

A close-up, high-speed photograph of a water droplet hitting a surface, creating a series of concentric ripples. The water is a deep, vibrant blue, and the lighting highlights the texture of the splash and the individual droplets. The overall mood is clean and refreshing.

# Anatomy of Intelligent Irrigation Installation

April 23, 2009

# Anatomy of Intelligent Irrigation Installation

- Urban Organics  
Landscaping
- Jason Isenberg, Owner &  
Landscape Designer
- [jason@uolandscaping.com](mailto:jason@uolandscaping.com)
- 520.791.9131



# Anatomy of Intelligent Irrigation Installation

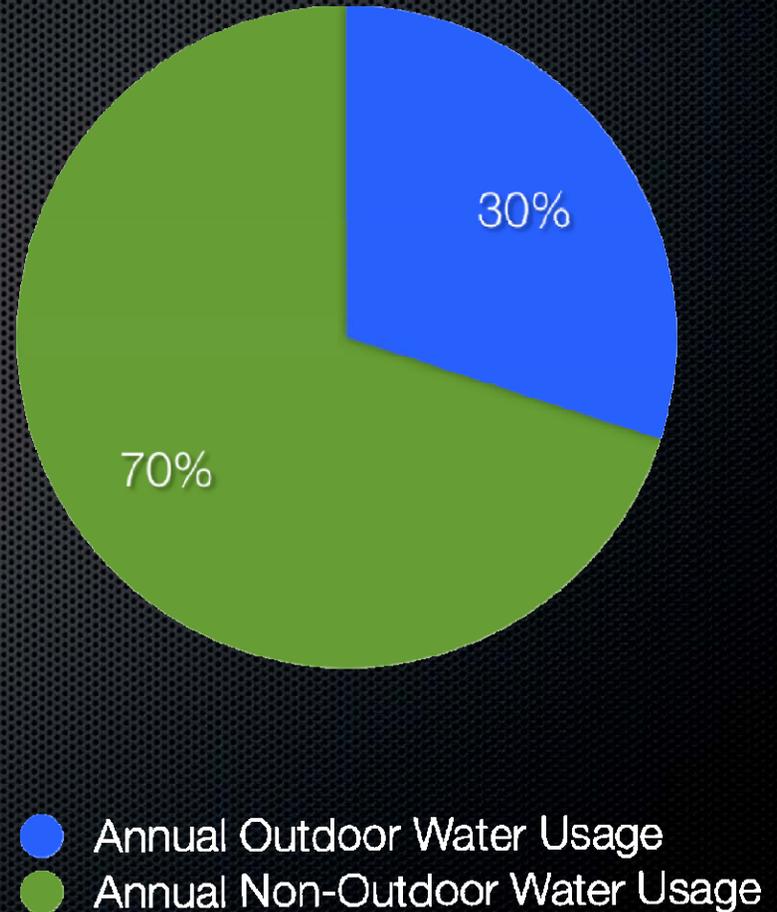
## Today's Agenda:

- Straight talk about water usage
- Technical irrigation fundamentals
- The basics of lateral irrigation system configuration
- Irrigation installation techniques
- What not to do
- System maintenance

# Anatomy of Intelligent Irrigation Installation

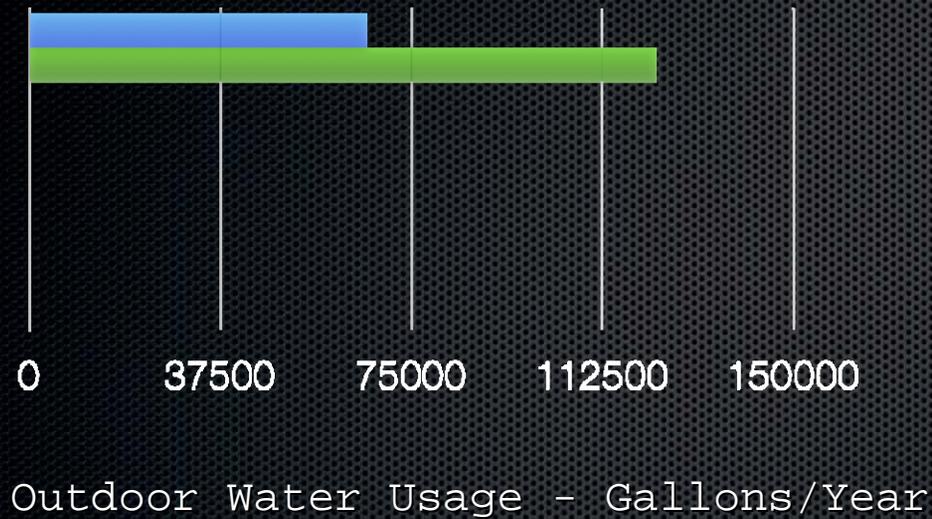
According to the United States Geological Survey, 26 billion gallons of water are consumed daily in the United States.

