EAST BAY MUNICIPAL UTILITY DISTRICT

Irrigation Basics

March 11, 2021

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UPCOMING WEBINARS

Graywater: Laundry-to-Landscape
Tuesday March 16, 1pm - 2pm

Leak Detection (English & Spanish)
Thursday March 18, 5pm – 6pm

Qualified Water Efficient Landscaper

- Spanish starts on Mar. 16 am
- English starts on Apr. 19 pm or April 20 am

Water Conservation Showcase
April 6, 13, 20, 27

Register at:
www.ebmud.com/watersmart

Overview

- Overview of irrigation components
- Drip irrigation in detail
- How to audit an irrigation system
- Common irrigation problems and solutions
- Irrigation rebates

Irrigation System Overview

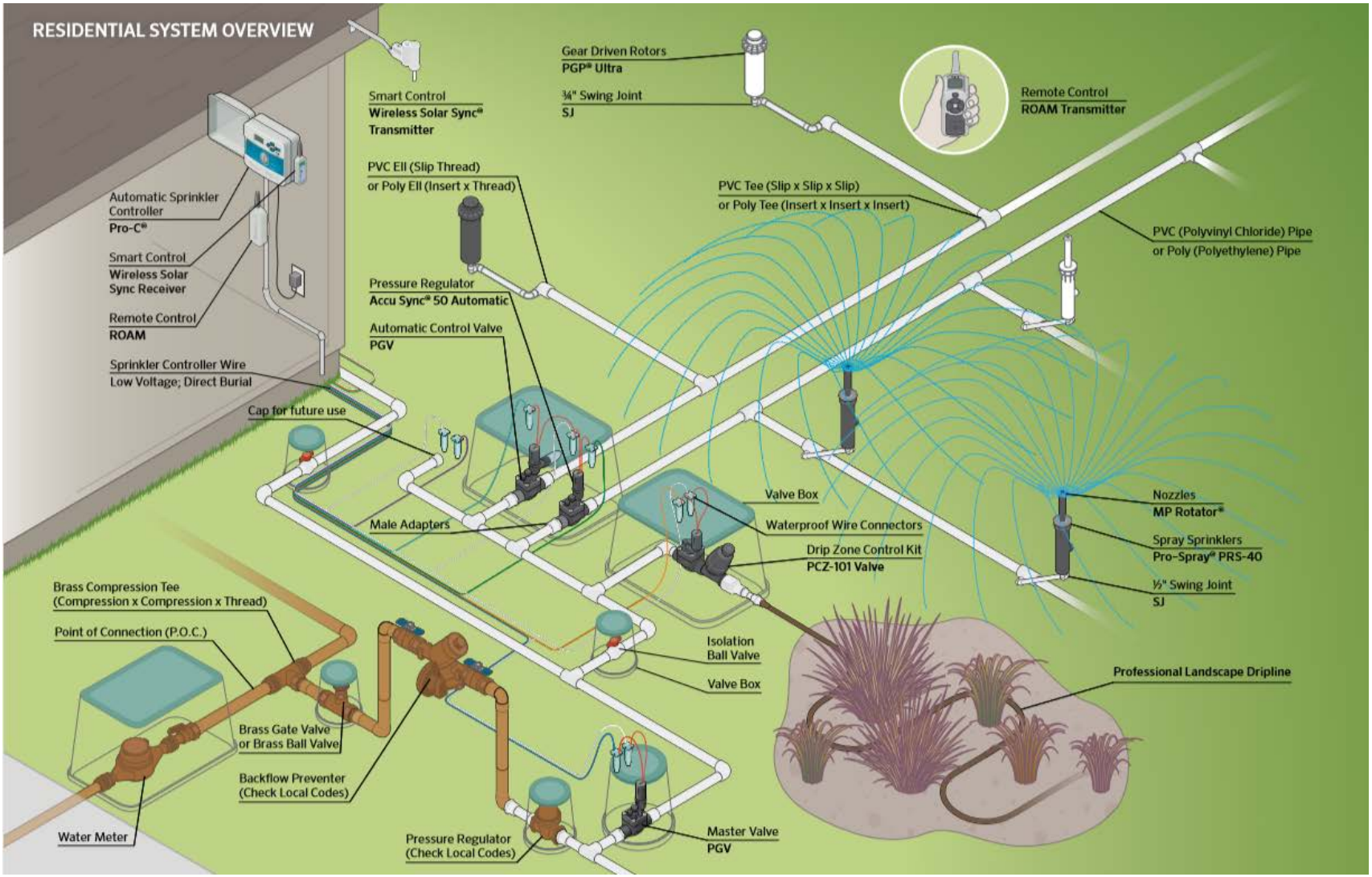
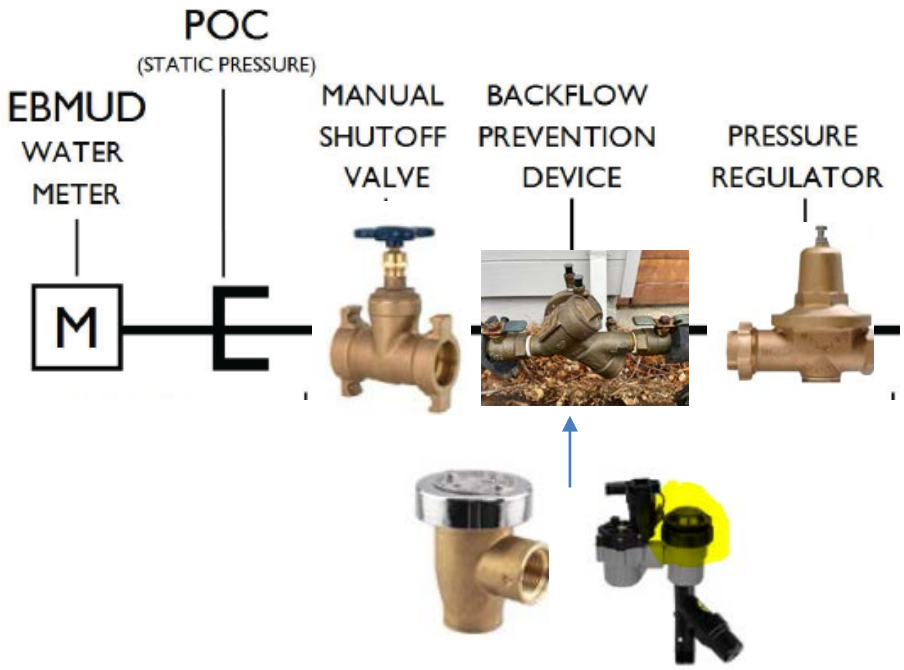


Image courtesy of QWEL & Hunter Industries

Basic Irrigation Components

- **EBMUD Meter:** connection to water distribution system
- **Point of Connection:** where the irrigation mainline connects
- **Manual Shut Off Valve:** allows you to shut off water serving irrigation (gate valve or ball valve)
- **Back Flow Prevention Device:** valve that protects irrigation water from contaminating potable drinking water supply (reduced pressure valve, check valve, antisiphon valve)
- **Pressure Regulator:** reduces outlet water pressure serving irrigation and can improve performance and longevity of irrigation system components



