Smart Irrigation and Drip Systems

September 30, 2020

Presented By:

City Water Conservation Target (State Law SBx7-7)
Post-2020 Target:
SB 606/ AB 1668
“Community Water Budget”
Urban Water Use
Typical Single-Family Residence

Toilets 14%
Showers/Baths 10%
Dishwashing 1%
Laundry 12%
Faucets 8%
Leaks 5%

IRRIG. 50% + transpiration = Evapotranspiration (ETo)

evaporation + transpiration = Evapotranspiration (ETo)
Tendency to Overwater

“Set it and Forget it”

Take **CONTROL** of Your Landscape Water Use
Stamard Controller Features

- **Station or Valve Circuit**: a single irrigation valve and the area irrigated by that valve (a 6 station controller can hold up to 6 valves)
Standard Controller Features

- **Start Time** - the time the first station in a program begins irrigating; all other stations in the program follow in sequence (e.g., 6 am)

- **Run Time** - the length of time a station irrigates (e.g., 5 minutes)

- **Program** - a set of watering instructions including start time, run times, and watering days for a station or group of stations (e.g., 6 am, 5 minutes, M, W, F)

- **Cycle** - the completion of watering all stations in a program in sequence

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**“Weekly” or “Interval” Calendar** - allows the operator to determine which days of the week to water (e.g., Tue, Thu, Sat) or to water a fixed number of days apart (e.g., every other day, every third day)
Standard Controller Features

- **Water Budget** - lets you change all your run times with one button, rather than resetting each station’s run time individually.
  (Run times are increased/decreased as percentages of the existing program, usually in 10% increments)

Runoff Due to Excessive Valve Run Times
Standard Controller Features

- **Multiple Start Times** - allows you to irrigate more than once per irrigation day
  - avoids runoff
  - reduces “ponding”
  - “Cycle-and-Soak”

- **Multiple Programs** - allows different hydrozones to be irrigated on different day and time schedules
  - typically, an “A”, “B”, and “C” program
  - each program will have two to four individual start times
  - each valve can be operated by one or all programs
Schedule Irrigation Wisely

- Adjust Standard Controller watering schedule to match the changing weather - Don’t just “set and forget”
- Early morning is best time
- Infrequent deep watering generally best strategy
- Sample Schedules at napa.watersavingplants.com/Watering-Guide/
- Consider a Weather-Based Smart Controller

“Smart” aka “Weather-Based” Irrigation Controllers

After initial set-up and monitoring, controller is self-adjusting, automatically changing irrigation schedule throughout the year based on local weather, plant types, and site conditions.

Minutes are the Output, not the Input.

The real “SET IT AND FORGET IT” with potential 20-40% water savings!
Weather Station

- Wind Speed
- Solar Radiation
- Temperature
- Humidity
- Rain Bucket
  Not used for ETo calculations

How Do Controllers Get Weather Data?

General Categories:

- On Site Systems
- Historical ET
- Internet-Based
Add Station: Step 1 of 6

Irrigation Method

Select the irrigation method used at this station:

- Sprinkler
- Drip emitter
- bubbler

Continue →

Add Station: Step 2 of 6

Plant Types

Select all the plant types watered by this station:

- Trees
- Ornamental Grasses
- Vegetables and Herbs
- Cacti and Succulents
- Lawn
- Trees
- Ornamental Grasses
- Vegetables and Herbs
- Cacti and Succulents
- Lawn
- Trees
- Ornamental Grasses
- Vegetables and Herbs
- Cacti and Succulents
- Lawn

Multiple Plant Types

Identifying Plants

Different plants have different watering needs, and your station's watering schedule will depend on the types of plants you enter here.

More Help Topics
Slope is an important factor in setting your watering schedule because water will run off if it is applied too quickly or not allowed enough time to soak in.

**Determining Slope**

Estimate the percent of slope using the visual guide at left. For greater accuracy, you can measure slope using the following formula:

\[
\text{Percentage of slope} = \left( \frac{\text{Change in elevation}}{\text{measured distance}} \right) \times 100
\]

For example, if you have a slope 30 feet long, and the distance from the top to the bottom is 2 feet, the percentage of slope is \( \frac{2}{30} = 0.0667 \times 100 = 6.67\% \). To make this measurement, you'll need a tape measure and a level. Attach one end of the tape measure to the top of the slope and hold the other end over the bottom, making sure it's level. Then measure the horizontal distance (measured...
Add Station: Step 5 of 6

Sun/Shade

- Sunny all day
- Shady part of the day (two to four hours)
- Shady all day

Help

In general, plants that are in the shade for all or part of the day will require less water than if they were exposed to the sun all day.

Averaging Sun Exposure

When making your selection, choose the condition that best describes the amount of shade covering all or most of the plants in this station, not just one or two plants.

More Help Topics >>

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Add Station: Step 6 of 6

Sprinkler Output - Spray Head

Specify the precipitation rate of your sprinklers. Measuring your sprinkler output will help ensure an accurate watering schedule for this station.

- Place them at different distances from the sprinkler, within the sprinkler pattern, as shown here.
- Turn on the water for 15 minutes.
- Empty all water into one of the cans.
- Using a ruler, measure the depth of the water.
- Divide by three to get the average.
- Multiply by four to get inches per hour.

Enter inches per hour: [ ]
Use default (1.5 inches/hr.)

Help

The watering output of various brands of sprinklers (spray head, rotor, etc.) can vary significantly. We can determine your watering schedule more accurately and save you water if you measure the output of your sprinklers using the simple method described at left.

