



Basic Drip Irrigation

7/17/20 10am

The Program will begin Shortly



Basic Drip Irrigation

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Basic Drip Irrigation Webinar Outline

Lesson 1.

Identifying types of drip
systems

Inline and Point Source

Lesson 2.

Design and Installation
Fundamentals

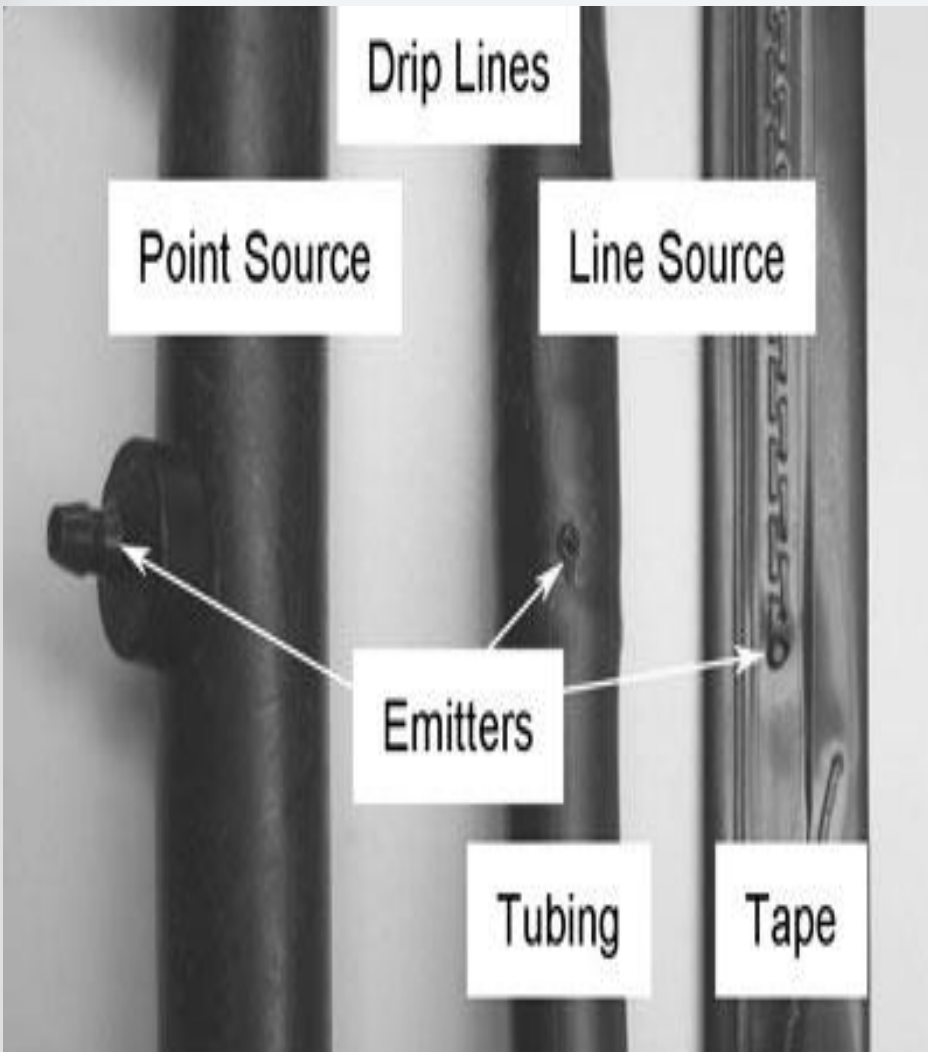
Lesson 3.

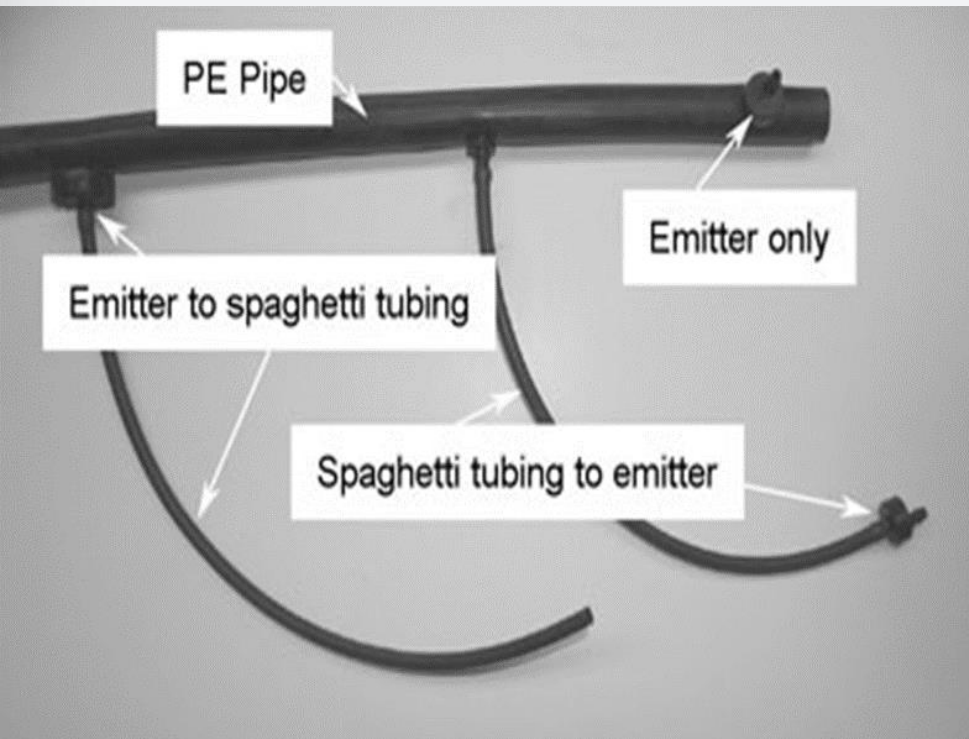
Scheduling for Success

Types of Drip

We will cover these skills:

