ACLP II
ADVANCED ARIZONA CERTIFIED LANDSCAPE PROFESSIONAL

Irrigation Tech II

Introduction

Why am I here?

- Irrigation Tech II is meant to provide hands-on continuing education for
  - Irrigation technicians after completing Irrigation Tech I course
  - Landscape professionals wishing to obtain their Advanced ACLP (ACLP II) certification

    Watch for the logo >>>

    ACLP II ADVANCED ARIZONA CERTIFIED LANDSCAPE PROFESSIONAL

  - Exam is online and must be taken within 14 days

Purpose of Irrigation

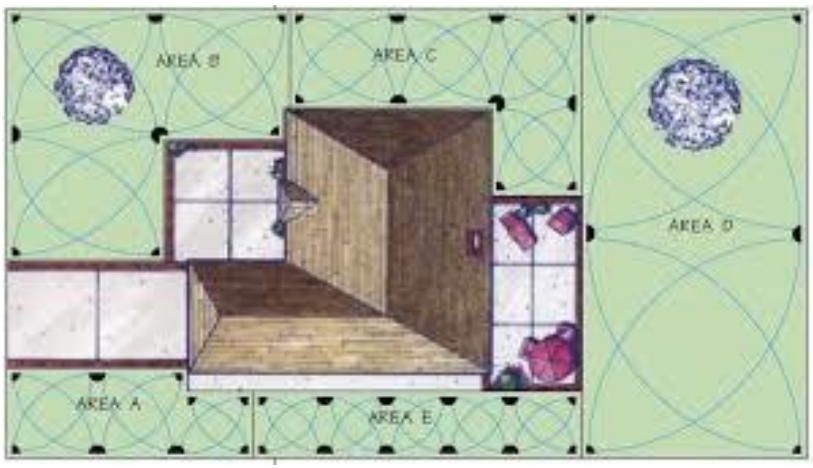
- To deliver water to plants that would not naturally survive on rainfall alone
- Efficiently distribute water to plants to maintain plant health

The Art and Science of Water Management
Water management can be as simple as turning the water off, but maximizing the potential of a landscape while reducing its water use can be complex. The correct amount of water can be quantified — it is science-based. Proper management, however, is both a science and an art. A skilled water manager has in-depth knowledge of multiple disciplines and may utilize advanced technology to improve water use efficiency.