Images courtesy of QWEL

Irrigation System Overview

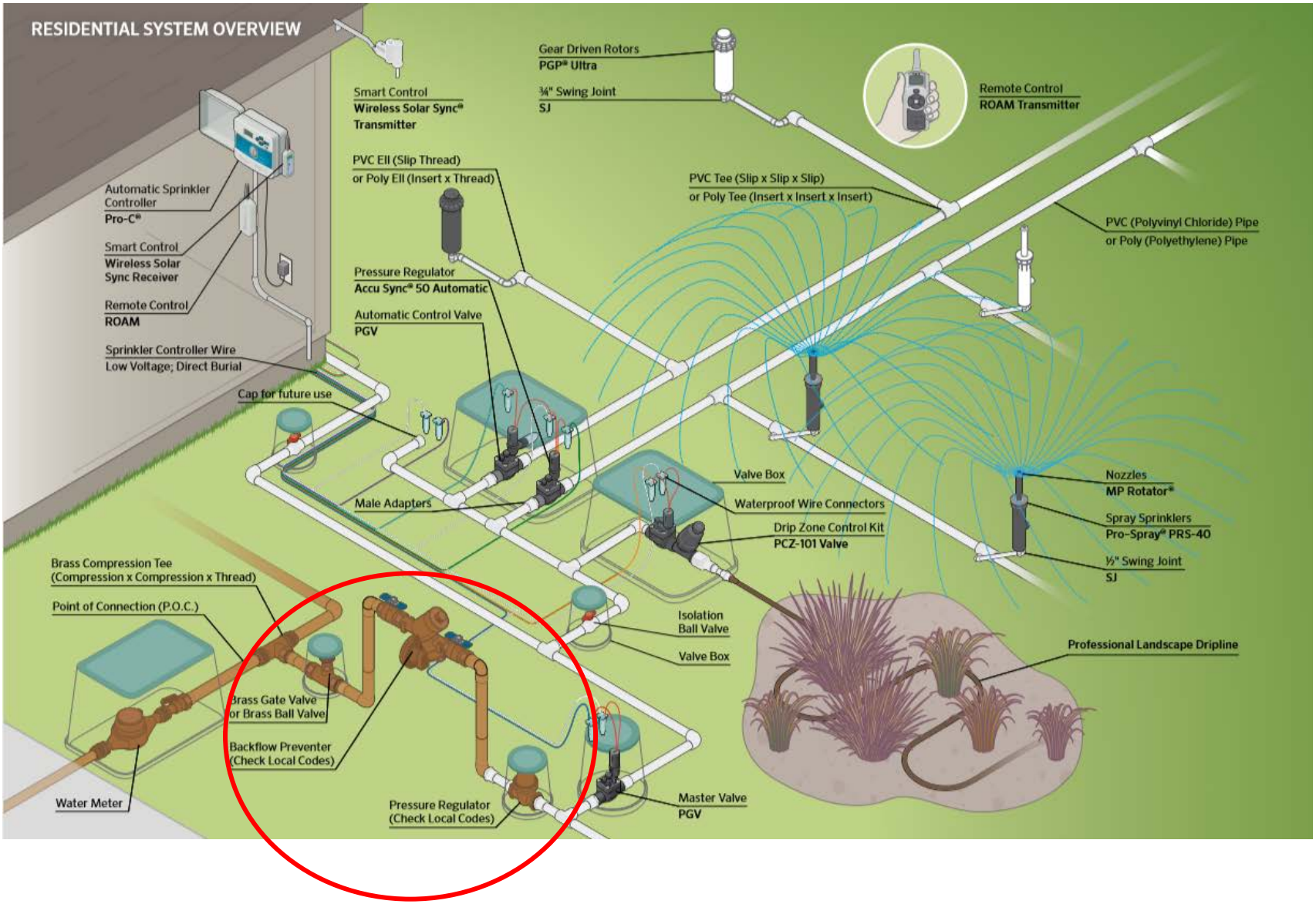
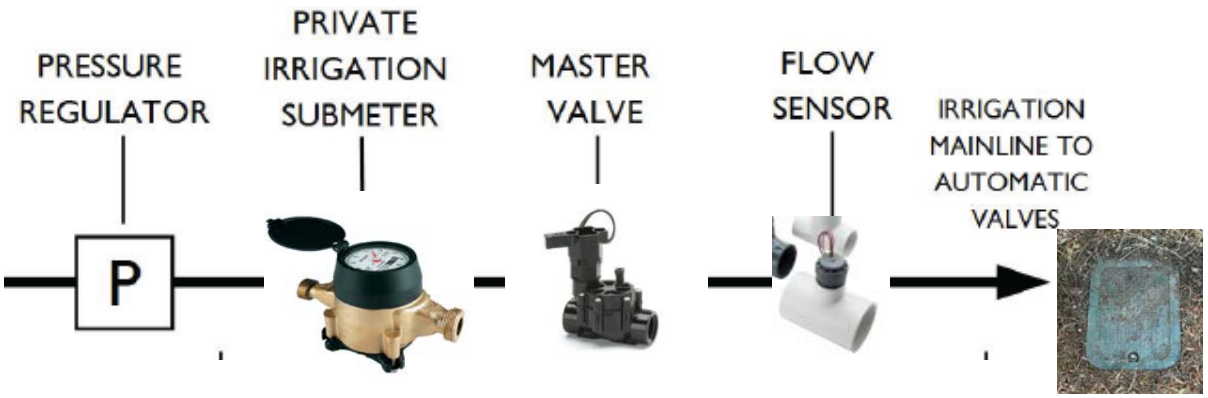


Image courtesy of QWEL & Hunter Industries

Additional Irrigation Components

- **Master Valve:** closed valved installed upstream of individual valves that prevents malfunctioning valves from wasting water when the system is not running
- **Private Irrigation Submeter:** measures the flow of water used on irrigation line and can detect leaks
- **Flow Sensor:** detects flow and sends electric current to the master valve when leak is occurring
- **Automatic Irrigation Valves:** individual valves that correspond to the number of zones programmed in your irrigation controller



