IN THE GARDEN SERIES

WASHINGTON COUNTY MASTER GARDENER ASSOCIATION

Getting Waterwise with Drip Irrigation

Oregon State University Extension Service

- What is Micro-irrigation?
- Hydrozoning
- Points of Connections
  - Spigot
  - In-ground
- Micro-irrigation vs Conventiona
- Distribution Components
- Scheduling
- Question and Answer session

Design for less water use!

- Plant xeric plants
- Limit lawn
- Water only when needed
- When you do water – do it efficiently!

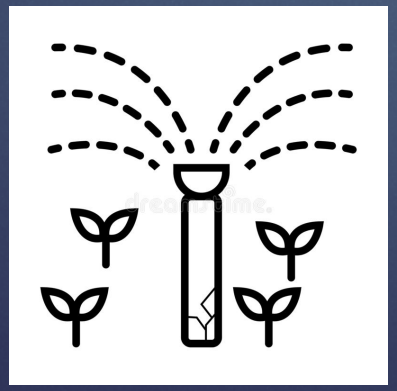
Efficient Irrigation

- Moisture sensors
- Rain gauges
- Smart controllers
- Monitoring

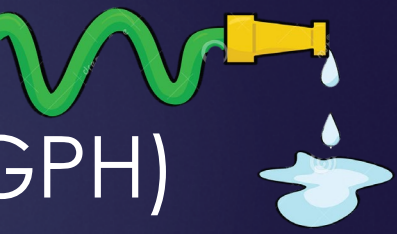
Conventional Irrigation

- High Volumes (GPM)
- Run minutes

- Mimics rainfall
- Whole area coverage



Drip or Micro Irrigation



- Low Volumes (GPH)
- Run hours

- Water at the root zone
- Plant specific coverage

Conventional Irrigation

- Operating pressure 30-70 psi
- Usually no pressure reducer
- Usually no filter

Drip or Micro Irrigation

- Operating Pressure 10-30 psi
- Pressure Reducer required
- Filter required

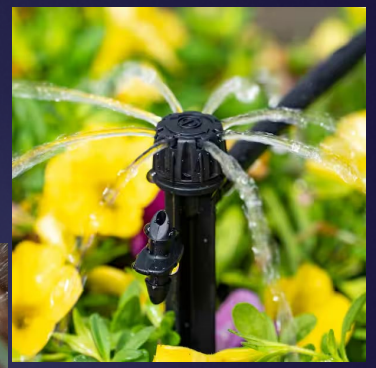
Micro-irrigation

delivers water at **low pressure** and **low flow rates**

Water ‘IN’

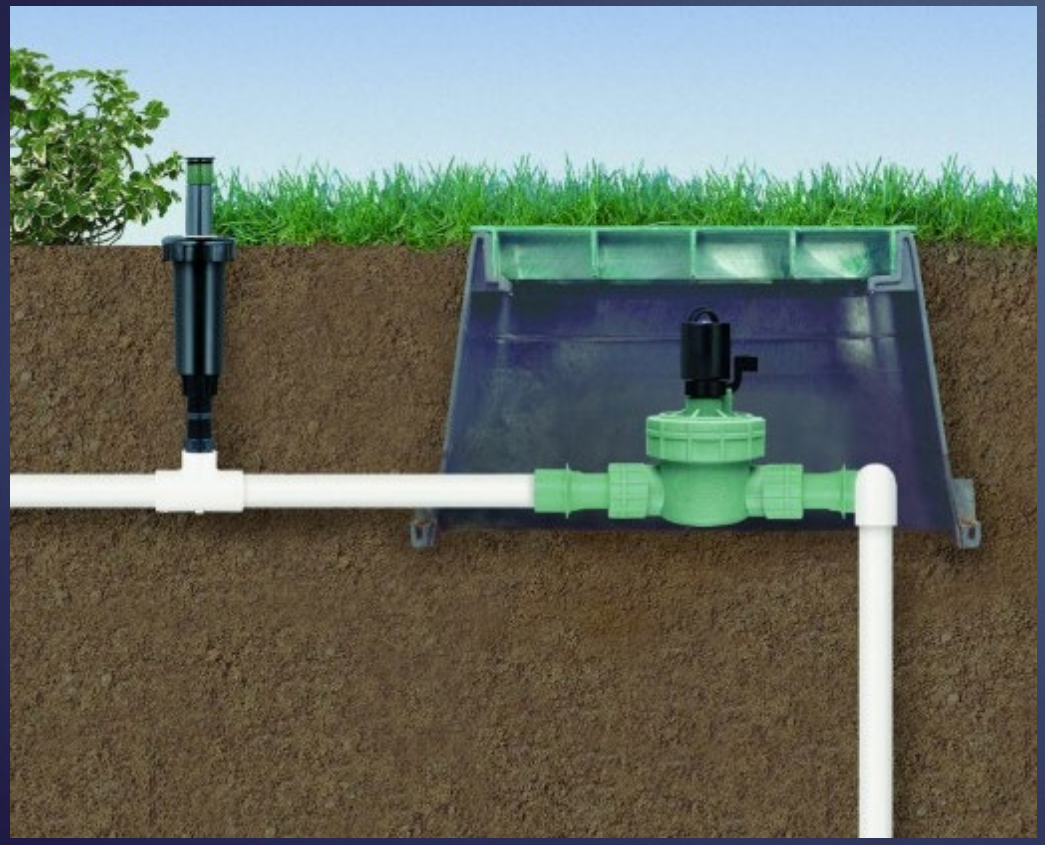
Distribution

Water ‘OUT’



Conventional Irrigation

- PVC pipe
- ‘Glued’ fittings
- “Pop-up” heads and rotors



Drip or Micro Irrigation

- PE pipe

- Compression or barbed fittings
- Point emitters, bubblers, microsprays

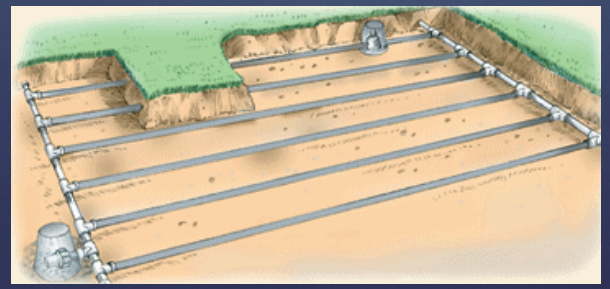
Conventional Irrigation

- Subsurface-installed
- More durable
- Easier to see problems
- More expensive

Drip or Micro Irrigation

- "Surface"-installed
- Less durable (but easier to repair)
- Easier to repair
- More flexible to change
- Easier to install
- Less expensive

What can be microirrigated?



Hydrozoning

- Grouping plants according to **water** needs

Plant Type	Supplemental Water Requirements	Hydrozone
• Natives • Xeriscape plants	Req for plant establishment	Very low 
• Some trees & shrubs • Perennials	Some req during growing season	Low 
• Ornamental trees & shrubs • Fruit trees & berries	Regular amts req during growing season	Moderate 
• Vegetable gardens • Turf grass	Regular amts req during growing season	High 

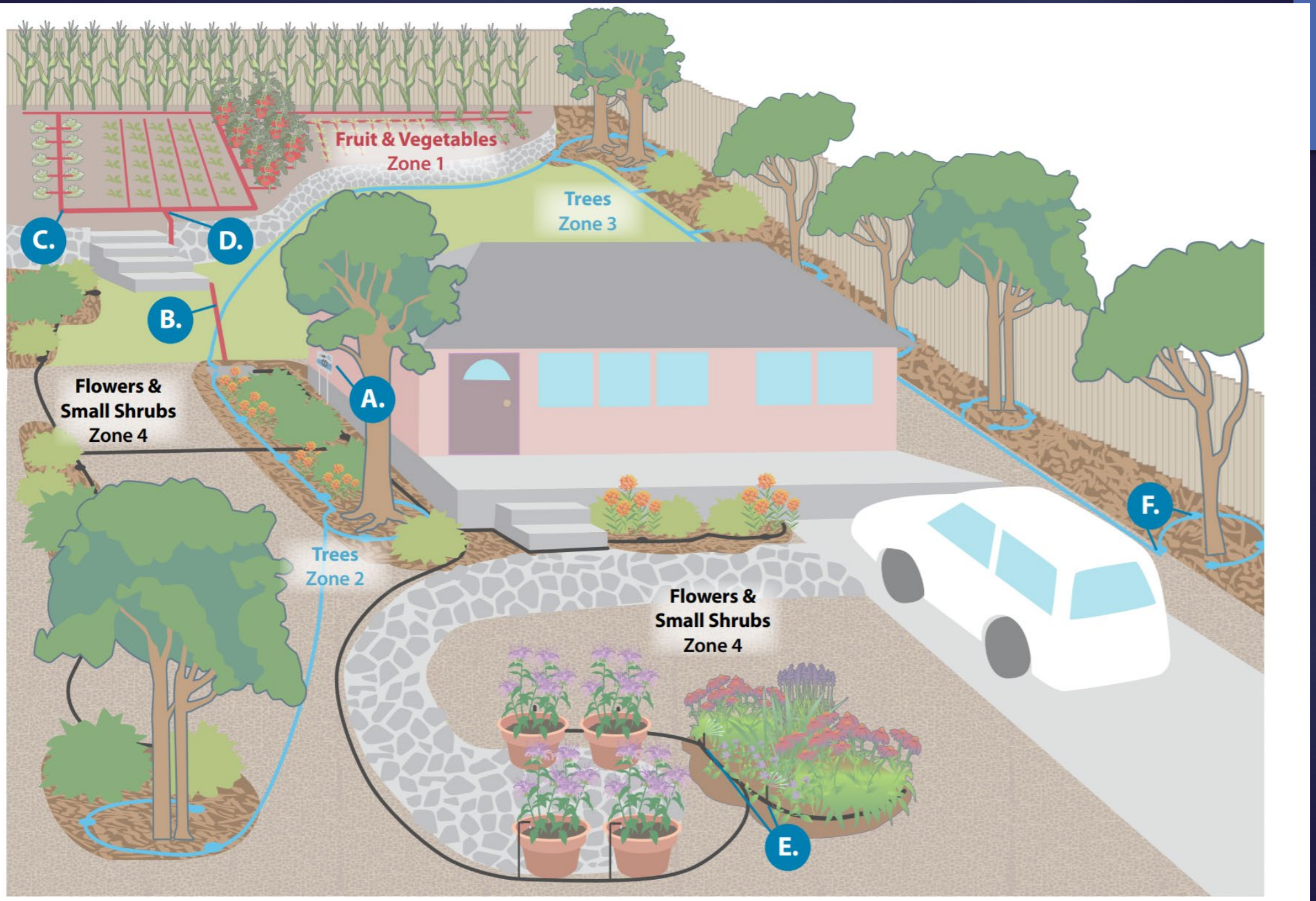
Other factors to consider

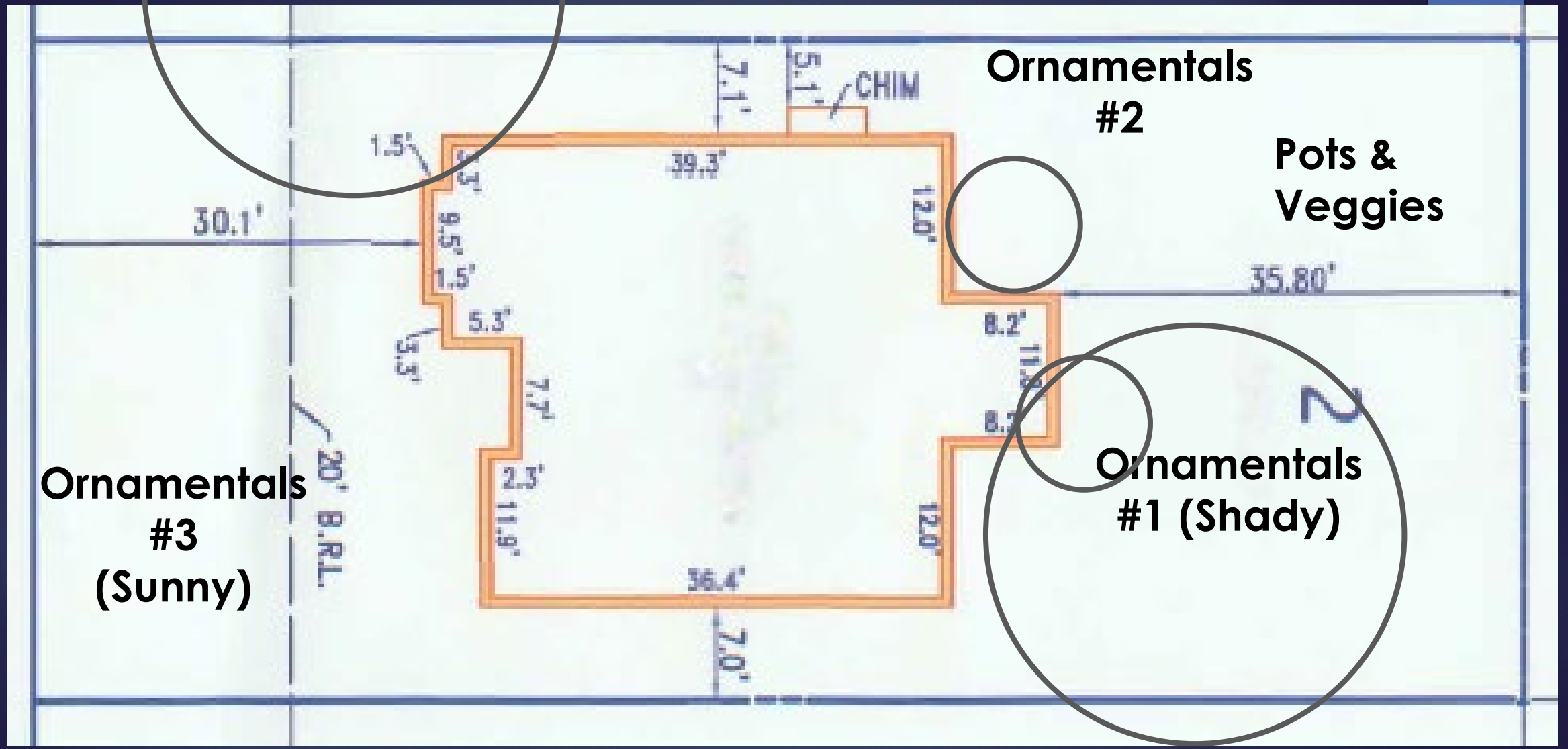
- Water needs
  - Moisture-loving
  - Dry-loving
- Sun Exposure
  - Sun
  - Shade
- Soil Type
  - Clay vs Sandy
  - Good vs bad drainage
- Slope

Avoid planting high-water-requiring plants next to a low-water plants!

Separate Hydrozone

- Continually shady or sunny area
- Area with drastically different soil types
- Lawn
- Pots
- Vegetable beds
- Note: Each hydrozone should be on a **SEPARATE** valve!

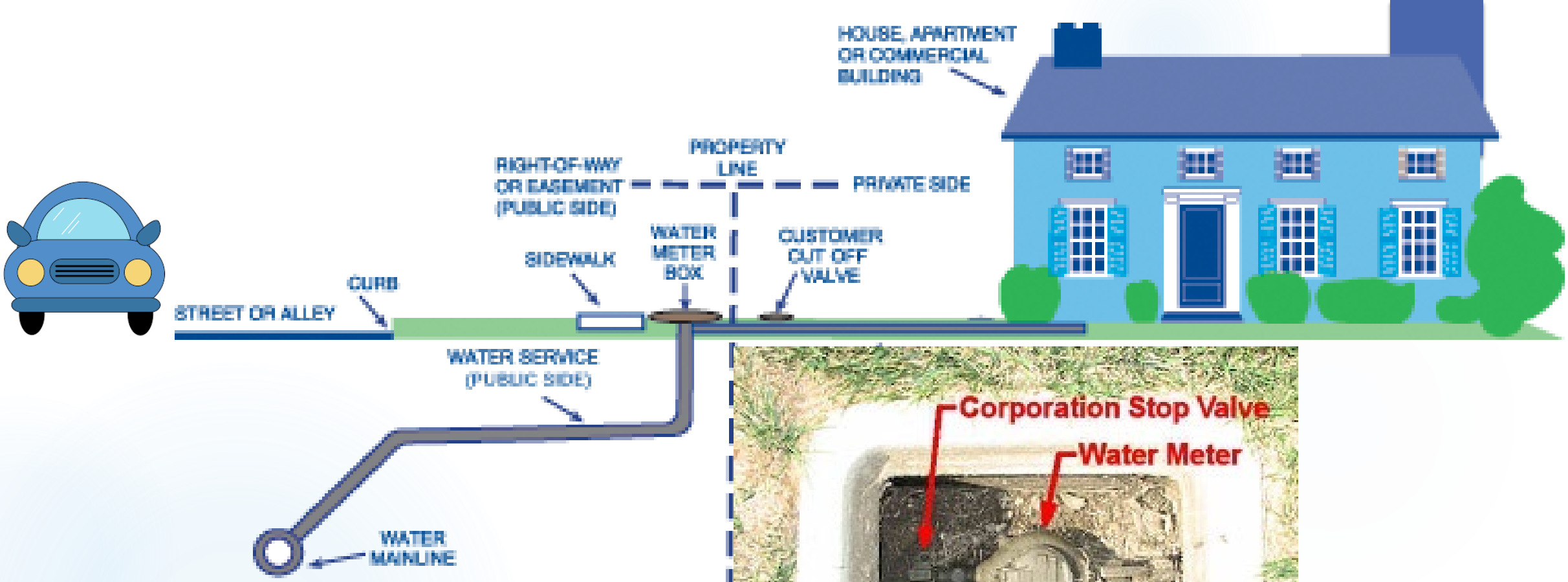

Fruit & Vegetables
Zone 1
Trees
Zone 3
C.
D.
B.
A.
Flowers &
Small Shrubs
Zone 4
Trees
Zone 2
F.
Flowers &
Small Shrubs
Zone 4
E.


