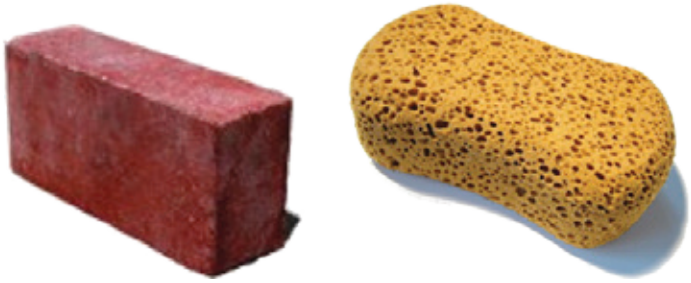
Mind The Foundation

Be sure to mark your doors, windows and footprint of your building on your plans. You will be grading the soil away from foundations and locating your mounded up berms and swales 5' - 10' away from the foundation of the buildings and 3' from edges of the walkways or neighbors.

Need help finding dimensions? *www.zimas.lacity.org* *www.maps.google.com*

Use ZIMAS, the LA City planning website, to get a rough site map with perimeter boundaries. Look at Google Maps for help placing buildings or trees on your property. Just type in your address, zoom in, and use the Satellite view.

Test your soil

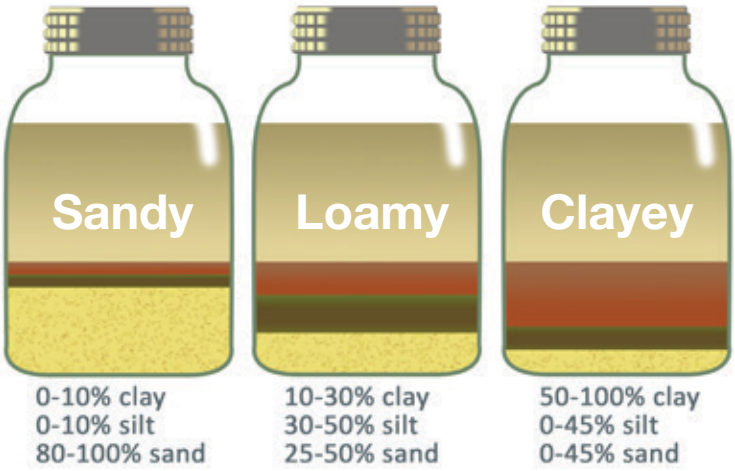


Is your soil a **Brick** or a **Sponge**?

If you have a brick you will need to take this into consideration when planning your contours. You will need to spend some time and effort to turn the soil back into a sponge. If the soil does not drain well, you will need to take special care when you plant that you do not drown your new plants.

We want to have soil in our landscape that can capture water and allow it to soak into the plant root zone within 24 - 48 hours. Building **healthy soil** therefore becomes important in our plan to capture rainwater and save it for a dry day, so you will need to follow the Soil Lasagna Recipe (*see pp. 26-27*).

Before we figure out how to grow better soil, we need to figure out what kind of soil we have. Sand, Silt and Clay, are the basic soil types. The smallest particles create clay soil and the largest make sandy soil, with loam (an even blend of sand, silt and clay) considered the "just right" medium. Professional designers will take soil samples and send them off to a lab for recommendations.



Which jar does your sample most look like?

For Example: If there are equal proportions of Sand and Silt, and very little Clay, then the proportions are something like 40% Sand and 40% Silt and 20% Clay.

Loam best describes the jar with 40% Sand, 40% Silt, and 20% Clay.

Your soil is Loam.

Percolation Test

You Will Need:

1. Dig a hole about 12" deep and 12" wide (that's a little larger than a 1 gal. plant container).
2. Fill the hole with water and wait. Note how long it takes to drain completely. This is necessary to completely saturate the soil.
3. Fill the hole all the way when all the water has drained out from first filling, and see how long it takes to drain out again.
4. Lay a stick or shovel handle across the hole and measure the distance from the top of the water to the stick each hour until it has drained completely.

Results:

>4" per hour - You have sand and need to add more organic matter to improve the soil *(see pp. 32-33*).

<1" per hour - **You have a brick!** Your soil needs some extra help so try sheet mulching (*see pp. 26-27*).

1" - 4" per hour - Congratulations! Your soil drains well! **You have a sponge!**

Determine Soil Type Using A Jar Test

(This is fun to do with kids!)

You Will Need:

1 Qt. size glass container with lid

1 Cup of soil from the garden (Select one area per container, or take samples from several holes and blend them together.)

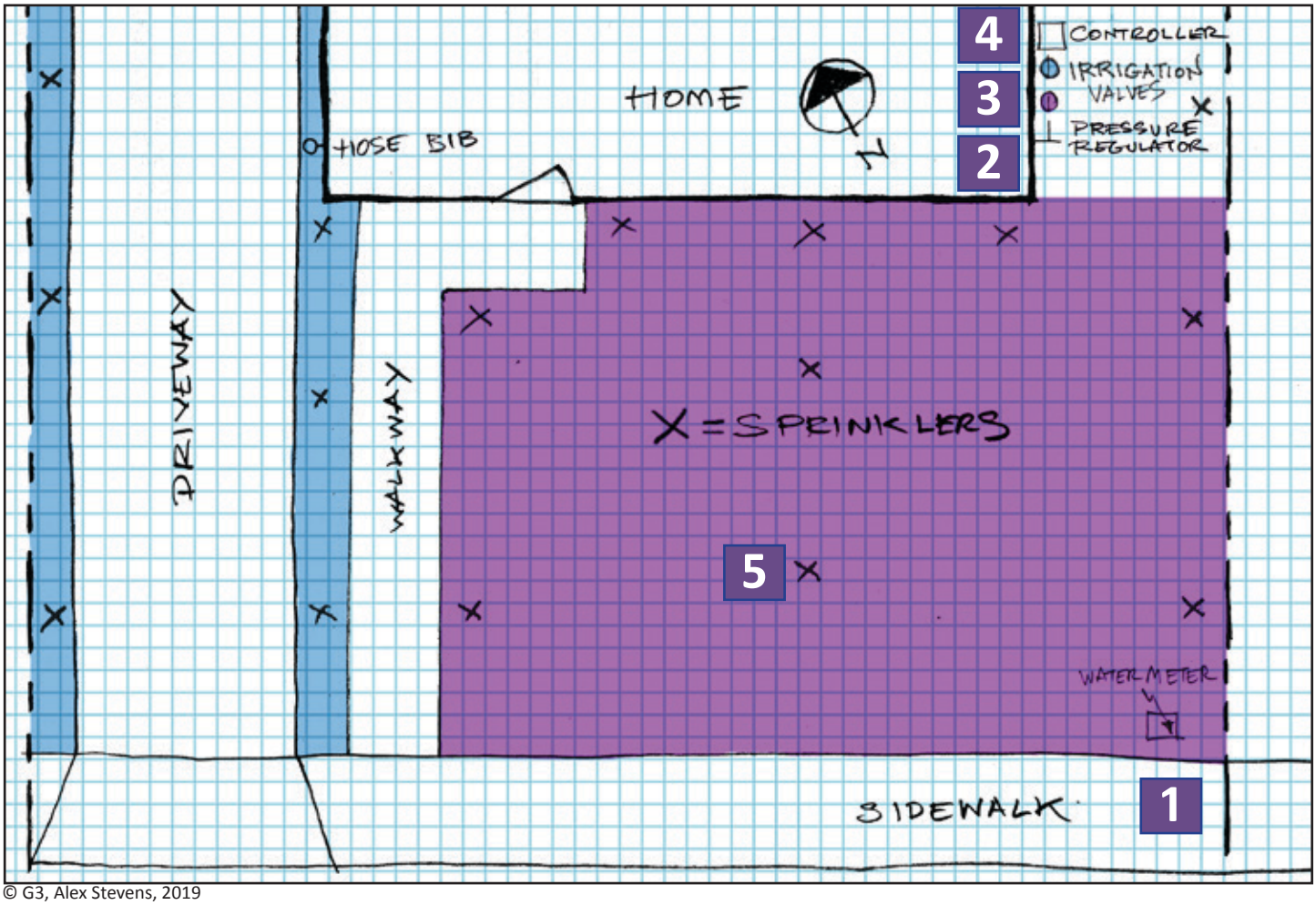
1 Teaspoon of alum (Find in baking section of grocery.)

3 Cups of distilled water

1. **Add soil, water, and alum together** in the glass container and shake until all solids are suspended.
2. **Place container on a shelf** and wait 24 hours.
3. **Wait another 24 hours**, if the container is still cloudy. After 48 hours, the layers should be settled: **Sand** on the bottom, **Silt** in the middle, and **Clay** on top.
4. **Measure the layers** in proportion to each other.
5. **Use the graphic** to determine the Soil Type based on the proportions of Sand, Silt or Clay.

Determine your Soil Type so that you can better program your "smart" irrigation controller and so you can select plants best adapted to your site.

Evaluate your **Existing Irrigation** layout



Make A Plan of your spray irrigation system.

Start the discussion about whether or not to abandon your existing irrigation by mapping out the components of the system. If you have lawn, chances are that your existing irrigation is a spray sprinkler system with an automatic irrigation controller. When converting older spray systems to drip, pressure differentials may damage unseen lateral lines, causing difficult to find micro-leaks. **If you are renovating most of your landscape, be prepared to start from scratch rather than try to significantly alter the existing irrigation system.** This way you have an opportunity to use the latest technologies and proper design for your new garden. It is especially difficult to match existing irrigation to new plants grouped by water needs (*see p. 18*).

Locate all the sprinkler heads on your property and mark their locations on a copy of your Site Plan. Note where the water comes on to your property from the street (the water meter/main line), the location of your irrigation controller, and the location of the valves that control the various irrigation zones. Also, mark the location of hose bibs, shut off valves, and pressure regulators or backflow prevention devices.

Now color code the areas that spray with each valve so you easily can see the various zones you are dealing with for replacing plants and irrigation. Our front yard example (above) has two separate zones marked by two different colors.

Images provided courtesy of Rain Bird Corporation

Water meter

Pressure regulator

Irrigation valve

Irrigation controller

Spray sprinkler

Go with the **Low Flow**: Drip Irrigation

places emitters into blank tubing.

This type of drip irrigation works best for random patterns that require snaking tubing around plants or avoiding hardscaped areas.

Be sure to keep all the emitters on one valve zone at the same GPH discharge rate. Emitters typically range between 0.5 GPH and 2.0 GPH.

If you have selected 0.5 GPH emitters and your plant requires 2.0 GPH, then you add three additional emitters for a total of 4 emitters to achieve the required flow rate.

If plants are spaced very far apart, and weeds are a concern, then use on-line emitters.

Image courtesy of Rain Bird Corporation

emitters are built into the tubing itself.

This type of drip irrigation works best for large groundcover areas, uniform planter areas, and when assembled into a grid pattern.

The technology keeps root intrusion from occurring into the line. All of the emitters in the tubing discharge at the same rate and are pressure compensating. Thus, the emitters do not irrigate until the entire line is filled with water, guaranteeing uniform distribution.

In the very early establishment of the garden, there may be more weeding to be done with this system because water is emitted throughout the line, regardless of whether or not there is a plant desiring the water.

Drip Irrigation delivers water directly to roots.

Installations of subsurface (or under at least 3 inches of mulch) systems may be the most efficient way to irrigate nearly every type of garden area. In order to qualify for the rebate, spray irrigation systems must be converted to drip irrigation or eliminated completely. Since drip irrigation is covered with soil or mulch, water does not evaporate as quickly as it might if it were applied at the surface by spray. The tubing is flexible, so it can be made to accommodate a wide variety of irregularly shaped areas or rectangular areas when laid in a grid pattern.

Gallons Per Hour (GPH) Drip systems apply water in GPH. They need to run for longer periods of time than spray systems. However, the actual run time must always account for how fast water is applied (precipitation rate) and eliminating runoff (*see p. 37*).

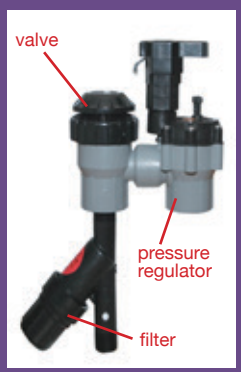
Challenges include the possibility that drip systems could apply water too quickly for the soil to absorb, so careful consideration is required especially when dripline grids are installed (*see p. 22*). Drip irrigation operates most efficiently at low pressure (between 15 and 30 psi). Optimal performance requires the use of pressure regulation and a filtering system to keep the emitters from becoming clogged. Most low flow valves have pressure reduction and filtration included, so replace all valves that are not specified for low flow systems.

What is a Tattle-Tale?

Screw a white cap (replacing the nozzle) on to the pop-up riser of one sprinkler head on each line when converting to drip.

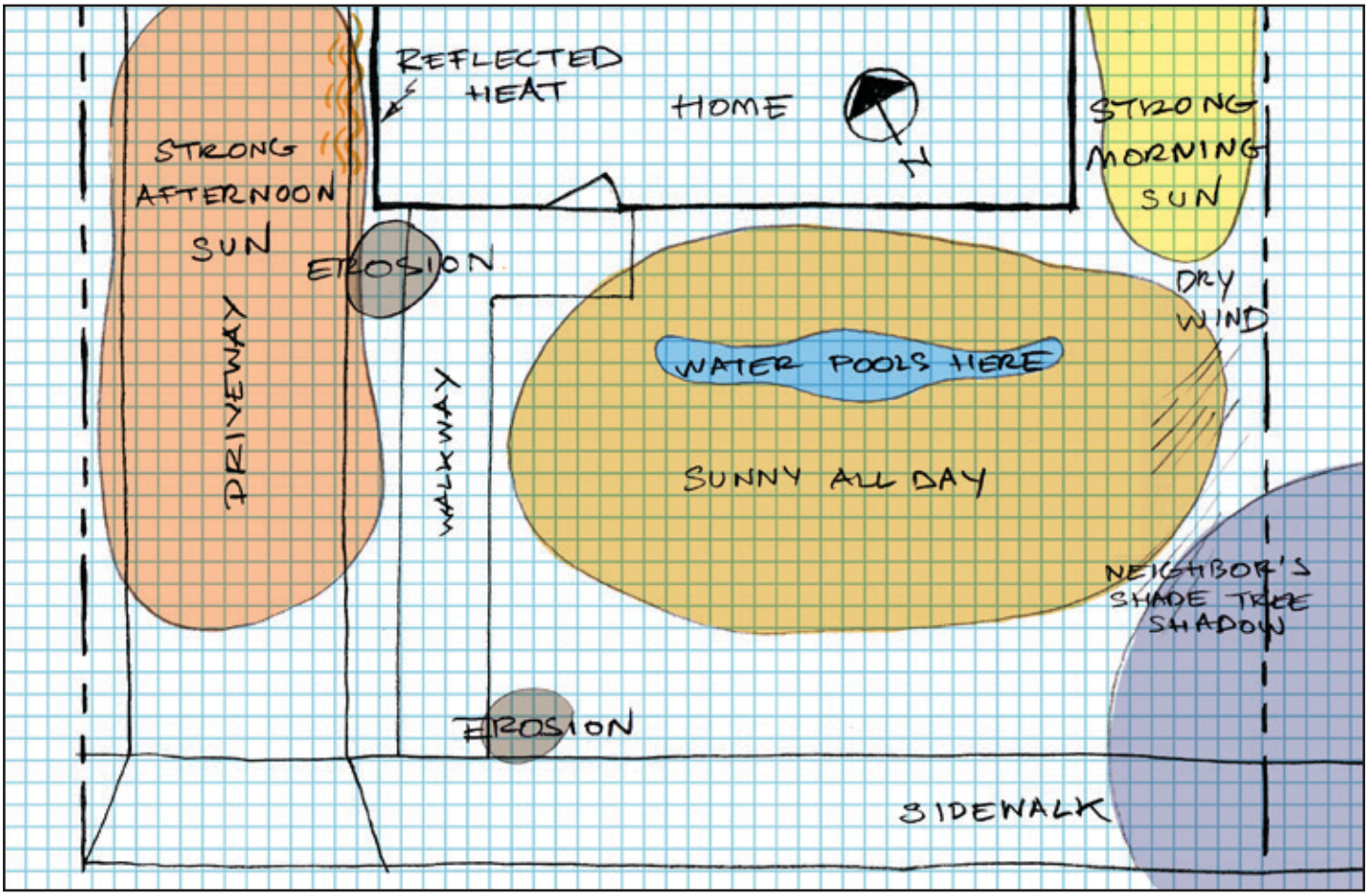
When the drip irrigation is running below the mulch, the tattle-tale will pop up and let you know that the irrigation is on.