- Identifying the difference between point source drip and inline drip systems.
- Precipitation rates of both systems
- Filters/Pressure Regulation
- Flushing capability, manually or automatically





Point Source Drip



Point Source Drip

- Used in sparsely planted areas
- Deep Watering
- Good on slopes

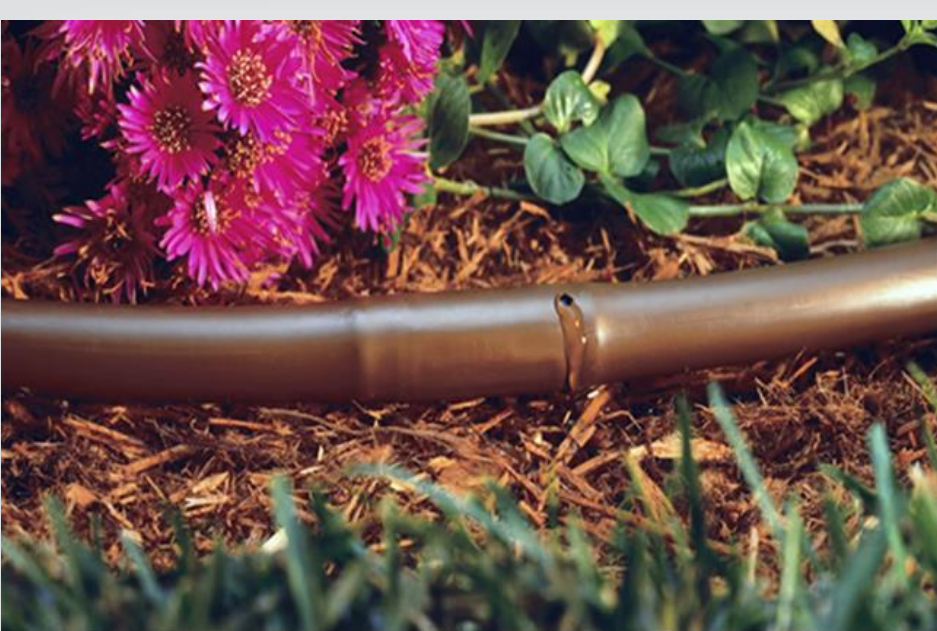


Inline Drip

Inline Drip System



- Uniform deep watering
- Used for densely planted areas
- Can be used during drought



Inline Drip System

- Used for plants that have
 - Similar water requirements
 - Similar Microclimate exposure
- Placed on surface or subsurface (turf)
- Even water distribution through capillary action
- Design dictated by soil type and flow rate of emitter