Images courtesy of QWEL

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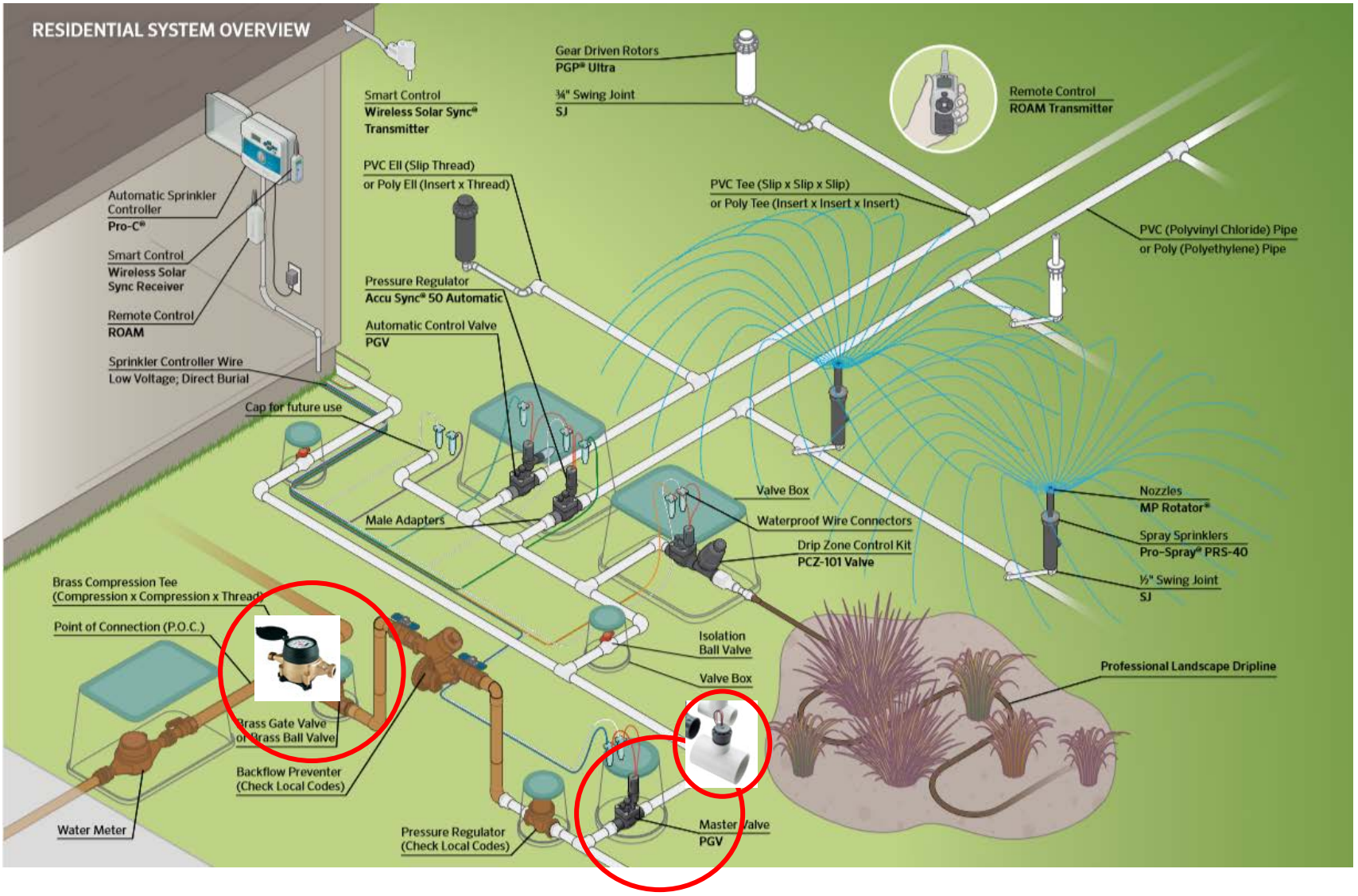


Images courtesy of QWEL & Hunter Industries

Sprinklers & Rotors

Fixed sprinklers:

- 2-17 ft throw with precipitation rate of 1.5-2 inches per hour
- Designed to operate at 30 psi

Rotating sprinklers:

- 6-35 ft throw with precipitation rate of 0.4-0.8 inches per hour
- Designed to operate at 40-55 psi
- Provide more uniform coverage and larger droplets (no misting)

Rotors:

- Designed for irrigated large spaces (fields or agriculture)
- 15-100 feet throw with precipitation rate of 0.25-1.5 inches per hour
- Older worn rotors tend to get stuck or over-water one area

Images courtesy of QWEL & Rainbird Corporation

What is Drip Irrigation?

- Micro-irrigation system
- Drips slowly
- Places water directly into the root zone and minimizes evaporation