What is a Low Flow Valve?



Irrigation valves are designed to work within a certain pressure range (pounds per square inch or psi) and flow range (gallons per minute or GPM). If you redesign your system and use drip irrigation, the flow through the valve may be so low that your existing valve will not operate effectively and may get stuck in the “open” position, wasting water. If you currently have flow lower than 5 GPM per valve, look for valves specifically marked as "Low Flow (Pressure) Valve" to replace them.

Consider your **Microclimates**



Microclimates are **Climate** factors **Particular** to your garden.

Every garden has areas where some plants will grow well and others will die. Structures, walls, fences, and other plants all can affect the amount of sun and shade in a garden. And every garden is completely different, even if it is located in the same general climate zone. There will be hills and hollows in your front yard that may collect cold air or, because your property is sloped, you don't get frost when your neighbors do.

Microclimates may differ significantly from the general climate of an area. You need to map these microclimates, and the first step is to walk around your property during the day and observe it more closely. Grab a chair, sit down outside, and start thinking about your design priorities.

Note Sun and Shade

Mark the areas that receive sun all day and areas that are shaded all or part of the day. Also note which areas receive only partial sun, maybe just a few hours of direct morning sun, mid-day or in late afternoon.

When you start choosing your plants, make sure to select those that are appropriate to your garden's sunlight patterns. Plants marked as "full sun" will not be happy in full shade or vice versa.

Are there other things you observe in your garden? Mark it on your Site Plan!

Plants Speak Latin

Did you know that many plants have the same common names? If you ask for a plant by their common name, you might end up with something completely different than what you want. The best way to order plants is to use the Latin botanical name; that way there is no miscommunication.

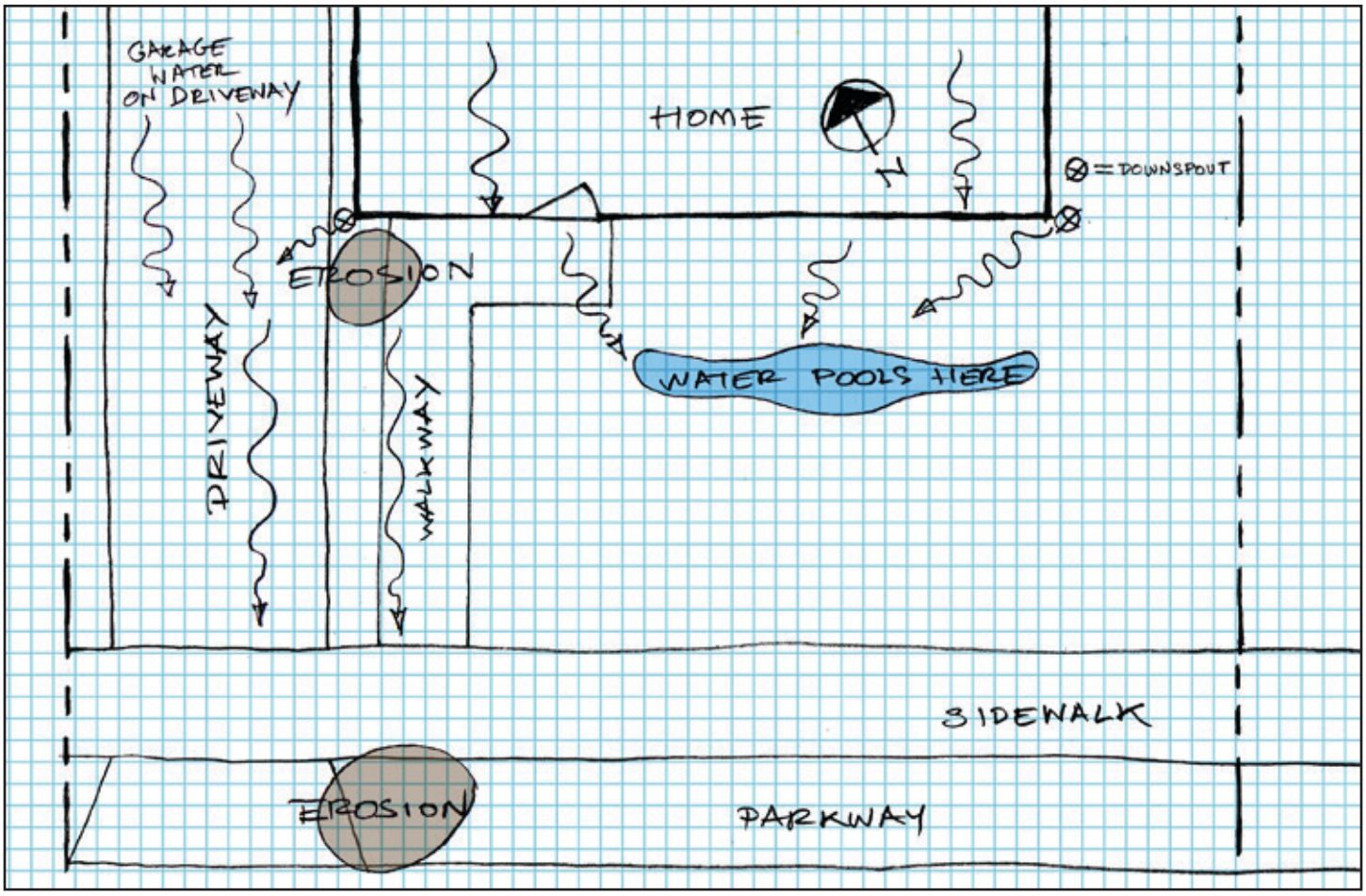
When you go to the nursery asking for plant identification, be sure to walk away with both the Latin name and the common name, so that you can conduct your research and be assured of selecting the right plant for the right place.

What About Plants You Keep?

Everyone has plants that are next to the grass area they are removing. Now is the time to decide which of these plants will work well in your new garden and which should be removed. If you don't know the name of the plant, take a photo and leaf/flower with a bit of stem attached to a local nursery to get some assistance.

Remember that trees and large shrubs that have been dependent upon the water you have been applying to your grass will now need a bit of extra love and care since you are removing the grass. Consider putting these plants on a separate hydrozone so they can get a little extra water (*see p. 22*).

Map your yard as a **Mini-Watershed**



Your **Roof** is the **TOP** of the watershed.

Make a Copy of Your Site Plan and Label It "Water Plan"

Watch what happens to water as it comes off the roof of your home and moves across your property. Your roof is the **Top** of your mini-watershed and where the water finally runs off your property is the **Bottom**. Think about how you can capture water in between the top and bottom of your landscape.

Begin to separate out each area that deposits water into a downspout. Mark the location of each of your roof gutters and downspouts.

Once you know the total area of the roof, you can figure out the amount of rainfall that it generates (*see p. 14*).

- Do you have low spots in which water pools?
- Does water run off the property anywhere?
- Does water run onto the property from a neighbor or street?
- Do any buildings or any hard surfaces appear to be water damaged or eroded? If so, does it appear to be a result of rain, irrigation, or both?
- Turn on the irrigation for no more than 10 minutes and note whether there is pooling or runoff (*see p. 37*).
- What parts of the roof divert water into downspouts, and is the water being diverted into your landscape? Indicate the direction of the water with arrows as seen above.

Look for a place in the landscape where you can place a swale that covers approximately 150 sq. ft. for every 1,000 sq. ft. of roof.

Use a water level (bunyip) to determine the grade of the property, especially the grade change between the foundation of the residence and the beginning of the area where you want to place the swale (*see p. 34*).

see AFTER image on p.7

Capture **First Flush**

First Flush is the **First Inch of Rain** after a dry spell.

This is the most important water to capture in your landscape. The first rainfall washes away pollution that has gathered on hard surfaces during the dry spell, and it needs to be filtered by the healthy soil and root zones of plants before it goes anywhere else.

Calculate How Much Water Comes Off Your Roof

The shape of your roof doesn't matter in the calculation of water it produces. A pitched roof and a flat roof have the same footprint and the same amount of rain falls on the total roof area. Just measure the outside edges (the footprint) and calculate the square footage as you would any landscape area.

Area of a Rectangle = length of side A x length of side B

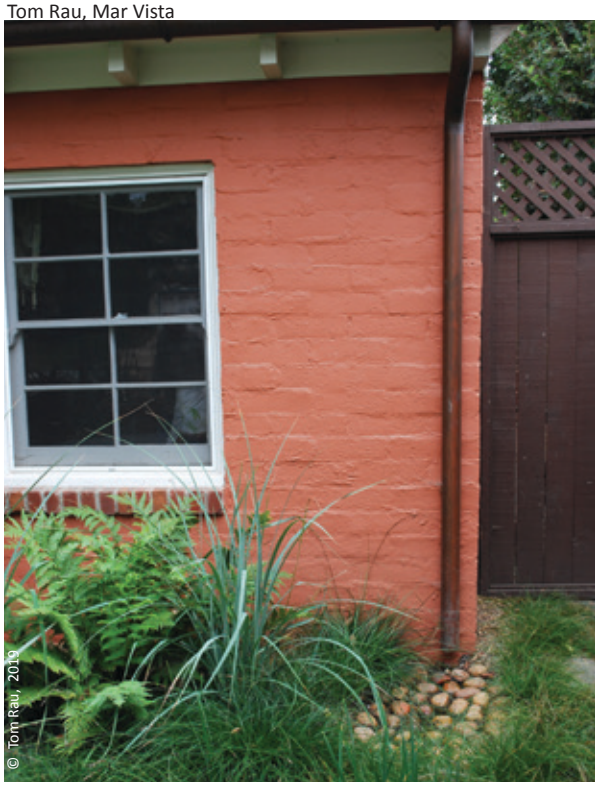
Some roofs are flat, and therefore easy to calculate. For complicated roofs, divide the area into squares and add up the area of each square.

Once you know the total area of the roof, you can figure out the amount of rainfall that it generates in gallons. 0.62 is a constant that converts square foot inches into gallons.

Rainfall (in Inches) x Roof Area Square Feet x 0.62 = Gallons of Rain Water From Your Roof

You can use these calculations to determine how much water comes off any hard surface (patio, driveway, sidewalk, etc.).

Tom Rau, Mar Vista



How Much water per downspout?

First figure out how much water is coming from the whole roof, and then divide the roof into sections and calculate the particular amounts falling from each downspout:
Rainfall (in Inches) x Roof Area Square Feet x 0.62 = Gallons of Rain Water From Your Roof

If your roof is 1,000 square feet (SF), here's how much water runs off it:

- 1"(rainfall) x 1,000 SF x 0.62 = 620 gallons
- 10" (typical coastal total rainfall) x 1,000 SF x 0.62 = 6,200 gallons
- 30" (typical foothills total rainfall) x 1,000 SF x 0.62 = 18,600 gallons

It adds up quickly, even in dry areas. Try to save as much as you can in your landscape sponge!

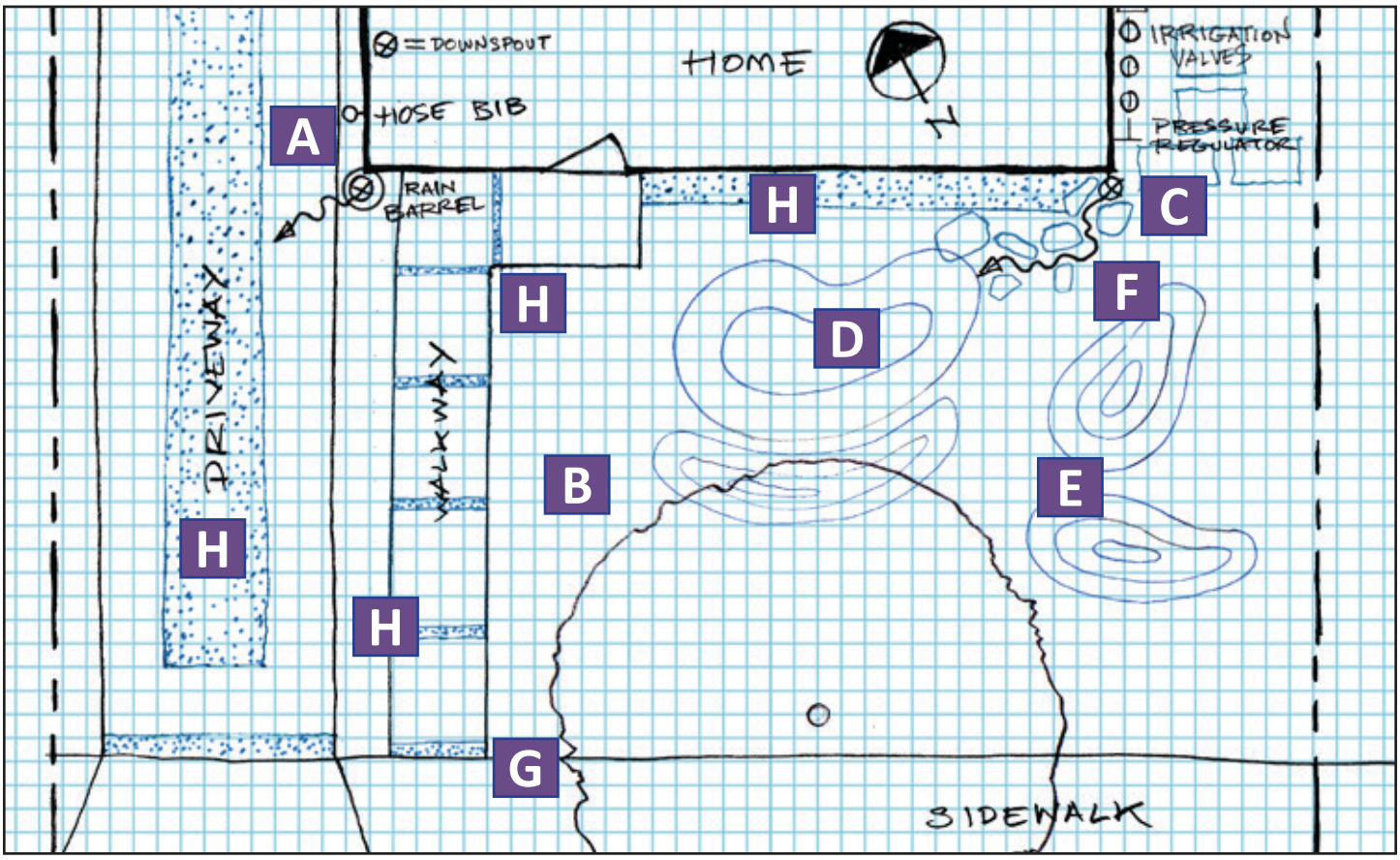
Imagine the water from your garage roof splits into two downspouts and Your Total Roof Area is 20' x 50' = 1,000 SF

If half of the water goes into each downspout, then the roof size for one downspout is: 1,000 SF ÷ 2 = 500 SF

Now calculate how much water that is in gallons from each inch of rain coming from one downspout:

1" x 500 SF x 0.62 = 310 gallons of water per inch of rain per downspout.

Plan to **Detain** the **Rain**



A **Downspout Redirected Into Rainbarrel** and away from the foundation of the residence. Overflow from rainbarrel slows down into gravel in the middle of driveway.

B **Healthy Soil** is being created with Sheet Mulching using 4" - 6" of mixed leaf and bark tree trimmings covering the whole yard *(see p. 26)*.

C **Downspout Diverted Into A Catchbasin** which is connected by underground pipe into the swale area of the landscape. This should eliminate the pooling and erosion caused by the downspout.

D **A Slight Depression**, or swale, has been dug out in the middle of the yard in the area where water always pooled. This swale is only 6" - 12" deep in the middle and covers approximately 150 sq. ft. for every 1,000 sq. ft. of roof area *(see p. 28)*.

E **Relocate Soil As Berms** when digging out the swale and the driveway area. Relocated soil becomes raised or mounded areas (berms) on either side of the depressed area. The berms become places for plants that like fast drainage *(see p. 28)*.

F **Stones And Boulders**, most typically no more than 12" - 18" in diameter, are used to retain the edges of the swale and provide visual interest in the landscape.

G **Overflow** of excessive rain should be directed through the garden and out to the street, not on to neighboring properties.

H **Concrete Removed and Gravel Installed** in middle and end of driveway and across the front of the residence. The 18" wide gravel area reduces erosion under roofline. Horizontal cuts made in the walkway are filled with 1/4" - 1/2" crushed gravel. These are not eligible for a rebate.