Today…

Troubleshooting

Plans



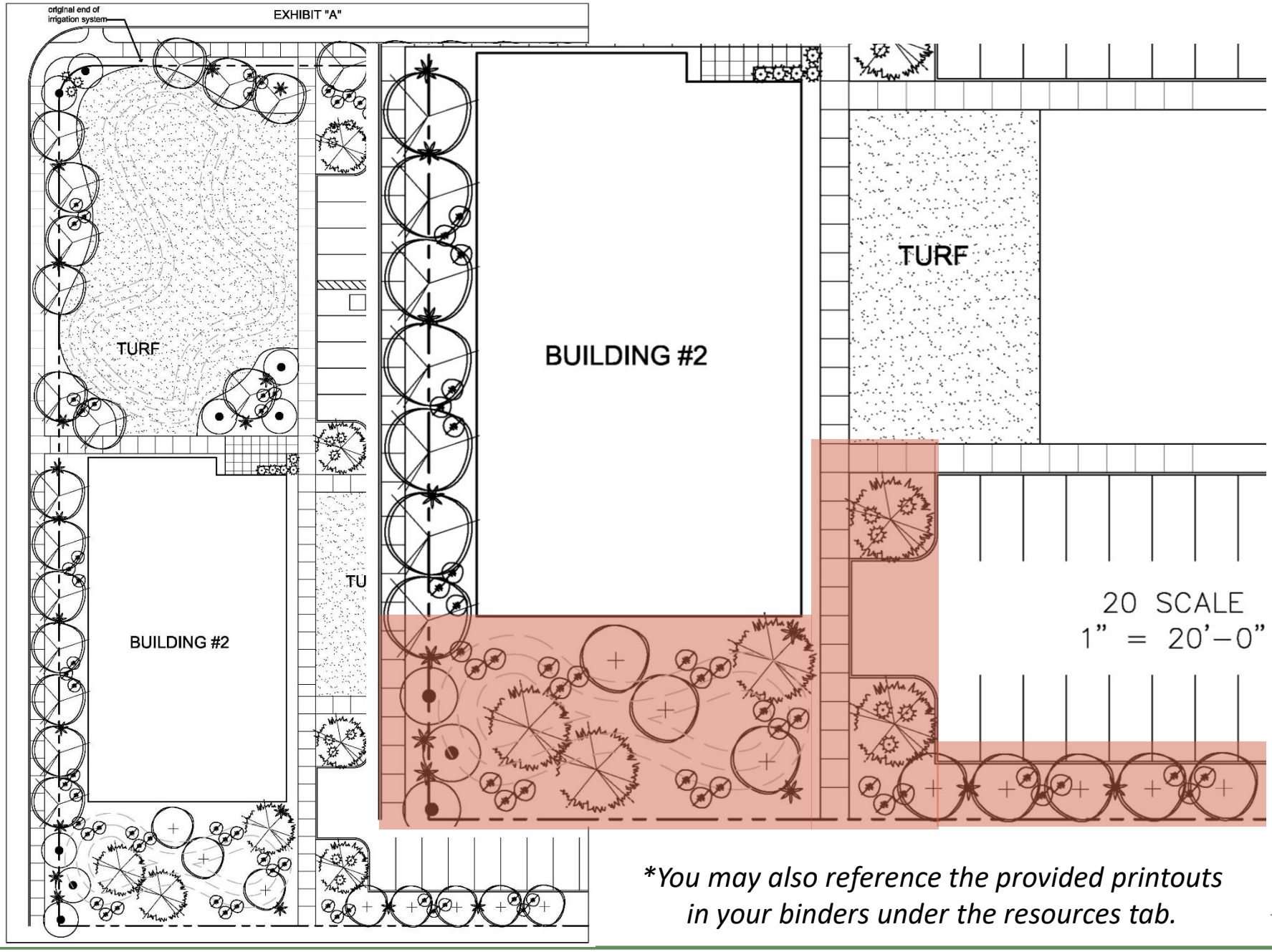
Why do we have plans?

Who needs to look at them?

Lack of Plans/ Poor Execution

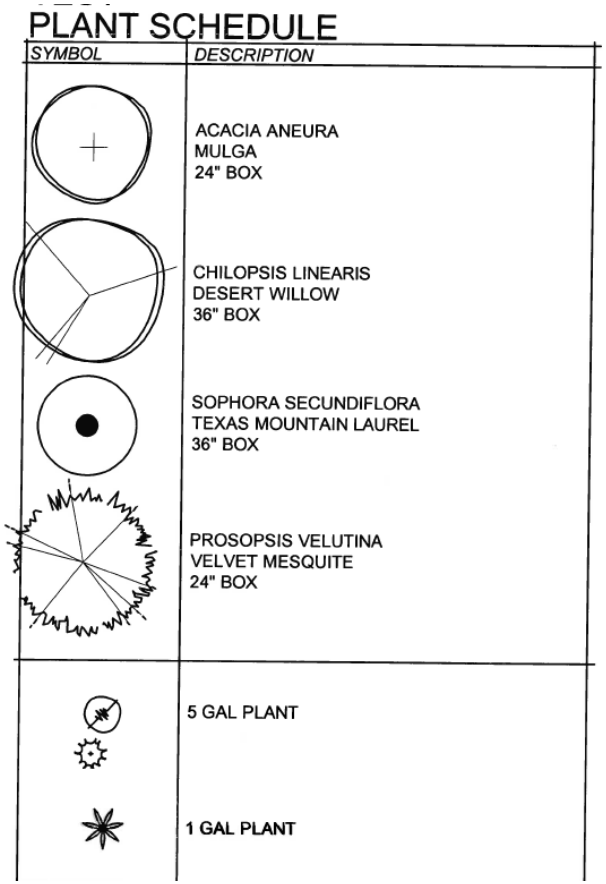
Someone didn't do their homework!