Inline Drip – Grid Spacing



Inline Drip ¼ inch Tubing

***Good for small tight areas, rock gardens, veggie beds

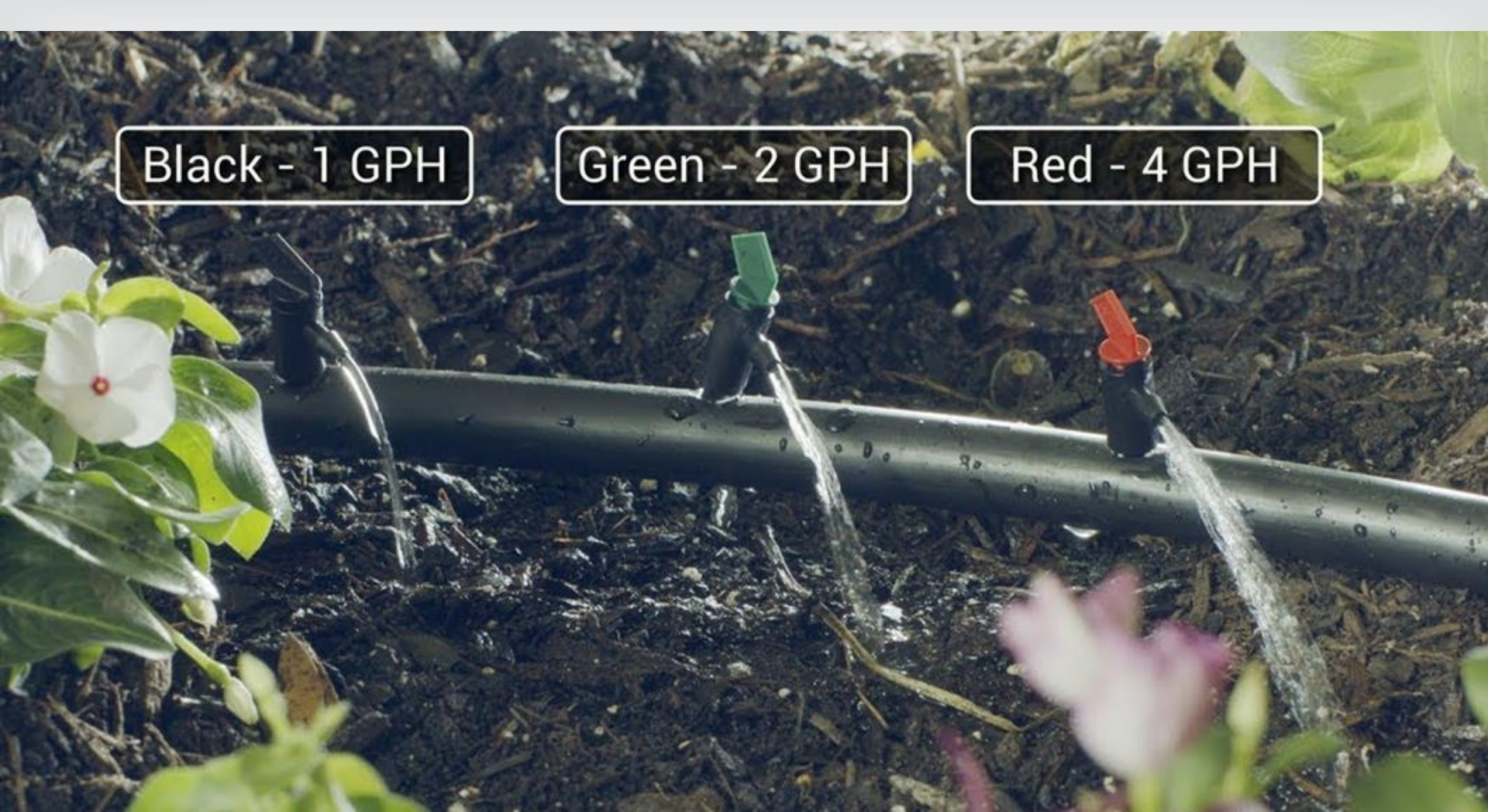


**** Typically Used in raised beds, under weed mat, or in furrows

Flow Rates



- Flow rates of emitters must match plant water requirements.
- Use WUCOLS to identify Plant Water Requirements
 - a. Higher water use plants need 2-4 gph emitter.
 - b. Medium water use plants need 1.0 gph emitter.
 - c. Low water use or potted plants need 0.5 gph emitter.
 - d. Many emitters are color coded for the gph depending on the manufacturer.



Black - 1 GPH

Green - 2 GPH

Red - 4 GPH

Emitter Water Output Gallons Per Hour (gph)

***Does not show .5 gph emitter.

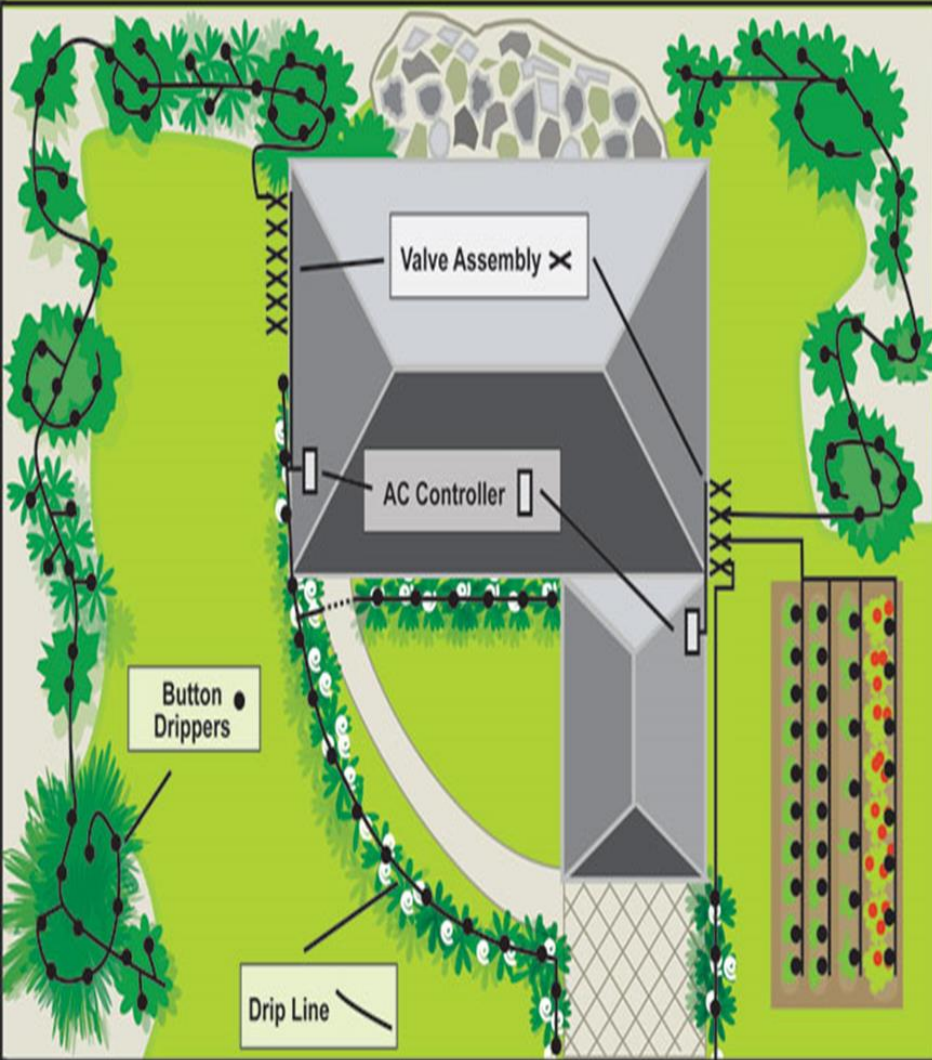


Drip Systems Summary

- Learned different types of drip systems.
 - Point Source Drip
 - Inline Drip
 - Drip Tape
- Matching the emitter size to the plant water requirement!
 - .5 gph low
 - 1.0 gph med
 - 2.0- 4.0 gph high
- WUCOLS IV- for Plant Water Use Requirements
- Water Use Classification of Landscape species