Used for growing food

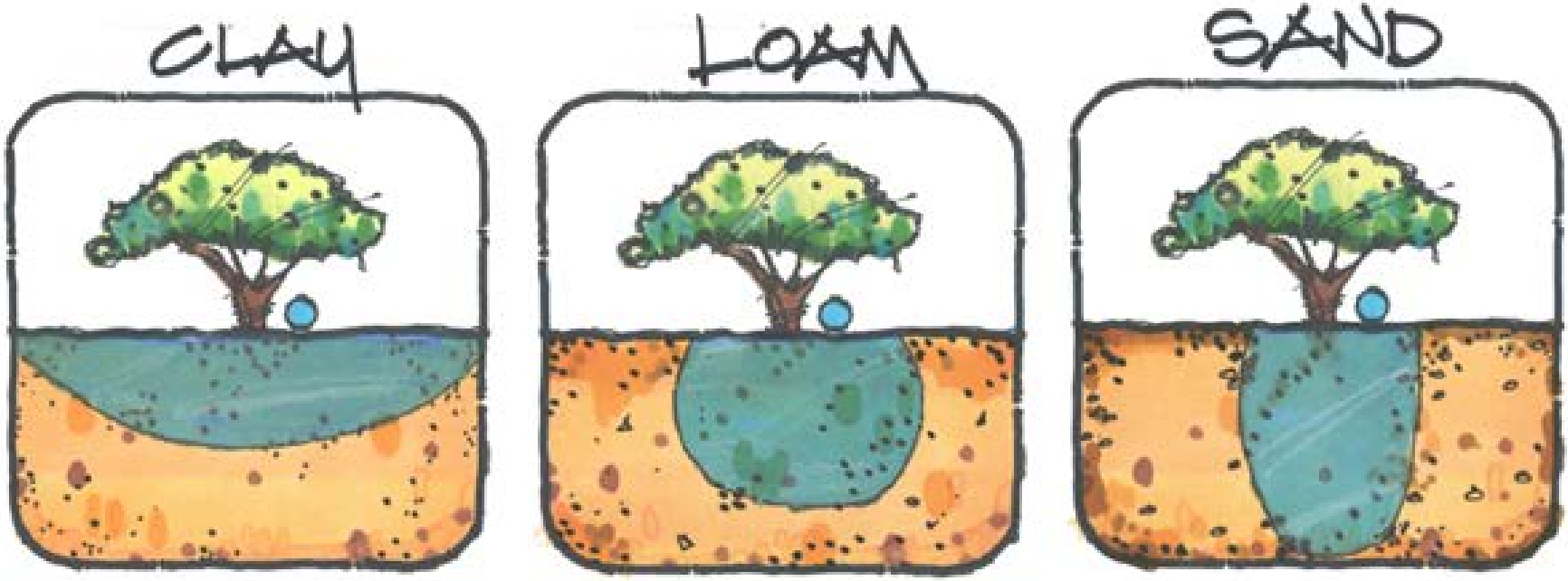

Raised beds


Shrubs


Trees

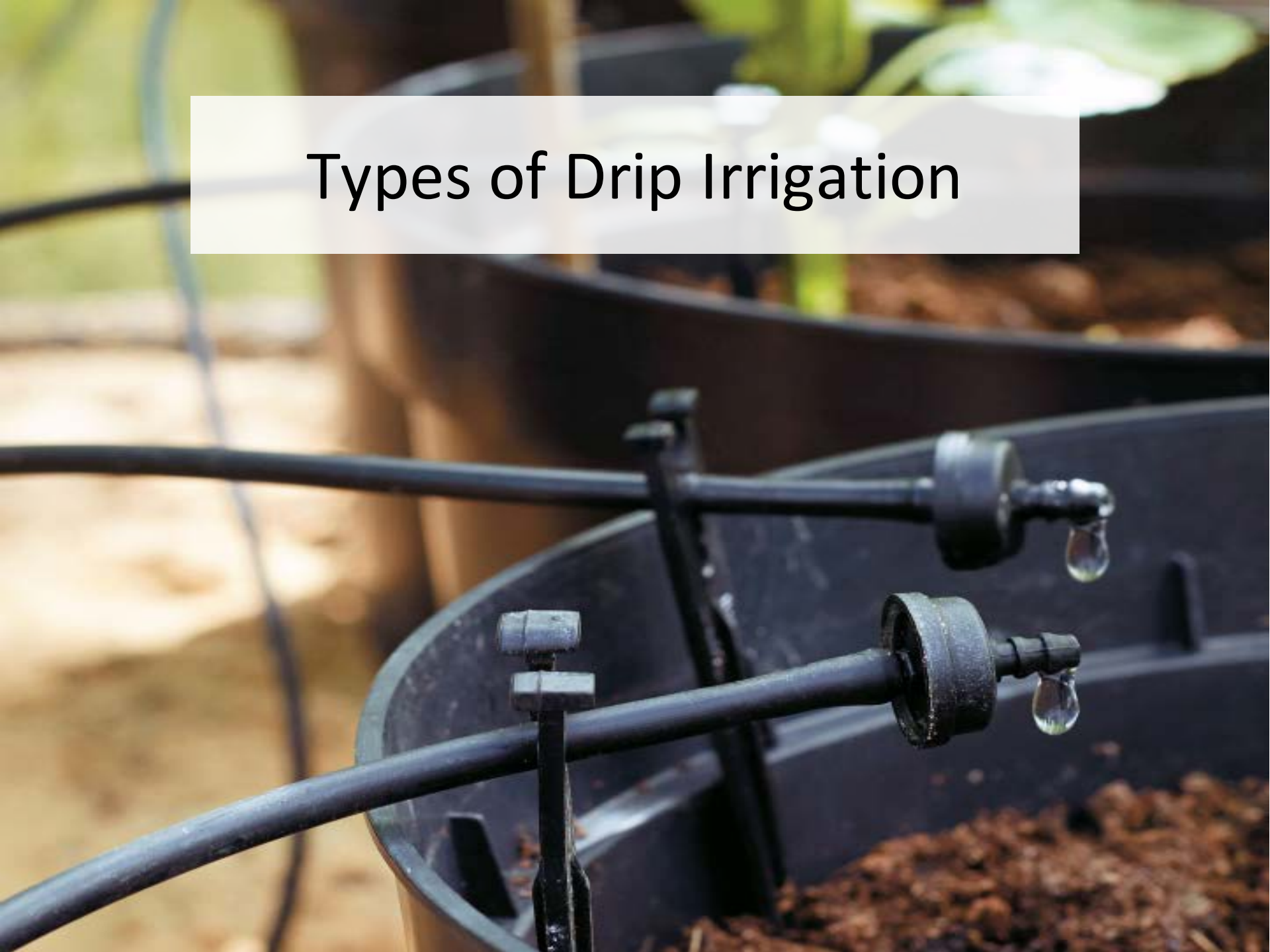

Narrow spaces

How water moves through soil



0.4 gph emitter	0.6 gph emitter	1.0 gph emitter
Used for tight compacted clay soils or where lower application rates are required.	Used for clay loam to sandy loam applications. Loam is a rich soil mix containing clay, sand and organic matter.	Used for sandy soil applications or where higher application rates are desirable.

Types of Drip Irrigation



Filter and Pressure Regulation

- Proper pressure regulation and filtration devices are required for optimal performance
- Pressure regulation helps avoid emitters being blown off the distribution tubing
- Optimum pressure: 30 psi

Shrub Bubbler

- Bubblers apply water to a small radius around the emission device
- The flow rate is many times higher than point-source drip emitters
- Suitable for applying water to larger shrubs and trees

Point Source Drip

- Sometimes called spaghetti tubing
- Emitters deliver water to plant root zone
- Multiple emitters may be needed for each plant depending on the plant's mature size and water requirements

In-line Drip
(1/2 inch tubing)

- Emitters are in the ½ tubing spaced every 6, 12, 18 inches
- For most applications, ½-inch drip line is a less maintenance, more resilient option
- Good choice for grid layouts
- Sold in large coils

Drip Leak Indicators

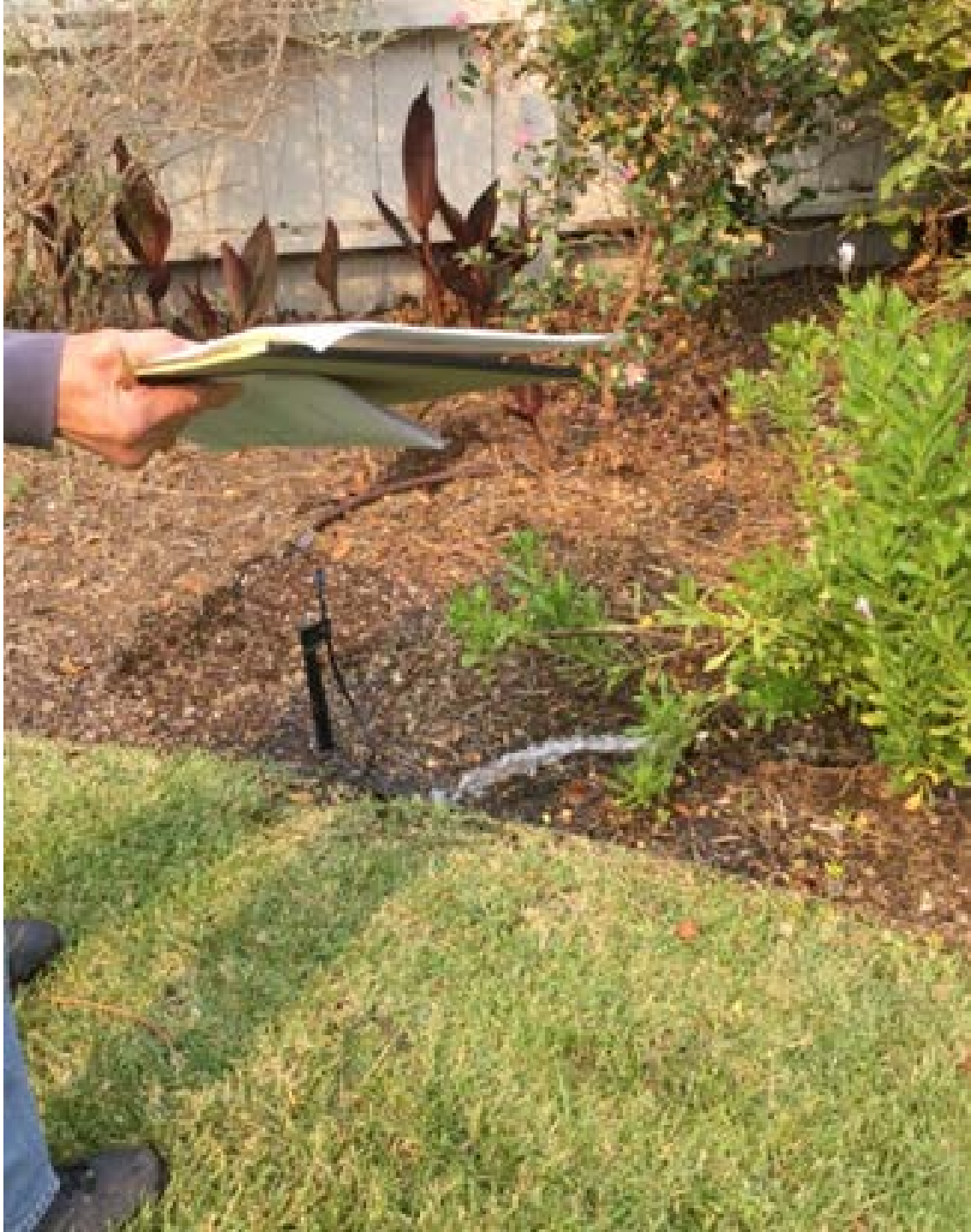
- Leaks in drip irrigation can be tricky to find
- Yellow indicator pops up when irrigation is on