Ornamentals #2
Pots & Veggies
Ornamentals #1 (Shady)
Ornamentals #3 (Sunny)
CHIM
39.3'
30.1'
35.80'
36.4'
20' B.R.L.

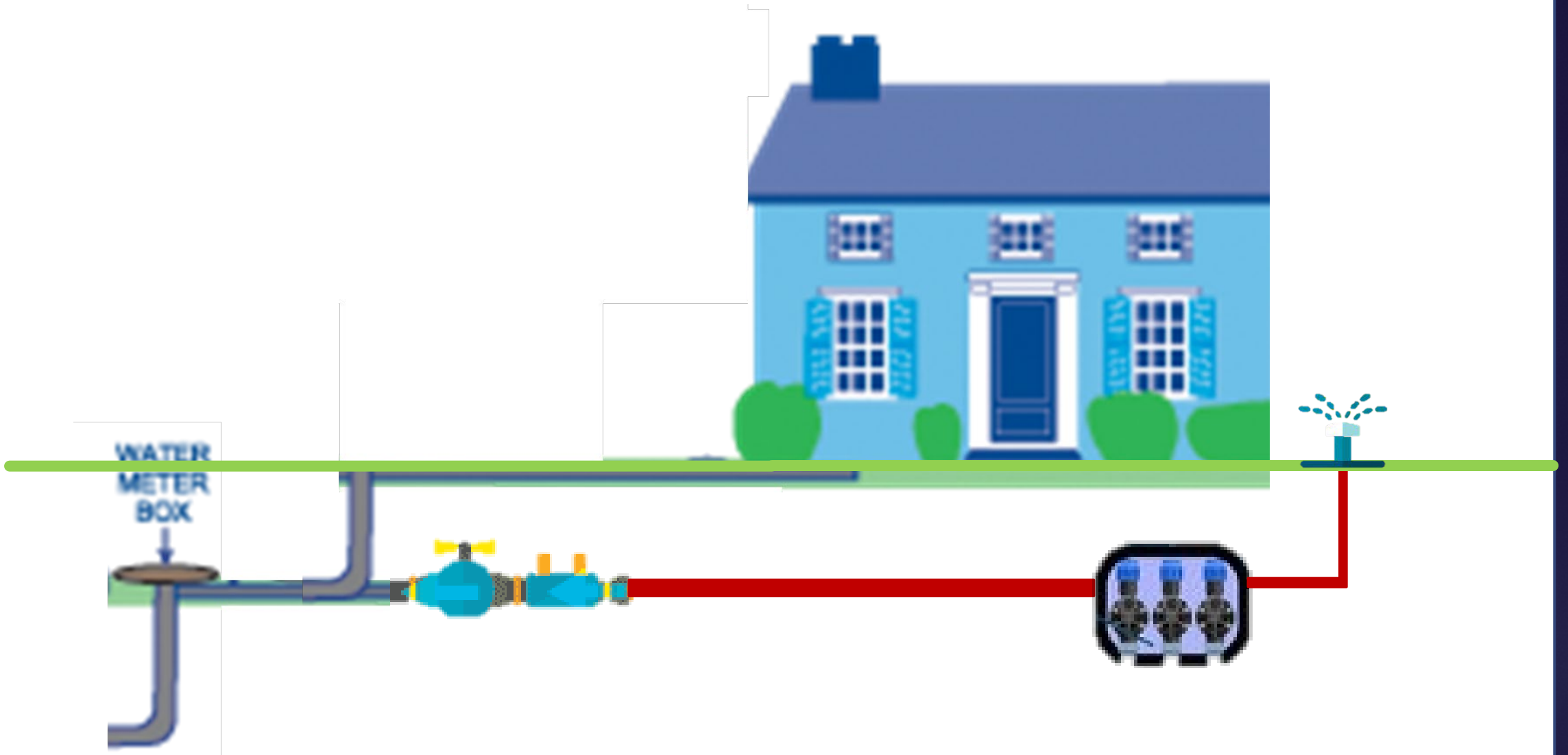
HOW DO WE HOOK IT UP?

