

# IRRIGATION DESIGN CONSIDERATIONS

When designing a sprinkler system to irrigate your plants, there are a number of considerations that need to be taken into account, so that the system has the ability to provide the appropriate amount of water to each plant. It is important to avoid causing runoff while only placing water where it is required or desired. This is accomplished through the selection of specific types of sprinkler heads or irrigation devices that actually apply the water, as well as the manner by which the watering time and frequency of application is controlled.

The least effective way is to water manually through a hose or a nozzle attached to the end of a hose. The ability to apply equal amounts of water in a consistent manner over a period of time is virtually impossible to accomplish in this manner with any degree of consistency. The more involvement and dependency the sprinkler system has upon human intervention or interaction, the greater the likelihood for over or under watering, wasting water and poor plant health.

The most dependable solution is to have an underground, automatically controlled irrigation system consisting of a controller, valves and sprinkler heads and/or nozzles. If properly designed, it will help to ensure that the appropriate amount of water reaches the root systems of the plants with a minimum of waste and runoff.

As a part of the basic design of a sprinkler system, there are several considerations to be made and addressed to ensure the best and most efficient use of water. They are:

- Plants with like watering requirements grouped together.
- Zoning based upon plant type, solar exposure and slope gradient.
- Grouping by the rate of water application.

## **Step 1: Plants with like watering requirements grouped together**

The best solution is to group plants together that have the same watering requirements – low, medium or high - on the same control valve or zone. This facilitates grouping sprinkler heads together into valve zones that irrigate plants with the same water requirements, for the most efficient use of water. You can download information about plant watering requirements by the geographical region you live in from this website under the heading WUCOLS. The WUCOLS information is divided up into six (6) geographical regions for California. Be sure to use the correct ratings for the region you live in.

It is very difficult to properly water plants with differing water requirements on the same zones or valves within the same time frames. One way to get around this is through the use of a drip or emitter system where plants with low water needs can be served by one emitter, and medium and high water needs plants by proportionally greater numbers of emitters. Therefore, when grouping heads that are served by the same valve, it is important that these sprinklers water plants with the same requirements.

## **Step 2: Zoning based upon plant type, solar exposure and slope gradient**

Another consideration is the grouping of heads into zones controlled by a valve with the following separations:

- Plant type - the root depth of the plant.
  - Shallow – turf, annuals, most ground covers and rooted cuttings.
  - Moderate – most shrubs, vines and espaliers.
  - Deep – trees

- Solar Exposure – irrigation zones or valves should be separated into areas which are in the sun versus in the shade.
  - Sunny areas on the south and west sides of buildings and structures such as fences or walls.
  - Shady areas on the north and east sides of buildings and structures such as fences or walls.
- Slope gradient - on slope areas that exceed 33% or 1 foot vertical for every 3 feet horizontal, it is best if the sprinkler heads at the top of the slope can be kept separate from the heads in the middle of the slope, and those in the middle kept separate from the sprinklers at the toe or bottom of the slope. Since water flows downhill due to gravity, both on the surface as well as under the surface and through the soil, the watering time at the top will be greater than the areas in the middle, which will be greater than the area at the bottom of slopes.

### **Step 3: Grouping by the rate of water application**

It is best to group sprinklers that apply water at the same rate on the same valve or zone. The rate is expressed by manufacturers as a numerical value for the “precipitation rate” of the head or nozzle. This is basically the gallons per minute of water a sprinkler applies, divided by the area covered. If one were to group a sprinkler head with a precipitation rate of .75 per hour with heads with a rate of 1.00 per hour, some areas would always be getting 33% more water than those areas served with the lower precipitation rate heads. You can see how much water would be over-applied in order to provide adequate water for the area and/or plants served by the lower precipitation rate heads. Water would be wasted due to run off and could cause harm to the plants.

Additional design information can be obtained through the internet by visiting sprinkler manufacturers’ web sites, as well as through services provided by local irrigation consultants, landscape architects, contractors, suppliers, nurseries, hardware stores and building supply chains.