Nearly 8 billion gallons (30%), is devoted to outdoor uses. The majority of this is used for landscaping.



# Anatomy of Intelligent Irrigation Installation

- National Average Annual Outdoor Water Usage
- Scottsdale, Arizona Annual Outdoor Water Usage



- The annual outdoor water usage national average is 66,175 gallons/year
- The annual outdoor water usage average for Scottsdale, AZ is 123,000 gallons/year - more than double the national average

## Anatomy of Intelligent Irrigation Installation

- About 70% of the earth's surface is covered by water yet less than 1% is available for human use
- 36 states are currently projecting water shortages by the year 2013
- Approximately 10% of homes have water leaks, each resulting in 90 gallons of water waste per day - the equivalent of over 170 billion gallons of water each year
- Regular irrigation system maintenance could reduce irrigation water usage by 15%

Thus the need for intelligent  
irrigation...

# Anatomy of Intelligent Irrigation Installation

## Technical Install Overview

- Backflow Prevention
- Valve Assembly
- Wiring
- Filtration
- Pressure Regulation
- Controller



## Anatomy of Intelligent Irrigation Installation

- Controller Talk
  - ET Controller (Evapotranspiration) - measures soil moisture and provides water to plants based on recurrent readings and not on arbitrary programmed settings
  - Smart Controller - obtains real-time weather data to determine how/when water is dispensed
  - Multi-Station Expandable Controller - allows user to augment their system based on continually-changing needs

# Anatomy of Intelligent Irrigation Installation PVB vs. RPVB



Grade change: RPVB  
installed 12" above any  
grade



Grade change: PVB  
installed 12" above  
highest point being  
irrigated - in this  
case 18"

# Anatomy of Intelligent Irrigation Installation

## Valve Notes

- 1" Valve assemblies preferred because water flow is adjustable (vs. 3/4" valves)
- PSI from street to house approximately 60-80 PSI
- PSI from house to irrigation should be reduced to 20-30 PSI
- Valves for sprinklers do not need filters or pressure regulation
- Install valves below grade in a secure valve box set flush with the existing grade