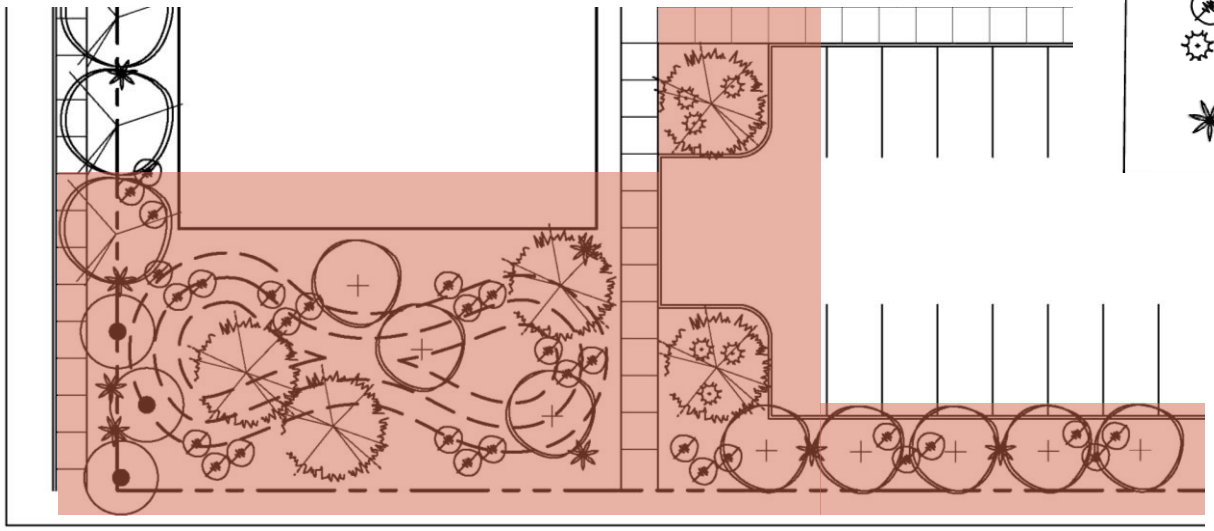
Let's take a look at landscaping plans created for this property



**You may also reference the provided printouts in your binders under the resources tab.*

- Station 1:
  - Mulga, desert willow, and velvet mesquite
    - **(5) 2 gal/hr emitters each**
  - Sophora
    - **(3) 2 gal/hr emitters**
- Station 2:
  - 5 gallon plants
    - **(2) 2 gal/hr emitters**
  - 1 gallon cactus
    - **(1) 1 gal/hr emitter**





Let's calculate the hourly rate…

Trees

• *Acacia aneura*	8@ 10 gal=	80 gal
• *Chilopsis linearis*	1@ 10 gal=	10 gal
• *Sophora secundiflora*	3@ 6 gal=	18 gal
• *Prosopis velutina*	5@ 10 gal=	50 gal