POINT OF CONNECTION

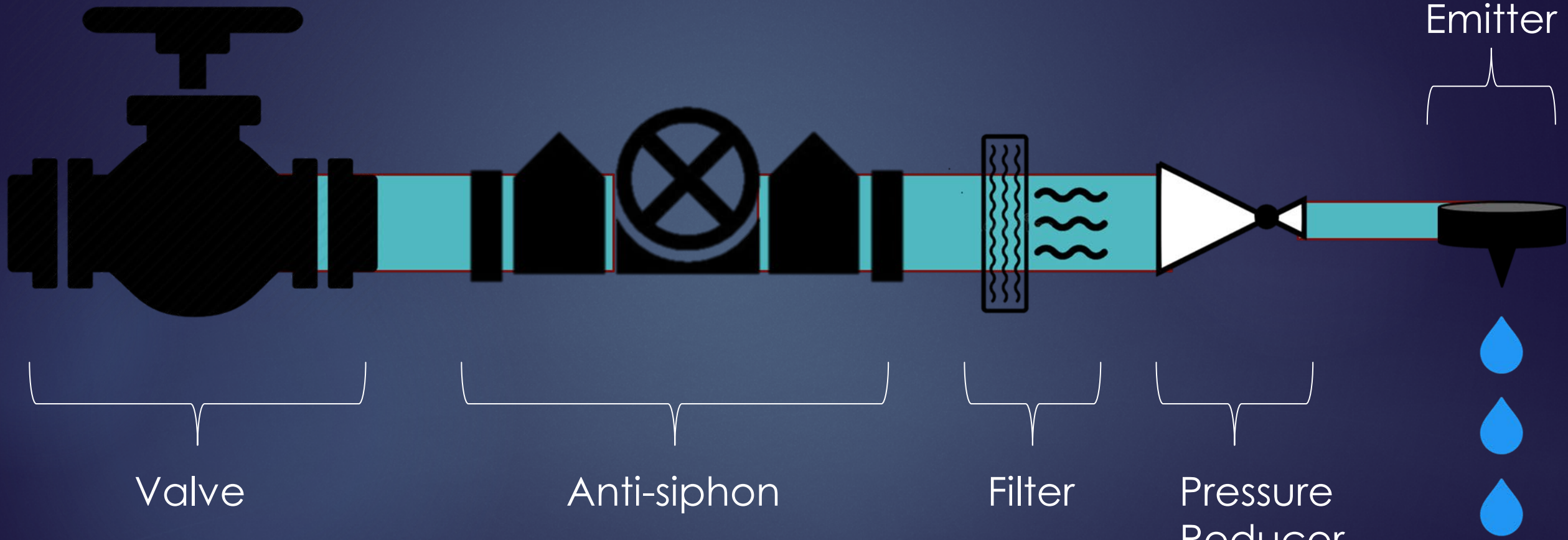
City Water Feed




WATER
METER
BOX

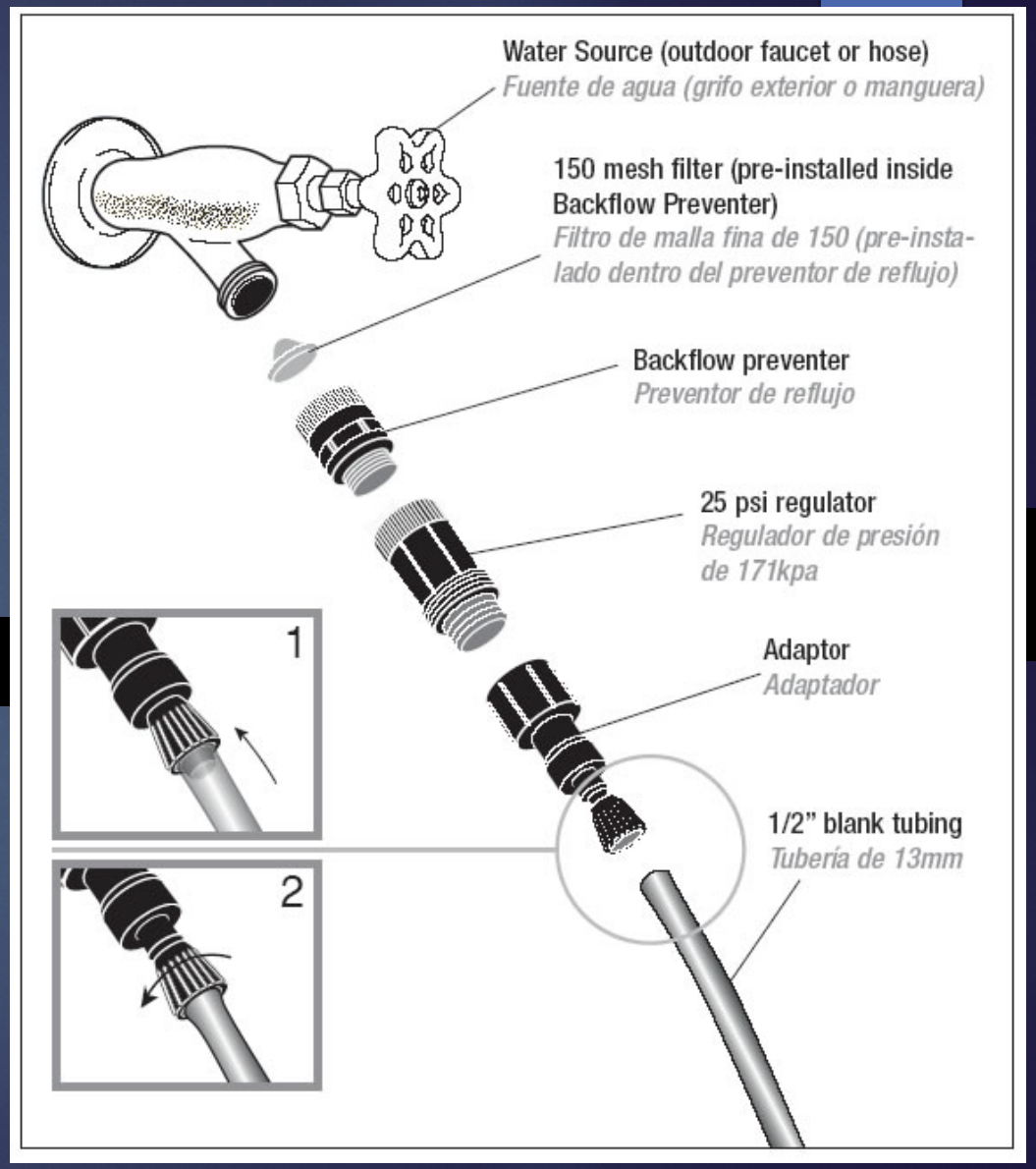

WATER
METER
BOX

Basic Components

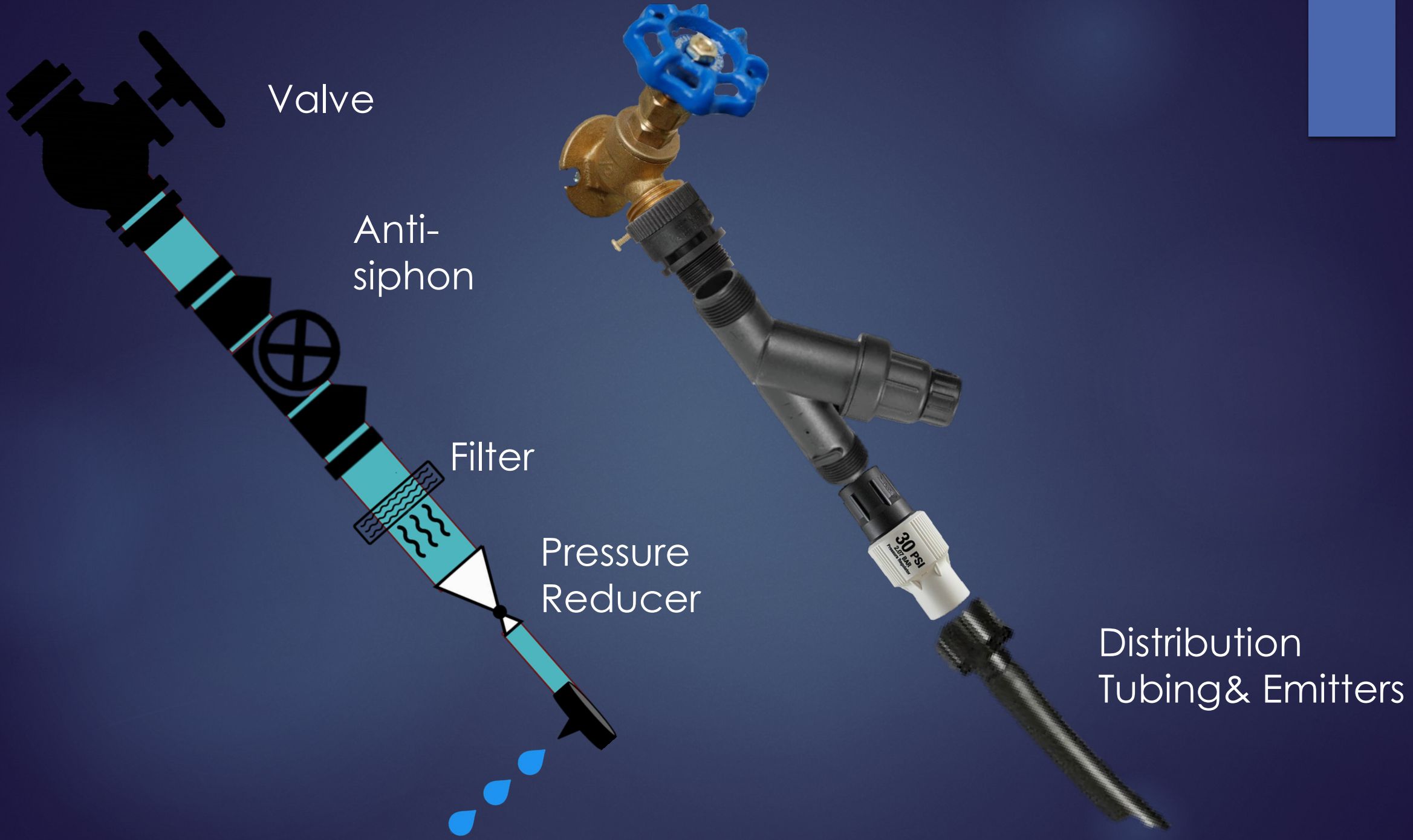

Emitter
Valve
Anti-siphon
Filter
Pressure Reducer

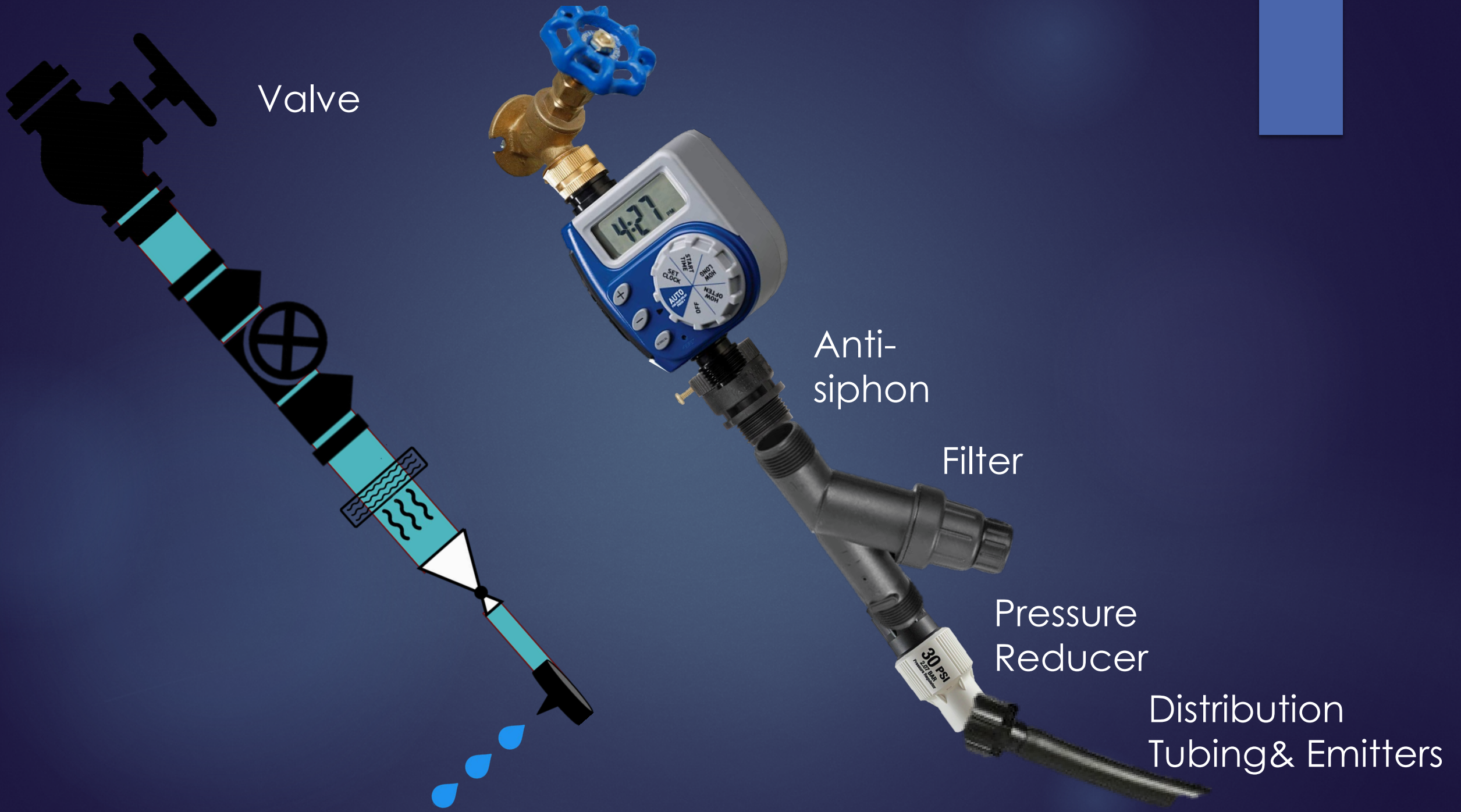

WATER
METER
BOX

Spigot hookup

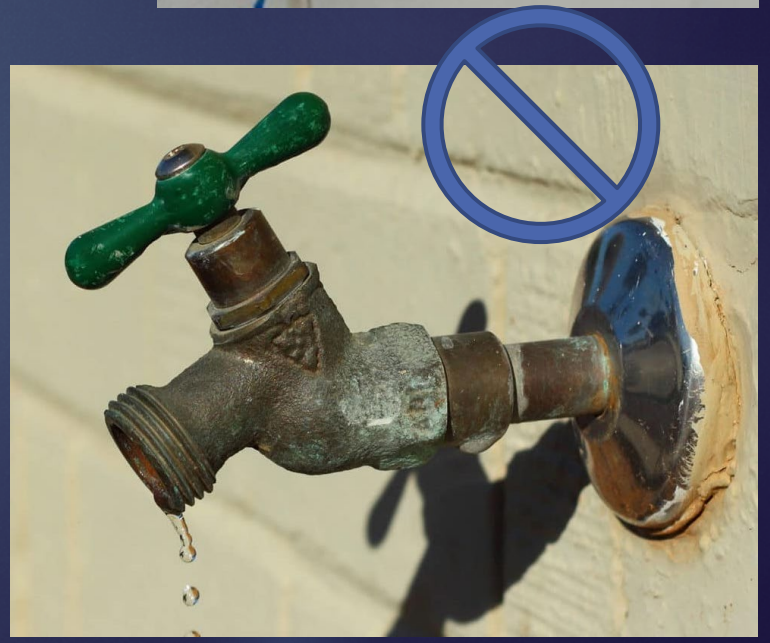


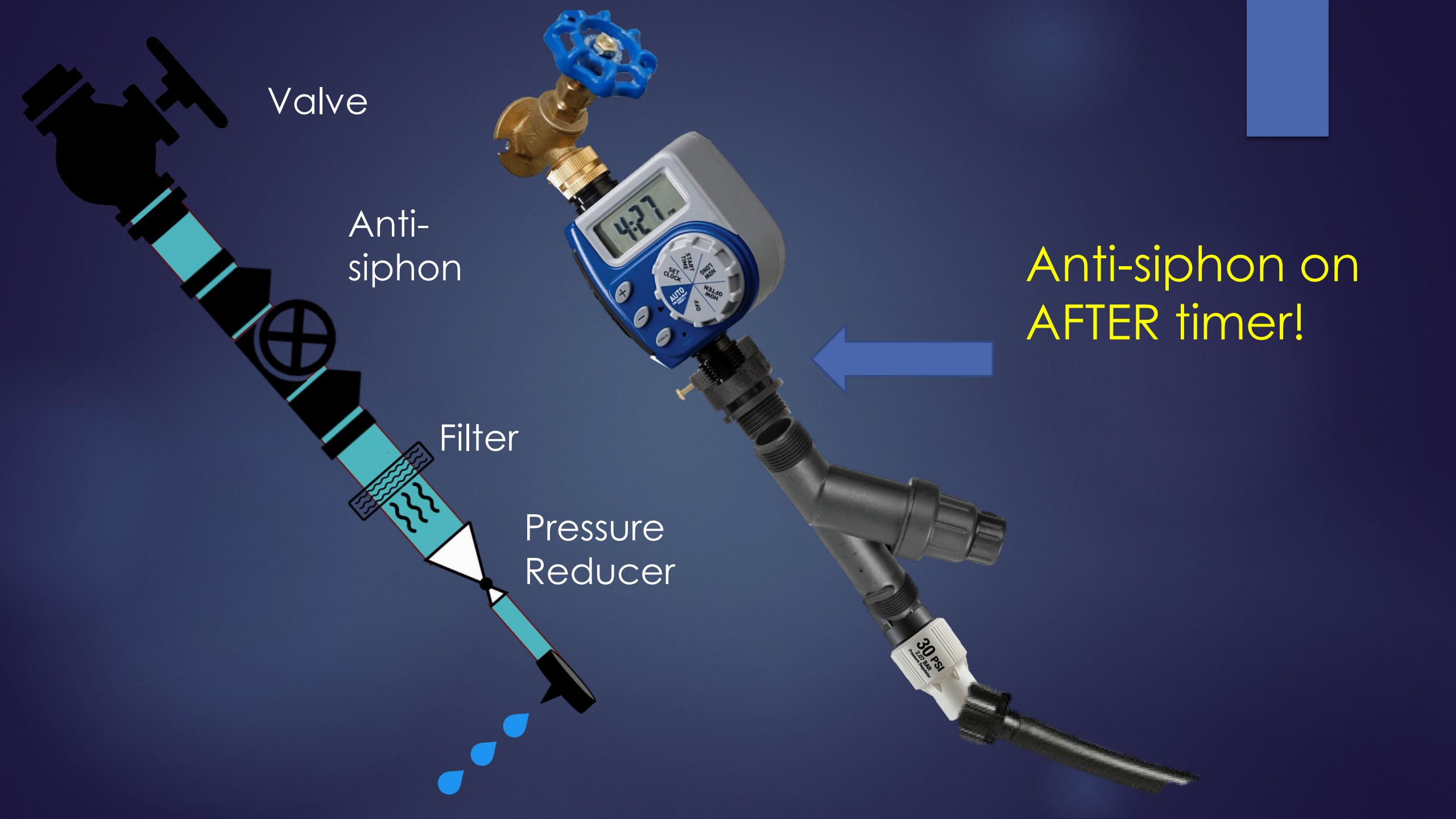
Spigot hookup


Valve
Anti-
siphon
Filter
Pressure
Reducer
30 PSI
Distribution
Tubing& Emitters


Valve
4:27
Anti-
siphon
Filter
Pressure
Reducer
30 PSI
Distribution
Tubing& Emitters

Anti-siphon



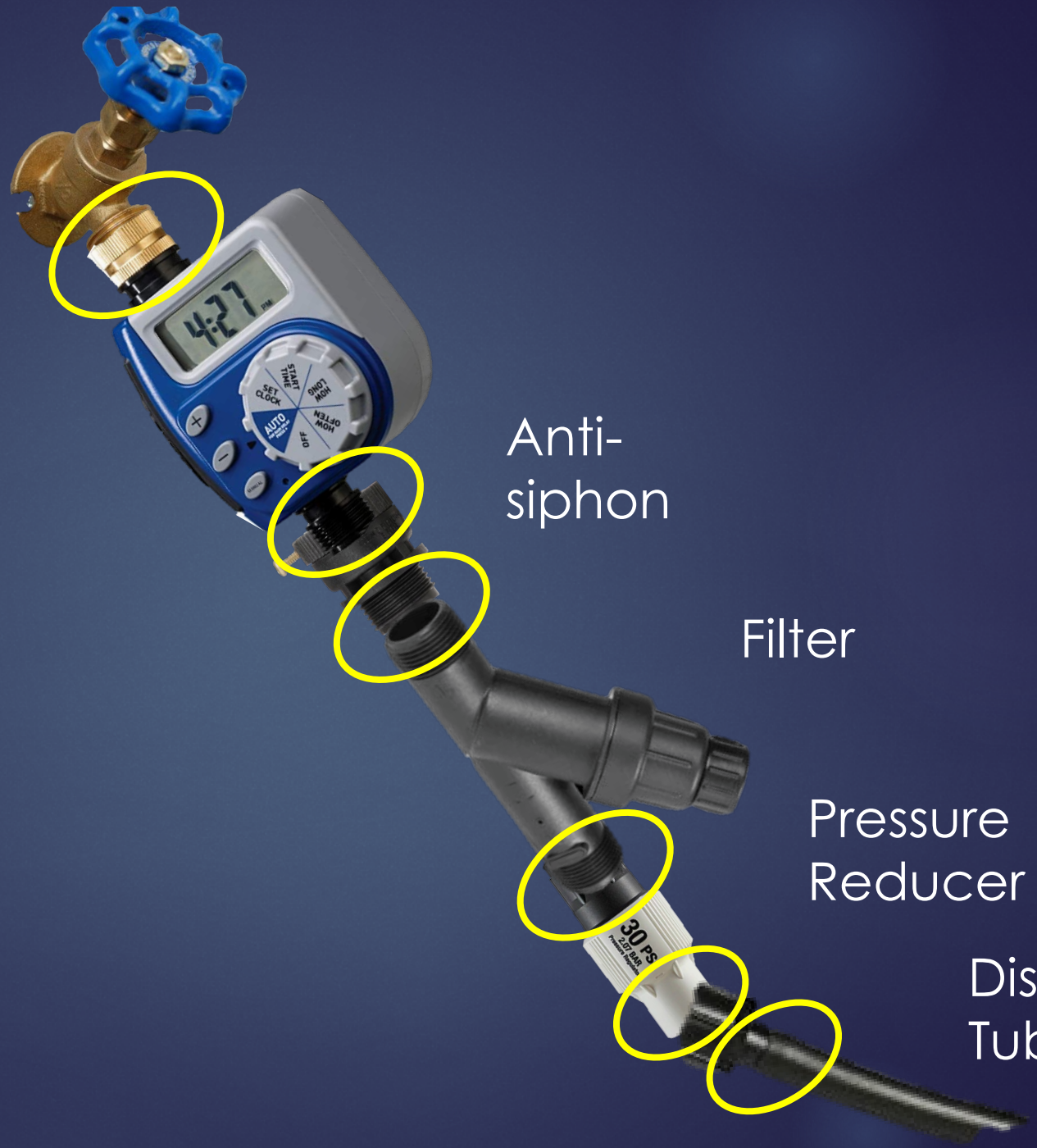

Valve
Anti-
siphon
Filter
Pressure
Reducer
Anti-siphon on
AFTER timer!
4:27
30 PSI


WATER DAY
START WATER
SET DAYS
OFF
OK
30 PSI
2.0BT BAR


4:27
PM
START TIME
HOW LONG
HOW OFTEN
OFF
AUTO
SET CLOCK
30 PSI


4:27
PM
START TIME
SET CLOCK
HOW LONG
AUTO
HOW OFTEN
OFF
30 PSI

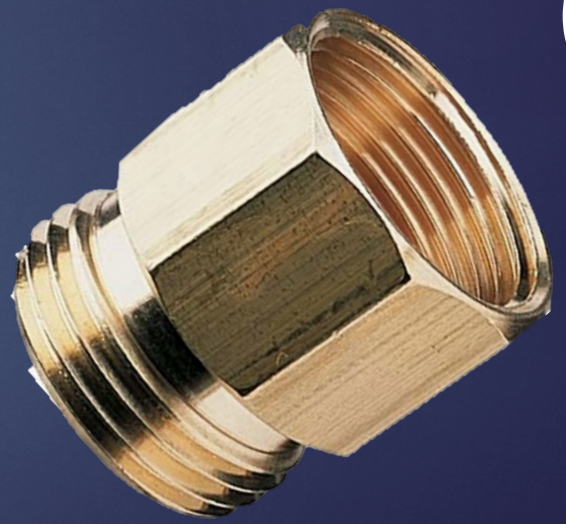

START WATER
OK
30 PSI
2.07 BAR


4:27
Anti-
siphon
Filter
Pressure
Reducer
Distribution
Tubing& Emitters

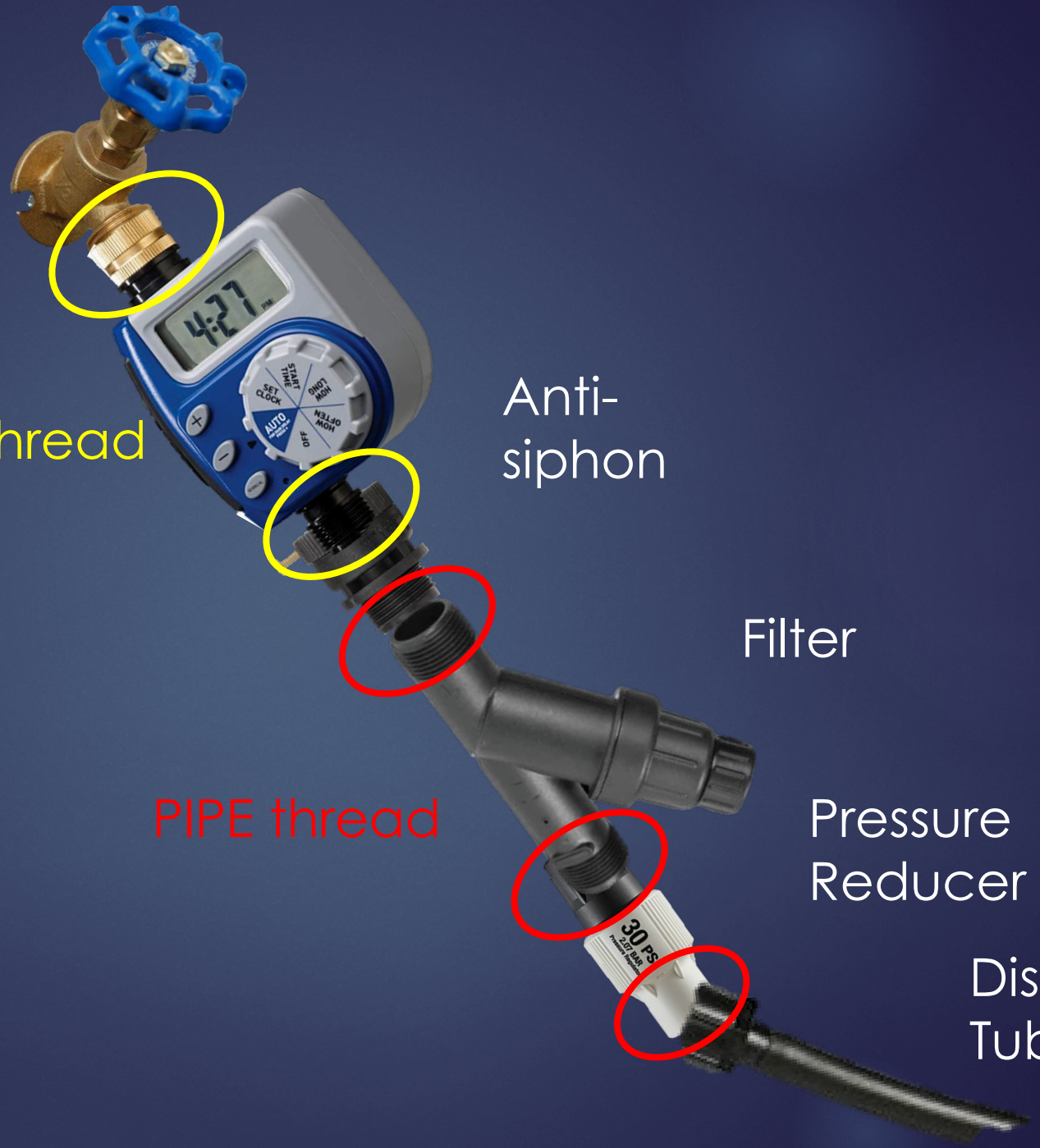
¾” HOSE Thread (GHT)