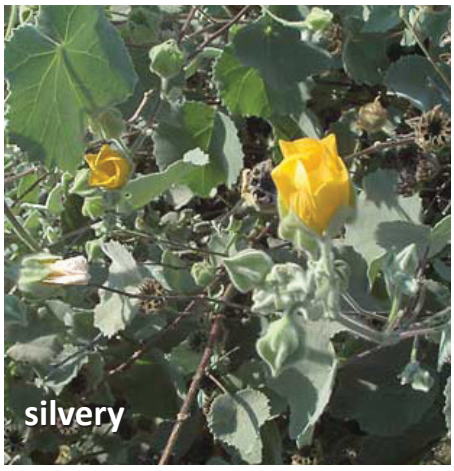
Rainbarrel with overflow into planter or permeable driveway

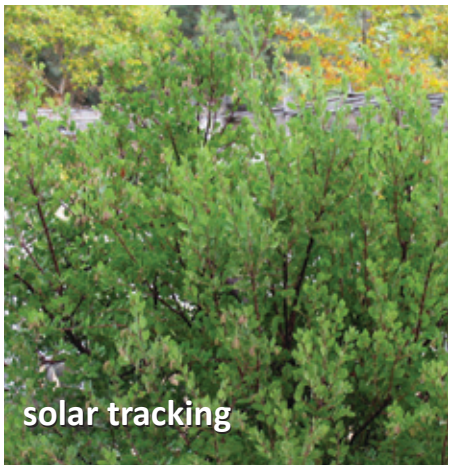
Sheet Mulch of leaf and wood tree trimmings builds healthy soil

Downspout diverted into swale area through catch-basin and underground pipe

Slight depression, berms, and boulders of a typical swale

Flower to the People, Los Angeles





California friendly plants have evolved over time to thrive in our unique and varied Mediterranean climate conditions, and are adapted to the hot and dry Los Angeles summers. By learning to recognize their adaptation tricks, you can identify climate-appropriate plants wherever you are. These four characteristics will allow you to find climate-appropriate plants in a crowded nursery.

Stiff or Leathery

These leaves hold on to water and stay evergreen for most of the year.

Silver or Hairy

Light colored leaves reflect sunlight, cooling the plant. Hairy back sides of leaves hold moisture longer, cooling them off.

Tiny or Little

Small leaves are like tiny solar panels that are easier to keep cool than one large hot surface.

Solar Tracking

Leaves that appear to be standing at attention, straight up and down in the middle of the day, are solar tracking. As the day progresses, or if you see the same plant in the early morning, you will find that the leaves are more horizontally oriented. This plant is moving its solar panels to minimize the hottest sun exposure. California native manzanitas (*Arctostaphylos*) are notorious for this adaptation.

Plant for **Pollinators**

Plant A Pollinator Garden

Look for the Butterfly icon on pictures of certain plants throughout this book. These are plants that attract beneficial insects and support the life cycle of butterflies. Try to get several in your garden that bloom during each season so you host the larvae and caterpillars as well as the full-grown nectar-seeking showstoppers. Find out more at *www.calscape.org*.

Gotta Get Bees

Not every bit of ground needs to be covered in mulch. Try designating a 5 - 10 square foot patch of open ground for solitary ground nesting bees and insects, especially if you have planted California native plants. Bees also will show up if you install some nesting boxes, or build an insect hotel.

Plants and **Bugs** need each other to survive.

Nature provides checks and balances in a garden, and you can attract insects and creatures that will help you maintain your garden without pesticides. Flowering plants rely on insects for pollination and thus reproduction. In turn, they provide for different insect species that feed on various plant parts and prey on other insects. Some bugs eat too much, destroy plants and spread diseases. Other bugs, beneficial insects, fight off the bad guys, keeping them in check by eating them or disrupting their reproductive process.

Use only organic methods, avoid chemical inputs, and actively cultivate a diversity of plants that provide resources at different times of the year, and you will be rewarded with a healthy and balanced mini-ecosystem.

Pollinator Attractors

1 Asclepias fascicularis
Narrow Leaf Milkweed

2 Heuchera maxima
Island Alum Root

3 Achillea millefolium
Common Yarrow

4 Verbena lilacina 'De la Mina'
Cedros Island Verbena

5 Ceanothus ssp.
California Lilac

How much **Water** does your garden **Need?**

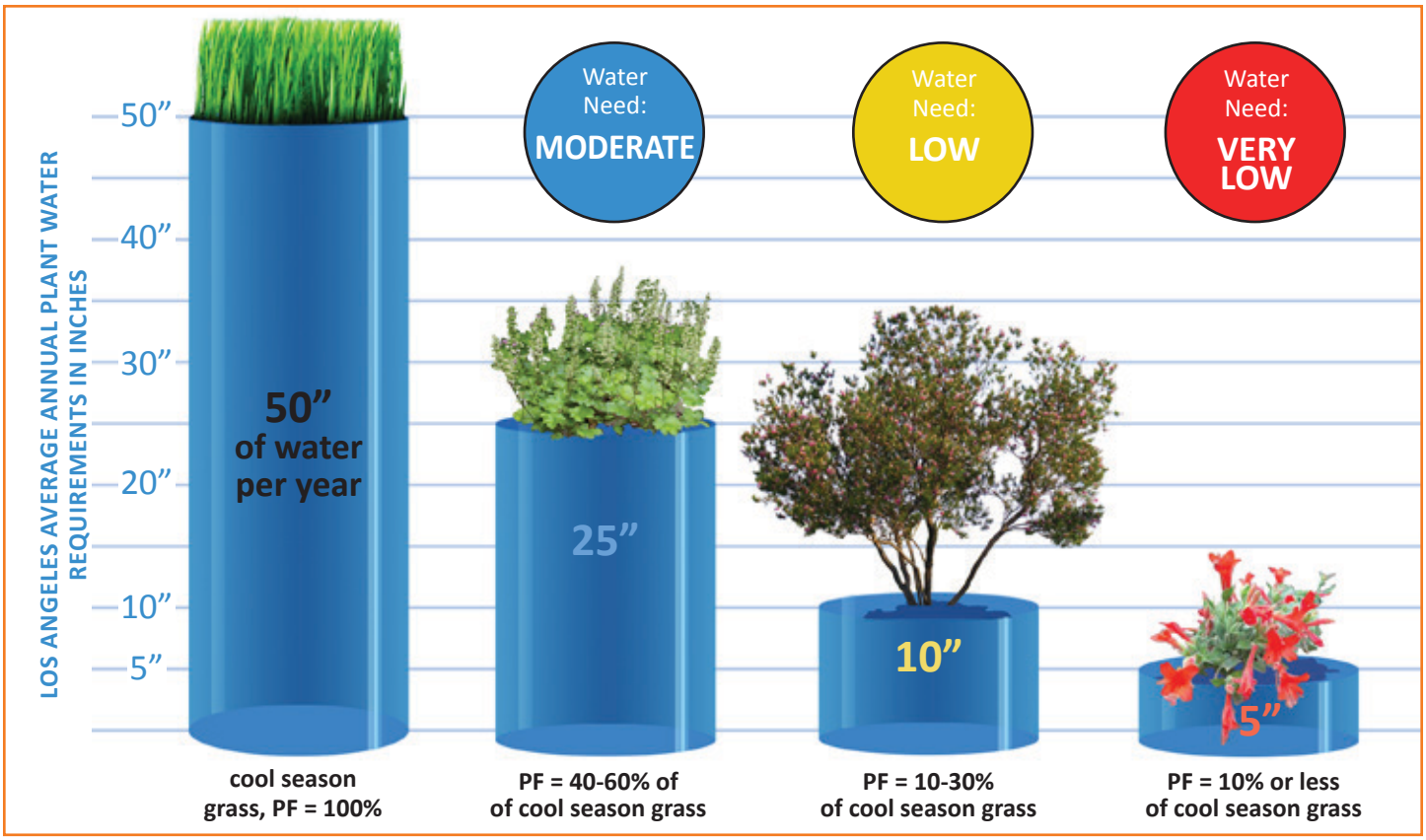
Evapotranspiration (ET) is the key to watering plants.

Evapotranspiration (ET) can be thought of as "reverse rain." ET measures the inches of water being transferred over some period of time from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration (sweat) from plants. ET is a quick way to explain environmental and climate conditions, especially solar radiation (sunshine or cloud cover). Many plants need more water in the summer, when the sun is high and days are long; winter days are shorter and often rainy or overcast, so many plants need less water.

ET therefore, explains how much water plants really need and when they need it; critical information for planning irrigation and managing the **Soil Moisture Account** (*see p. 36*).

Plant Factor (PF) describes the specific water need of each plant in your landscape. PF can be determined by gathering information about a plant and then comparing it to the amount of water needed by cool season grass growing in your climate zone. PF is expressed as a percentage of the water needed by cool season grass. Plant watering needs, include: **VERY LOW at 10%**, **LOW at 20%**, **MODERATE at 50%** and **HIGH at 100%** (cool season grass).

Landscape Water Need takes into consideration the effects of irrigation efficiency (IE Percentage) (*see p. 37*) and square feet of landscaped area (SF) to figure out how many gallons of water a particular landscape would require, given its climate zone (ET Inches) and plant selection (PF Percentage).

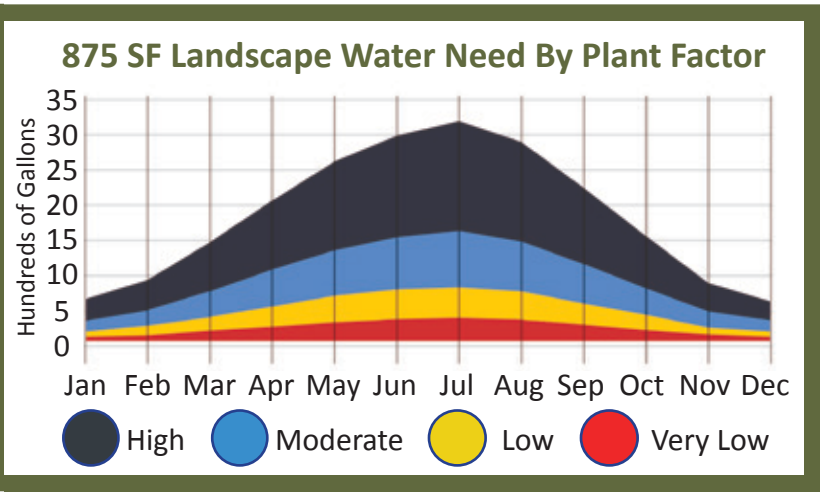


Reduce Landscape Water Need: Understand **ET**, **PF** and **IE**

Every plant choice gives us the opportunity to reduce the Landscape Water Need.

In our 875 SF Front Yard (*see p. 8*) replacing **HIGH Plant Factor** cool season grass with **VERY LOW Plant Factor**, climate-appropriate plants saves almost 32,000 gallons of water annually, before changing to drip irrigation for higher irrigation efficiency (IE) (*see p. 37*).

Converting to drip irrigation with a higher IE saves even more (up to 20%)!



How much **Water** can your new garden **Save?**

Calculate your landscape watering need in **Gallons.**

Our Front Yard Landscape Water Need:

Our front yard is 875 Square Feet (Landscape SF). In order to calculate the Landscape Water Need, we will keep climate zone (ET Inches) and irrigation efficiency (IE Percentage) constant (*see p. 37*), but change the plant selections (PF Percentage). See how much water could be saved every year by switching from cool season grass and replacing the area with climate-appropriate **MODERATE**, **LOW**, or **VERY LOW** water requirement plants. **Improving IE to drip irrigation makes a BIG difference in water savings** (*see p. 37*).

Landscape SF = 875 Annual ET Inches = 45” Drip Irrigation Efficiency % = 90%
Landscape SF x ET Inches x Plant Factor % ÷ Irrigation Efficiency % x 0.62 = Landscape Water Need in Gallons

Grass Water Need: **HIGH**

HIGH Water Need
Plant Factor = 100% = 1.0

875 SF x 45” x **1.0** ÷ 0.90 x 0.62 =
27,125 Gallons Annually

New Front Yard Water Need: **MODERATE**

MODERATE Water Need
Plant Factor = 50% = 0.50

875 SF x 45” x **0.50** ÷ 0.90 x 0.62 =
13,563 Gallons Annually

In our 875 SF Front Yard, replacing cool season grass with **MODERATE** climate-appropriate plants saves 13,562 gallons of water annually, without changing our irrigation efficiency assumptions, and using drip irrigation.

Stout Design Build, Encino

Urbafloria, North Hollywood

LOW Water Need Plant Factor = 20% = 0.20

875 SF x 45” x **0.20** ÷ 0.90 x 0.62 =
5,425 Gallons Annually

Replacing cool season grass with **LOW** Water Need plants saves 21,700 gallons of water annually, without changing irrigation assumptions.

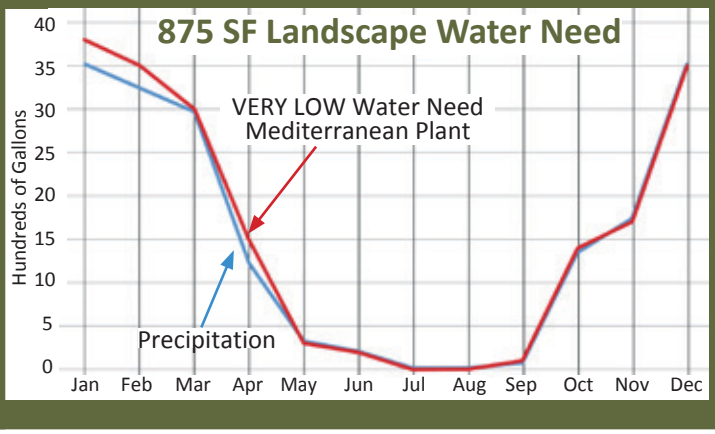
VERY LOW Water Need Plant Factor = 10% = 0.10

875 SF x 45” x **0.10** ÷ 0.90 x 0.62 =
2,713 Gallons Annually

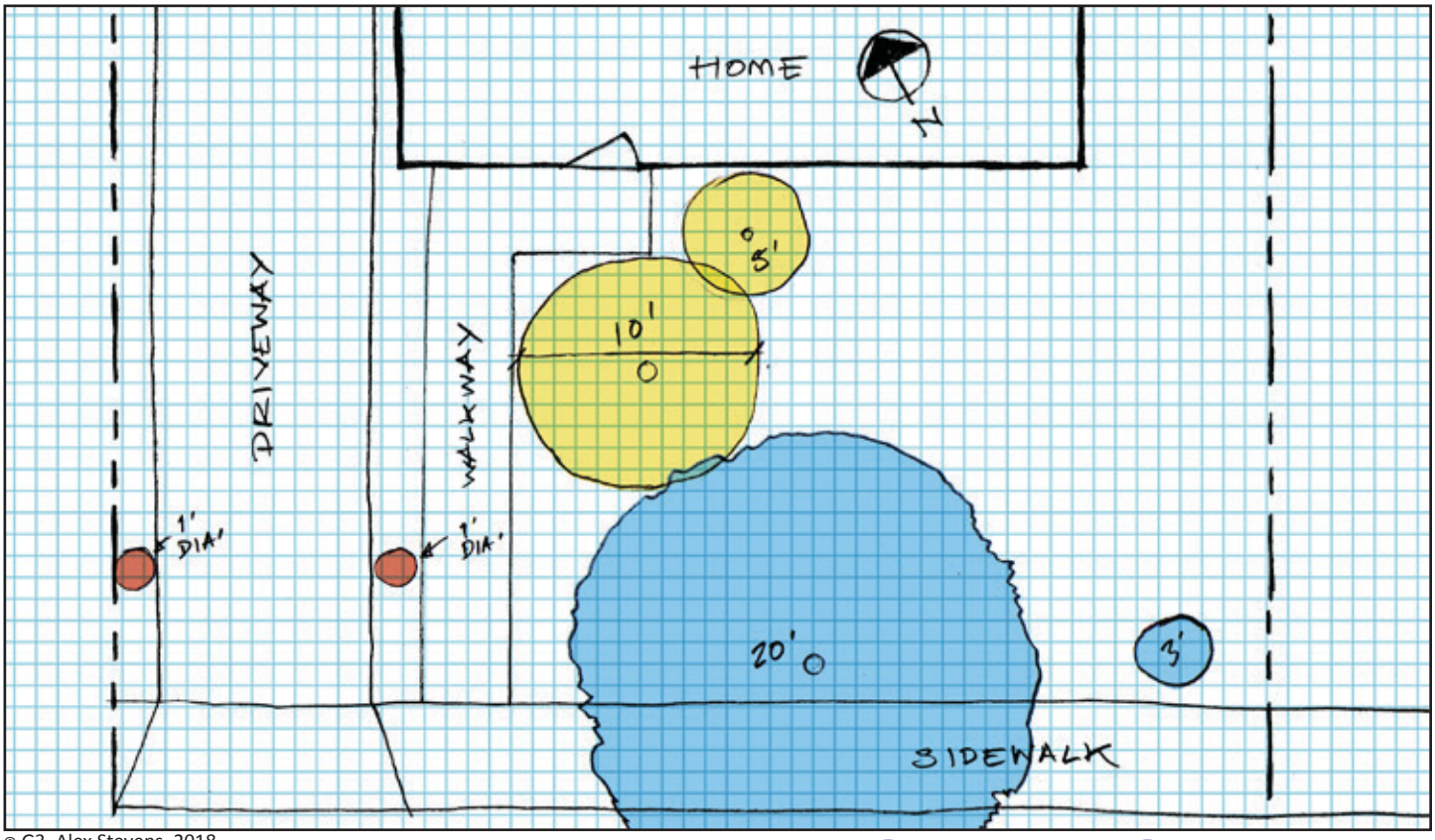
Replacing cool season grass with **VERY LOW** Water Need plants saves 24,412 gallons of water annually, without changing irrigation assumptions.