Shrubs

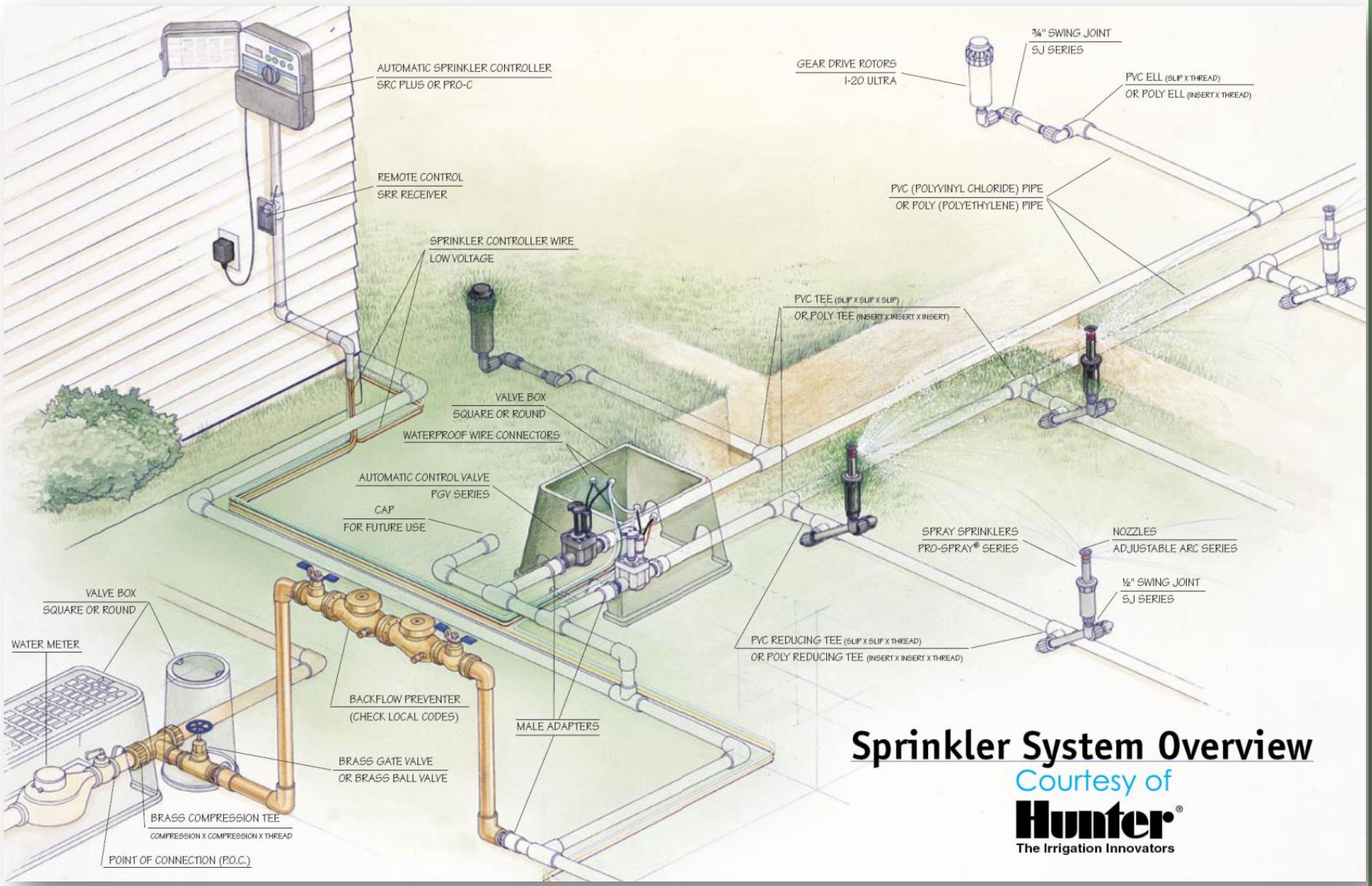
• 5 gal plants	36@ 4 gal=	144 gal
• 1 gal plants	6@ 1 gal=	6 gal

What volume of water is being delivered to these plants?