¾” PIPE Thread (NPT)

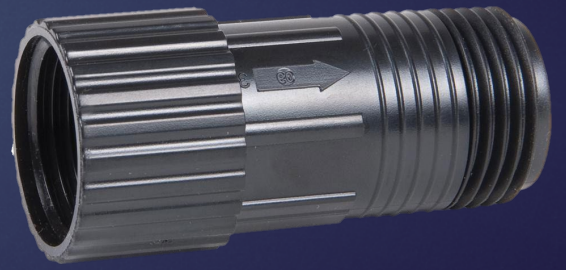
Female Threads (F)

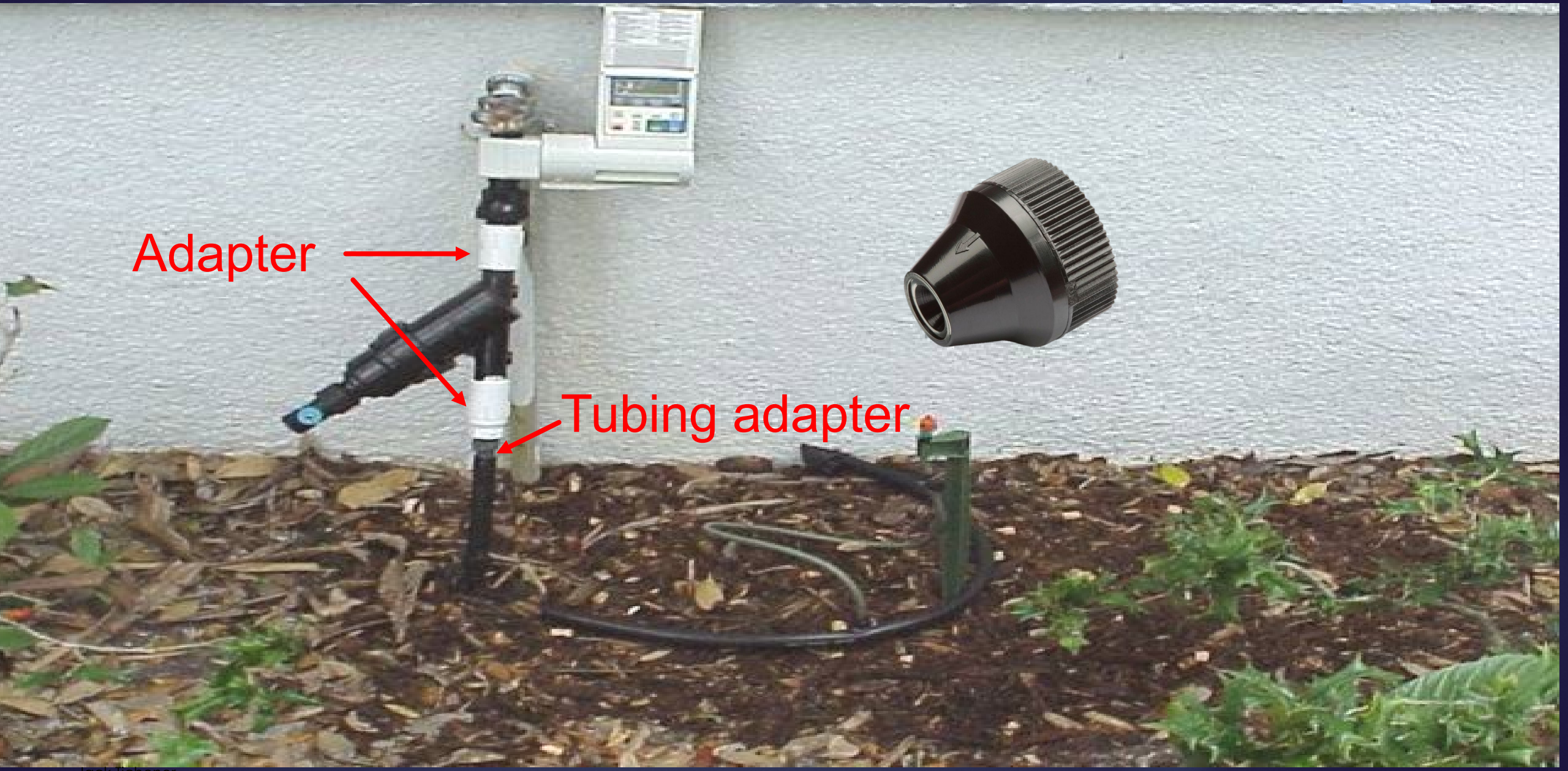


Male Threads (M)

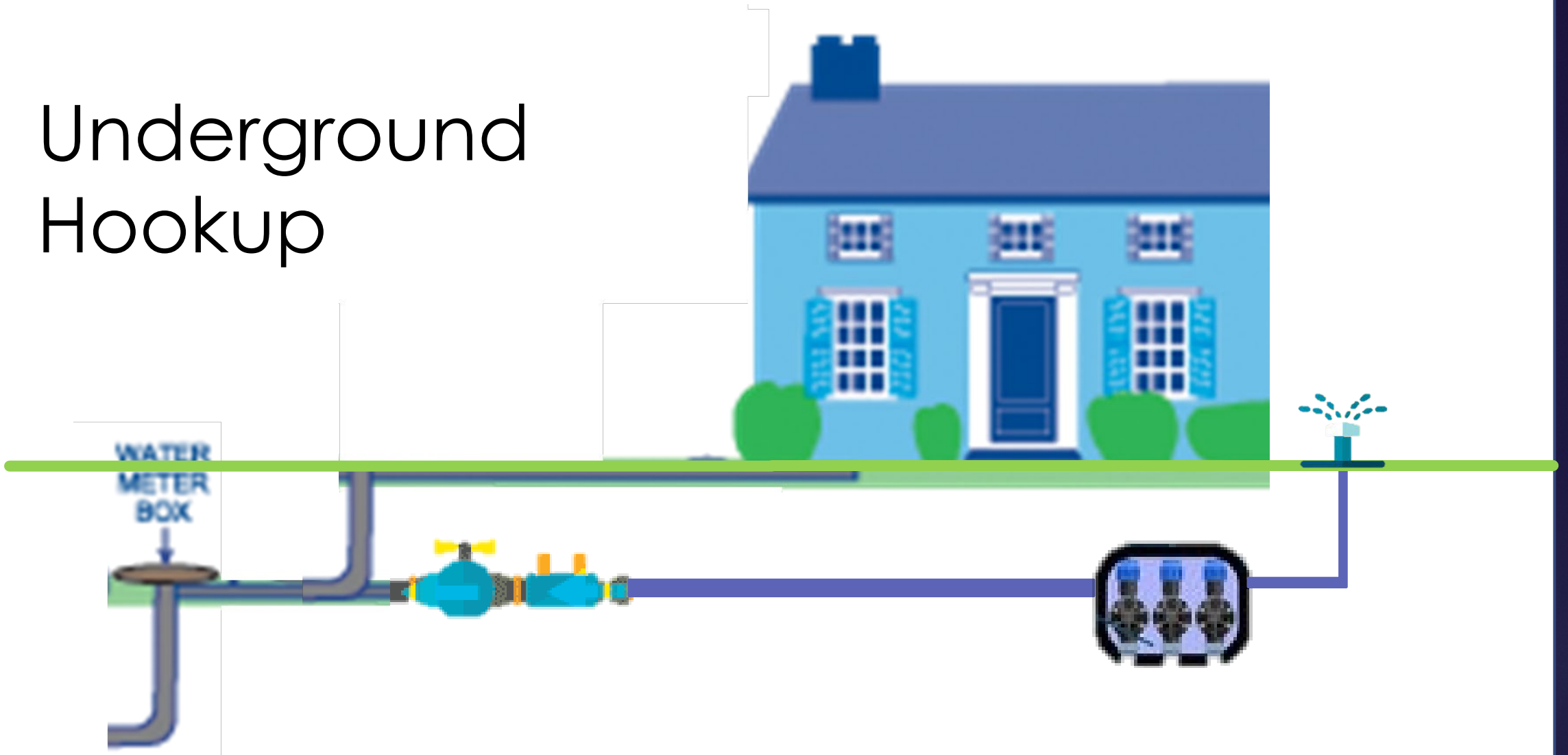

HOSE thread
Anti-
siphon
Filter
PIPE thread
Pressure
Reducer
Distribution
Tubing& Emitters

Pay attention to the arrow and orientation with the flow!




Adapter
Tubing adapter

Underground Hookup



Professional Hookup or Conversion

- Drip Control Zone Kit

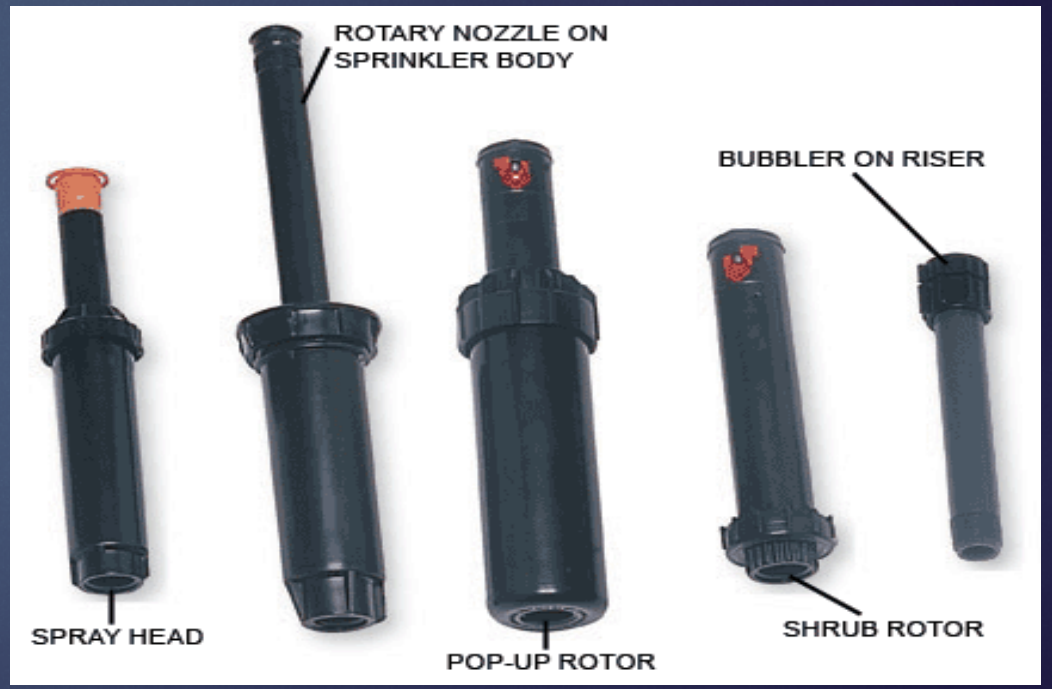
(Can buy these as separate components)

1 Valve for EACH zone!

What if you already have an irrigation system?

CONVENTIONAL RETROFIT!

Conventional

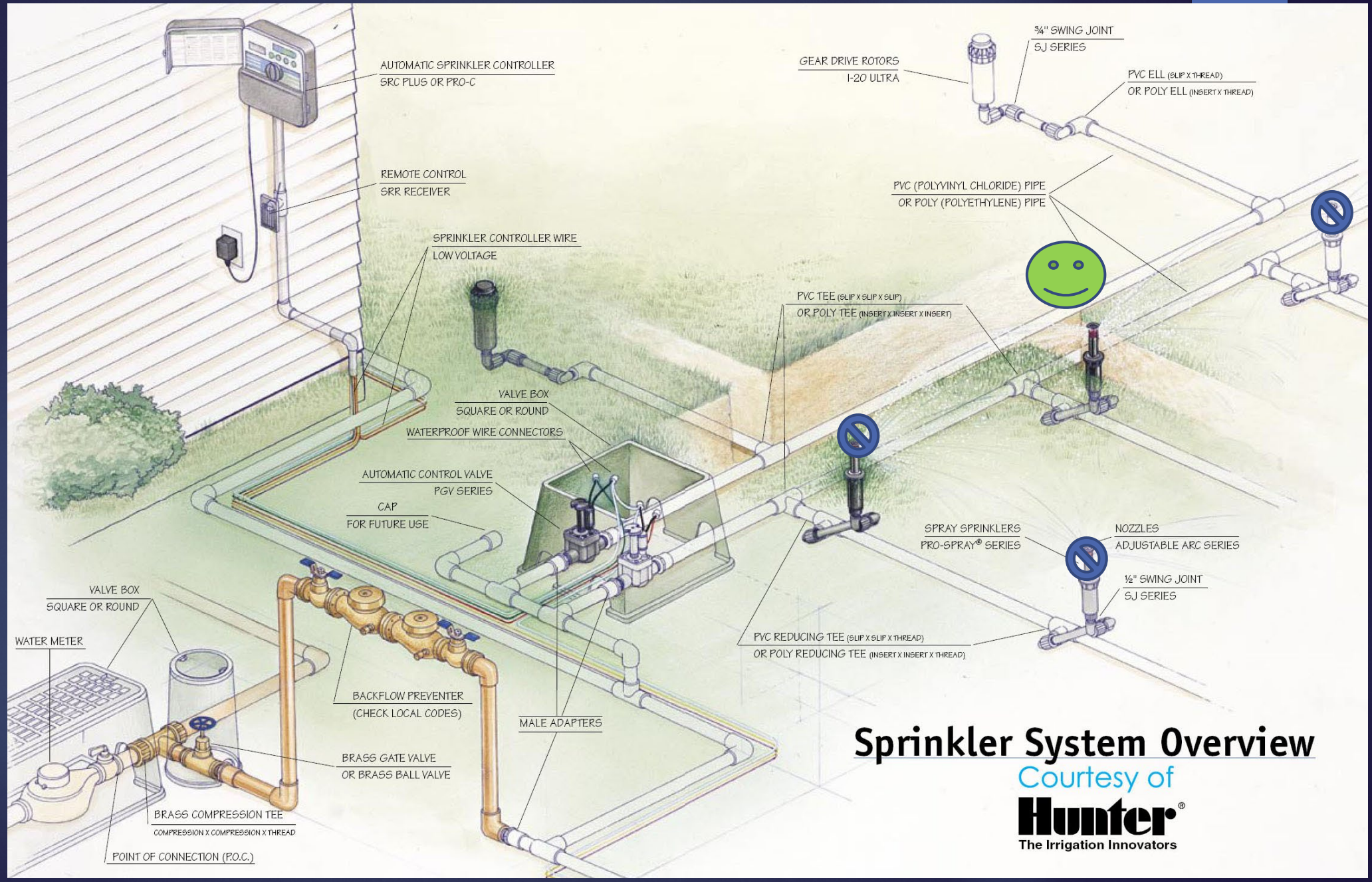


Look at popup head brand & model and look for ‘Drip Retrofit Kit’

Rainbird
Toro
Hunter

Filter & Pressure reducer built in

Must cap off the other heads!!!