Sleep in summer, Grow in winter: Mediterranean climate-appropriate plants

Since many climate-appropriate plants from Mediterranean climates have **MODERATE**, **LOW** or **VERY LOW** water needs, planting them saves water when compared to cool season grass. However, most of these plants don’t want water in the summertime when they are dormant; they want water in the winter, when they can grow their roots in cool soil using rainwater. Irrigation needs can be reduced by directing rain-water to the garden from the roof and other surfaces in the winter months. But beware the dry winter -- these plants will need supplemental irrigation in winter if they are to survive the following summer.



Plant in the **Hydrozone**



A Guide to Plant Water Needs (*see p. 18*)**:** **Moderate** **Low** **Very Low**

Group Plants by **Water Needs** and plan ahead for **Maturity**.

Proper plant placement, considering mature plant size, should limit the need for future pruning and reduce the amount of maintenance required in the long run. Natural forms are encouraged for habitat value, but fire prevention does require pruning and removal of dead, diseased, damaged and deranged plant material.

Scale Your Plants for Maturity

Make circles on your plan the size of the plant at maturity using a 1/4" = 1' scale (each box = 1').

Practice using colored paper to indicate the water needs of the plants. It will make it easier to lay out the planting plan in irrigation zones if you easily can move around the paper circles.

See on the plan how big the (MODERATE water use) 20' wide canopy trees will be at maturity. Will this change the microclimates in the future? Think ahead if your new trees will cover a whole yard that's now sunny.

Play By The Hydrozone Rules

- Plants with similar cultural and water requirements should be planted together in order to irrigate them efficiently.
- Consider the soil, water needs, sun/shade and temperature requirements for each hydrozone.
- Each hydozone should be watered by a separate irrigation valve.
- Do not mix plants with different water requirements in the same hydrozone.
- Do not mix different irrigation types in the same hydrozone.
- The irrigation of each hydrozone should have matched precipitation (every nozzle needs to emit the same gallons per hour for drip).

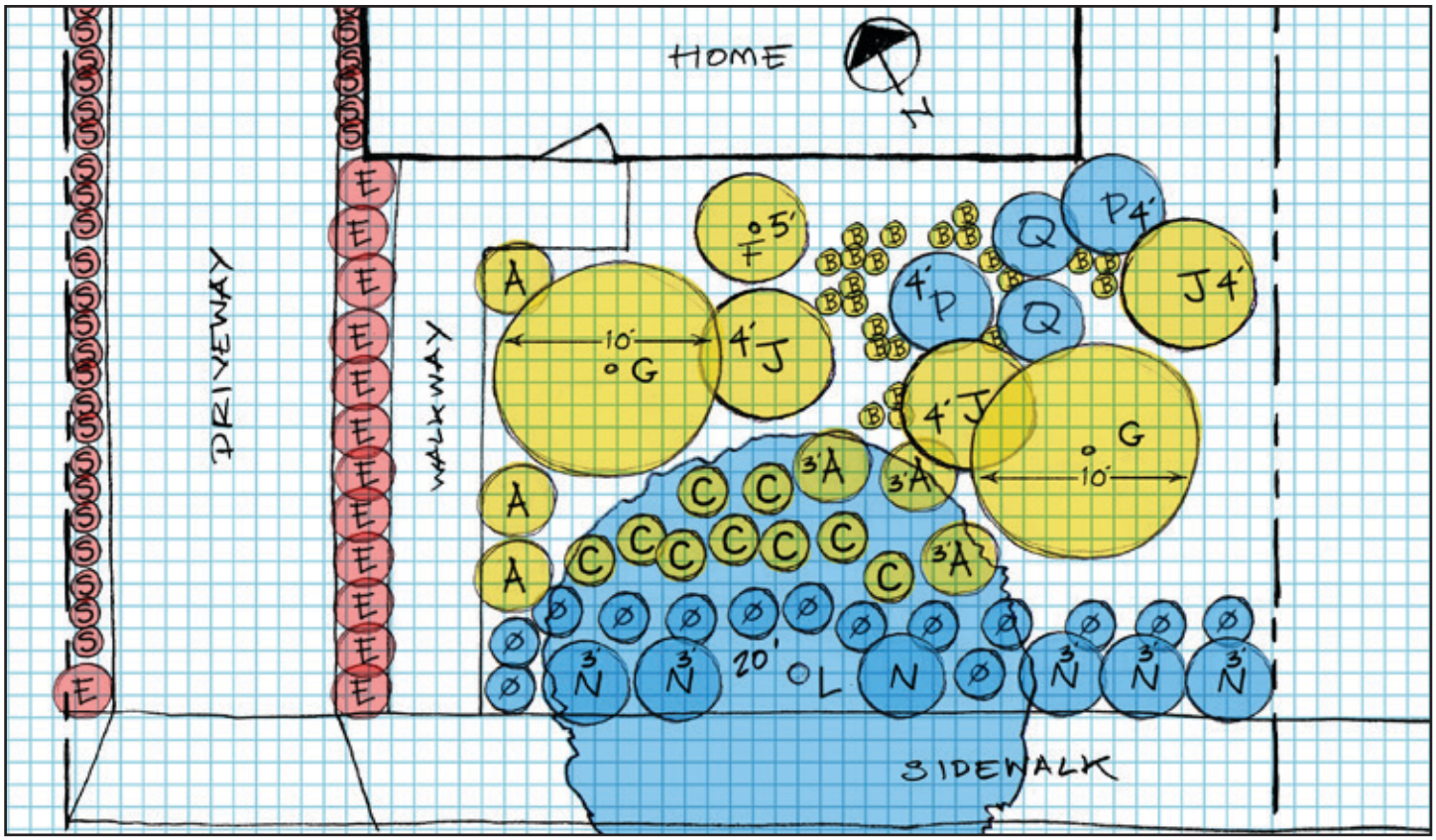
Root depth matters

Make notes about the root depth of the plants when you are placing them on your plan. Trees, with their deep roots, will be irrigated less frequently, but for a longer time. Groundcovers with shallower roots will require more frequent watering. **Keep trees and groundcovers on separate hydrozones.**

Small plants are mighty

Once planted in a properly prepared bed, and watered wisely, small plants establish themselves more vigorously than plants raised in larger containers. But just because you've selected small plants, doesn't mean you need to buy more than the space allows when those plants reach maturity!

Make your **Planting Plan**



Qty.	Symbol	Form/Water Need	P	Botanical (Latin) Name	Common Name	Plant Factor	Sun	Dimension H' x W'	D/E/S	Flower Color	CA Native?
4	A	Groundcover	x	Achillea millefolium	Common yarrow	L	F	2' x 3'	S	various	Y
23	B	Perennial	x	Sisyrinchium bellum	Blue-eyed grass	L	F	1' x 1'	E	purple	Y
9	C	Perennial	x	Heuchera maxima	Island alum root	L	F/S	1' x 2'	E	pink white	Y
9	E	Perennial	x	Eriogonum crocatum	Conejo buckwheat	L/VL	F/PS	2' x 3'	E	yellow	Y
1	F	Perennial	x	Epilobium canum 'Catalina'	CA fuchsia	L/VL	F	4' x 5'	S	orange red	Y
2	G	Perennial	x	Salvia leucophylla 'Point Sal Spreader'	Purple sage 'Point Sal Spreader'	L	F	3' x 10'+	E	rose pink	Y
3	J	Perennial	x	Verbena bonariensis	Purpletop vervain	L	F	6' x 4'	E	purple	N
1	L	Tree/Shrub	x	Cercis canadensis 'Forest Pansy'	Forest Pansy redbud	M	F	20' x 25'	D	purple	N
6	N	Perennial	x	Pacific Coast Hybrids	Pacific Coast iris hybrids	M/L	PS	2' x 1'	E	various	Y
14	O	Perennial	x	Geranium sanguineum	Bloody cranesbill	M	F/S	2' x 3'	S	fuchsia pink	N
2	P	Perennial	x	Iris douglasiana	Douglas iris	M/L	PS	2' x 4'	E	various	Y
2	Q	Perennial		Juncus patens / Juncus effusus	California wiregrass	M	F/PS	3' x 3'	E	brown	Y
32	S	Ornamental Grass		Bouteloua gracilis 'Blonde Ambition'	Blonde Ambition blue grama	VL	F	1.5' x 1'	E	chartreuse/wheat	N

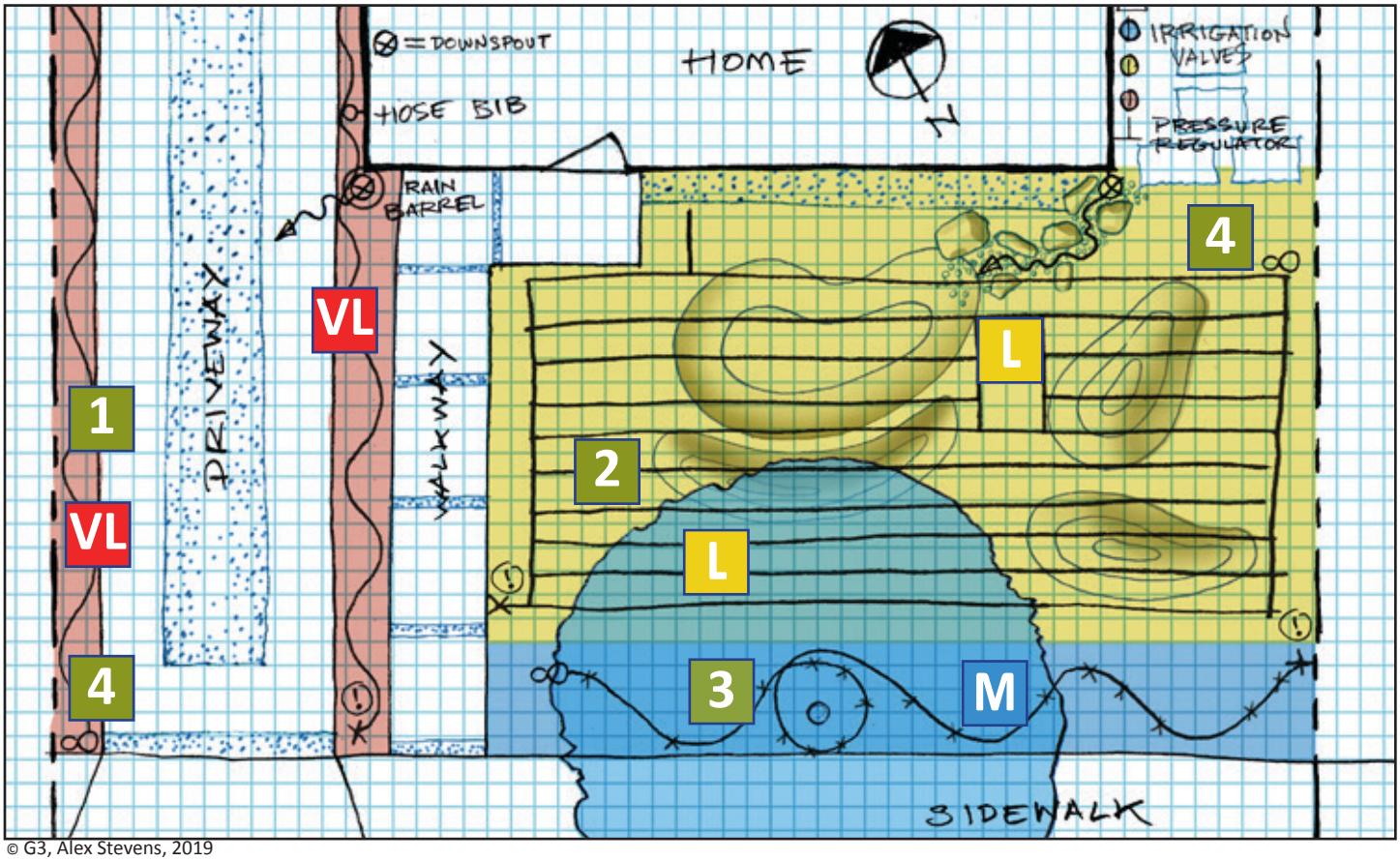
Plant List Key

Form:	Water Use:	Sun:	P:	D/E/S:	CA Native?:
Natural shape taken by the plant	**M=Moderate** **L=Low** **VL = Very Low**	**F**=Full **PS**=Part Shade **S**=Shade	Plant supports life cycle of pollinators, butterflies and insects	**D**=Deciduous, **E**=Evergreen, **S**=Semi-Deciduous	This plant is a CA native plant or a very close cultivar

Plan for Planting Start with a copy of your **Microclimates Map** (*see p. 12*). Begin the plant design process by selecting the right plant for the right place in your garden. Use the Plant List above to practice matching plants with the conditions, and represent the plants with circles the appropriate size and color reflecting water requirements. This is the foundation of your **Plant Shopping List** *(see p. 43).* It's just a paper plan, so move things around! Experiment!

1. Take into consideration microclimates and select plants that need Full Sun, Part Shade or Shade as appropriate.
2. Consider Plant Factors - Low or Very Low plants on berms and Moderate plants in the swales.
3. Consider the height, width and root depth of each plant.
4. What form of plant do you desire - Groundcover, Ornamental Grass, Vine, Shrub, Perennial, or Tree?
5. Once you've drawn your plan, count the number of plants you will need to order and mark them in the Quantity box.

Match **Irrigation** to new **Hydrozones**



Adjust Valve Zones to Hydrozones.

Which sprinkler heads go on at the same time and what kind of plant material are they irrigating? Get ready to make changes to your irrigation system in order to accommodate both the new grading and the new plants you are introducing into your garden. In our example garden, we have three different hydrozones.

VL **VERY LOW** water use plants in the strips along the driveway will have **in-line drip irrigation in a random pattern** around each plant. Each drip emitter is 1 GPH.

L **LOW** water use plants in front yard dry creek and berm areas will have an **in-line drip irrigation line in a grid pattern**; the grid pattern is better for situations where you want to achieve a more uniform wetting pattern that works especially well with groundcovers and high-density mixed planting. Each drip emitter is 1 GPH, spaced 18" apart, in rows spaced 18" apart..

M **MODERATE** water use plants along the sidewalk will have an **on-line or "point source" drip irrigation line in a random pattern** around each plant; note that the tree gets special attention with an extra ring to accommodate its expected growth. Each drip emitter placed in the blank tubing is 1 GPH.

END FIGURE "8" FLUSH-OUT VALVE

TATTLE TALE (*see p. 11*)

ON-LINE DRIP LINE (*see p. 11*)

IN-LINE DRIP LINE (*see p. 11*)

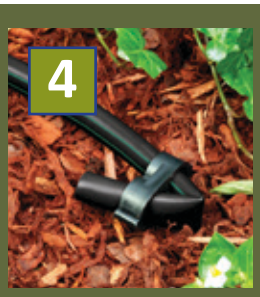
MULCH OR GRAVEL

Images courtesy of Rain Bird Corporation

On-line drip emitter inserted into blank tubing

In-line drip grid emitters are built into tubing

Tree drip ring needs to expand as tree grows



Dripline end figure 8 can double as a flush-out valve

Convert **Spray** to **Drip**

Now you are ready to **Irrigate** your landscape.

If you are renovating most of your landscape, or your irrigation system is older than 5 years and was not installed by an irrigation professional, be prepared to start from scratch rather than try to convert from spray to drip. For those newer spray systems, a conversion to drip irrigation is possible using a kit that replaces the sprinkler body.