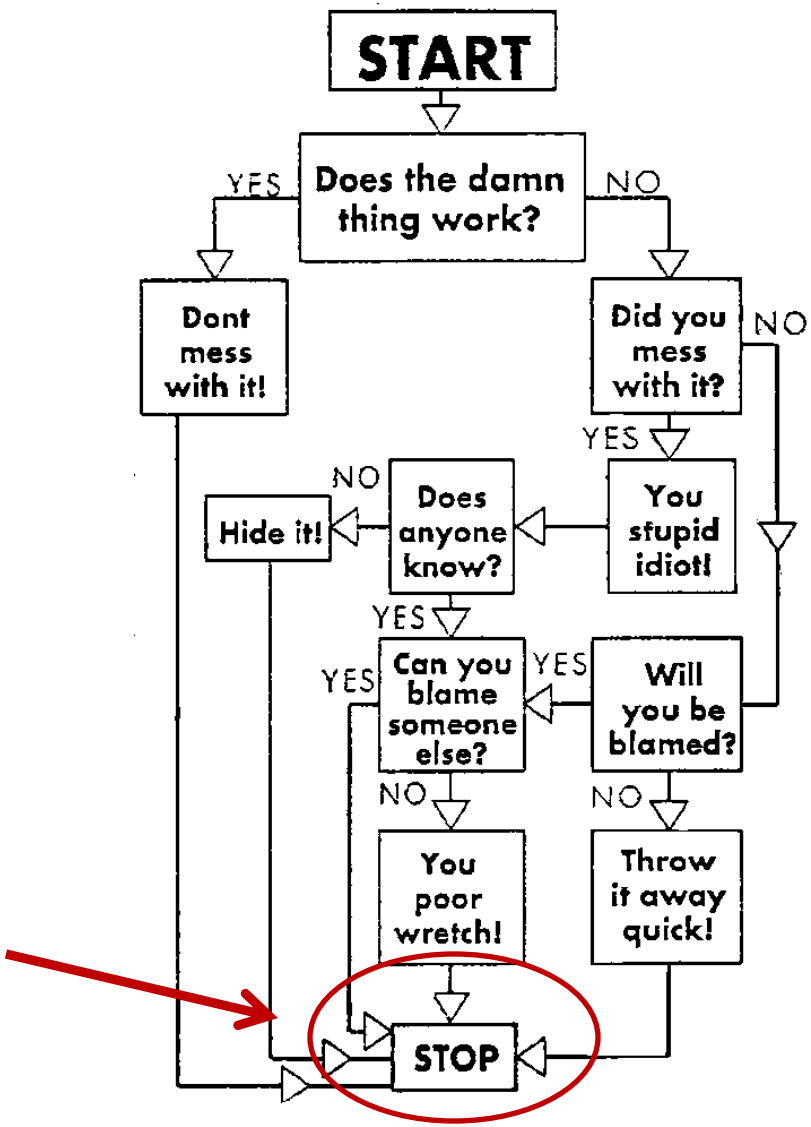
- Tree line uses 158 gallons per hour
- Shrub & cactus line uses 150 gallons per hour

Will there be enough water available to deliver to all the trees on the property?

What happens if additions are made to this landscape?