Landscape design and installation

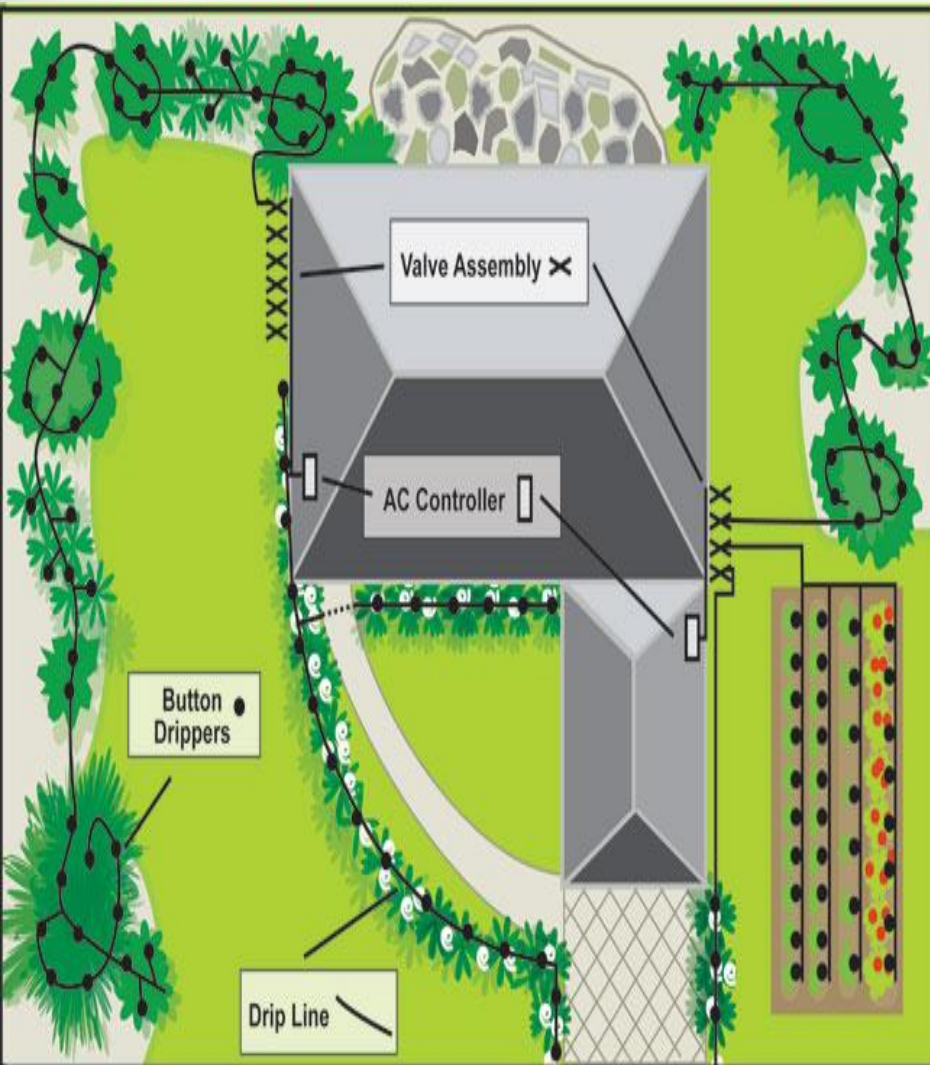
- Basics for designing a drip system
- Hydro Zones
- New Point Source Drip Systems
- Retrofit Existing System to Point Source Drip
- Inline Drip Applications