Image courtesy Hunter Industries

QUESTIONS?

Pre Season Irrigation Check Up (Spring)

- Turn on controller and check settings (run times, date/time, batteries)
- Flush irrigation system to remove dirt
- Turn on valves (look/listen/feel)
- Flag all issues and correct



Check and adjust controller schedule

LAWN & LANDSCAPE WATERING SCHEDULE

	LAWN			LANDSCAPE								
SPRINKLER /DRIP TYPE	Pop-Up/ Fixed-Spray Sprinkler	Impact/ Rotor Sprinkler	Multi-stream/ MP Rotator Sprinkler	Pop-Up/ Fixed-Spray Sprinkler	Impact/ Rotor Sprinkler	Multi-stream/ MP Rotator Sprinkler	Drip Emitters 1 gph 2 per plant 0.3" per hour	Inline Drip 0.6 gph 18" spacing 0.43" per hour	Inline Drip 0.6 gph 12" spacing 0.96" per hour	Inline Drip 0.9 gph 12" spacing 1.42" per hour	High Volume Drip 10 gph 1 per plant 1.5" per hour	Micro-Sprays 20 gph 1 per plant 1.6" per hour
CYCLES	3 cycles	3 cycles	3 cycles	3 cycles	3 cycles	3 cycles	3 cycles	3 cycles	3 cycles	3 cycles	3 cycles	3 cycles
TIMING	3–6 minutes	7–10 minutes	15–20 minutes	3–6 minutes	9–12 minutes	20–24 minutes	30 minutes	20 minutes	10 minutes	6 minutes	6 minutes	5 minutes
JANUARY	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
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Flush out the Filter and System

Periodically flush the irrigation system

Removes dirt and debris that may
have built up

To flush the system, locate the valves, sometimes in an irrigation box (pictured)

Flushing Sprinklers

- Remove the sprinkler head furthest away from the valve
- Flush for 30 seconds and turn off
- Reinstall the sprinkler
- Clean out each sprinkler nozzle individually

Flushing Drip Irrigation

- Flushing out the ends of your drip lines
  - Open flush valve or remove end cap furthest away from the valve on the drip line
  - Flush for 30 seconds and turn off
  - Close flush valve or seal with end cap

- Flushing out the drip irrigation filter
  - Open by turning the knob to manually bleed water from the upper chamber
  - Flush for 30 seconds and turn off
  - Turn the knob to close off the manual bleed port
  - Use caution not to completely remove the flush valve

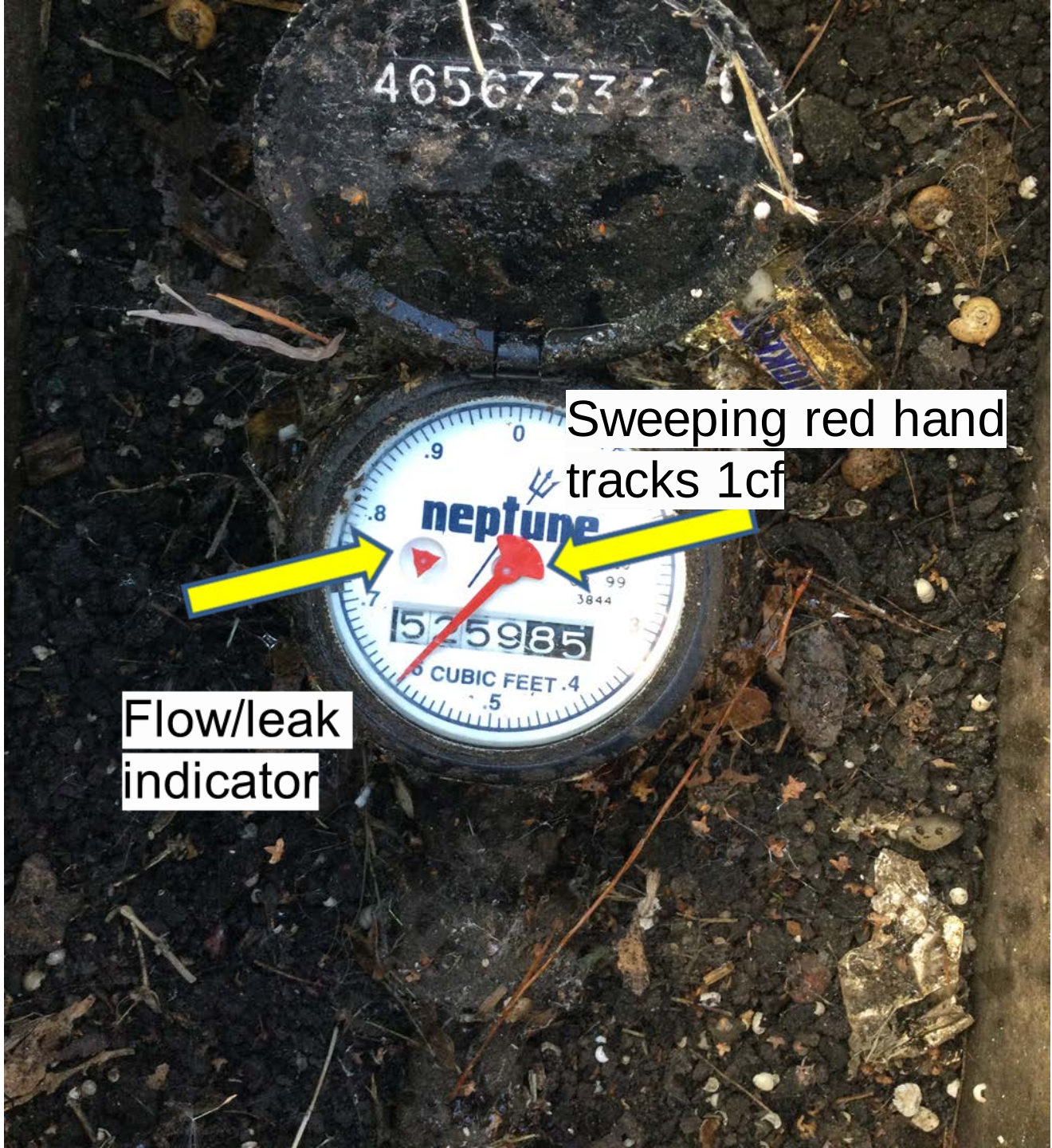
Post Season Irrigation Check Up (Fall)