You Will Need:

- Tools: trenching shovel, hand trowel, pliers
- Sprinkler caps
- Sprinkler Retrofit Kit
- Compression tees and elbows
- Rolls of drip tubing (1/2" blank or with in-line emitters)
- "U" soil staples
- 1 GPH pressure compensating emitters for on-line, tubing punch

Images courtesy of City of Santa Monica

If You Get Stuck An irrigation system designer or licensed landscape contractor can help you design and then install the new drip system. You will need to seek the help of a licensed plumber or landscape contractor to convert the typical irrigation valves suitable for spray to low flow valves designed for drip. Consult professional assistance if you must install a backflow prevention device to keep water that has already gone into the landscape from passing back into the household or city water system.

Sprinklers to Drip Retrofit in Ten Steps

(LADWP is not responsible for the performance of any product(s) demonstrated at any Hands on Workshops)

1. **Warm Tubing In Sun** to make it easier to handle. Use 1/2 inch drip tubing either with the emitters built into the tubing or blank so on-line emitters may be added later. Each emitter should not exceed 2 gallons per hour (GPH).
2. **Turn On system.** Mark each sprinkler with a flag. Then identify which sprinkler is the last to receive water on the line. Place 1 additional flag at that one (2 flags total).
3. **Convert Last Sprinkler** on the line (2 flags) to Tattletale (*see p. 11*).
4. **Choose a Conveniently Located Sprinkler** to install the drip retrofit kit. Place 2 additional flags at this one for a total of 3 flags. Often a drip grid is best run off a corner sprinkler (*see p. 11*).
5. **Unscrew the Top** of the sprinkler in Step 4 (3 flags). Remove the insides of the sprinkler.
6. **Replace With the Retrofit Kit**, elbow, and a compression tee and adaptor. Note: You many need to replace the entire sprinkler head with parts provided in your kit.
7. **Cap Other Sprinklers** as you find them;
   - For Rain Bird and Hunter sprinklers, unscrew the tops and replace with the Rain Bird caps.
   - For Toro sprinklers, use Toro caps.
   - For all other brands, you'll need to remove the sprinklers and install PVC caps on the riser.
8. **Push Drip Tubing Into Compression Tee** on both sides. Maximum of 100 feet of tubing with 1 GPH emitters per sprinkler head retrofit and 300 feet of tubing with 1 GPH emitters per valve.
9. **Make a Grid** with the drip tubing using elbow compression fittings to make the 90° turns. For trees, wrap a drip line around the entire tree but leave at least 12" from the trunk.
10. **Replace Existing Sprinkler Valve** with a low flow antisiphon valve and install. Anti-siphon valves are not necessary if a master backflow device currently exists *(see p. 11)*.

Lawn: Cut It out or Cook It down?

grows best in cooler periods of the year.

This grass requires water in the hot summer or it will die.

Typically these grasses grow as bunch grasses and propagate by seed or weak stolons. Cool season grasses are smothered easily by sheet mulching with 4" - 6" of mulch.

Varieties include: Bent Grass (*Agrostis*), Fescue varieties (*Festuca varieties*,) Kentucky Bluegrass (*Poa pratensis*), Perennial Ryegrass *(Lolium perenne*).

Cool season grass needs more water than warm season grass and is considered a HIGH water use plant.

grows best in warmer periods of the year.

This grass hits its stride when temperatures exceed 80°F, but will go dormant (golden brown) in the winter time when rainy and cool.

Typically these grasses grow from sturdy rhizomes extending deep underground. Warm season grasses require physical removal and/or intensive sheet mulching using at least 6” - 12” of mulch.

Varieties include Bermuda Grass (*Cynodon dactylan*), Blue Grama *(Bouteloua gracilis*), Buffalo Grass (*Buchloe dactyloides*), St. Augustine Grass (S*tenotaphrum secundatum*), Zoysia, and Seashore Paspalum.

Warm season grass is a MODERATE water use plant.

if you have cool season grass.

If your lawn is a cool season turf, you can leave it in place and sheet mulch following the Soil Lasagna Recipe (*see pp. 26-27*) to cook your grass away. **This might take up to four months to complete.** If you want to speed things up a bit, cut out the grass with a sod cutter and then sheet mulch to restore your soil.

Rent a Sod Cutter

Most large box stores or hardware stores have sod cutters available for rent. Sod cutters are heavy equipment and may need a truck for delivery.

if you have warm season grass.

If you have any combination of the warm season grasses, you have a bigger project ahead of you. You’ll need to remove the grass, as much of the roots as you can, and perhaps even the top few inches of soil as you try to get rid of the roots.

The best way to do this is with a sod cutter. A sod cutter, dumpster to remove the cut sod, and other equipment can be rented. Once you’ve cut it out and disposed of it properly, you can get cooking using the Soil Lasagna Recipe to build the healthy soil. **If you cut out the sod, you can plant as soon as you finish contouring and sheet mulching! No need to wait.**

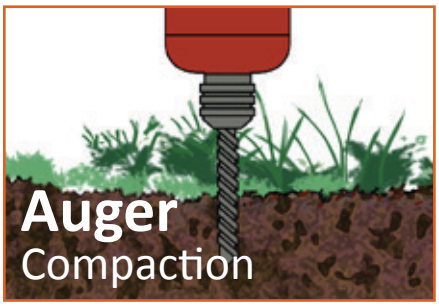
Prepare for Success

If you are ready to transform your water-guzzling grass into healthy soil, just follow along with the recipe for Sheet Mulching, a.k.a. "Soil Lasagna" (*see pp. 26-27*), and you will have delicious soil in no time. Here are some things to consider as you plan your grass removal process. **Remember to check the rebate requirements to make sure your project is eligible. Be sure to reserve your rebate BEFORE removing grass.**

Grass should be living until you remove it. You want to be able to work with the microbes in the soil, and they need water to stay alive. Also, it will be easier to remove grass that is fresh and moist than it will be to try to find the weeds you missed in a clump of dry dead grass.

Keep irrigating lawn until the day before you are ready to sod cut or sheet mulch the grass away.

Weeds are encouraged to grow right through plastic weed cloth because soil building is kept from happening when the organic matter from fallen leaves and mulch doesn't touch the soil to begin decomposing. Paper is the only weed barrier needed to keep sunlight from germinating seeds in the soil. Over the course of a few months, the paper breaks down and turn into soil. On steep hillsides, coir mat or compost blankets may be used for stabilization, but always with the objective of complete decomposition within a specified period of time (*see p. 34*).



Use an 18" long x 5/8" diameter masonry drill bit with a hand drill to make targeted holes in compacted soils. Drill holes throughout the compacted area, and keep them at least 12" apart on center. Follow this hole-making with good compost or worm castings, and thoroughly water in everything.

Use a Site Plan to figure out how much area of grass you are removing. Now you will have to do the calculations for compost, paper and mulch (*see p. 33*).

You will need the following, if you are going to do Sheet Mulching (*see pp. 26-27*):

1. 1" of compost
2. 4" – 6" of mulch over the whole area
3. Rolls of painters' paper or cardboard with 6" overlaps

RULE OF THUMB: Multiply the Square Footage of the area by 1.25 to determine the total amount of paper you will need. This multiplier allows you to overlap the paper by at least 6" on all sides to make sure that no sunlight gets in.

Compaction Kills Plants

The bigger the equipment for removing the turf, the more the soil beneath is compacted. Try to only use hand powered or walk-behind equipment rather than a bobcat or other scraper.

Call Dig Alert (811)

Hitting a gas line or water main is no laughing matter! Call at least two days before digging so marks can be made to avoid underground cables, water lines, gas lines and sewer pipes. Be careful when digging around irrigation lines; they can be as shallow as 4" below the surface. Have some irrigation repair materials on hand to be able to fix a leak if you break one.

Till Can Kill

Tilling soil breaks up and kills soil microbes so you are pretty much guaranteed to have weeds pop up afterward. If you have to till, follow up right away with compost or sheet mulching.

Stout Design Build, Cheviot Hills

Build healthy soil with **Sheet Mulching** (aka Soil Lasagna).

We call this process Sheet Mulching, or **Soil Lasagna,** because it boosts microbes so much, they actually cook down the organic matter and start eating up the grass as food. Once you've made the Soil Lasagna, all you need to do is keep the system wet so the microbes can stay awake and cooking. How long this will take depends upon the kind of grass you have (*see p. 24*). When you're ready, just dig a hole right into it, cutting through paper/cardboard (if it's still there) and plant into the healthy soil beneath.

You Will Need:

Shovels and Rakes
Bins for removed grass and soil
Landscape flags
Compost, Worm Castings, or Compost Tea
Wheelbarrow(s)
Mulch
Painters' Paper or big sheets of Cardboard
Hose with shut off nozzle at end
Water (LOTS!)

Secure Your Permits

Call DIG ALERT (8-1-1) at least two days in advance of digging. Soil removal and large-scale drainage or grading may require permits from the City.

Rent A Dumpster

For every 1,000 sq. ft. of turf removed you will need 1 low-boy (10 yard capacity) dumpster. A permit from the City is required to put a dumpster on the street.

1 After you have checked for permits and any other local restrictions, deal with the lawn you have. If it's cool season, mow it to about 1/2" height, say goodbye and soak it thoroughly with water. Then go to #3. If you want to cut out cool season grass, go to #2.

2 If you have warm season grass, rent a sod cutter and remove the grass and 2-3" of roots beneath. The result is that you will be removing up to 6" of grass and soil. Unfortunately, this must be hauled away, so you will need to get a permit and rent a dumpster.

3 Flag your sprinkler heads so you can find them and cap or convert them to drip irrigation later (*see p. 23*).

4 Dig a trench 8-12" deep (about 1 shovel depth) and at least 10-24" wide (the wider the better) around all hard surfaces and 6" deep along building foundations. **Before moving on, complete your contouring for rainwater absorption and retention.** *(see p. 28).*

5 Add a (1/2" to 1" deep) layer of compost on top of the graded soil. Alternatively, use humates, a sort of freeze-dried compost available at some landscape supply stores, or spray with compost or worm tea. You are adding good instant food and some beneficial microbes to the soil!

6 Water everything well. Wake up, microbes and get the party started!

7 Roll out painters' paper, cardboard or other paper. Overlap at the seams by at least 6". No naked soil!

8 On the hardscape edges, make a "burrito" by A) overlapping the edge of the hardscape by 10" - 12" with paper and covering the trench with mulch, and then B) folding back the paper and covering it with mulch to keep grass from re-sprouting immediately.

9 The paper is watered again and add another layer of compost here, if you'd like. Rake a thick blanket 4-6" deep of finely chopped mixed leaf and wood mulch over the paper or compost.

10 Water the mulch thoroughly. This mulch layer will absorb more water than you ever thought possible to become soaked through. Don't despair; just keep watering!

11 Plant right through the layers. The longer you wait to plant, the tastier the lasagna will be for the new plants, but you can plant right away if you removed the grass. **If you kept your cool season grass in place, count on waiting 3-4 months before planting.**

12 Step back and admire your work! Have a glass of lemonade too; you earned it!

Contour Your Garden in Eight Easy Steps

1. Make Your Site Plan and note where rain falls and flows. Look for an open, mostly flat low spot to direct water towards in the front yard, or anywhere with the center at least 10' away from the house foundation and 3' away from the sidewalk and neighbors (*see pp. 14-15*).

2. Lay Out Your Low Spots. Spread out a garden hose to outline the shape. The area must be basically flat or slightly bowl-like, and not sloping back toward the house. Be careful around trees. Don't put your contours under a mature tree or disturb any big roots. Remove all plants (including grass) from the area and start digging.

Do not dig without calling 8-1-1- DIG ALERT!

3. Do A Percolation Test. If you have compaction, try to break through it with a shovel or a pitchfork (*see p. 9*).

4. Dig A Basin that is between 6" and 12" deep at the center. Slope the sides gently to make a sloping bowl, not a cylinder. **For every 1,000 sq. ft. of roof area, plan on creating a basin covering 150 sq. ft., and six inches deep** (*see p. 15*).

5. Mound Extra Soil around the bowl to increase capacity. At the bottom of the basin, put down at least an inch of high quality compost or worm castings to activate your soil.

6. Direct Downspouts Into The Basin area, moving the rainwater through gravel lined ditches or aboveground drainage pipes. Also, make an overflow path so extra water has a direct channel away from your house (*see p. 15*).

7. Plan For Overflow that isn't directed onto your neighbor's property; overflow always should be directed from your property into the street (*see p. 15*).

8. The Basin Will Fill Up when it rains, creating a temporary pond until the water soaks into your soil. All the water should be gone in 24 hours.

TAKE ACTION if your basin is slow draining!

If water in your basin is not gone within 48 to 72 hours maximum, then auger the basin to eliminate compaction (*see p. 25*). Add worm castings when it has drained. Whenever you disturb the soil, be sure to reapply compost.

Contours capture rain

Native Plants OK With Wet Feet (Basin Swale Plants)

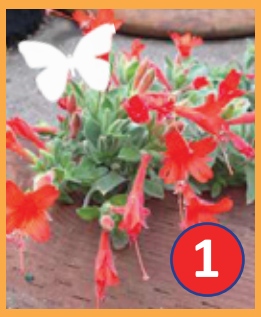
1 Anemopsis californica
Yerba Mansa

2 Juncus patens
California Wiregrass

3 Clinopodium douglasii
Yerba Buena

Swale Plants Are Special. These basin plants like wet feet and can be completely submerged in rain water and still survive Los Angeles' hot dry summers without extra water. They're sort of plant Super Heroes that way!

Native Plants That Prefer Dry Feet (Berm Plants)



1 Epilobium canum 'Everett's Choice'
Everett's California Fuchsia

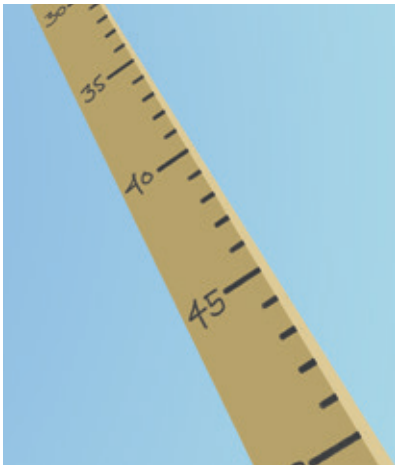
2 Salvia leucophylla 'Point Sal Spreader'
Point Sal Purple Sage

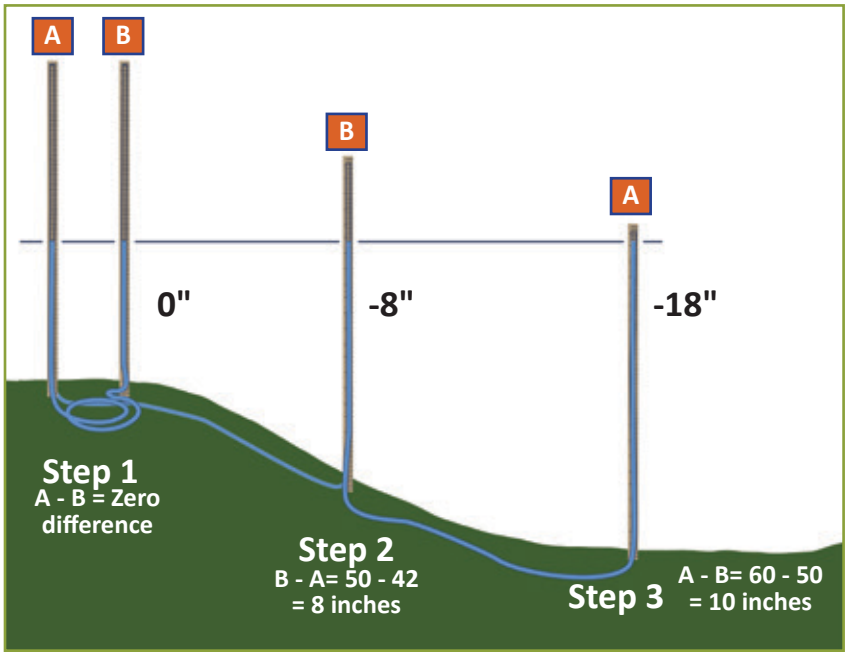
3 Bouteloua gracilis 'Blonde Ambition'
Blonde Ambition Blue Grama

Berm Plants Like It Dry. On the mounded side berms, choose plants that like their feet drier. Plants from the chaparral community are great choices here. Throughout the entire landscape, make sure to mulch at least 3" deep around all the plants (though not right up against the trunks), including those in the bottom of the swale.