AUTOMATIC SPRINKLER CONTROLLER
SRC PLUS OR PRO-C
REMOTE CONTROL
SRR RECEIVER
SPRINKLER CONTROLLER WIRE
LOW VOLTAGE
VALVE BOX
SQUARE OR ROUND
WATERPROOF WIRE CONNECTORS
AUTOMATIC CONTROL VALVE
PGV SERIES
CAP
FOR FUTURE USE
VALVE BOX
SQUARE OR ROUND
WATER METER
BACKFLOW PREVENTER
(CHECK LOCAL CODES)
MALE ADAPTERS
BRASS GATE VALVE
OR BRASS BALL VALVE
BRASS COMPRESSION TEE
COMPRESSION X COMPRESSION X THREAD
POINT OF CONNECTION (P.O.C.)
GEAR DRIVE ROTORS
I-20 ULTRA
¾" SWING JOINT
SJ SERIES
PVC ELL (SLIP X THREAD)
OR POLY ELL (INSERT X THREAD)
PVC (POLYVINYL CHLORIDE) PIPE
OR POLY (POLYETHYLENE) PIPE
PVC TEE (SLIP X SLIP X SLIP)
OR POLY TEE (INSERT X INSERT X INSERT)
SPRAY SPRINKLERS
PRO-SPRAY® SERIES
NOZZLES
ADJUSTABLE ARC SERIES
½" SWING JOINT
SJ SERIES
PVC REDUCING TEE (SLIP X SLIP X THREAD)
OR POLY REDUCING TEE (INSERT X INSERT X THREAD)
Sprinkler System Overview
Courtesy of
Hunter®
The Irrigation Innovators

Distribution

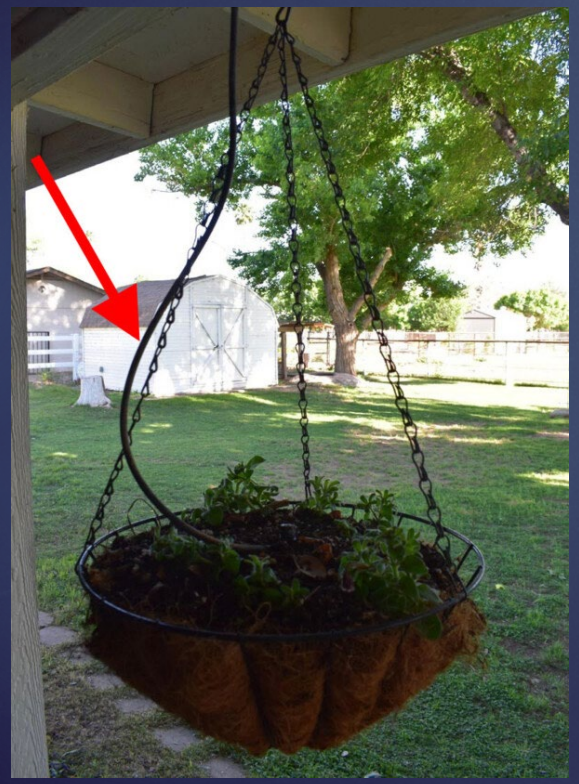
Point-Source

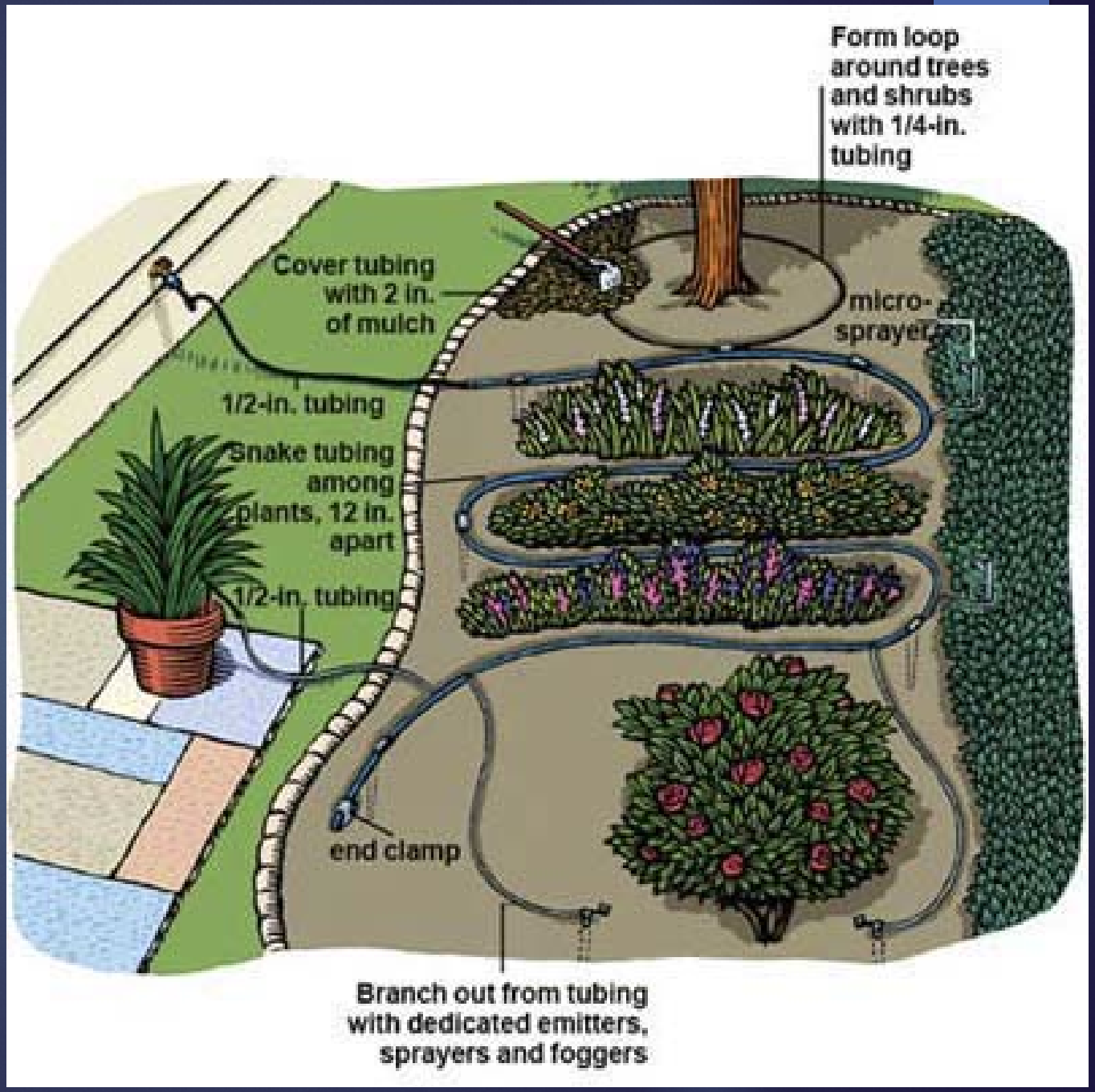
Inline

Point Sources

Surface

- Beds
- Pots
- Hanging Plants





¼” Distribution Tubing
‘spaghetti’ tubing

½” or ¾” Distribution Tubing

Components – Pipe & Fittings for Low Pressure Systems

Poly Pipe – PE Pipe (Polyethylene)

Cautions!

- Get same brand of distribution pipe and fittings!
  - ½” is not ½” is not ½” ☺
- ‘Funny pipe’ or ‘riser pipe’ is NOT distribution pipe!

Water delivery components

- Drip Emitters (Button emitters)
- Microbubblers
- Microsprays
- Micropops

Drip Emitter
Button Emitters

- Come in different gallon sizes (i.e. 0.5 GPH, 1 GPH, 2 GPH, etc)
- Can install before or after spaghetti tubing
- Bugs plug easily so can get bug caps

Microbubblers

- Install on stakes
- Good for small areas, pots, shrubs, trees
- Delivers more water than buttons
- 0-30 GPH—adjustable by turning cap

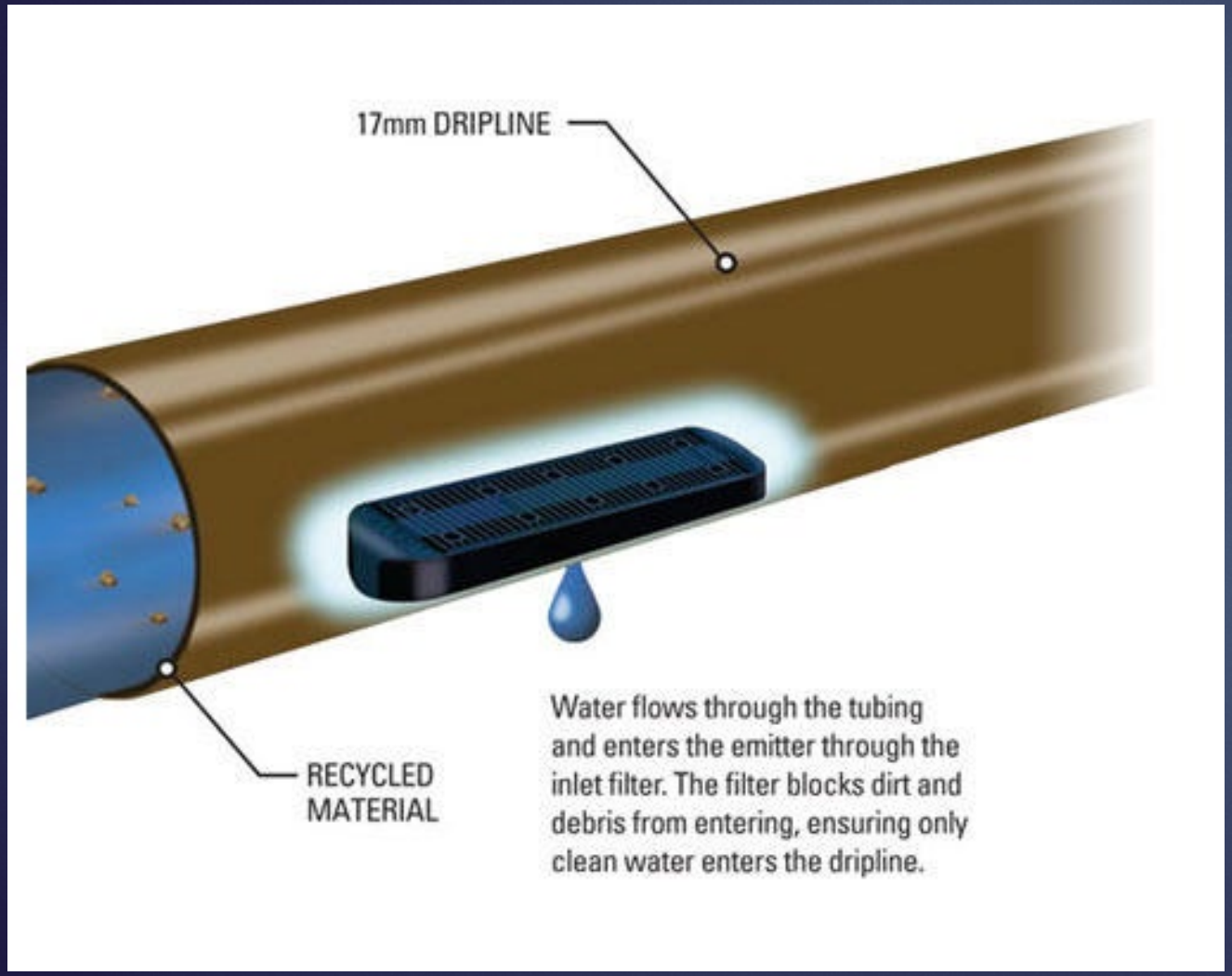
Microsprays

- Fan of water
- Good for groundcovers
- 3-8’ radius
- 0-30 GPH

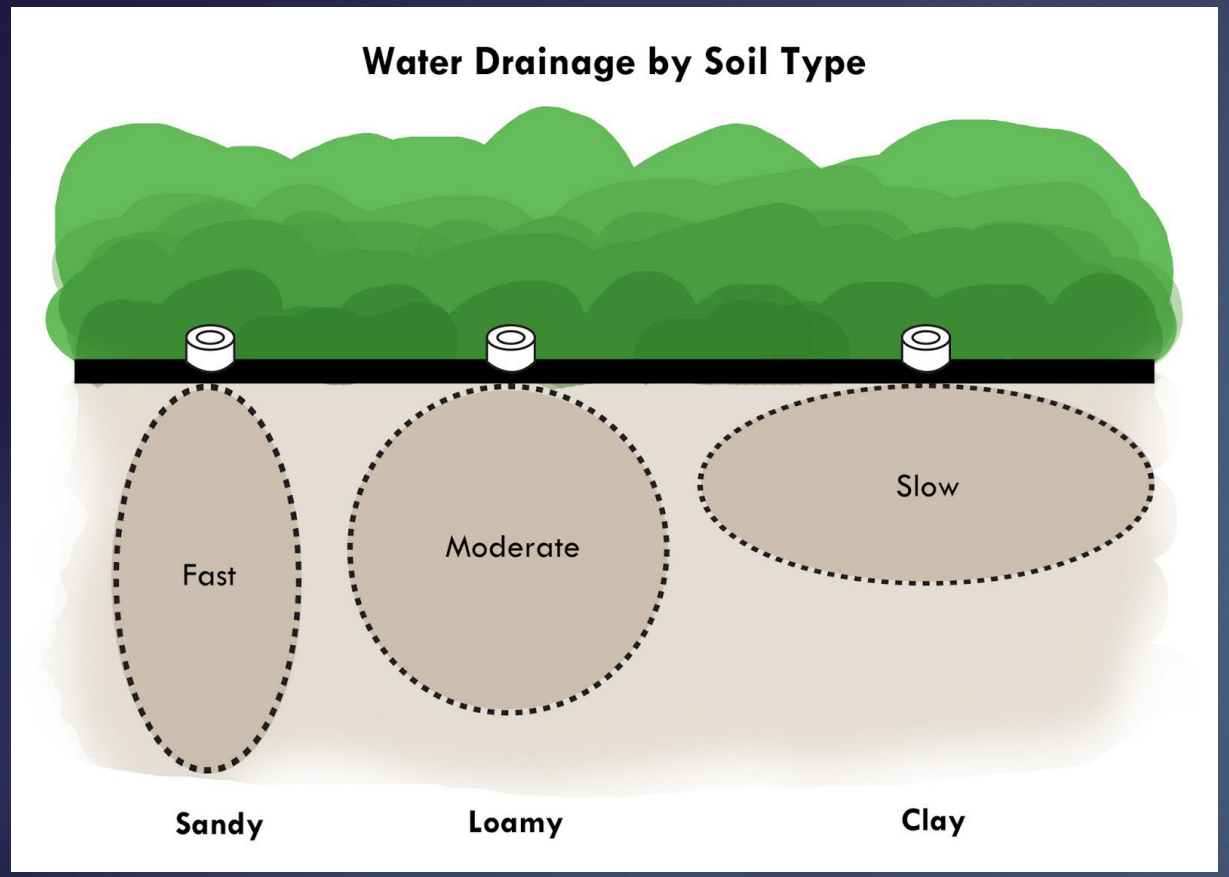
Micropops

- Use regular small radius spray nozzles
- Good for groundcovers, annuals
- Vandal-prone areas, pets

Inline Emitter Tubing



Emitters


Water Drainage by Soil Type
Fast
Moderate
Slow
Sandy
Loamy
Clay

1. Surface
   - Raised Beds Veggies
   - Landscape Beds

2. Subsurface
   - Lawn
   - Landscape Beds

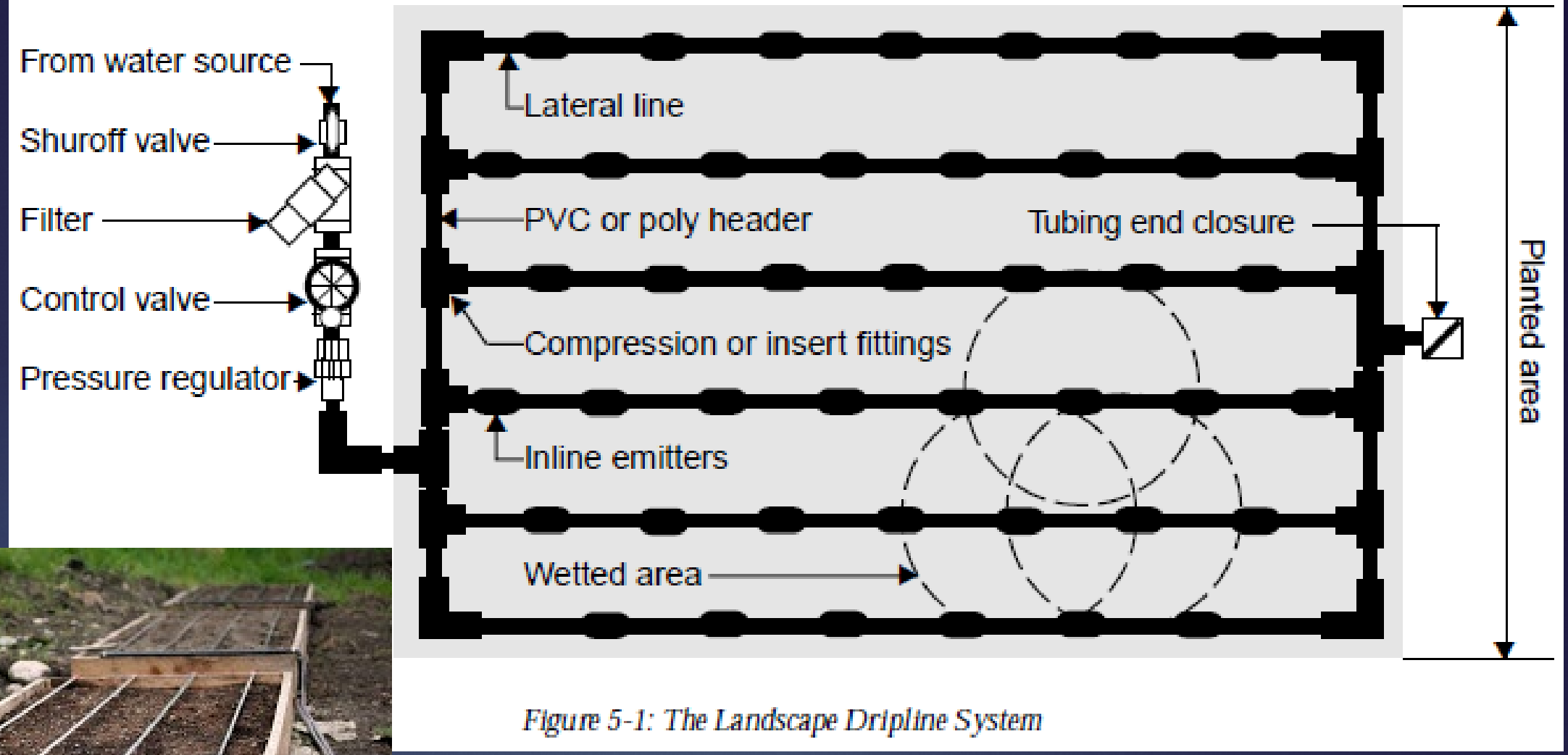


Figure 5-1: The Landscape Dripline System

Circular pattern

Typical install

planting.