- Clean filters
- Turn off irrigation at the valve
- Release pressure in valves and close off
- Set controller to off

Image courtesy of QWEL

What is needed for an audit?

Meet Your Meter



How to audit with your meter

1 revolution/cubic foot
= 7.48 gallons

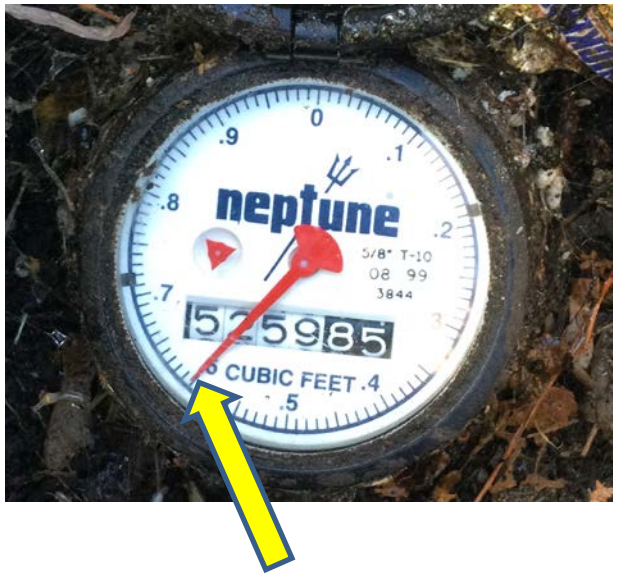
Run irrigation for one minute

Note start and end read

Pin test

Measuring your irrigation zones

Start read



Red sweeping hand on .6

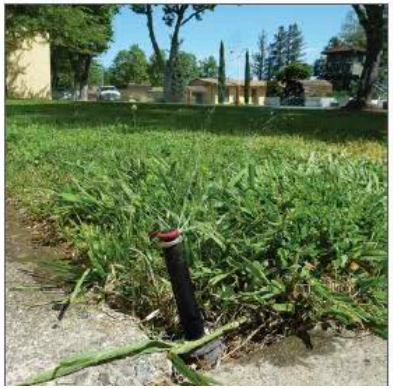
End read

Sweeping hand traveled 1.5 revolutions

Example:

1.5 revolutions/minute X 7.48 gallons/CF= **11.22 gallons/minute**

Common Irrigation Problems

- Poor coverage and runoff

Image courtesy of QWEL

- High pressure
- Mix-matched irrigation equipment
- Spray irrigation in non-suitable areas
- Improper controller programming