Make and Use a Bunyip

You Will Need:





Tips for Measuring Contours with a Bunyip

1. **Calculate the Depth and Contour** of your swale or the topography of your entire garden using the easy-to-make Bunyip **(mythical Australian water monster)** or water level. You will need:

- **Two** six foot (or more) lengths of 1" x 2" strips of pine wood.
- **Mark lines** on each of the strips, across one side in 1" intervals. Start with the 1" at the top and work your way down the stick.
- **Purchase 40'** of clear vinyl 5/8" diameter tubing .
- **Zip tie** the tubing in three places to the sides of the wood strips that have the markings on them.

2. **Use A Funnel** to get water into the tube or siphon water by submerging one end in a bucket and lowering the opposite end.

3. **Remove Air Bubbles** in the tubing before reading to get the most accurate level.

4. **Keep Your Thumb On Top** of the vinyl tubing when you are moving the sticks to keep the water from coming out.

6. **Establish Zero Elevation** as the point from which you will be calculating the difference in height of two points in the yard. Put a flag in this spot; all other measurements will be compared to this starting place.

7. **Move B To Measure Height Difference** and you can see that the water eventually levels out. The difference between the reading on B and the reading on A is the change in height between these two points.

8. **Move A To Continue Mapping Slope or Topography** of the yard. The last side to move always stays in place as you work your way around the yard. Each new measurement of the difference between the level marks on the sticks is added or subtracted to the previous measurement to determine the TOTAL CHANGE FROM ZERO.

(Step 1) A - B = 0 Move B.

(Step 2) B - A = -8 This point is 8 inches lower than the starting point. Move A.

(Step 3) A - B = -10 This point is 18 inches lower than the starting point. 0-8-10 = 18

Tips for Eliminating Erosion

1. **Calculate Your Slope** for terracing using stakes, string and a measuring tape.

- **Place** two stakes in the ground - one at the top of the slope and one at the bottom.
- **Take** a 5' to 20' long string and wrap it around both stakes, pulling it taught.
- **Attach** a **line level** to the middle of the string and allow it to hang down beneath the string.
- **Determine** the **Rise** of the Slope by measuring the distance between the ground and the string on **Stake A** on the lower part of the slope, and doing the same on **Stake B** on the upper part of the slope.
- **Subtract** the **Stake B** distance from **Stake A** distance. This is the **Rise** of the slope.
- **Determine** the **Run** of the Slope by measuring the length of the string between the stakes.
- **Divide** the **Rise** by the **Run** and multiply by 100 to determine the percent of slope.

2. **Make and Use a Bunyip** to calculate the slope (*see p. 29*).

3. **Think About Irrigation** before doing any hillside work. Drip tubing is ideal for sloped areas, especially for wider-spaced shrubs and trees. Pressure compensating emitters should be used for all irrigation (*see p. 11*).

4. **Apply Water In Short Durations** so that it can be fully absorbed into the soil between application times. This is called Cycling and Soaking (*see p. 37*).

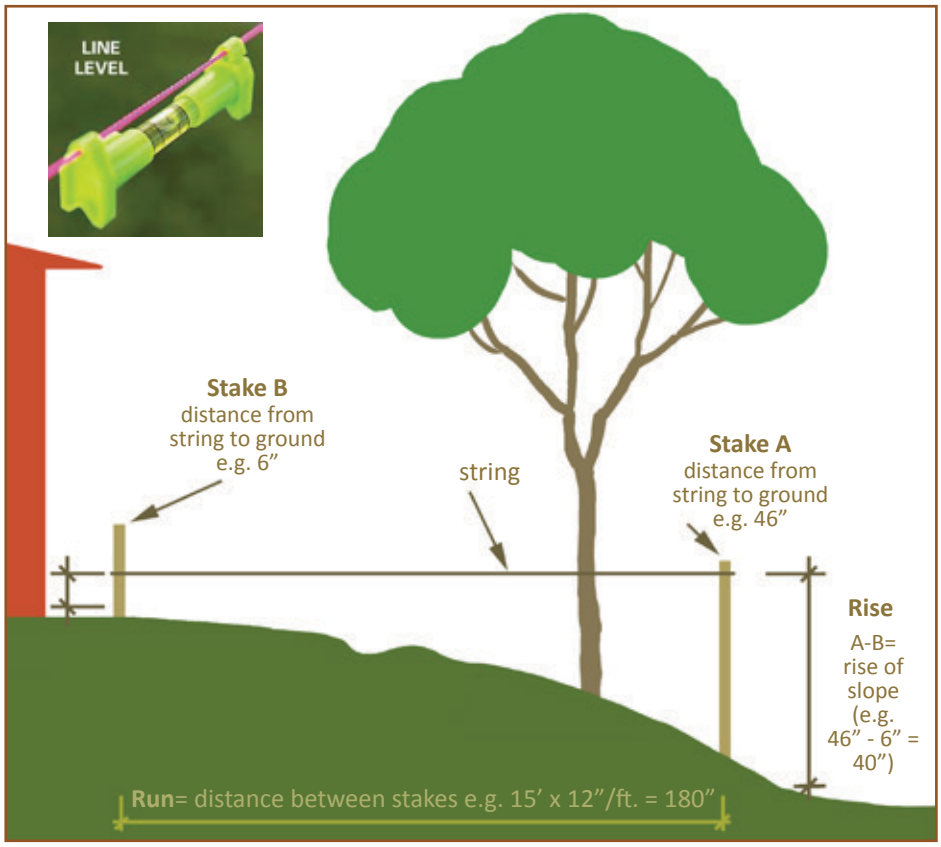
5. **Separate Irrigation Valves For Top and Bottom** of the slope, and place irrigation emitters above the plant basins. Check Valves should be placed on the lower emitters of all spray systems to avoid low point runoff.

6. **Capture On Contour** using very shallow mulch-filled or planted basins to slow, spread and sink rainwater and any irrigation runoff to nourish the hillside root systems (*see p. 28*).

7. **Pathways For Maintenance** make it easier to walk around on the hillside after plants are established. Try to create at least 18" wide footpaths or stepping stones that can be incorporated into rainwater capture.

8. **Natural Form Plants**, correctly spaced when planted, keep maintenance to a minimum.

Contour **Hillsides** with **Caution**



Rise of Slope = **Stake A** - **Stake B** = 46"- 6" = 40"
Run of Slope = 180"
Slope Percentage is Rise Divided by Run Multiplied by 100 or **40" ÷ 180" x 100 = 22%**

Plant with **Confidence**

Now you are ready to **Install** plants!

It's almost as easy as digging a hole, but a little extra love will help. By following these simple steps, you will get your plants' roots growing properly, quickly spreading into the living soil and making friends with the other drought tolerant plants. Strong roots make strong plants, and this is especially important in dry environments.

You Will Need:

- Tools: shovel, hand trowel, hose
- Plants
- Compost
- Mulch

Add these to your list for more advanced planting:

- Mycorrhizae
- Fish Emulsion or Water Soluble Humates

"Hey, where's the fertilizer?" you may ask. **California friendly plants don't want nutrient rich (i.e. fertilized) soil, so don't use it!**

What's with all the **Water**?

Drainage. If the water does not drain within an hour or so, it's probably not a good place to plant a climate-appropriate plant until you fix the compaction.

Awaken Microbes. By watering so thoroughly, you are waking up any microbes that might be in the surrounding soil.

Plant Shock. The major reason plants suffer from planting shock is that the dry soil around the new plants wicks water away from their rootball, sending the plant into shock from which they never recover. By watering the surrounding soil, you reduce the probability of plant shock.

Successful Planting in Ten Easy Steps

1. **Dig A Hole!** Don't dig it any deeper than the rootball of the plant. Do dig at least a little bit wider than the plant to loosen the surrounding soil. If you accidentally dig too deep, be sure to put the soil back in and tamp it down firmly before moving on, to give your plant a solid base.

2. **Throw In Some Compost** or worm castings no more than 1" deep - along the bottom of the hole. Never put mulch in a hole! And don't bother with fertilizers either.

3. **Fill The Hole With Water TWICE**, and allow it to drain completely each time. This will take a long time, unless your soil is really sandy. Start digging the next hole, or take a break.

4. **Submerge The Rootball** in a bucket of water until air bubbles stop bubbling up. Keep the plant in its container but it's ok if you take it out - just be careful with the delicate roots.

5. **Add Fish Emulsion** or soluble humate to the water (follow label directions). Dust the rootball with a mycorrhizae inoculant (only if the plants are woody, so don't bother with the ornamental grasses).

6. **Place Plant In Hole**, make sure the root collar (that's where the roots join the stem or trunk) is a bit (1/2" - 1") higher than the surrounding soil/ existing grade. This is super important because we don't want the plant to get choked by the surrounding soil.

7. **Fill The Hole With Water** one more time (this time with the plant in it) and let it drain completely.

8. **Now Fill The Hole With The Soil** you dug out (not with fancy potting soil!), making sure the soil slopes away from the root collar. Tamp the soil down (use your feet, but be gentle) so the plant doesn't move around.

9. **Don't Create A Bowl** around the plant. Really! Your plant doesn't need it and it might make a moat that would drown your climate-appropriate plant.

10. **Water The Soil All Around The Plant** one more time, and deeply. And have a drink yourself!

Keep adding **Compost** and **Mulch**

Compost looks like soil. You cannot tell what it once was. That is because it is food scraps, landscape debris and/or manure from livestock, or biosolids (human manure) and other organic matter that already has been mostly consumed and completely decomposed by microorganisms. Good compost brings the elements of healthy soil - oxygen, water and life - in one package.

How to Use Compost. Compost can be store-bought or homemade. When compost looks like soil, it can be worked directly into the soil. The more coarse or visible the bits of the compost are, the more likely it is to be used as mulch on top of the soil rather than as an incorporated amendment.

Compost works its magic in several ways. First, the compost itself contains particles that improve soil structure. Next, as compost decomposes in soil it encourages microbes to start the formation of healthy soil aggregates. These resulting aggregates are composed of existing soil particles and decomposed organic matter, which combine to create a more stable and better functioning soil structure like a sponge.

Mulch is organic material that covers soil and looks like the recycled debris that it is. Mulch can be made from organic debris such as not-quite-completely-decomposed compost, grass clippings, leaf litter, and shredded wood trimmings.

Mulch protects soil and plant roots from temperature change, keeps moisture in by slowing evaporation from the surface of the soil and keeps weeds from sprouting by reducing sunlight penetration to the soil surface.

How to Use Mulch. Mulch always stays on top of the soil, and is never worked in. Recycled organic debris is the most effective type of mulch, because it builds soil structure over time and provides a durable, protective surface barrier. The smaller the debris and the more mixed leaves with wood chips, the faster it decomposes. When building soil, small and mixed is best. Don't bother with inorganic mulches like rubber, gravel, or decomposed granite in planted areas. These are only applicable in pathways or gathering areas; they don't help grow good soil.

Inorganic mulches are not eligible for areas covered by the rebate.

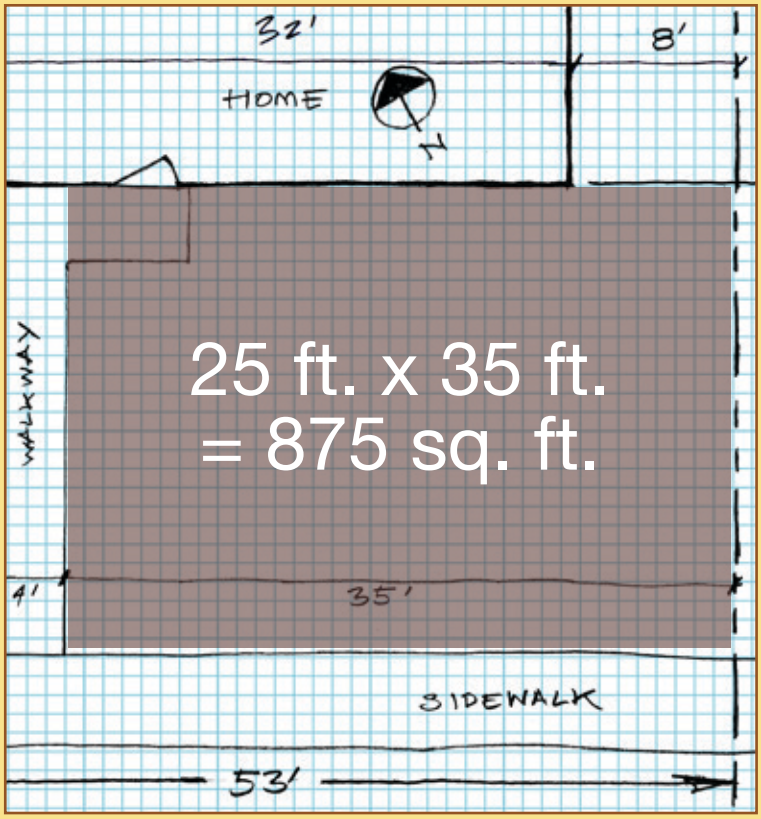
Need help buying amendment? *www.buy-compost.com*

MAKE IT
Less than 5 Cubic Feet

BUY IT IN BAGS
Between 5 and 25 Cubic Feet

BUY IT IN BULK
More than 25 Cubic Feet or 1 Cubic Yard

How much **Mulch** does your garden **Need?**



Add Organic Matter

Add 1-3" of compost to improve the water holding capacity of soil by 30%.

Place 4-6" of mulch on top of the soil to hold in moisture and keep down weeds when planting, and maintain 3" of mulch on beds at all times thereafter.

Keep mulch at least 1-6" away from the stems of plants.

Calculate the Material Requirement

Start with the **Square Footage (SF)** of space to be covered and figure out how much you will need for **1 inch of material.**

SF x 1 inch ÷ 12" = Cubic Feet (CF) of material needed. (Dividing by 12" turns your inch of amendment into feet of amendment.)

If you need less than 20 CF of material, you can probably make it in a compost pile or purchase it in bags.

If you need more than 25 CF of material, you must convert your materials to Cubic Yards, because you are going to have to have it all delivered in bulk.

CF ÷ 27 = Cubic Yards (CY).
So, 25 CF ÷ 27 = about 1 CY of material needed.

Applied to Our Site Front Yard:

875 SF x 1" ÷ 12" = 73 CF for each 1" of mulch.

If you need 3", you multiply the amount needed for one inch by 3 and if you need 6", you multiply the one inch total by 6.

We need 3" of mulch = 73 CF x 3" = 219 CF

For our front yard, that is 219 CF ÷ 27 = about 8 CY of mulch. That sounds like a lot of material! It looks like we will have to buy it in bulk (*see p. 32*).

Avoid These Mulches Around Plants!

While these mulches are commercially available, and some are organic materials, they are not recommended. For example, dyed mulches are composed primarily of recycled wood materials such as treated or painted furniture or wood pallets. Shredded redwood or cedar present significant fire hazards. Gravel and rubber are not eligible for the rebate, do not decompose to feed the soil microbes, and raise the temperature of the entire landscape.