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

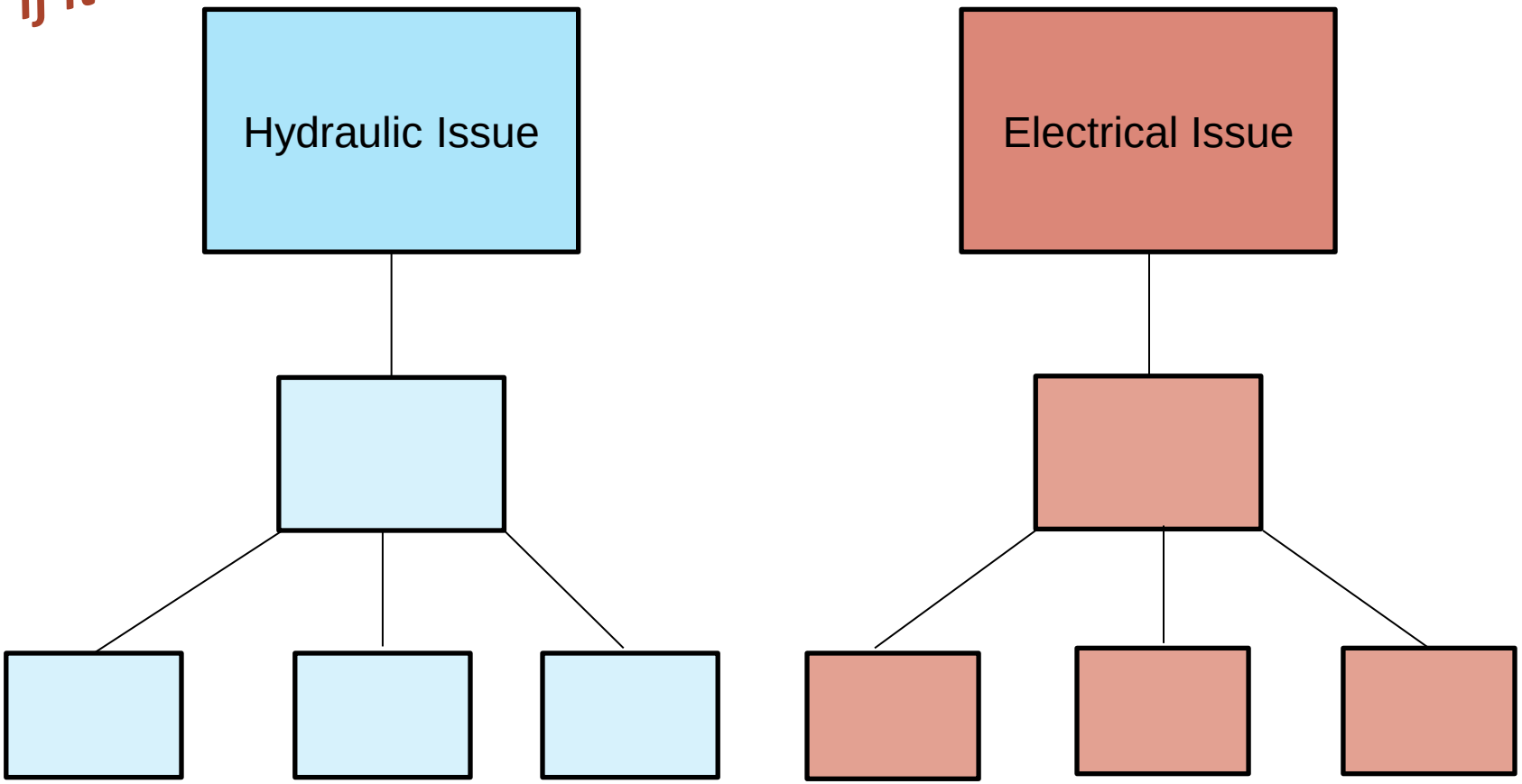
Irrigation Troubleshooting



Not an option!

System Troubleshooting

First, determine if it is….