Problem: runoff

Solutions

Lower the run time

Clear out clogged nozzles

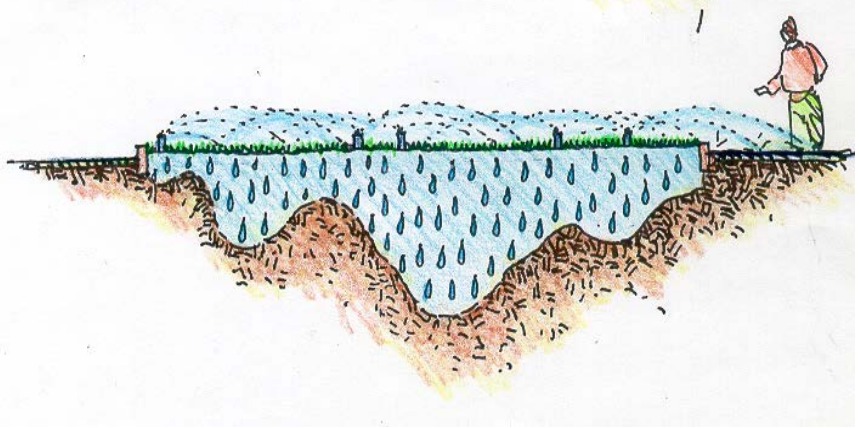
Realign nozzles

Reduce pressure

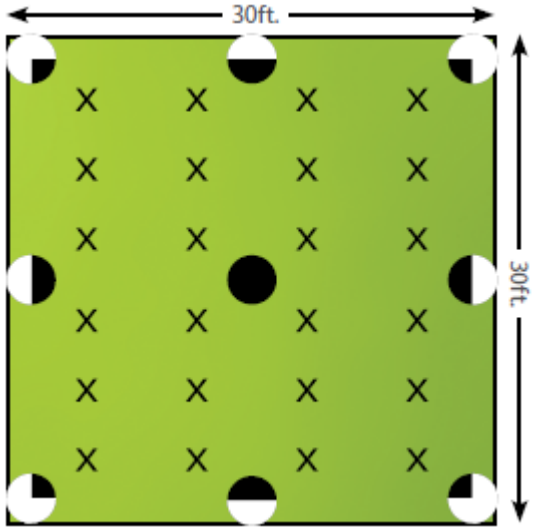
Improve distribution uniformity

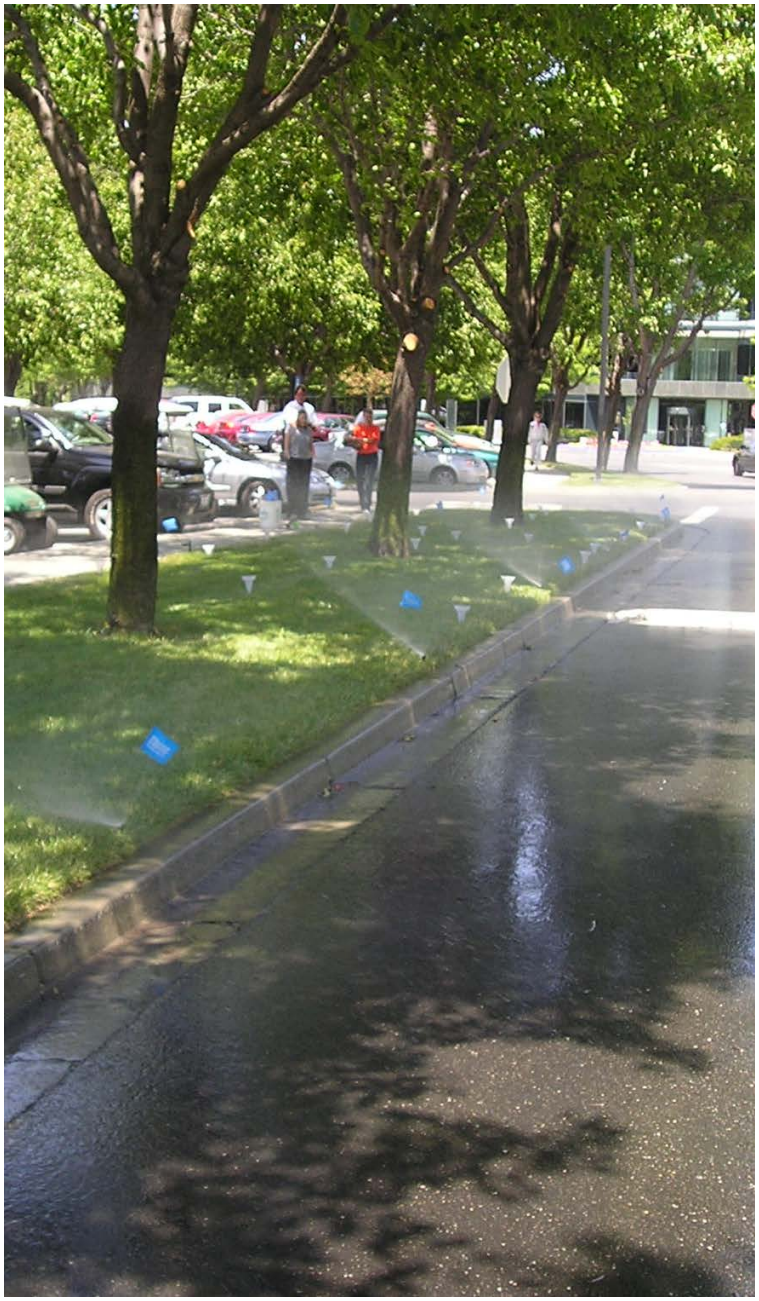
Distribution Uniformity

- Aim for head-to-head coverage
- Signs of poor distribution uniformity
  - Brown spots
  - Soggy spots
  - Circles



Ask a pro to perform a catch can test on your lawn






Problem: mixmatched irrigation equipment


Solution:
match it up

Problem:
high pressure

Solution: Reduce pressure system wide

Install a pressure regulator on the irrigation line

Optimum pressure for irrigation should be 20-40 PSI

Rebate available!

Solution: reduce pressure on a zone

Install high efficiency nozzles

Install pressure regulating sprinkler bodies

Rebates available!


Problem: spray irrigation in non-suitable places

Solution: narrow space, narrow irrigation

Cut out automatic irrigation

Convert spray to drip irrigation

Rebate available

Converting spray to drip

Converting spray to drip

Converting spray to drip


Problem: poor design

Problem: Improperly programmed controller

Poor scheduling

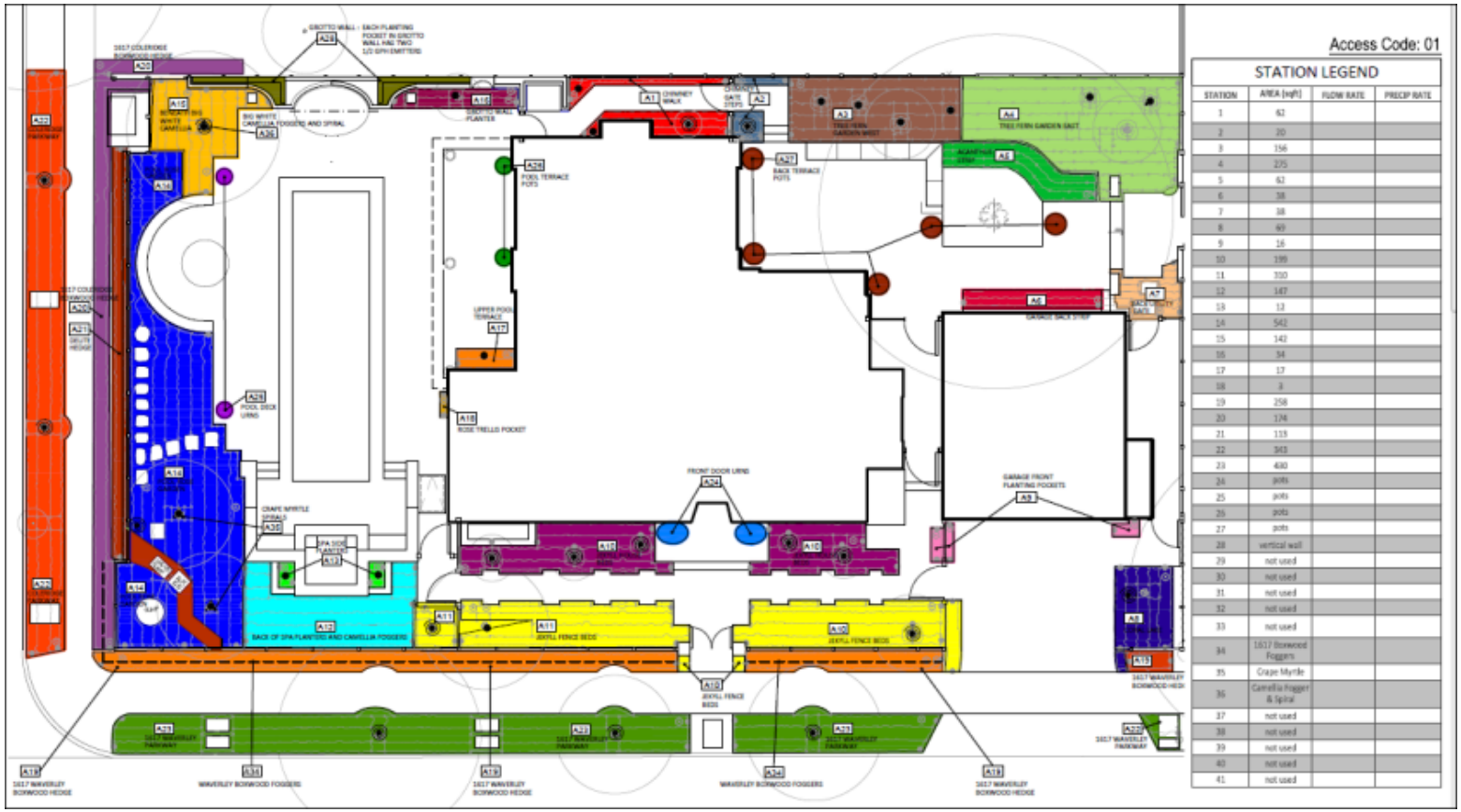
Wrong time settings

Multiple programs serving the same irrigation zone

Controller returning to standard settings after power outage

Solution: interact with your controller

Map out your irrigation zones
Adjust controller monthly
Refer to schedule guides and tweak as needed