"gorilla hair" shredded wood

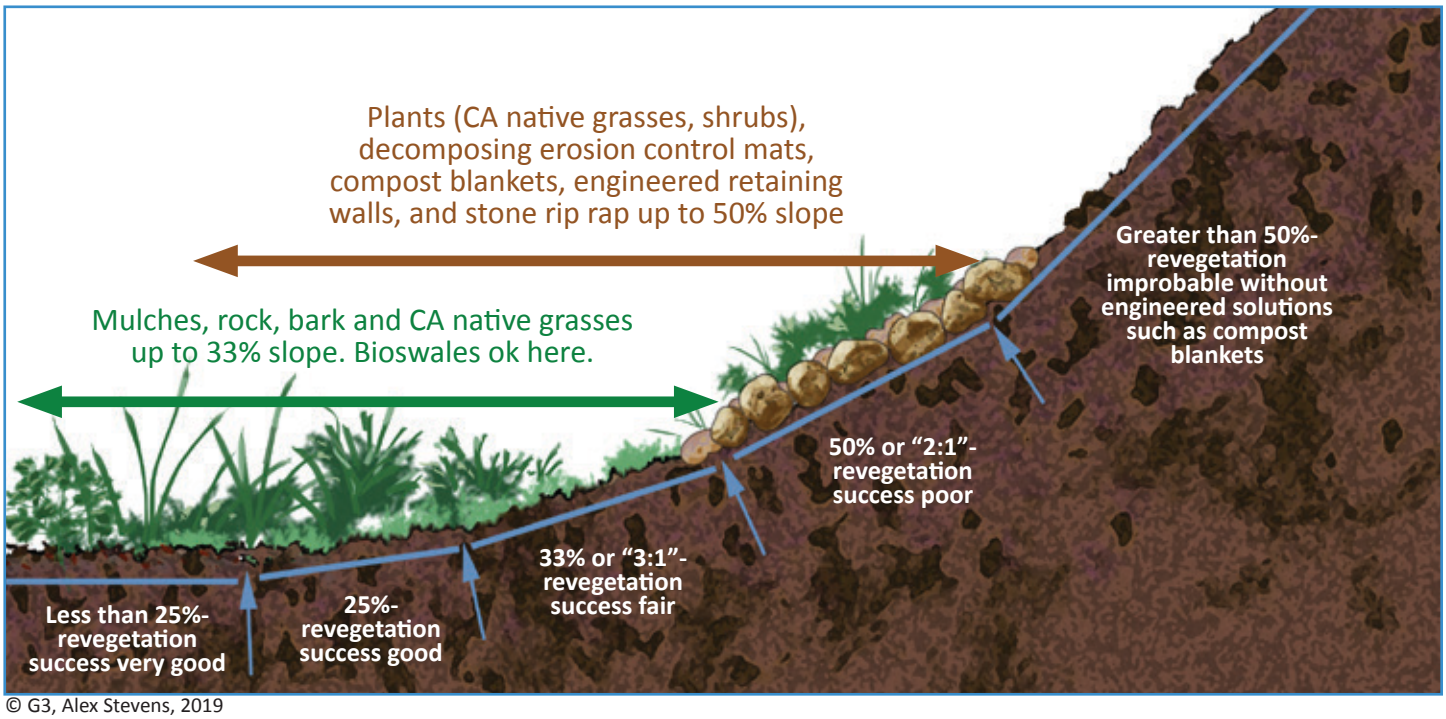

dyed wood


dyed wood


gravel


rubber

Slopes and Hillsides are special



Hardy Hillside Holders

Benefits Pollinators

1 Salvia sonomensis
Creeping Sage

2 Ceanothus 'Yankee Point'
California Lilac

3 Cistus salviifolius 'Prostratus'
Sageleaf Rockrose

4 Artemisia californica 'Montara'
Montara Sagebrush

5 Epilobium canum 'Catalina'
Catalina Fuchsia

Plan for Stabilization

Working on a slope or hillside should be a collaborative process in which you should seek the advice of a licensed civil engineer, landscape architect, or other professional before grading and capturing rainwater on existing hillsides. Get to know your soil type (*see p. 9*) and slope percentage (*see p. 30*) before moving forward with any disturbance.

Whenever possible, do not disturb canyon hillsides. Select low water use plants, trees, deep-rooted native plant species, and climate-appropriate plants with strong root structures for disturbed or built slopes and hillsides, as these root systems can help hold soil together.

If your slope is gentle, 3:1 or less (33% grade) coarse compost and mulch can be applied directly to hillside and slope surfaces, providing surface protection from the force of falling rain and shading exposed soils. With occasional irrigation, mulch will "knit" together.

Compost blankets are a kind of erosion control mat applied to the soil surface to protect and preserve it, and can be used either alone or with other organic engineered material with biodegradable grids for stabilization that will degrade into soil within a year or two. Compost mats allow water to penetrate through to underlying soils while retaining loose soil and debris and preventing erosion. You can plant right through them or use pre-seeded products. Compost blankets can be found at specialized landscape products distributors.

Consider working with an irrigation design professional to design and install your irrigation system. Runoff, erosion and efficient deep watering are important issues to keep in mind always, but especially on hillsides. Contouring across the slope can help slow, spread and sink rainwater into the planted areas and goes a long way toward reducing or eliminating any potential runoff from irrigation during dry months (*see p. 28*).

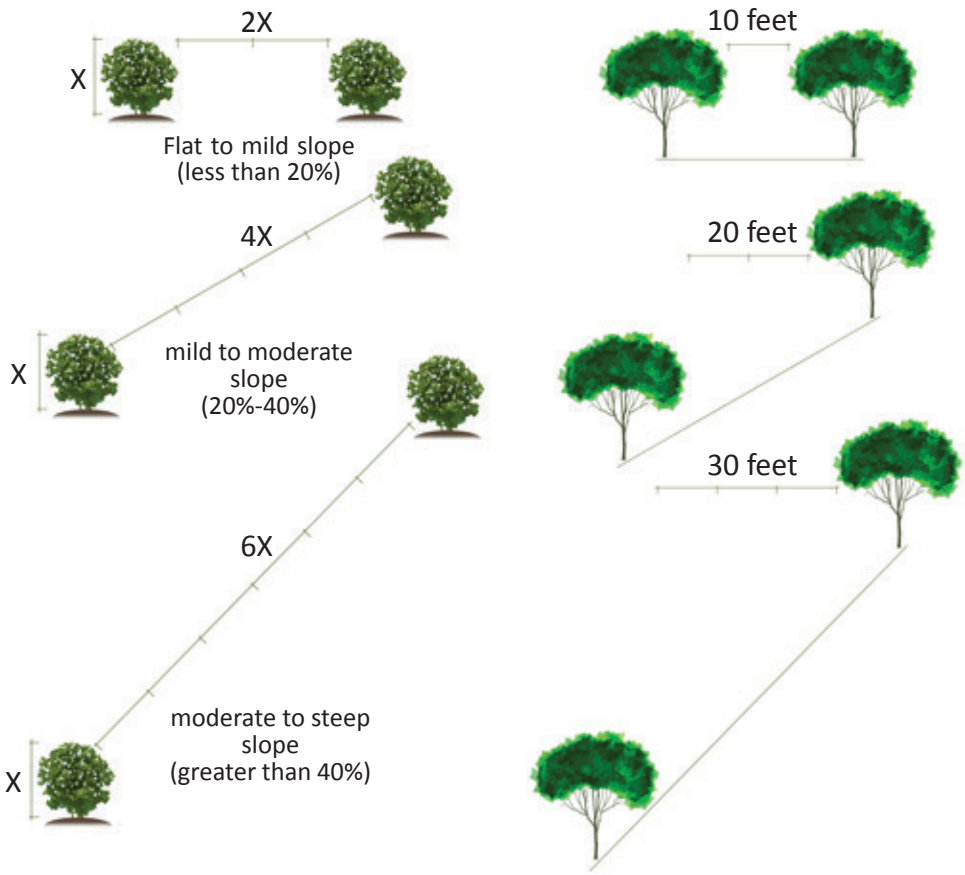
Fire is a **Real** and constant **Threat**

Your Plan Can Save Lives. This is especially true in canyons and wildland-urban interface areas commonly found in Los Angeles. Plant selection, design and consistent maintenance all must be in accordance with fire safety guidelines.

Landscapes should resist ignition and provide 35 ft. of actively maintained defensible space around structures and access zones (**Zone 1**), maximizing fire prevention and also allowing for access by fire crews, if necessary. Cut or remove grasses and weeds to less than 3 ft. in height, remove dead and dying vegetation, and maintain proper vertical and horizontal spacing on large shrubs and trees.

Beyond Zone 1, the landscape should reduce the chance of potential airborne embers through careful thinning of native vegetation for another 65 ft., or greater if located on an uphill slope (**Zone 2**).

Spacing Landscaping Plants for Fire Resistance



Six Fire-Safe Practices

1. Fire Safe Zones should be created with stone, masonry walls, and gravel and other permeable pathways and patios. Think about placement of fire-resistant hedges or screens to catch embers. Retaining walls on terraced areas disrupt airflow, creating wind "eddies" that may keep embers away from structures.

2. Keep Wood Mulch Away From Structures and replace with gravel, broken concrete, or other permeable, non-flammable surface, that doesn't jeopardize wood siding or foundation sills.

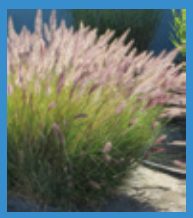
3. Keep Roofs and Gutters Debris Free and keep vegetation away from vents or eaves or from under or near decks and siding.

4. Choose "Living" Wood Mulch that is either well composted or has a good mix of green leaf and small brown woodchip material and is smaller than 1-1/2". Avoid large wood chips, pine needles, rubber, and shredded "gorilla hair" type mulches, which smolder and produce huge flames.

5. Create Vertical Spacing between shrubs and the lowest branches of trees, limbing up trees at least 10' from the ground or 3x the height of the nearest shrubs.

6. Avoid Invasive Plants, especially grasses and groundcovers, which contribute to fire risk by spreading the fire from woody plant to woody plant. **Remove these plants from your garden (***see p. 42* **)!**

Avoid and Remove The Fire Prone Four:



Pennisetum setaceum
African Fountain Grass

Juniperus ssp.
Juniper (various)

Cytisus scoparius
Scotch Broom

Eucalyptus ssp.
Eucalyptus (various)

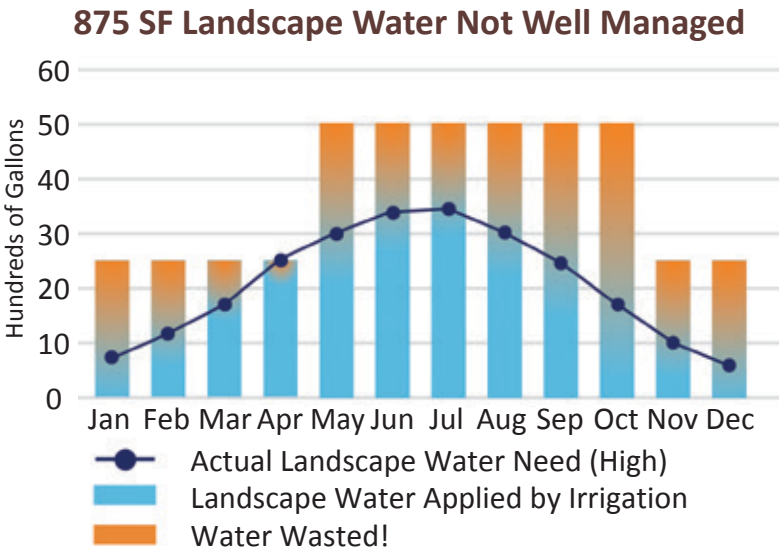
Stout Design Build, West Los Angeles

Balance your soil Moisture account.

The objective of managing water wisely in the landscape is to keep just the right balance of oxygen and water so that plants look great, stay healthy, and the soil microbes are kept awake cycling nutrients. When oxygen and water are in balance within the soil, the amount of water that is lost through evapotranspiration (ET) is just like writing a check for water out of the soil bank account (*see p. 18*).

Rain and irrigation deposit water into the soil checking account. The trick is to make sure not to apply more water than is needed in dry months, and to hold on to rainwater in the wet months. Most people apply more irrigation water than their landscape really needs. The amount of wasted water can be greatly reduced by closely managing/adjusting the landscape water applied through irrigation.

How do we tell when the account is depleted? Smart irrigation controllers and landscape professionals are able to calculate this OR you can rely on using a soil moisture probe or even probing with your fingers.



Wet or Dry?

Use "digital" technology! Soil may appear dry on the surface, stick your finger into the soil and make sure it's wet below. If it's wet up to your second knuckle, it doesn't need any more water, so wait another day or two. Alternatively, if you use a soil probe, you can feel the moisture in the soil and make a determination yourself. You can look at plant health to determine water need, but sometimes overwatering and underwatering will produce similar symptoms in plants.

Underwatering Symptoms

- Soil is bone dry
- Older leaves turn yellow or brown or drop
- Leaves are wilted
- Leaves curl and become brittle
- Stunted growth
- Plant is dead!

Overwatering Symptoms

- Soil is constantly saturated
- Leaves turn a lighter shade of green or turn yellow
- Young shoots are wilted
- Leaves are green yet brittle
- Algae and mushrooms are present
- Growth is excessive or stunted
- Plant is dead!

Plan for **Zero Runoff** (even after converting to Drip)

Keep Water in the root zone.

Just because your new sustainable landscape has a more efficient irrigation system doesn't mean that the rest of your property should not benefit from the same principles. Observe the irrigation while running and check to make sure that no water is flowing onto sidewalks, patios or walkways. If the water is being applied too fast for the soil to absorb, runoff will occur whether you irrigate using spray or drip. Puddling and pooling also may be an indication that water is applied too fast or too often. Repairs to broken pipes, drip lines, and emitters should be made immediately, or the system should be turned off until repairs can be made. The optimal time to water is in the late evening and very early morning.

look for WaterSense Meets EPA Criteria

Install a "Smart" Irrigation Controller that automatically adjusts irrigation schedules in response to changing site and/or weather conditions; most of these interface with mobile devices and computers, so you can change the programs in your pajamas. ET (Evapotranspiration) controllers monitor weather conditions and Soil Moisture Sensors directly sample moisture in the soil profile. When selecting a controller, look for brands with the EPA WaterSense® label.

Cycle and Soak Programming eliminates water runoff. Observe how quickly runoff occurs when you are running your irrigation. This is the MAXIMUM run time for your irrigation controller in this hydrozone. So, to cycle and soak your irrigation, you divide up the total minutes required by the hydrozone into blocks of time no longer than the observed runoff time and allow a 30 minute rest period in between the irrigation cycles. **For example, if we need 30 minutes of water in a certain hydrozone, but we observe runoff after 10 minutes, break down the 30 minute total into three 10 minute cycles with 30 minutes between each cycle.**

Hose Shutoff Nozzle

Hand Watering is especially good for getting a garden established when you are going to want to spend more time looking at the plants to make sure nothing is amiss. During establishment you may need to water more frequently because roots are only 4"-10" deep on a newly-planted one gallon plant. (That's why it's great to try to plant during the rainy season!) Be sure to use a hose shutoff so that you are not inadvertently wasting and spraying water into the street.

Really look at your plants. Are they appearing droopy or sad? Is the soil very dry? If so, then give the plants a good drink and watch. Don't water more than two days in a row, and let the soil partially dry out before watering again. Remember the symptoms of overwatering and underwatering are very similar *(see p. 36).*

After the first year or two, once your plants are settled, your sustainable garden should not need water more than once or twice a month, if at all. If you are at the coast, you may be able to eliminate regular irrigation altogether after establishment.

Pressure Regulation either for the whole house, or at each irrigation valve for each zone, eliminates excess pressure, and allows the irrigation system to run more efficiently. With drip systems, pressure regulation is essential, because drip lines operate best at very low pressure.

What Is Irrigation Efficiency (IE)?

Irrigation Efficiency describes how well your irrigation system is delivering water to the plants you are intending to irrigate. Since no mechanical system could be 100% efficient, the IE of any particular irrigation system will always be less than 100%. A well maintained spray system may achieve 70% IE, while a drip system could be as high as 90% IE.

Since there are many inter-connected mechanical parts of a system, there are lots of ways your irrigation can become inefficient and begin applying water in places that are not beneficial to your landscape. IE depends upon four key elements:

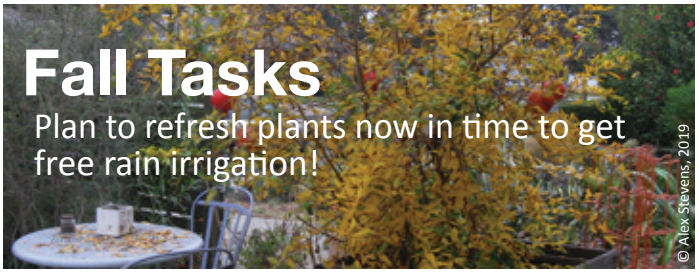
1. Design of your system reflects the best components for the specific conditions of your site.
2. Installation of the system uniformly distributes the water to the plants in the landscape.
3. Management of the system correctly balances the soil moisture account.
4. Maintenance adjustments and repairs are made frequently.

Tips for Eliminating Runoff: Drip or Spray

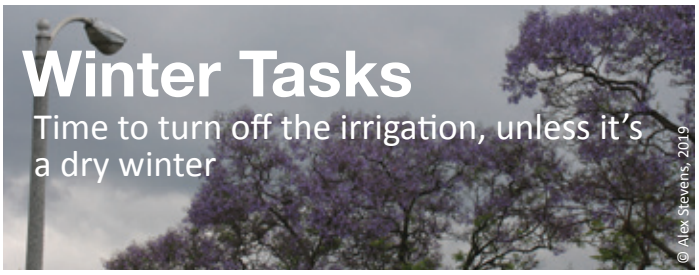
In general, several things can be done to minimize runoff due to irrigation. These include:

1. Convert spray systems to drip irrigation with the lower precipitation rates, pressure regulation, and a filter (*see p. 11*).
2. Make sure to have check valves in all hillside and low point spray systems.
3. Do not install spray irrigation in areas that are too narrow for spray (10' wide or narrower).
4. Move spray heads 24 inches from any buildings or hard and impermeable surfaces.
5. Cycle and Soak irrigation run times.
6. Be sure to follow organic maintenance practices to keep your soil spongy.