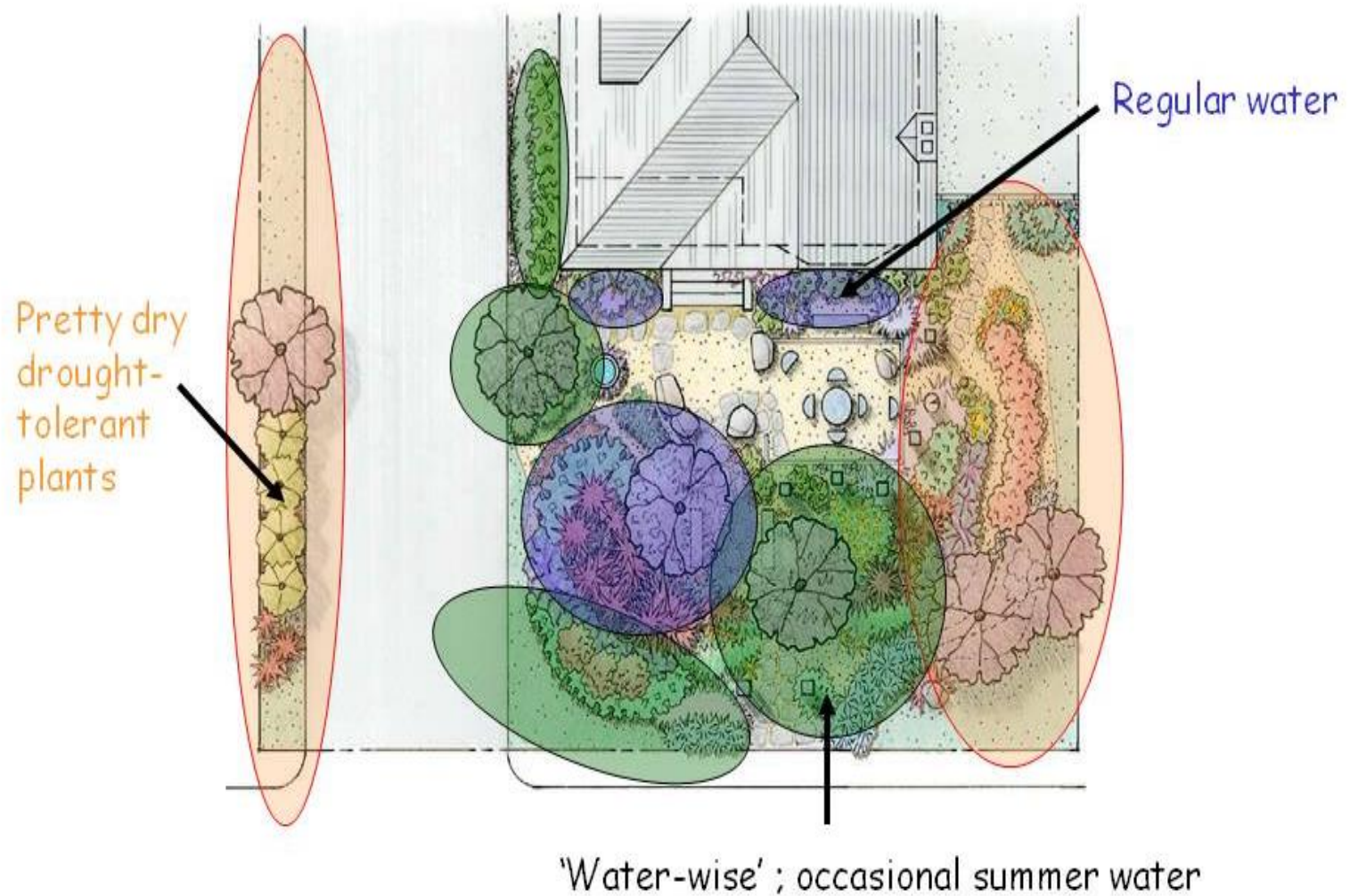


Drip System Design Basics

- Draw a Plan of Your Irrigation

- A rough layout of your yard, planting areas, plant types, sizes
- Water locations - is it a new “POC” (point of connection) or existing watering system to be retrofitted
- Your plan does not need to be precisely to scale.
- But it should be a fair representation of future and existing plantings in order to get a count of
 - a. number of emitters on that zone
 - b. lengths of drip tubing needed for the area/zone
 - c. To identify separate hydrozones





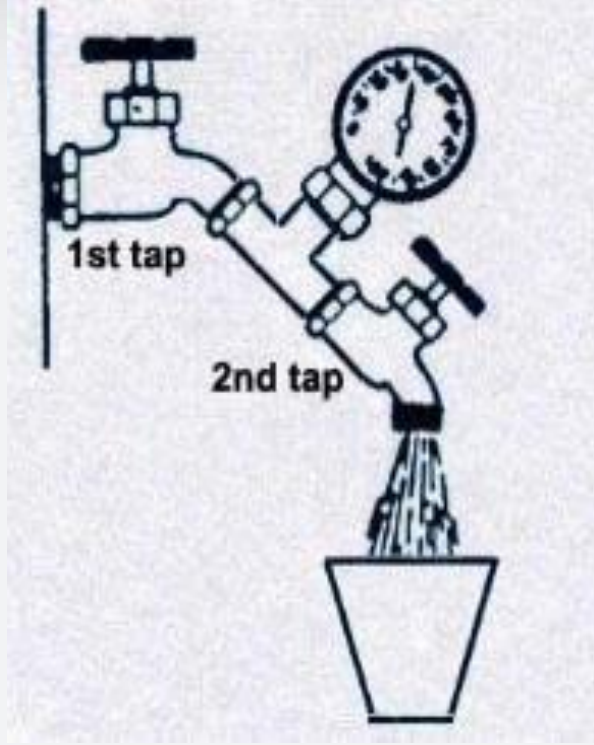
Hydro Zones – Separate zones for specific

- a. plant types (trees vs shrubs vs ground cover vs turf vs garden)
- b. microclimates
- c. plant water use requirements

*** Need to take in account HZ's no matter on what type of drip system you install or retrofit.

Design Basics

- **Determine available pressure on a hose spigot**
 - Most drip systems will require between about 10-30 PSI (pound per square inch) in the main supply tubing. Make sure you have at least 50-80 PSI available at the source or before the zone valve.
 - Flow Bucket Test
 - If available pressure is higher, you may need to have one or more pressure regulators installed, depending on the type of irrigation device selected.
 - Pressure regulation can be done at the hose spigot, irrigation control valve or on a retro kit at the spray head.



Point of Connection (POC)



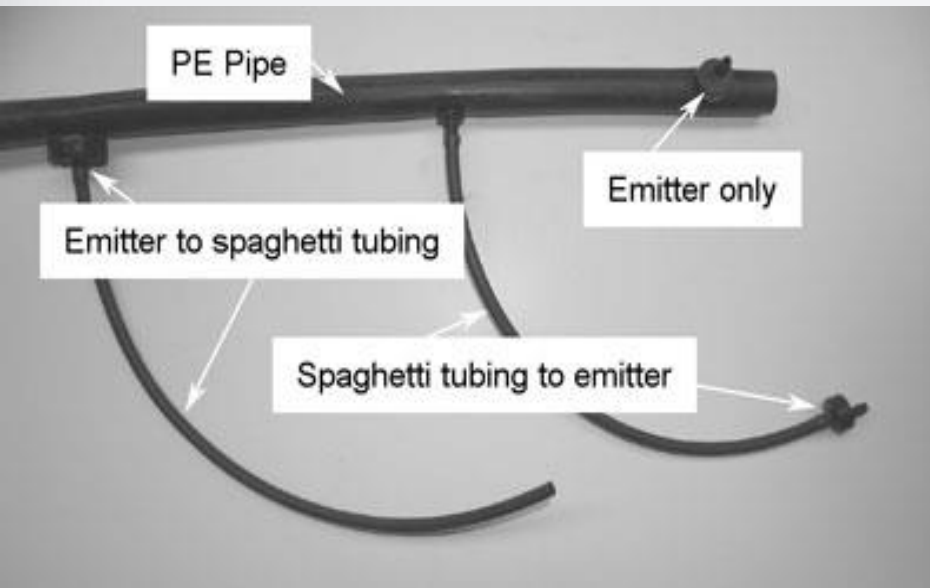
- A new installation or manifold at main service line from the house
- An existing zone valve being converted to an inline drip zone
- A hose spigot
- Rain barrel?