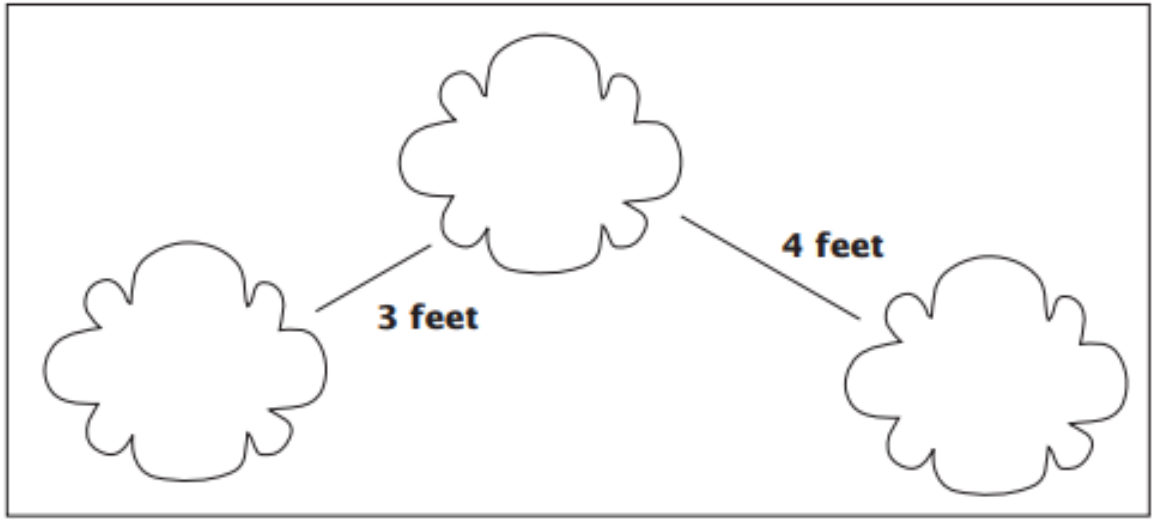


Figure 2-1: Typical sparse planting

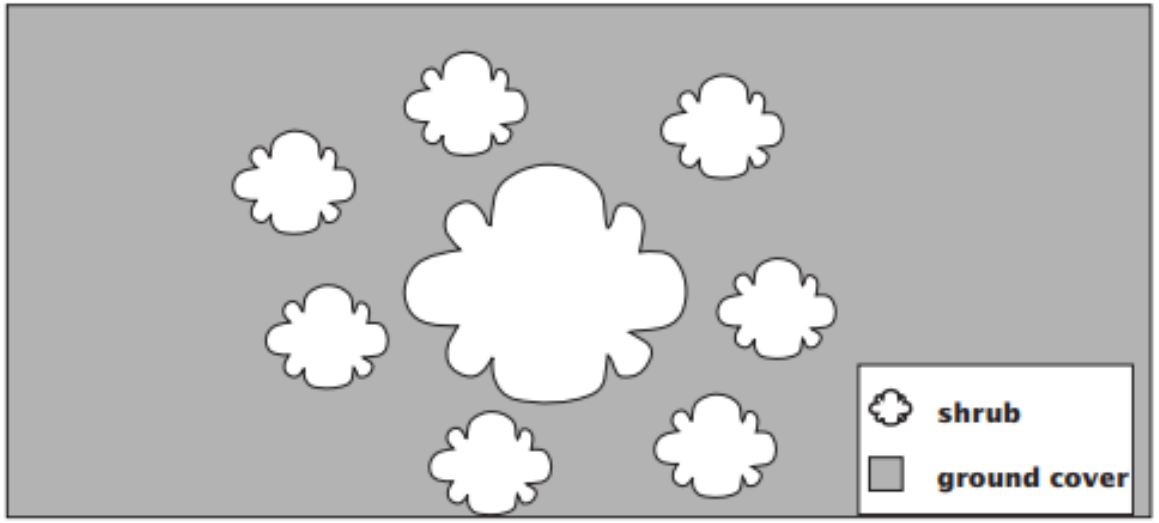
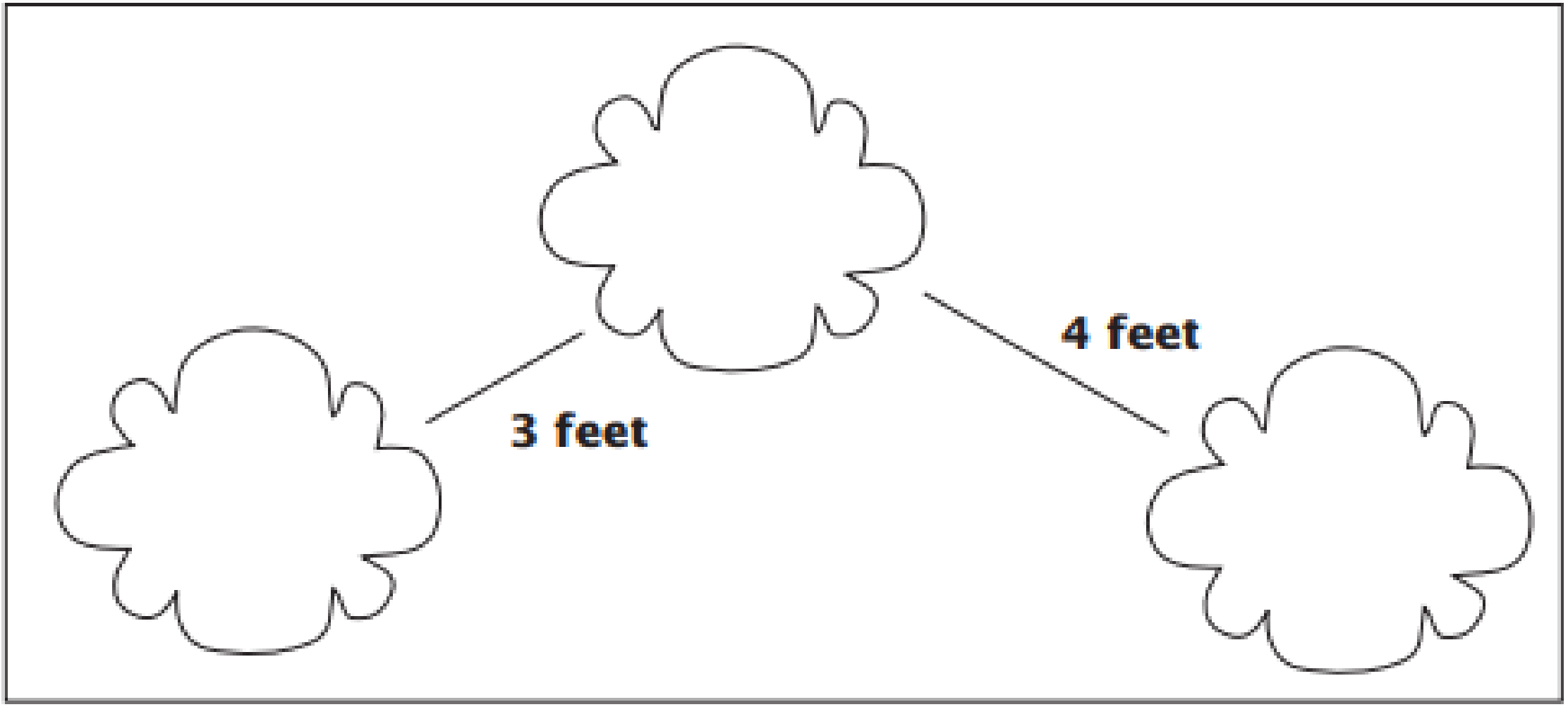
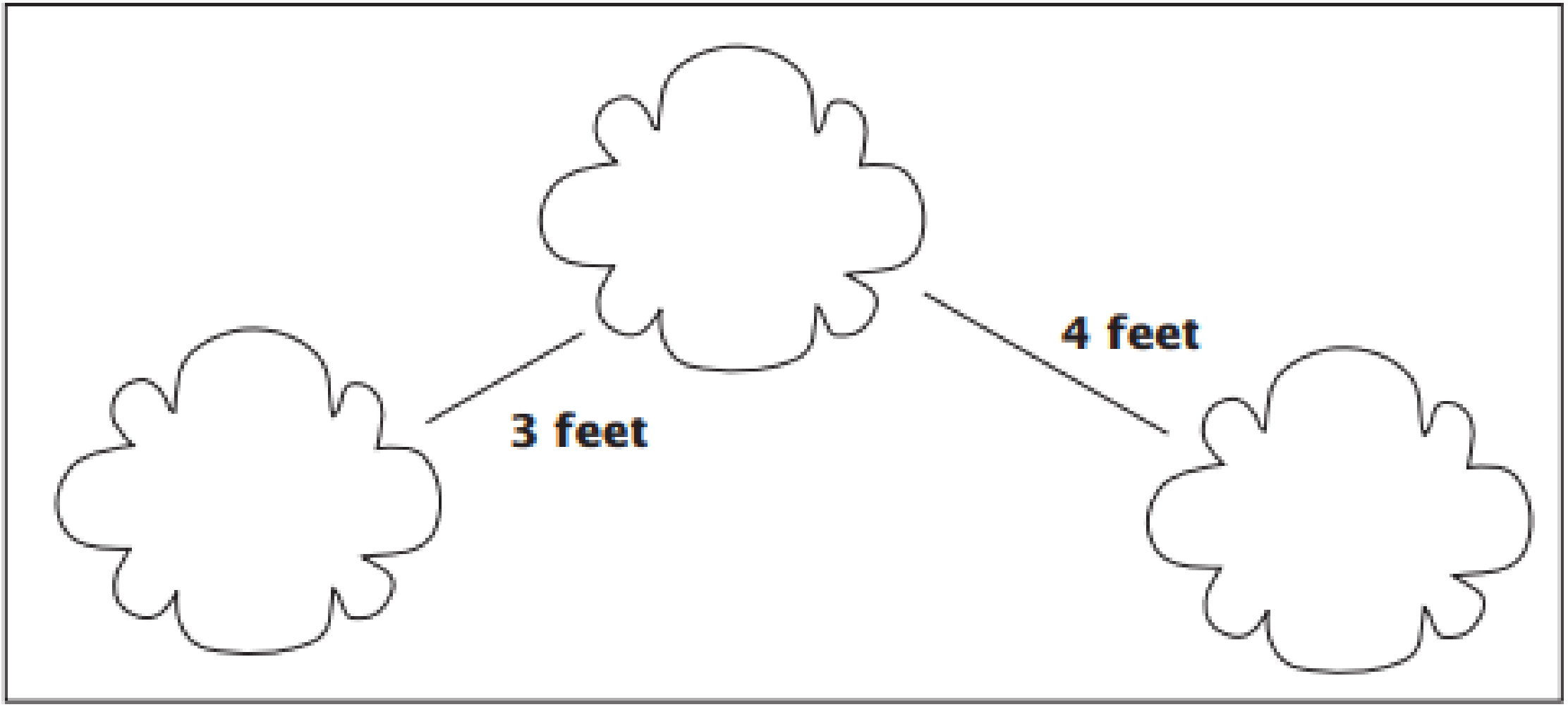
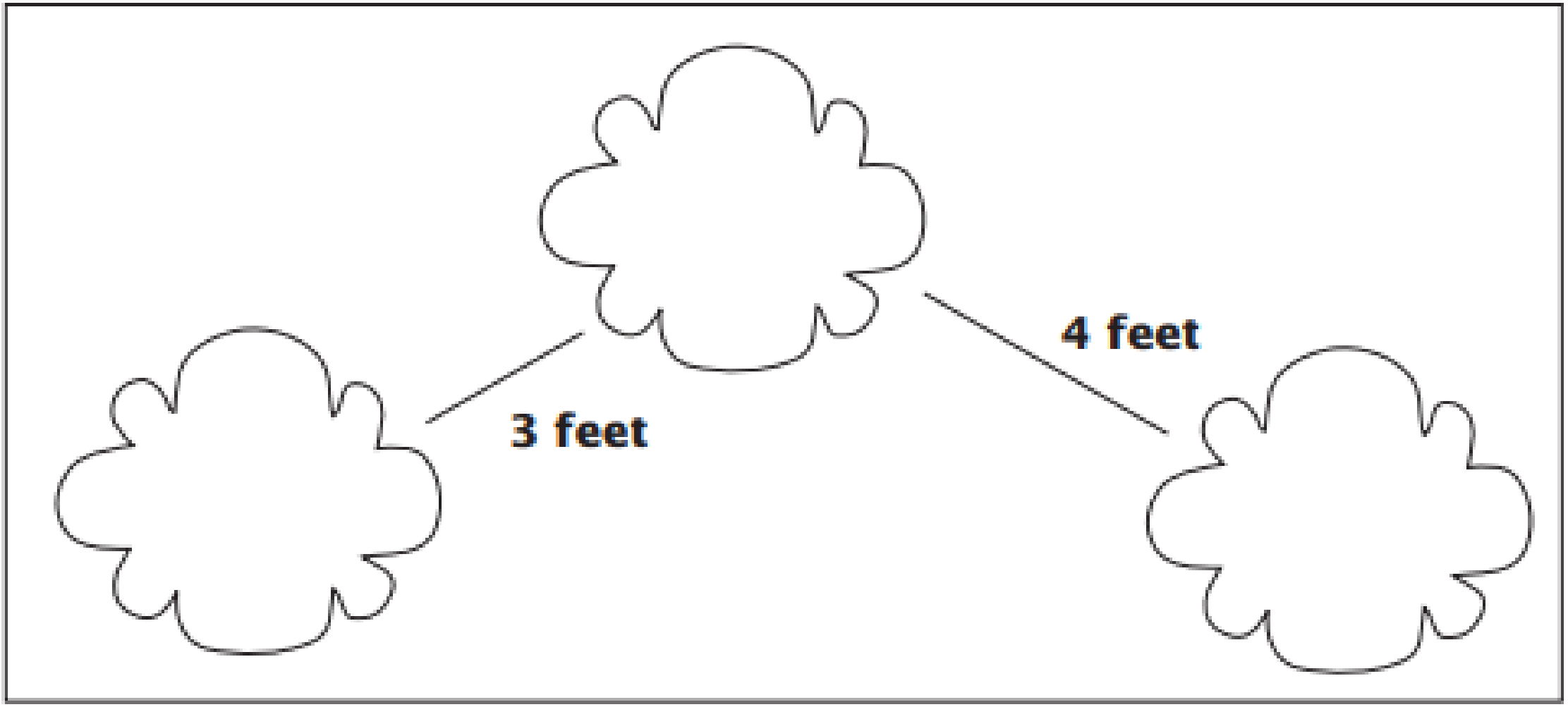
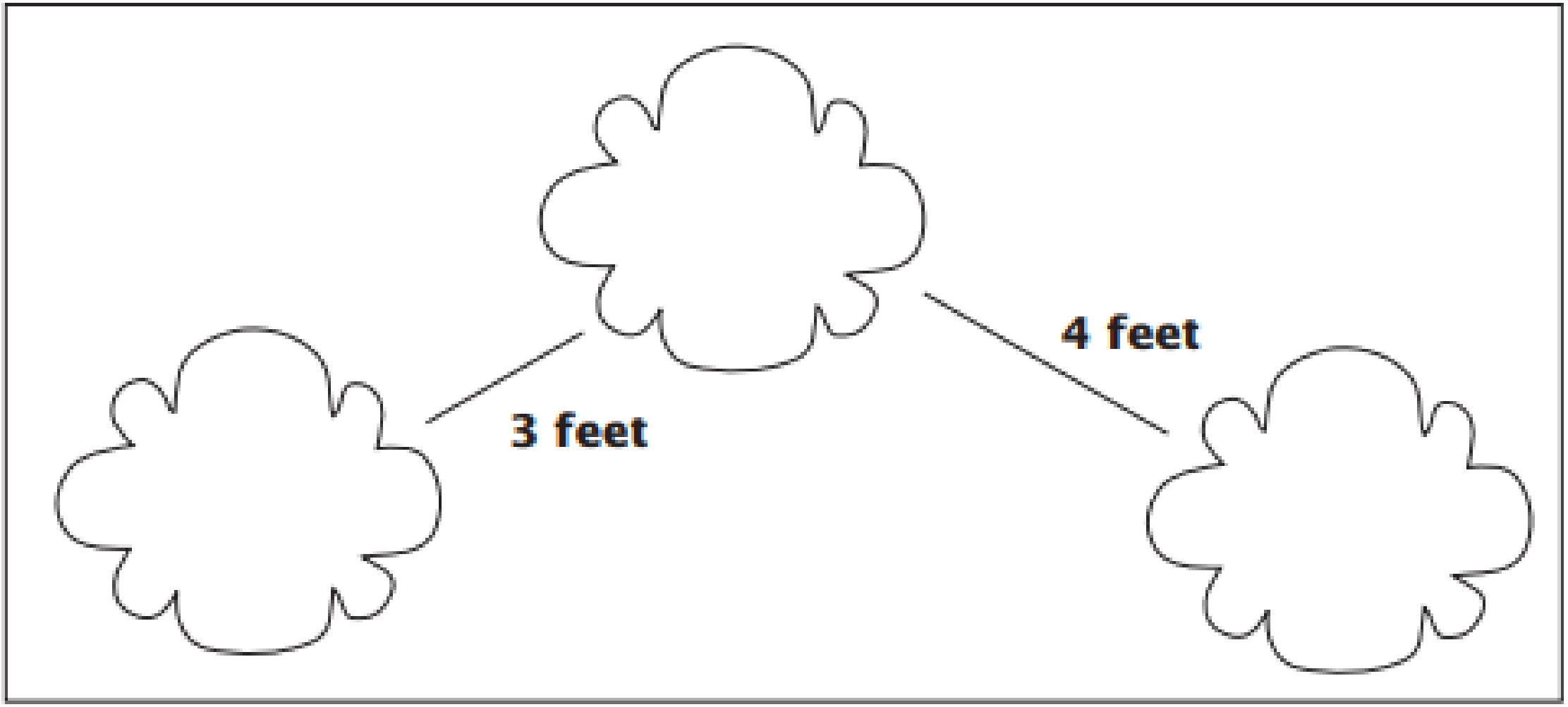