Use this **Maintenance Checklist**

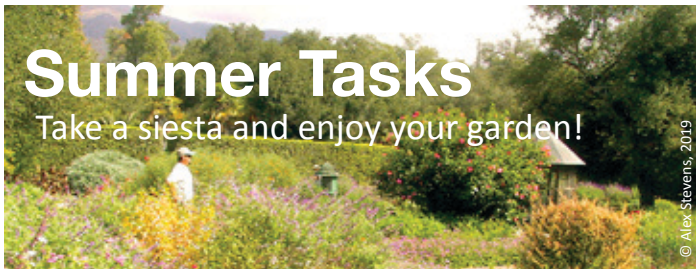


- ☐ General Landscape Management
  - Review plant health and investigate reasons for observed decline
  - Weed and deadhead flowers as needed
  - Stake trees: add new or make adjustments
- ☐ Maintain Rainwater Capture Systems
  - Make sure gutters and downspouts are not clogged
  - Clean rainbarrels/cisterns and clean out catch basins
  - Drill holes in bottoms of catch basins, if standing water
  - Make sure mosquito screens are not ripped or loose
  - Flush pipes
  - Remove debris from swales, especially at inlets/outlets
  - Refurbish berms and basins as needed
- ☐ Add Compost or Worm Castings
  - De-compact or aerate areas around trees/large shrubs and add worm castings/compost
- ☐ Replenish Mulch
  - Maintain 3” if established garden, 4” - 6” if still getting established
- ☐ Late Fall Pruning (Chop and Drop)
  - Cut back ornamental grasses (once a year for deciduous, less often for evergreen)
  - Cut back young salvias (sages) by 1/3
  - Cut back perennials and pinch back non-woody shrubs and perennials
- ☐ Irrigation Checkup
  - Turn on each valve to check for problems and make repairs
  - Open manual flush valves and flush
  - Clean irrigation filters
  - Adjust controller - reduce time



- ☐ General Landscape Management
  - Review plant health and investigate reasons for observed decline
  - Weed and deadhead flowers as needed
  - Stake trees: add new or make adjustments
- ☐ Pruning (Chop and Drop)
  - Prune dead, diseased, damaged, and deranged branches of trees and large shrubs
  - Cut back perennials and pinch back non-woody shrubs and perennials
- ☐ Still Time to Plant (but not in wet soil!)
- ☐ Irrigation Checkup
  - Turn on each valve to check for problems and make repairs
  - Manually run irrigation if the weather has been very dry

- ☐ General Landscape Management
  - Review plant health and investigate reasons for observed decline
  - Weed and deadhead flowers as needed
- ☐ Replenish Mulch
  - Maintain 3” if established garden, 4” - 6” if still getting established
- ☐ Irrigation Checkup
  - Turn on each valve to check for problems and make repairs
  - Open flush valves and flush
  - Clean irrigation filters
  - Seasonally adjust automatic irrigation schedule
  - Move drip irrigation and add emitters as the tree grows in order to maintain the wetting zone at the outside edge of the tree’s canopy (dripline)



- ☐ General Landscape Management
  - Review plant health and investigate reasons for observed decline
  - Weed and deadhead flowers as needed
- ☐ Irrigation Checkup
  - Turn on each valve to check for problems and make repairs
  - Return irrigation controller to summer program

Use this **Project Checklist**

Prepare to work pp. 2 - 7

- ☐ Clean up Your Property
  - Remove trash and debris, weeds, dead plants
- ☐ Orient Yourself
  - **Check with LADWP for rebate eligibility**
  - Check with City if permits are required, and secure them if needed
  - Find out if you are in a hillside grading area or special viewshed
  - Confirm fire regulations in your area
- ☐ Make a List of Things You Want In Your New Landscape
  - Think about how much maintenance you want to do
  - Consider how much rainwater you want to catch in barrels or cisterns
  - Determine how much of your property you want to change – and how much lawn to remove

Plan before digging pp. 8 - 15

Do you need design help?

Walk around and take photos (for BEFORE)

- ☐ Make a Site Plan
  - Take measurements
  - Make a Microclimate Plan
- ☐ WaterPlan
  - Do roof area calculations
  - Note location of downspouts
  - Calculate water available from each downspout
- ☐ Grading Plan For Capturing Rainwater
  - Look at slope of the site
  - Plan for where to stockpile topsoil if project is large
  - Identify trees to be protected during construction
- ☐ Test Soil Type
  - Percolation Test – Brick or Sponge?
  - Jar Test - Sand, Silt or Clay?
- ☐ Make an Existing Irrigation System Plan
  - Run irrigation and make immediate adjustments
  - Determine whether or not you will abandon the irrigation or convert spray to drip
  - Adjust controller program time to eliminate runoff (cycle and soak)
- ☐ Do Some Shopping and Research
  - Source rain chains, rainbarrels and cisterns
  - Source mulch and compost
  - Go to nurseries for plants and watch for native plant sales
  - Install gutters, if you want to harvest more water

APPLY FOR YOUR REBATE BEFORE YOU BEGIN WORK!

Notes

Use this **Project Checklist**

Design for plants pp. 16-23

What do you want in your yard?

Follow guidelines for hillside planting

Ask for help at a nursery or native plant sale

☐ Make A Planting Plan
- Assign Plant Factors to existing material
- Research native plant communities for your area
- Consider butterflies and pollinators
- Where are the swales and berms (wet and dry feet!)?
- Add in edibles and fruit trees
- Select one or two shade trees
- Check *www.plantright.org* for the BAD GUYS
- Scale plants for maturity
- Hydrozone

Begin your project installation pp. 24 - 31

Do you need construction/installation help?

CALL 8-1-1 BEFORE BEGINNING WORK

☐ Make Calls to Order Equipment, Material, Deliveries
- Rent a sod cutter and dumpster, if necessary
- Order organic matter for the soil
- Select boulders and gravel for creek beds, if you like that look
- Order catch basins or piping for irrigation and drainage
- Deliver rain barrels and cisterns

☐ Stockpile Soil and Protect Trees
- Protect trees from construction damage (limbs and roots)
- Remove plants that are not wanted

☐ Change Existing Hardscape to Make It More Permeable

☐ Remove Grass and Build Soil With Soil Lasagna
- Continue to water your lawn up to two days before removal
- Remove your turf without chemicals through Sheet Mulching

☐ Contour Site For Rain
- Contour soil to hold onto First Flush (first inch of rain)
- Remember 150 sq. ft. of area, six inches deep for every 1,000 sq. ft. of roof
- Do not remove soil; use it to create your contours
- Add organic matter to the soil
- Install catch basins, drainage pipe and sleeves under hardscape

☐ Repair Irrigation
- Identify or move future drip irrigation points of connection
- Replace valves for low pressure valves
- Install pressure regulator, flow meter, or landscape sub-meter
- Install low-head check valves on slopes and grade changes

☐ Capture Rainwater
- Lay out plan using flour, chalk or builder's inverted spray paint
- Install boulders and materials for creek beds or swales
- Install rain barrel or cisterns

Notes

Use this **Project Checklist**

Install new plants pp. 21 - 31

Compare Planting Plan with Existing Irrigation Plan

Fall is the best time to get free rain irrigation!

Order or purchase plants and gather materials necessary for planting

☐ Lay Out Planting Plan

- Lay out your Planting Plan using flour or chalk
- Make your "in field" adjustments
- Install your plants into the Soil Lasagna
- Be sure to respect correct plant placement for mature size
- If drainage is poor, auger holes and wait to complete
- Thoroughly and completely water holes, plants, and surrounding soil

Upgrade and adjust new irrigation p. 23

Consider hand watering until landscape is established (1-2 dry seasons)

☐ Accommodate the Planting Plan

- Convert spray head sprinklers to drip or install new drip lines
- Cap all unused spray head sprinklers
- Install tattle-tale flush assemblies
- Install end caps on the drip zones
- Create an "as built" drawing of the new irrigation layout
- Install a weather-based irrigation controller

Establish and steward new landscape p. 38

☐ Complete Irrigation Installation

- Irrigation for establishment is best used during fall, winter and spring months if rainfall is limited
- Adjust irrigation to eliminate runoff
- Regularly flush drip irrigation lines, especially during the first year
- Seasonally adjust automatic irrigation schedule
- Reduce in fall; turn it off in winter!
- Move drip irrigation and add emitters as the tree grows in order to maintain the wetting zone at the outside edge of the tree's canopy (dripline)

☐ Maintain Living Soil and Plants

- Maintain 3" of living mulch and add more annually (more mulch, fewer weeds)
- Practice Integrated Pest Management

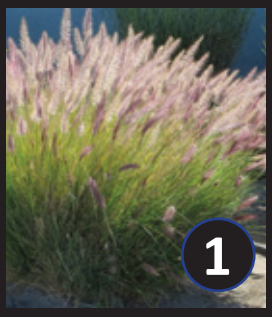
☐ Maintain Rainwater Capture Systems

- Make sure gutters are not clogged
- Clean rainbarrels/cisterns and clean out catch basins
- Make sure mosquito screen is not ripped
- Flush pipes
- Remove debris from swales, especially at inlets/outlets

Notes

Don't plant a Pest

Remove These Invasive Plant Pests

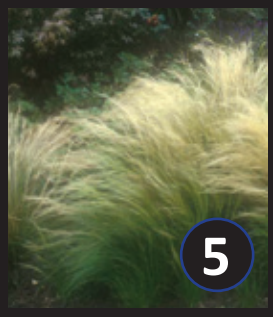


1 Pennisetum setaceum
African Fountain Grass

2 Vinca major
Periwinkle

3 Cotoneaster
Cotoneaster

4 Cytisus scoparius
Scotch Broom



5 Nassella tenuissima
Mexican Feather Grass

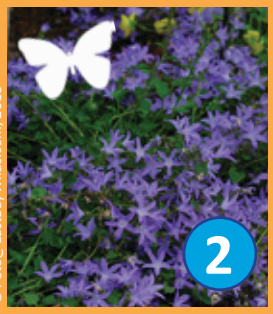
Some exotic plants such as these and species of *Pyracantha*, Algerian ivy (*Hedera algeriensis*), and privet *(Ligustrum*) can be innocently planted without realizing they end up beyond the far reaches of our gardens when birds, wind or water carry them to areas where they are difficult to control.

Their spreading and greedy behavior can take over native habitats, inhibiting areas for all to enjoy. Few of these species offer any benefits to the local animals and insects. Invasive species and species that act like invasives should be removed from your gardens, removed from nursery stock and should not be planted in the first place.

Plant These Well Behaved Alternatives Instead

Benefits Pollinators

1 Melica imperfecta
Small Flowered Melica



2 Campanula poscharskyana
Serbian bellflower

3 Heteromeles arbutifolia
Toyon / Christmas Berry

4 Peritoma arborea
Bladderpod

5 Stipa cernua
Nodding Needlegrass

PlantRight *www.plantright.org*

Since 2005, PlantRight has been working with California's nursery industry to stop the sale of horticultural invasive plants in ways that are good for business and the environment. PlantRight unites leaders from California's nursery and landscape industries, conservation groups, academia, and government agencies in a voluntary, science-based, and collaborative way. PlantRight's Plant List, identifying the highest priority invasive garden plants, is the cornerstone of the program. For each plant on the invasive plant list, PlantRight suggests several non-invasive alternatives. Retailer partners pledge not to sell any plants on the Plant List, and any plants added to the list in the future. To track its progress and inform the plant list, PlantRight conducts a survey of retail nurseries throughout the state. PlantRight also has a Continuing Education program available for free to anyone who wants to learn about horticultural invasive plants.

California Native Plant Society (CNPS) *www.lasmmcnps.org* *www.calscape.org*

Our gardens play an important role in local ecosystems. The plants we choose for our gardens have the power to support pollinators, build wildlife corridors, and restore our natural landscapes. ***Calscape.org***, is a tool CNPS has developed that makes it easier for gardeners to create thriving, natural gardens and avoid invasive plants. Use it to discover which plants are native to your location and to search by water requirements, blooming season, pollinator habitat and more. You also can build custom plant lists and find nearby nurseries who carry the plants you want. In addition to online resources, CNPS has 35 local chapters statewide that host native plant sales, garden tours, field trips, and expert talks.

You're ready to **Shop!**

My Shopping List

My Garden Microclimate Notes

My Supply Stores & Nurseries

	name	size	quantity
trees			
shrubs			
perennials			
hedge			
ground cover			
other plants			

Landscape with a **Professional**

Assessment Organizations including site assessment and testing, various measuring services, surveyors, soil testing services and even Google Maps are available to help. Property measuring and surveying companies can develop more detailed plans with elevations, sighting of trees and landscape amenities, irrigation, etc. If you get out into the yard with a measuring tape and the guidelines we've put into this book, you should be able to make a serviceable site plan to scale.

Planning and Design professionals can help you develop a working plan and budget for your landscape. The plan should include drawings, a list of resources, and an outline of the techniques to be used to implement the plan. Licensed landscape architects and licensed landscape contractors can assist you in developing a plan and budget. Landscape designers also can help you create a conceptual design. Working with a licensed professional (architect, landscape architect, landscape contractor or civil engineer) is recommended if you have hillsides and slopes or complicated structures. *www.apldca.org; www.asla.org; www.asce.org*

Landscape Installation and Construction professionals are licensed landscape contractors who specialize in building landscapes, and are able to work on all aspects of the sustainable landscape plan. If you are handy, and feel comfortable with the techniques outlined in this book, there is no reason why you cannot install your own garden, especially knowing that if you get stuck you can call upon the expertise of a landscape professional. Find licensed contractors at the California Landscape Contractors Association (CLCA). *www.clca.org*

Certified Arborists are specialists trained in the art and science of planting, caring for, and maintaining individual trees. Arborists are knowledgeable about the needs of trees and are trained and equipped to provide proper care. Find tree consultants at the American Society of Consulting Arborists (ASCA). *www.asca-consultants.org*

Rainwater Catchment specialists include people certified by the American Rainwater Catchment Systems Association (ARCSA) to design and install rainwater capture systems. These professionals can bring a lot of specific expertise to your project, particularly if it involves the installation of an active capture system such as a cistern. *www.arcsa.org*

Greywater Action can assist you on an as-needed basis if you are attempting a DIY renovation. Their expertise is in the design and installation of laundry-to-landscape greywater systems. *www.greywateraction.org*

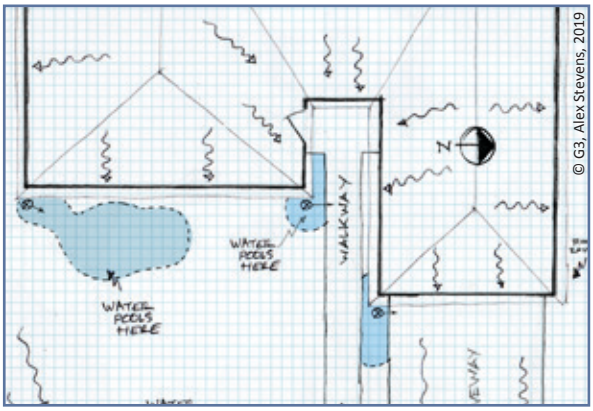
Irrigation Systems Consultants include people who have been certified by an EPA WaterSense® labeled certifying organization to provide irrigation system auditing, design, and maintenance. These professionals can bring specific expertise on improving the efficiency of irrigation systems. *www.irrigation.org; www.qwel.net*

Water Managers are a big part of ongoing landscape maintenance. Learning how to manage your own water is best, but if you are still using an irrigation system for your landscape, you may consider hiring a certified professional who has demonstrated expertise in water management.

Watershed Wise Landscape Professionals are people who are certified to provide site evaluation and consulting on using the watershed approach to landscaping in design, construction, and maintenance. *www.greengardensgroup.com*

Plant Selection specialists include your local retail nursery and garden center, native plant societies, Master Gardeners, and professional gardeners. The best plant selector, however, is you! Do the homework to select plants that are both climate-appropriate and locally native to your place, and you will be rewarded with a better understanding and appreciation of your garden as it evolves over time. Plus, you can advise your friends on their plant selections!

Maintenance of sustainable landscapes requires an understanding of the watershed approach to landscaping and water management. While there will be less mowing of lawns and blowing of leaves, there will be more fine pruning, irrigation flushing and tuning, cleaning and checking rain barrels and other water retention devices and soil building. Maintenance people should demonstrate an ability to think critically, be open to the techniques and ideas outlined in these guidelines and understand how to implement IPM, mulching, basic irrigation tune-ups, and native plant husbandry.



Urban Water Group, Los Angeles

Topic

To compost this handbook, remove metal binding and recycle; then place the remaining paper in the compost. Shredding the paper will make it decompose faster.