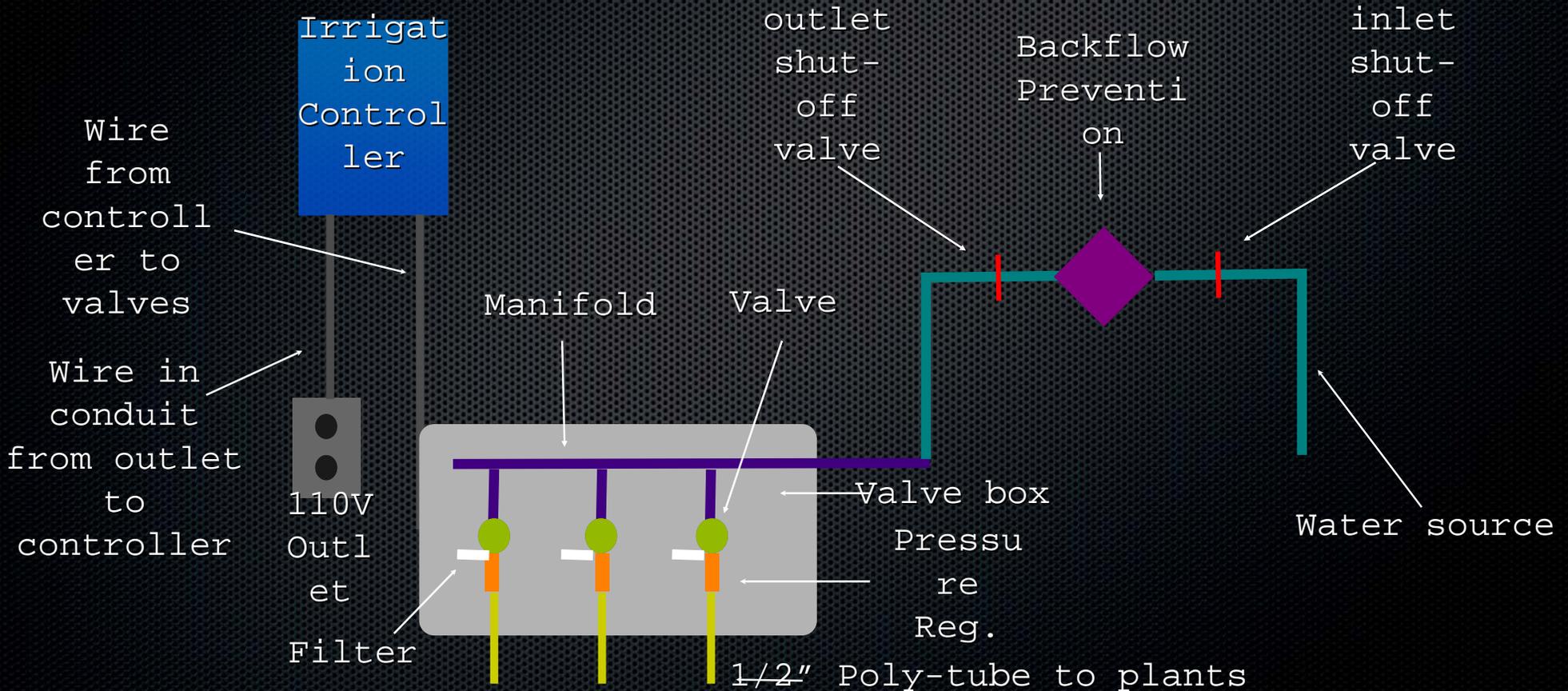
# Anatomy of Intelligent Irrigation Installation

## Valve Notes Continued

- Leave approximately 4" open space below valves for future access with tools
- Place rock at the bottom of valve box to keep valves free of debris
- Use a screw-type manifold instead of cut-and-glue PVC - easier to install - easier to modify - easier to repair

# Anatomy of Intelligent Irrigation Installation

## Technical Irrigation System Assembly

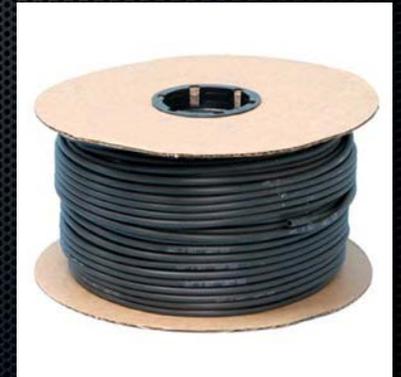
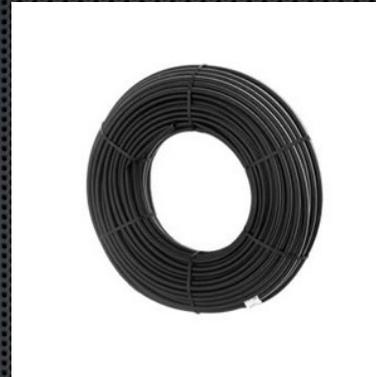