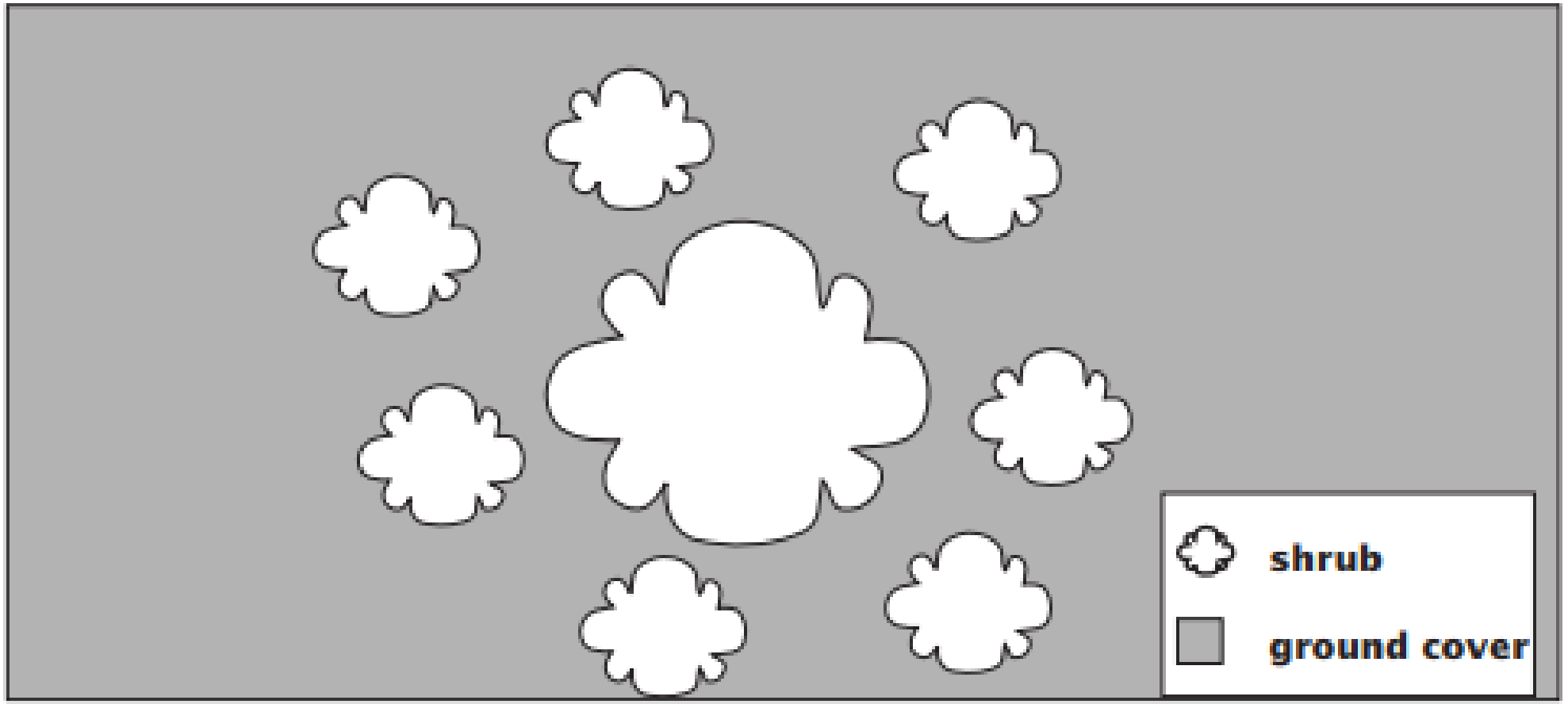
Figure 2-2: Typical dense planting


4 feet
3 feet


4 feet
3 feet


4 feet
3 feet


4 feet
3 feet


shrub
ground cover

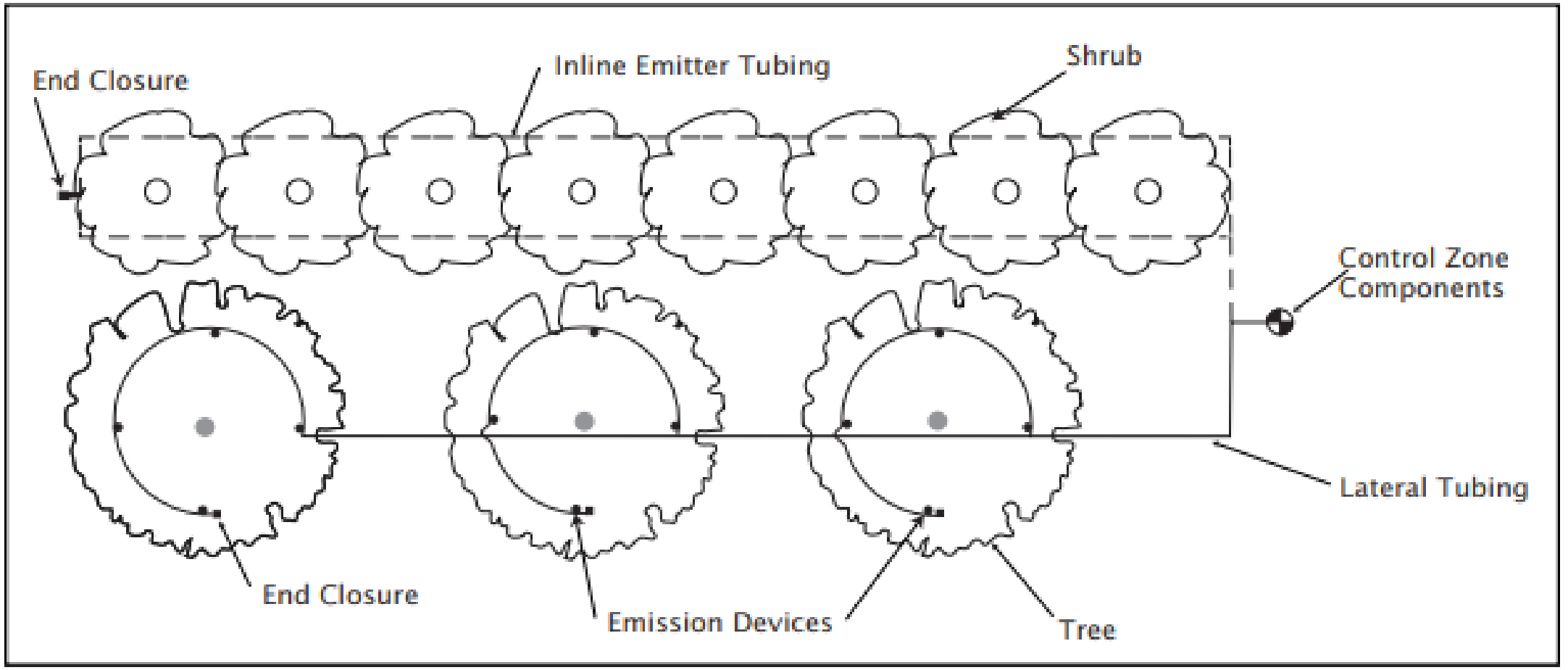
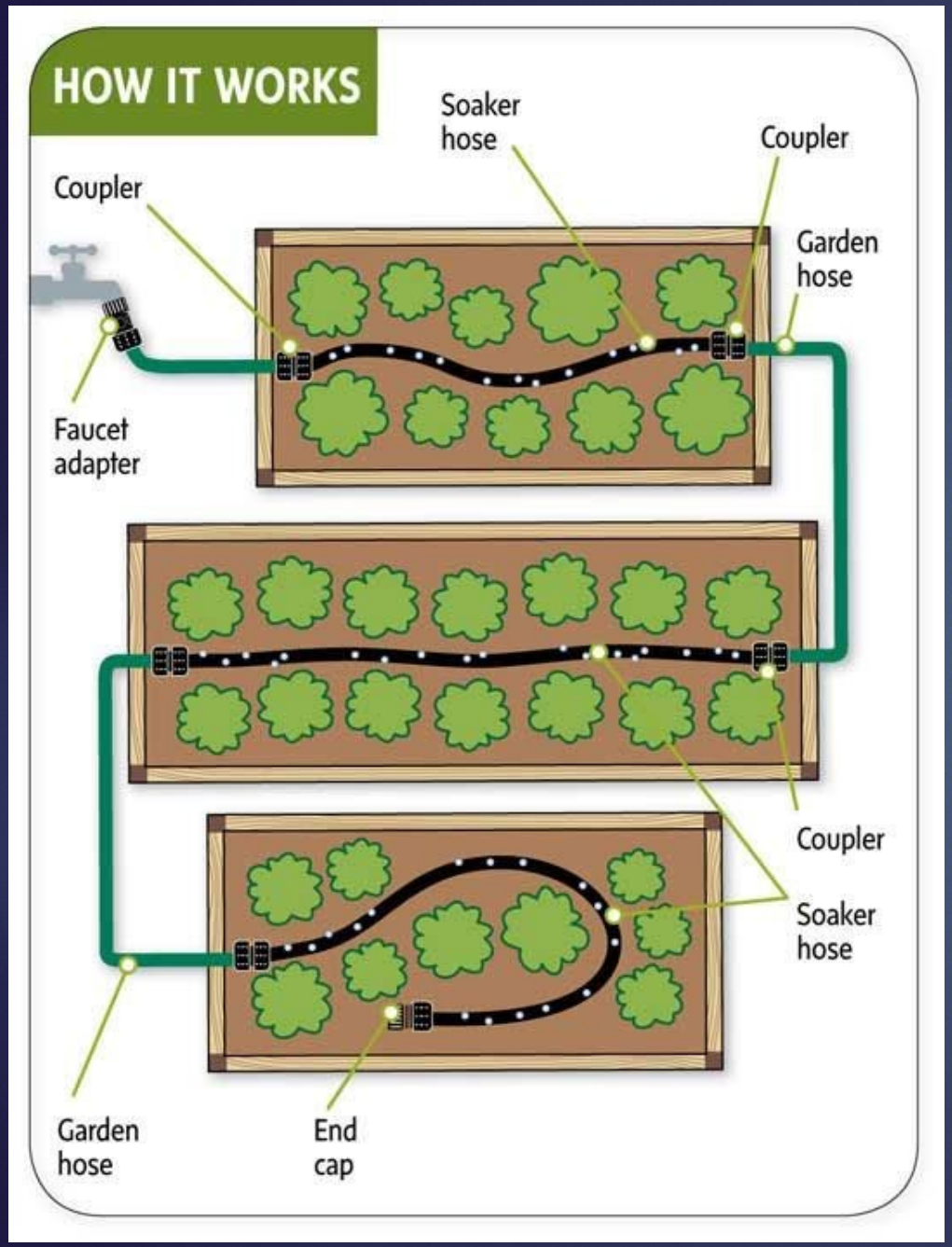
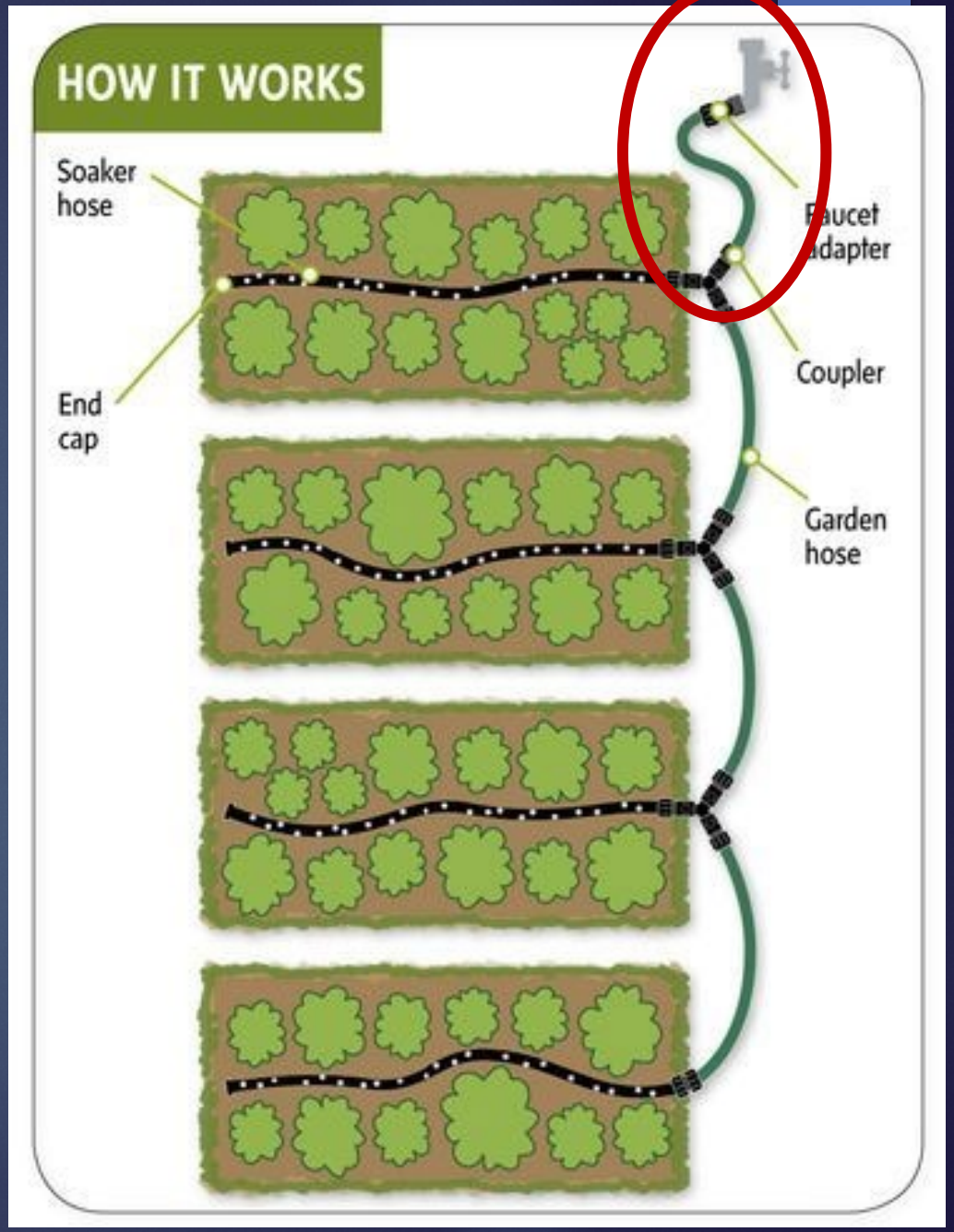