New Drip System



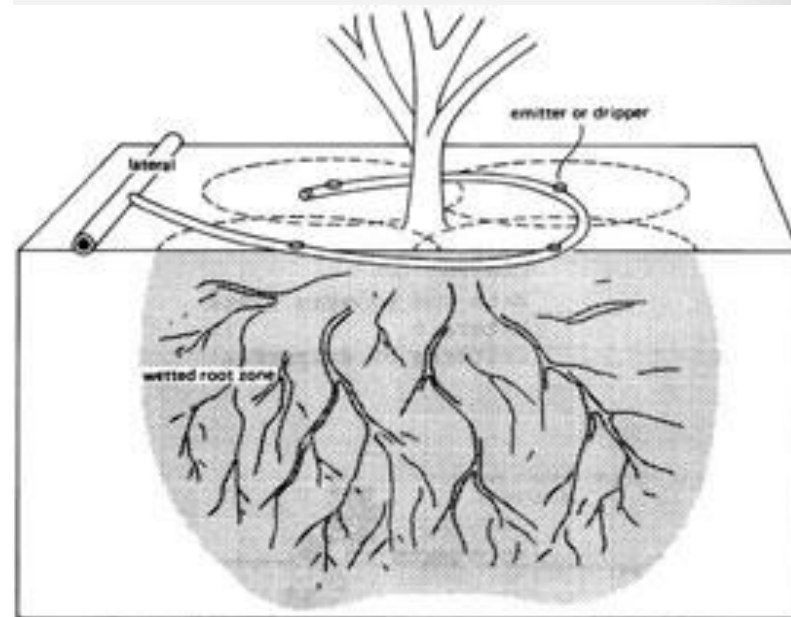
- At the main service line into the house a tee and shut off needs to be plumbed in.
- Add a manifold which contains the number of drip zone control valves based on your sketch and hydrozones.
- Add sprinkler control wire in same trench and run to you irrigation timer.
- Connect drip zone valves to poly pipe and run to separate planting areas.
- Pipe in planting areas can be either point source or inline but should not be both on the same valve.

Point Source Design Basics



- PE pipe moves water from the zone valve through ½" poly tubing to plant locations and emission devices.
- Water then moves through smaller ¼" polyethylene or vinyl distribution tubing.
- Distribution tubing is attached via connectors punched directly into the supply tubing by utilizing a punch tool.
- From the main supply tubing connection, distribution tubing is easily run to various plant and emitter locations through a series of tees, couplings and elbows and ¼" tubing.
 - *Older systems were 1/8" can be retrofitted to 1/4"
- With its small diameter, distribution tubing is very flexible and can be run in difficult locations and interspersed among plants, hardscapes or other obstacles.

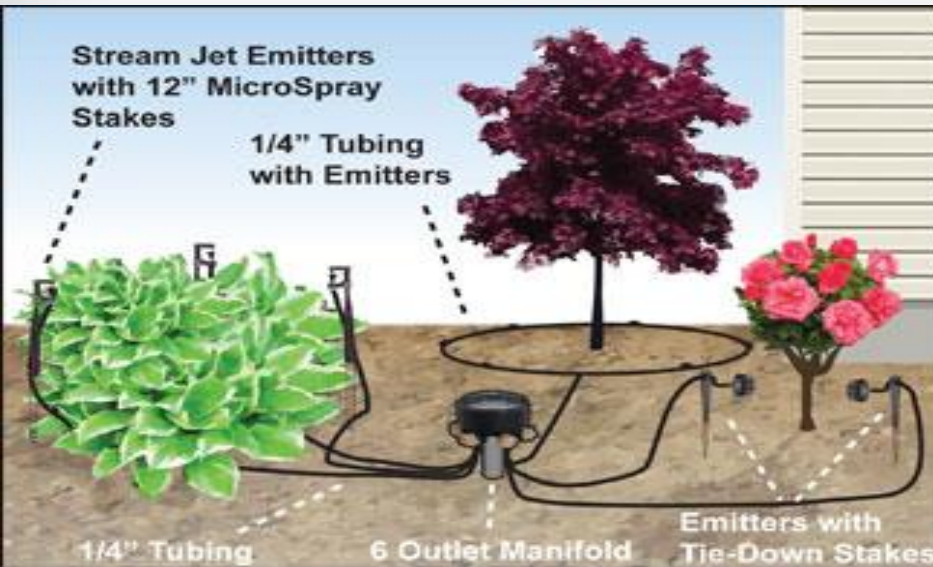
	No. of Emitters	Output	Placement
Vegetables (closely spaced)	1	1/2–1 gph	every foot
Vegetables (widely spaced)	1	1–2 gph	base of each plant
Flowerbeds	1	1 gph	base of each plant
Groundcovers	1	1 gph	base of each plant
Shrubs (2–3 feet)	1–2	1 gph	base of plant
Trees & Shrubs (3–5 feet)	2	1 gph	1/2–1 foot away from trunk
Trees & Shrubs (5–10 feet)	2–3	2 gph	2 feet away from trunk
Trees & Shrubs (10–20 feet)	3–4	2 gph	3 feet away, at dripline
Trees (over 20 feet)	6	2 gph	4 feet away, at dripline



Quantity of Emitters for Point Source Drip systems

Emitter Placement

- Placing your drip emitters too close together or too far apart is a bad move.
- Placing them evenly will ensure that your plants get the proper amount of water without having areas oversaturated.
- A good rule of thumb is to place drip emitters evenly spaced along the plant line and a minimum of six inches from the base of the plant.
- Drip Systems are dynamic and should move with the drip line of the tree or shrub as plants grow.





Zone Valve with Filter



Pressure Reducer



1/2" Connector



1/2" Tee



1/2" 90 or elbow



Button Emitter



1/4" Connector



Flag Emitter



1/4" Plug



1/2" Poly Pipe

Drip Irrigation Parts – New System

Retrofit Drip System

- Retrofit existing pop up spray type sprinklers to a drip system
- Add a section to an existing drip system.
- Use a hose spigot for small areas or potted plants use, add the line and a battery operated timer.
- Upsize emitter sizes and additional pipe if necessary for larger trees or more mature plants.





Drip Irrigation – Retrofit System's 1/2" Tubing

****Can be used to retrofit to point source or inline drip systems

Octabubbler



Spray to Drip Retrofit Kit ¼" Tubing



Drip Irrigation Parts – Retrofit System

Inline Drip System



- Determine grid pattern necessary and pipe and row spacing. Based on plant density.
- Consider:
 - a. Row spacing (12", 24")
 - b. Distance between emitters (6", 12", 18")
 - c. Precipitation or Flow Rate .4 gph, .6gph , .9gph (Inline Drip tubing varies from .4, .6 and .9 gallons per hour).
- Match plant water requirements and soil type to emitter output.
- **YES**, you can over water with drip!!!!