# Anatomy of Intelligent Irrigation Installation

## Lateral Irrigation

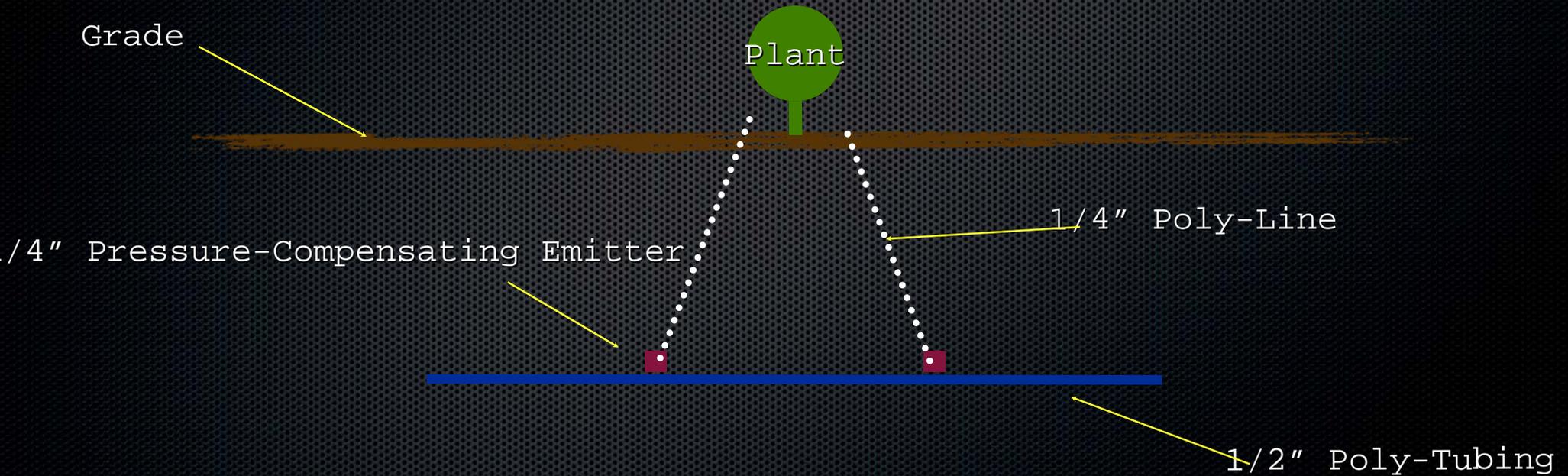
### Overview

- 1/2" poly-tubing
- 1/4" poly-line
- Pressure-compensating emitters
- 1/4" & 1/2" fittings (elbows, tees, couplers, end caps, goof plugs)



# Anatomy of Intelligent Irrigation Installation

## Basic Lateral Irrigation Configuration



## Anatomy of Intelligent Irrigation Installation

### Miscellaneous Lateral Line Notes

- Burial depth of 1/2" lateral line = 6" - 8" below final grade
- Width of 1/2" lateral line trench is dependent on number of lines being run
- Recommend running one additional "contingency/expansion" line in irrigation lateral line trench with other in-use lines
- Burial depth of 1/4" lateral line = 3" - 5" below final grade
- Amount of 1/4" lateral line exposed = 1/2" above final grade

## Anatomy of Intelligent Irrigation Installation

### Miscellaneous Lateral Line Notes

- Sleeve material size  $> 2"$  diameter per  $1"$  of total line girth Continued
- Sleeve material - Sch 40 PVC (when left unused, cap ends to prevent dirt from entering and clogging access)
- Shooting under hardscapes: "after-the-fact" sleeve situation - maximum width easily able to span = 5'
- When backfilling trench, ensure that no large rocks are resting/pressing on lateral line material
- Always fill lines with water first when backfilling to minimize potential for crimping

## Anatomy of Intelligent Irrigation Installation

### Miscellaneous Lateral Line Notes

Continued 2

- To backfill trench = fill, gently tamp, wet, fill, tamp, wet, repeat until completely backfilled to original grade
- Consider 1/4" emitter tubing (.5 gph every 6") for vegetable gardens and pots
- Maximum length of 1/4" poly-line is 6' from 1/2" poly-tube
- Always place emitter between 1/4" and 1/2" lines (pressure compensation, protection from UV/dust, less visual impact)
- Install 1/4" emitter with sharp point into 1/2" line and 1/4" emitter attached to 1/4" line

## Anatomy of Intelligent Irrigation Installation

### Miscellaneous Lateral Line Notes

Continued 3

- When unrolling 1/4" and 1/2" poly line, gently pull both sides of line to relax the roll/curl
- When installing a 1/4" emitter, turn on the station/valve desired to create pressure in the line- then insert emitter into 1/2" line and pull gently to create a tight seal
- Calculate water from valve (in gallons) per minute - convert to gallons/hour - compare to count of emitters (and their gallons/hr designations) - make sure not to exceed gallons/hr of available water from valves - otherwise emitters won't be operating at 100% capacity/accuracy/efficiency