Troubleshooting

Electrical

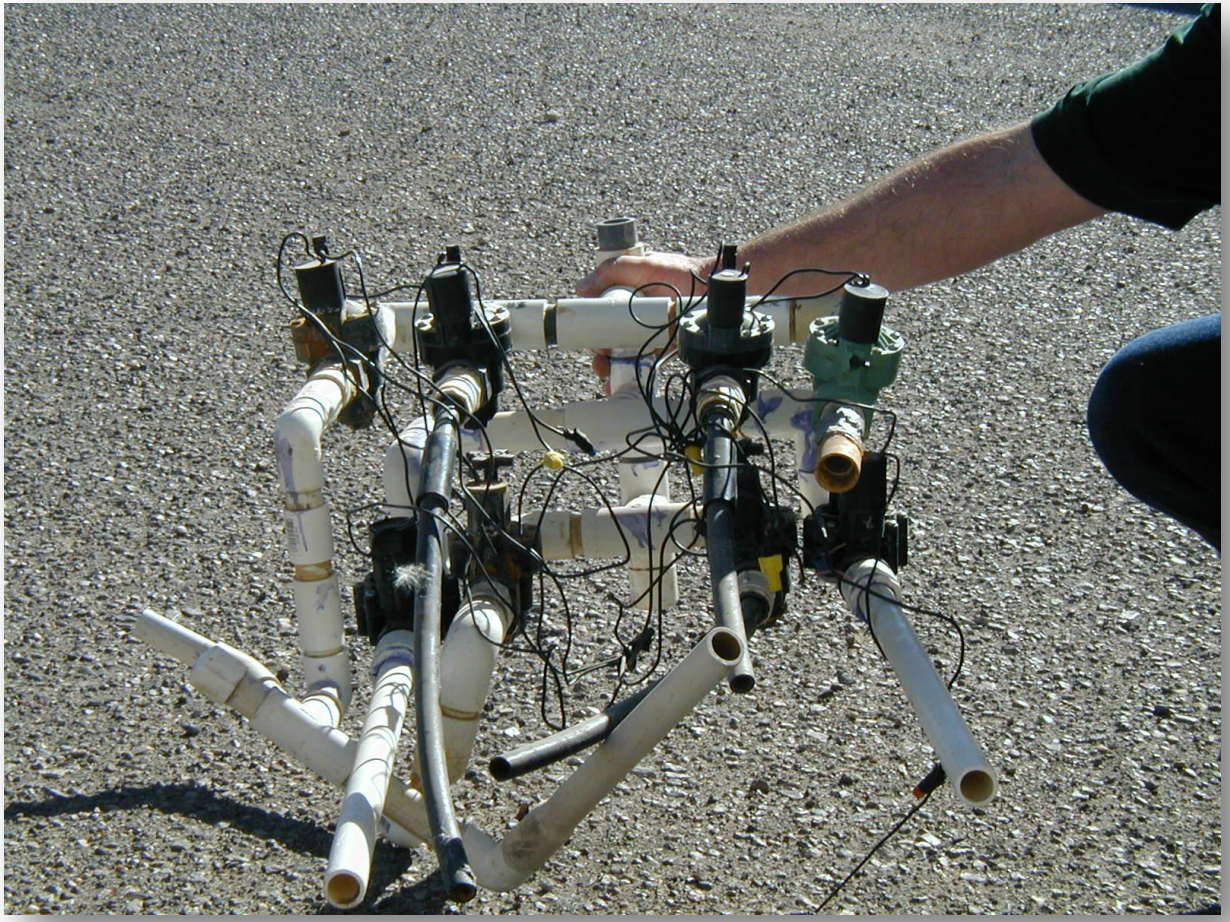
- No power to controller
- Controller is dead
- Wire faults
- Line breaks
- Bad solenoid
- Damaged, cut, skinned or loose wiring
- Poor connection
- Unknown zone assignments
- Bad splices
- Bad wirenut- corroded
- Line obstructions- see hydraulic

Hydraulic

- Incorrect pipe size
- Too many heads
- Broken lines
- Missing heads
- Too many valves on at same time
- Low pressure
- Too much pressure
- Partially closed valves
- Elevation changes
- Nozzles too large
- Running pipes too far
- Mixed heads on a line

Electrical Troubleshooting

Electrical Troubleshooting



You will be receiving a multimeter today on behalf of SiteOne Landscape Supply

Hydraulic Troubleshooting

Irrigation Hydraulics

What we're going to learn from this class:

1. How water moves through the different parts of an irrigation system
2. Identify and use our knowledge resources
3. Select equipment and design an efficient system
4. Identify and propose solutions to enhance system effectiveness

Irrigation Hydraulics

Hydraulics:

The science that deals with the laws governing water or other liquids ***in motion*** and their applications in engineering; practical or applied hydrodynamics.

Static pressure: pressure when water is at rest
Dynamic pressure: pressure when water is in motion

Water Source

Identify your water source:

- Is it a potable city tap?
- Reclaimed?
- Lake or canal?

Take pressure readings at the entry point and note the size of meter or outlet and performance of pump (if retrofitting)

Hydraulics

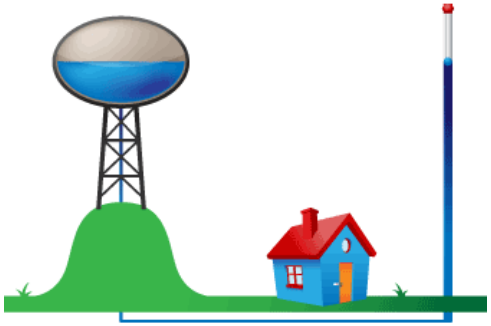
- Non-uniform pressures in an irrigation system cause non-uniform application of water.