Drip Zone Control Valve

- Anti-syphon
- Filter
- Pressure Reducer
- Going into PVC as shown but could go directly into the ½" distribution or supply tube.





1/2 Inch tubing - spacing and gph



1/4 Inch tubing- spacing
and gph

Inline Drip Tubing with Built-in Emitters

***Examples of 1/2" tube and 1/4" spaghetti tubing

***In areas where there are no plants, or under sidewalks, use "blank tubing" or tubing with no holes or emitters. Then reconnect to the inline tubing with emitters, this will help keep the weeds at bay.



Inline Drip Built-in Emitter-Close Up



Screw this into after the pressure reducer/filter



TLCOUP
Insert Coupling



TLELL
Insert Elbow



TLTEE
Insert Tee



TLCROS
Insert Cross



TL050MA
1/2" Male Adapter



TL075MA
3/4" Male Adapter



TL075FTEE
Combination Tee
Ins x Ins x 3/4" FPT



TL2W075MA
2-Way Insert
3/4" MPT x Insert



TLIAPE-B
Insert Adapter for 1" or
Larger PE (Requires 11mm
or 7/16" drill or punch)



TLIAPVC-B
Insert Adapter with Grommet
1 1/2" or larger PVC Pipe



TDBIT16.5
Drill Bit for TLIAPE-B
Fitting (16.5mm or 21/32")



TLFIG8
Figure 8 Line End



TLS6
6" Soil Staple



TLSOV
Shut-Off Valve
Ins x Ins



TLCV
Inline Check Valve

- Flow Range: 0.9 to 4.4 GPM
- Opening Pressure: 10.2 psi
- Closing Pressure: 5.8 psi (13.4 Feet Column of Water)

Inline Drip System Parts



Inline Drip System Sample Layouts



<https://www.rainbird.com/products/spray-drip-retrofit-kit>



<https://landscapeproductsinc.com/product/retro-drip-adapter/>

Inline Drip System Retrofit Kits

*** Convert a spray system to an inline drip system (you will need to cap other existing spray heads)

Landscape Design and Installation Summary

- Point Source Drip
 - Design flow rates of emitters to plant type in a group
 - 1/4" inch tubing, connectors and emitters go together
 - Match the emitter size to the plant water requirement - .5 gph low, 1.0 gph med, 2.0 gph high
- Inline Drip
 - Grids, rectangles or line
 - Spacing of emitter line and built in emitters must be considered
 - Stake pipes down with metal stakes



Scheduling for Success

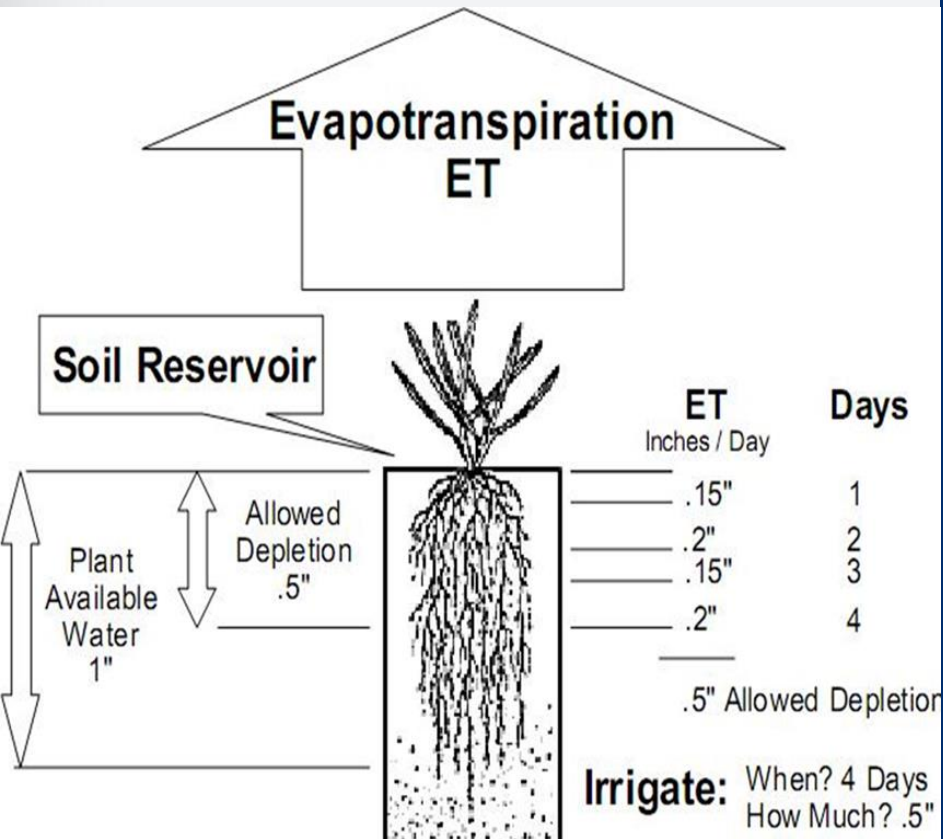
- Evapotranspiration from plants/soils
- Plant establishment tips and schedule vs. a weather-based irrigation schedule
- Scheduling your irrigation timer - see City of Roseville Irrigation Schedule



Evapotranspiration

- What is Evapotranspiration?

**the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants.*



- Soil moisture deficit, only put back what water is required not to saturation or run-off

- Weather Based Scheduling-
Adjust Seasonally!