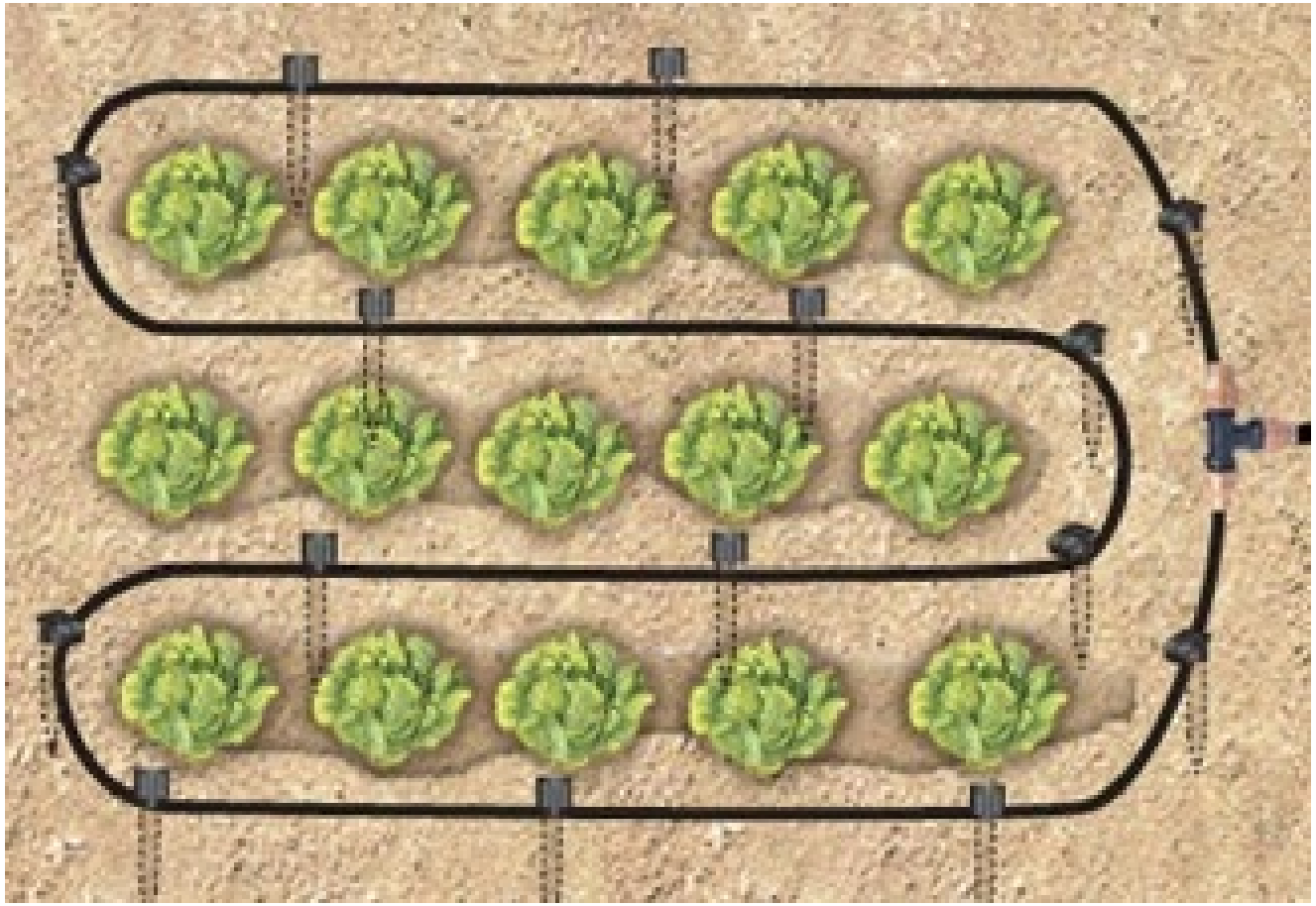
Figure 8-1: Correct placement of emitters

- Established ornamental trees don't usually need supplemental water
- Young trees – 3-5 yrs
- Fruit trees do better with some water

☹


HOW IT WORKS
Soaker hose
Coupler
Coupler
Garden hose
Faucet adapter
Coupler
Soaker hose
Garden hose
End cap

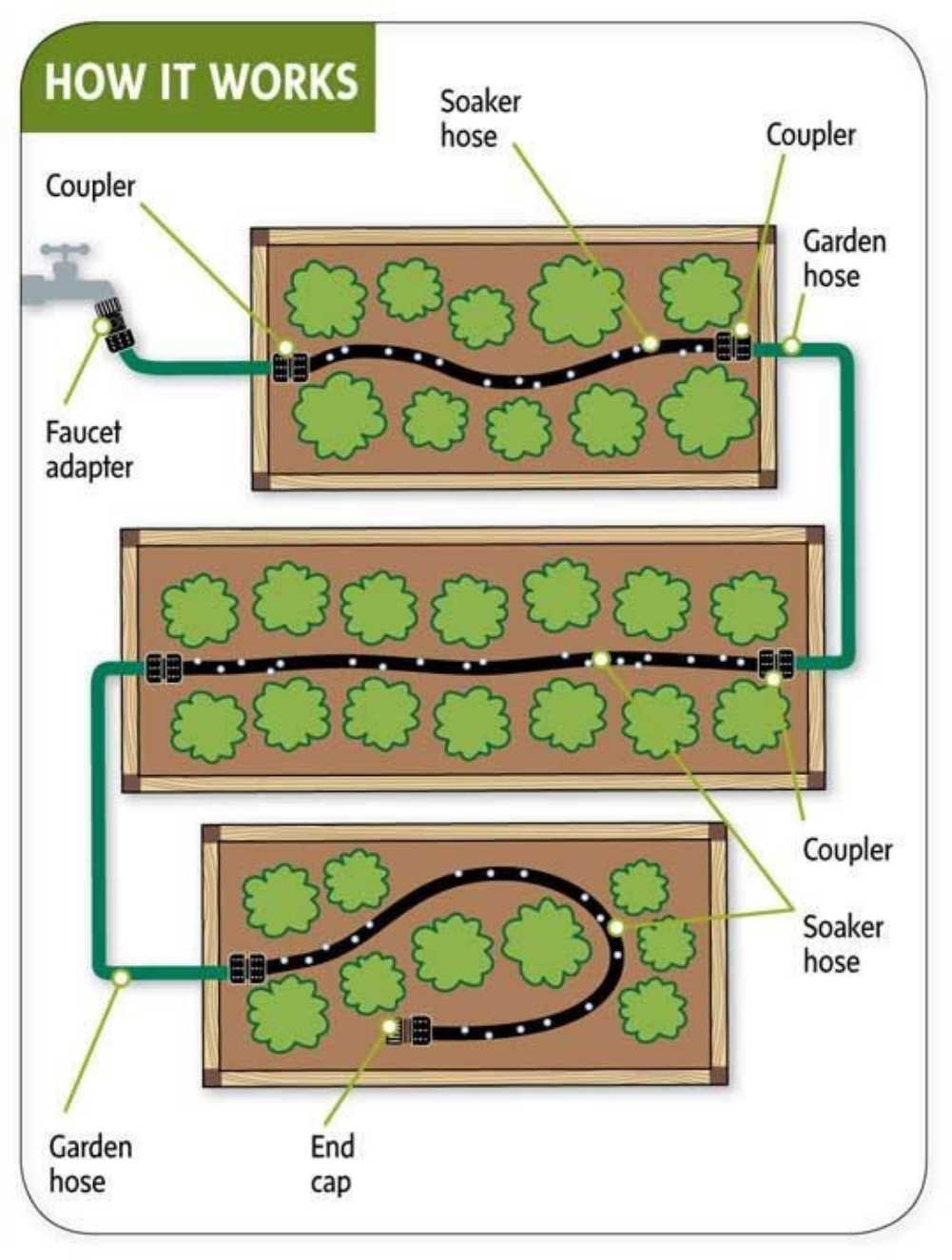

HOW IT WORKS
Soaker hose
End cap
Coupler
Garden hose



Loop your system for the WIN!

Special Considerations

Slopes



Use Pressure Compensating (PC) emitters!

.600" ID x .700" OD Tubing Maximum Length Run Chart

	PCE Pressure Compensation Emitters						Non Pressure Compensation Emitters		
	0.5 GPH		*1.0 GPH*		*2.0 GPH*		*0.5 GPH*	*1.0 GPH*	*2.0 GPH*
	20 P.S.I	30 P.S.I	20 P.S.I	30 P.S.I	20 P.S.I	30 P.S.I	20 P.S.I	20 P.S.I	20 P.S.I
12" Spacing *(100 Emitters per 100')*									
Maximum Run in feet	360	465	225	245	165	200			
GPH Required	180	233	225	245	330	400			
18" Spacing *(66 Emitters per 100')*									
Maximum Run in feet	440	590	280	375	200	265	300	210	135
GPH Required	147	197	187	250	267	353	100	140	180
24" Spacing *(50 Emitters per 100')*									
Maximum Run in feet	535	710	340	450	240	320	360	250	160
GPH Required	134	178	170	225	240	320	90	125	160

Note: If your water source is from a Hose Bibb (Water Faucet, Spigot or Hydrant) you are limited to 240 GPH.


NETAFIM™
GROW MORE WITH LESS
Cross
Coupling
Elbow
Tee
3/4" Female
Thread Adapter - Tee
3/4" Male
Thread Adapter - "V"
3/4" Male
Thread Adapter
1/2" Male
Thread Adapter
Dripper Plug
Manual Flush Valve
Figure 8 Line End
Emitter Micro-
Tubing Adapter
Techline CV 17mm Fittings

OK – I got it set up!
Now What??

- How long do I run my irrigation?

- How often do I run my irrigation?

CAUTION!!! You CANNOT run a drip irrigation zone like a normal pop up zone! Or WITH a pop up zone!

Plant Type	Supplemental Water Requirements	Hydrozone
• Natives • Xeriscape plants	Req for plant establishment	Very low 
• Some trees & shrubs • Perennials	Some req during growing season	Low 
• Ornamental trees & shrubs • Fruit trees & berries	Regular amts req during growing season	Moderate 
• Vegetable gardens • Turf grass	Regular amts req during growing season	High 

Other factors to consider

- Water needs
  - Moisture-loving
  - Dry-loving
- Sun Exposure
  - Sun
  - Shade
- Soil Type
  - Clay vs Sandy
  - Good vs bad drainage
- Slope

Guidelines – How much?

- Button emitters
  - Drought resistant perennials or small plant 0.5 gal per hour
  - Typical perennial or larger plant 1.0 gal per hour
  - Small shrub 2.0 gal per hour
  - Small tree 2-3 x 2.0 gal per hour
- Plan on running your drip zone for 45-60 minutes

Monitor and adjust as necessary!

Guidelines – how often?

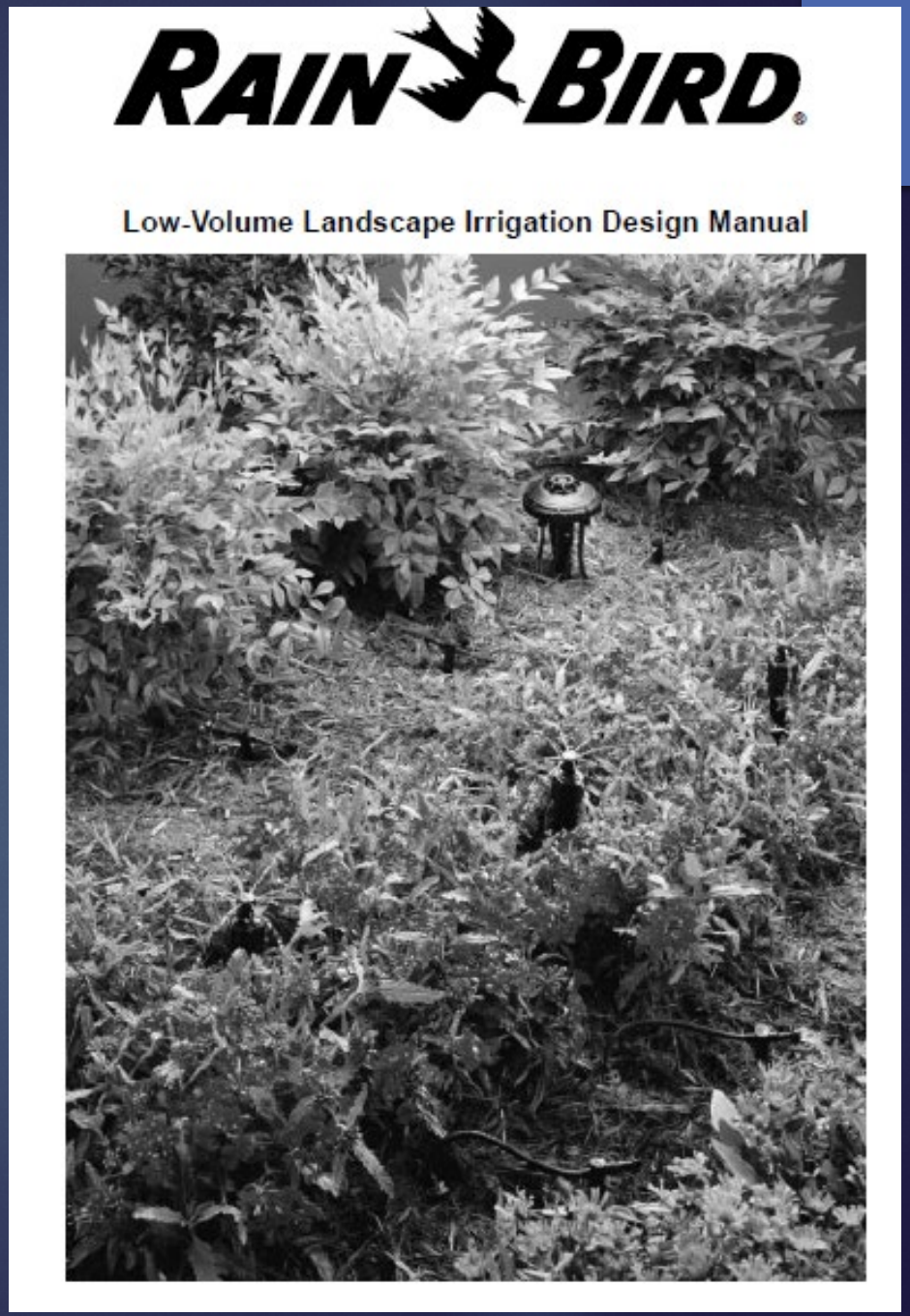
- 4X per week
  - veggie beds
  - patio pots
- 2-3X per week
  - Landscape beds,
  - Fruit trees, Berries
- 1X per week or 2X/month
  - Xeriscape plants
- 1X/month (good, long soak)
  - Natives
  - Established trees

Weekly Watering Number

- https://www.regionalh2o.org/water-conservation/outdoor-water-conservation/weekly-watering-number#:~:text=How%20to%20use%20the%20Weekly,water%20as%20the%20weather%20changes.

Design

100 PAGES! YIKES!



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- Some material adapted from

Taking the Mystery Out of Micro-irrigation **Jack Tichenor, Water Conserv. Agent**

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