Using Default Value

If you do not want to take the time to measure your sprinkler output then you can use our default precipitation rate, which is based on an average flow rate for the type of sprinkler you have. Unfortunately, using our default value may prevent you from obtaining your maximum water savings.

You Can Return Later

If you decide to use our default precipitation rate for now, you can always return later to the website and enter more accurate information.
Considerations for Use of Smart Controllers

- **Size of Current Water Bills**
  Is “Smart” Controller worth the investment?

- **Current condition of irrigation system**
  A “Smart” controller will reveal uncorrected maintenance problems

- **Accuracy of initial set-up**
  Get professional help?

- **Ease of use**
  Don’t need to fiddle with once it’s properly set up!

- **Look for EPA WaterSense-labeled product:**
  epa.gov/watersense/irrigation-controllers
  Efficient irrigation year-round without lifting a finger.
Tendency to Overwater
“Set it and Forget it”

More frequent adjustment
...or a “Smart” Controller

or Water By The Holidays

Easter - 40%

Cinco de Mayo - 60%

Fourth of July - 100%

Labor Day - 60%

Halloween - 30% (or OFF!)
Broken Head:
Activate the Valve Circuit
During the Day to
Identify and Correct
Operational Problems

Blocked Head
or
Dirt in the Nozzle
Excessive Run Times or Stuck Irrigation Valve

Low Head Drainage:
Corrected by Installing an In-Line or Under the Head Check Valve.
Misting Due to High Pressure:
Install a Pressure Reducing Valve

Overspray
Due to Mis-aligned Heads
Improper Head Placement and Lack Of Maintenance

[Image: EPA.gov/Watersense/irrigation.png]

Spruce Up Your Sprinkler System

Inspect sprinkler heads. A broken one can waste 25,000 gallons of water in six months!

Select a WaterSense labeled irrigation controller and water smarter.

Connect hoses and pipes well. A leak as small as the tip of a pen can waste 6,300 gallons of water per month!

Direct spray on lawns, not sidewalks and pavement.

[Website: epa.gov/watersense]
QUESTIONS?

Drip Irrigation
For Gardens and Landscapes

Presented By:
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Certified Irrigation Designer
LOW VOLUME
DRIP IRRIGATION

SPRINKLER IRRIGATION
DRIP EMITTERS

DBK04
NB4
NWB4
NPC4
NWPC4
DPJ04

DRIP HOSE IN GARDEN
SPAGHETTI TUBING TO PLANTS

ONLINE EMITTERS AT EDGE OF ROOT BALL
INLINE EMITTERS AROUND TREE

INLINE EMITTERS IN VEGETABLE BED
1/4" COUPLER CONNECTION INLINE TO 1/2" DRIP HOSE

STRAWBERRY PLANT AT INLINE Emitter
MICRO SPRINKLERS
“TRIM THE EDGES”

MICROJET WITH RISER
AND RISER SUPPORT
MICROJET: TWO PARTS, BASE & CAP

DIG MINI-SPRINKLER COMPLETE ASSEMBLY
DIG MINI-SPRINKLER: 5 PARTS

MICROJET WITH COMBO STAKE & SPAGHETTI
SPOT SPITTER
FOR CONTAINERS

SPOT SPITTER
SPAGHETTI “OCTOPUS”
HOSE BIB HEAD ASSEMBLY

ANTI-SIPHON VALVE
DRIP ASSEMBLY
UNDERGROUND BOX WITH LID DOWN

IRRIGATION TIMER IN EXTERIOR CASE
MULTI-PROGRAM DIAL CONTROLLER

DRIP FILTERS: SCREEN AND DISK
CENTRIFUGAL SAND SEPARATOR FOR WELLS

PRESSURE REGULATORS: FIXED & ADJUSTABLE
CHOOSE CORRECT FLOW RANGE FOR REGULATOR

DRIP HOSE & SPAGHETTI WHAT SIZE?
SPIN LOC FITTINGS

COMPRESSION FITTINGS
PVC UNDERGROUND TO DRIP SYSTEM

FLEXIBLE PVC TO RISER PREVENTS DAMAGE TO MAIN
SCH80 RISER UP TO BED

RISER FROM UNDERGROUND PVC IN LANDSCAPE
HOSE THREAD CONNECTION WITH VALVE

ESTABLISHED DRIP IRRIGATED LANDSCAPE
NEWLY PLANTED DRIP IRRIGATED LANDSCAPE

DRIP IRRIGATED BORDER
DRIP IRRIGATED SHADE GARDEN

DRIP SYSTEM PARTS ASSEMBLY

“PLAYING WITH GARDENER’S TINKER TOYS”
DRIP HEAD ASSEMBLY APART

DRIP HEAD ASSEMBLY TOGETHER
DRIP EMITTERS APART

DRIP EMITTERS TOGETHER
DIG MINI-SPRINKLER APART

DIG MINI-SPRINKLER CLOSEUP APART
DIG MINI-SPRINKLER CLOSEUP TOGETHER

MICRO-JET CLOSEUP APART
MICRO-JET COMPLETE

O-JET APART
O-JET TOGETHER

SOAKER DRIP WITH 1/4” CONNECTOR
SOAKER DRIP WITH END PLUG

1/4" SOAKER DRIP HOSE

DOUBLE ENDED GOOF PLUG

DRIP END CAP APART

1/2" DRIP HOSE

THREAD NEED CAP X PERMA-LOC
DRIP END CAP TOGETHER

Contact Info:
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info@harmonyfarm.com
Upcoming Virtual Workshop

Wednesday, October 21
Greywater Systems

naparcd.org/event/greywater

THANK YOU FOR WATCHING!

Tonight’s slides will be posted in Water-Wise Landscaping Workshops section of web site:

cityofnapa.org/water