<u>Encourages growth</u>	<u>Limits growth</u>	<u>Additional factors</u>
loose soil	compacted soil	organic matter added to backfill soil no more than 1/3 rd
proper irrigation management	little or no irrigation or too much	root stimulant products, kelp, B-12
mulch 4-6" around planting hole	grass and weeds close to trunk	fertilizing at planting
root flare slightly above soil surface 1"	planting too deep	adding spores of mycorrhizae*
leaving top of tree/shrub intact	pruning at planting	Use a soil moisture meter

*can enhance growth on seedlings under certain circumstances

Plant Establishment

- Ways to encourage growth
- Normal weather-based schedule



Irrigation Watering Schedule

Check your systems regularly



Winter

	DECEMBER				JANUARY				FEBRUARY			
	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	8	1	4	2	8	1	4	2	12	1	4	3
Shrub Spray Fixed	3	1	3	1	4	1	4	1	8	1	4	2
Drip System	8	1	4	2	12	1	4	3	20	1	4	5
Turf/Rotary Nozzle	32	1	4	8	32	1	4	8	56	1	4	14

Spring

	MARCH				APRIL				MAY			
	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	24	2	4	3	32	2	4	4	36	3	4	3
Shrub Spray Fixed	12	1	4	3	20	1	4	5	24	2	4	3
Drip System	28	1	4	7	44	1	4	7	56	2	4	7
Turf/Rotary Nozzle	96	2	4	12	144	2	4	18	180	3	4	15

Summer

	JUNE				JULY				AUGUST			
	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	48	4	4	3	64	4	4	4	48	3	4	4
Shrub Spray Fixed	32	2	4	4	32	2	4	4	32	2	4	4
Drip System	72	2	4	9	80	2	4	10	72	2	4	9
Turf/Rotary Nozzle	240	4	4	15	256	4	4	16	216	3	4	18

Fall

	SEPTEMBER				OCTOBER				NOVEMBER			
	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	36	3	4	3	24	2	4	3	12	1	4	3
Shrub Spray Fixed	25	2	4	3	16	1	4	4	8	1	4	2
Drip System	56	2	4	7	36	1	4	9	16	1	4	4
Turf/Rotary Nozzle	168	3	4	14	112	2	4	14	52	1	4	13

Quick sprinkler tips

- Check system regularly for leaks or missing drip emitters
- Adjust and straighten sprinklers for overspray on hardscape like sidewalks and drive ways
- Install check valves for low head drainage

Call us at (916) 774-5761
to schedule a Water Wise House
Call if you have questions.

Irrigation Schedule

- Seasonal Schedule
- Minutes Per Week
- All Sprinkler Types
- Set up Individual programs for plant types and irrigation system type.
 - Program A-Turf
 - Program B-Shrubs
 - Program C-Drip





Irrigation Watering Schedule

Check your systems regularly



Winter

DECEMBER			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	8	1	4
Shrub Spray Fixed	3	1	3
Drip System	8	1	4
Turf/Rotary Nozzle	32	1	4

JANUARY			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
8	1	4	2
4	1	4	1
12	1	4	3
32	1	4	8

FEBRUARY			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
12	1	4	3
8	1	4	2
20	1	4	5
56	1	4	14

Spring

MARCH			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	24	2	4
Shrub Spray Fixed	12	1	4
Drip System	28	1	4
Turf/Rotary Nozzle	96	2	4

APRIL			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
32	2	4	4
20	1	4	5
44	1	4	7
144	2	4	18

MAY			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
36	3	4	3
24	2	4	3
56	2	4	7
180	3	4	15

Summer

JUNE			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	48	4	4
Shrub Spray Fixed	32	2	4
Drip System	72	2	4
Turf/Rotary Nozzle	240	4	4

JULY			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
64	4	4	4
32	2	4	4
80	2	4	10
256	4	4	16

AUGUST			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
48	3	4	4
32	2	4	4
72	2	4	9
216	3	4	18

Fall

SEPTEMBER			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	36	3	4
Shrub Spray Fixed	25	2	4
Drip System	56	2	4
Turf/Rotary Nozzle	168	3	4

OCTOBER			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
24	2	4	3
16	1	4	4
36	1	4	9
112	2	4	14

NOVEMBER			
Minutes per week	Days per week	# of cycles per day	Minutes per cycle
12	1	4	3
8	1	4	2
16	1	4	4
52	1	4	13

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- Install check valves for low head drainage

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Scheduling for Success Summary

- Evapotranspiration
- Establishment Pre-Post Establishment
- Sample Schedule

Internet Resources

California Landscape Contractors Association- www.CLCA.com

City of Roseville- www.roseville.ca.us/savewater

Regional Water Authority- www.bewatersmart.info

DIY Network-<https://www.diynetwork.com/.../landscaping/how-to-install-a-drip-irrigation-system>

Drip Depot-<https://www.dripdepot.com/Drip/Systems>

The Irrigation Association- www.irrigation.org

Hunter Industries-<https://www.hunterindustries.com/product-line/Micro%20Irrigation>

Irrigation tutorial- www.irrigationtutorials.com

Jain- <https://jainsusa.com/training/point-source-inline-irrigation/>

Netafim-<https://www.netafimusa.com/landscape/>

Peaceful Valley (Drip Tape)-<https://pdfs.groworganic.com/media/pdfs/catalog/Tools-Irrigation-2020-WEB.pdf>

Landscape Products-<https://landscapeproductsinc.com/>

Rain Bird-<https://www.rainbird.com/professionals/products/drip-irrigation>

Sprinkler Warehouse-<https://www.sprinklerwarehouse.com/products/drip-irrigation>

Toro-<https://www.toro.com/en/homeowner/irrigation-landscape-drip>

WUCOLS-Water Use Classification of Landscape Species- <https://ucanr.edu/sites/WUCOLS/>

YouTube<https://www.bing.com/videos/search?q=youtube+drip+irrigation+channel&qpvt=youtube+drip+irrigation+channel&FORM=VDRE>



Thank you for joining us.

roseville.ca.us/savewater