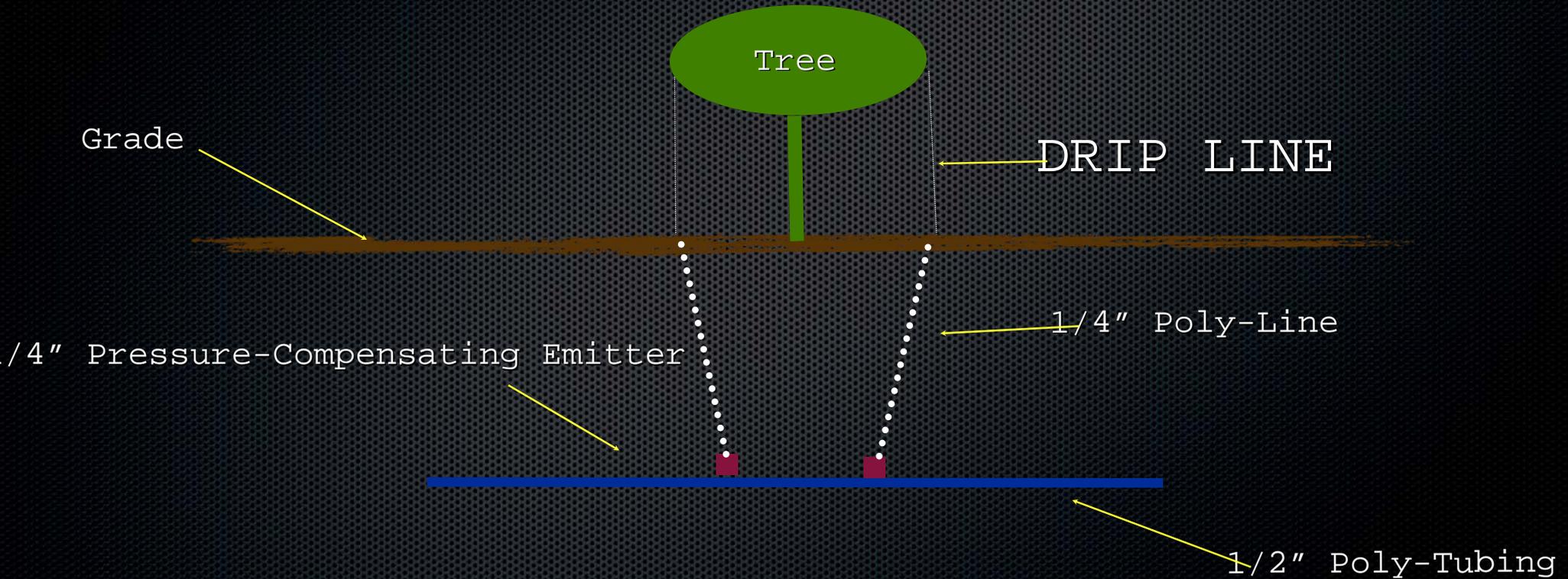
## Anatomy of Intelligent Irrigation Installation

### How To Configure Lateral Irrigation For The SW Desert

- Consider each type of plant material present in landscape (trees, citrus, pots, lawn, shrubs, cacti & succulents, vegetable garden, hydroseed/wildflowers, desert, etc.)
- Install one valve specifically for each type of plant so that each type of plant gets EXACTLY the kind of water it wants

# Anatomy of Intelligent Irrigation Installation

## Lateral Irrigation Placement For Trees



## Anatomy of Intelligent Irrigation Installation

- Do not place emitters at the end of 1/4" lines
- Do not share water between different types of plants
- Do not install emitters the "wrong way" into 1/2" line
- Do not bury 1/2" line too shallow (erosion exposure, UV damage)
- Do not use "crimp-style" end cap
- Do not use different style emitters on same line in landscape (e.g. flag vs. spray vs. drip)

## Anatomy of Intelligent Irrigation Installation

- Modify controller at ~~System Maintenance~~ <sup>Season</sup> based on season 1x/month
- Flush lateral lines @ end cap 1x/3 months
- Flush valve filter 1x/3 months
- Replace controller battery 1x/year (battery does not run controller when power is out - only saves settings)
- Turn on all stations and check for lateral line leaks 1x/month
- Visually inspect valves in valve box for slow leaks 1x/month



"In an age when man has forgotten his origins and is blind even to his most essential needs for survival, water along with other resources has become the victim of his indifference"

- Rachel Carson