How to use the irrigation schedule guide

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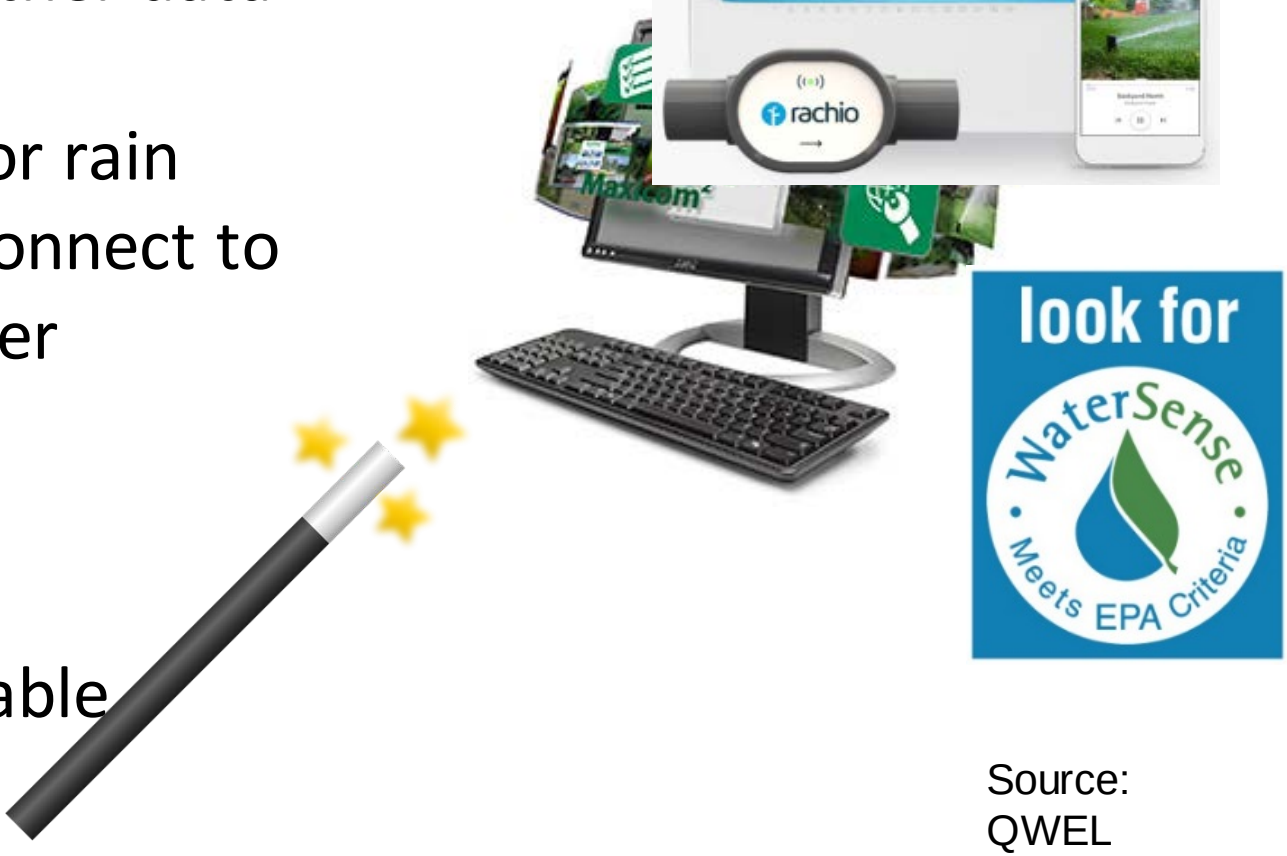
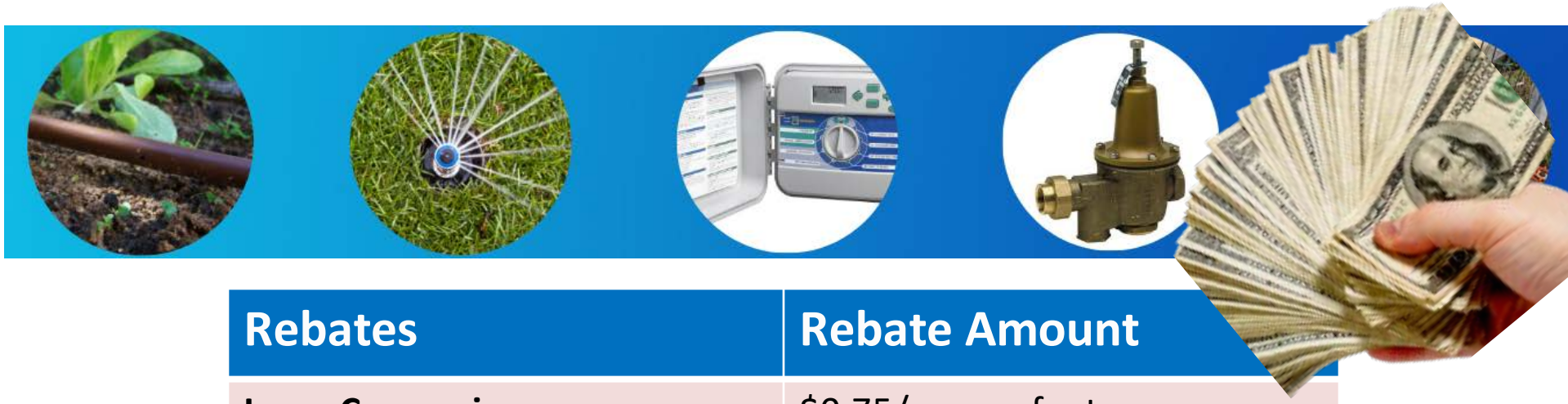
Solution: take out the guess work of scheduling

- Install a smart controller that will adjust based off local weather data
- Install a soil or rain sensor and connect to your controller
- Interact!
- Rebate available



Source: QWEL

Rebates!



Rebates	Rebate Amount
Lawn Conversion	$0.75/ square foot
Drip Conversion	$0.25/ square foot
Smart Controller	$75 per controller
High Efficiency Nozzles	$2 per nozzle
Pressure Regulator	$75 per device
Irrigation Submeter	$75+ per device

Steps for success with your rebate project

Read the rebate requirements first

Research before you buy

Think critically about this project

Seek an expert's advice when you need it

www.ebmud.com/rebates

Helpful Resources

EBMUD's Lawn & Landscape Watering Guide

EBMUD's Hiring a Landscaper Guide

EBMUD's WaterSmart Gardener Center

Your local irrigation store

www.ebmud.com/watersmart

Summary

- Overview of irrigation components
  - basic and advanced
  - overhead spray options
- Drip irrigation in detail
  - bubblers, point source, inline
- How to audit an irrigation system
  - pre and post season check
  - look, listen, feel
  - meet your meter
- Common irrigation problems and solutions
  - mixed matched heads
  - high pressure
  - scheduling
- Irrigation rebates and resources

Thank you!

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