- The movement of water through an irrigation system is described by hydraulic principles.

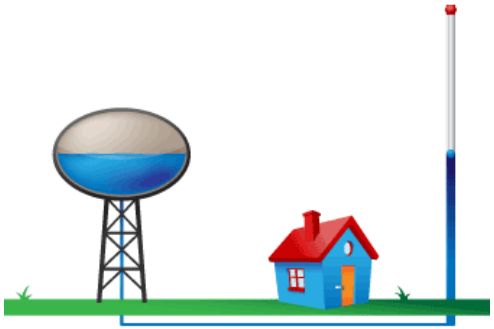
Ross, D.S. 2006. Understanding an Irrigation System: Pressure and Flow

Water Pressure

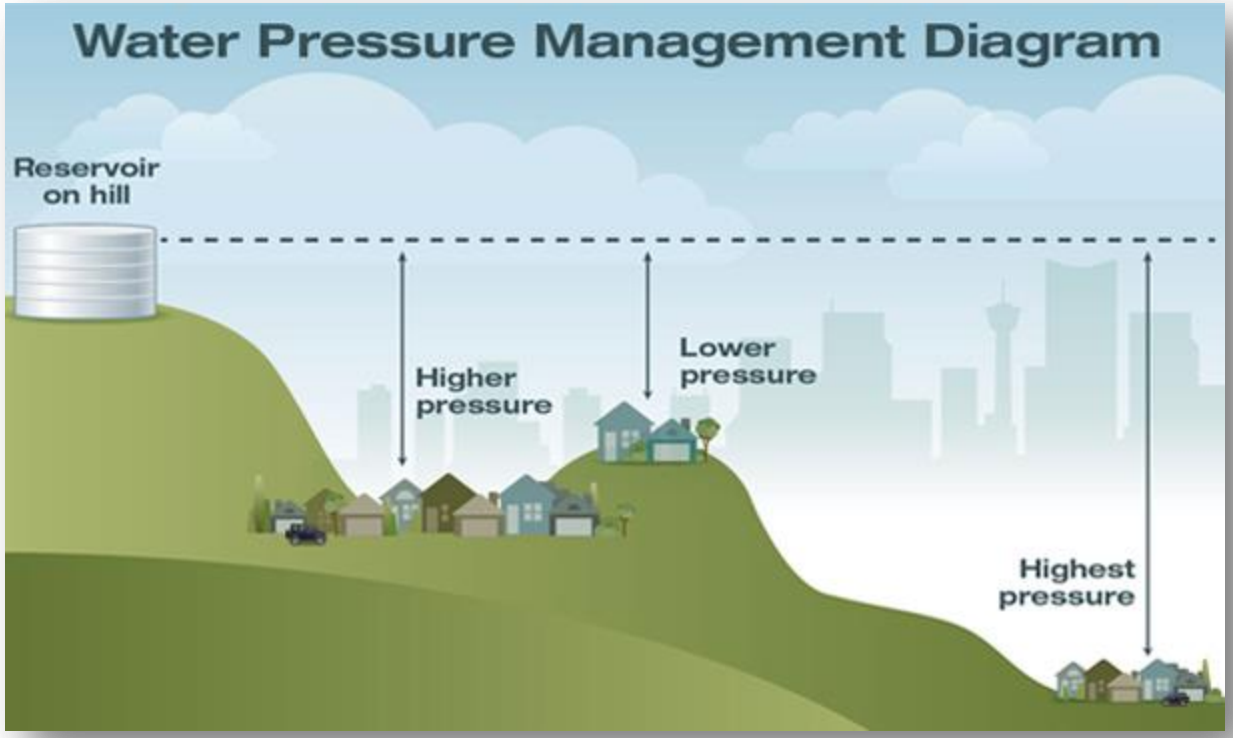
- Where does it come from?



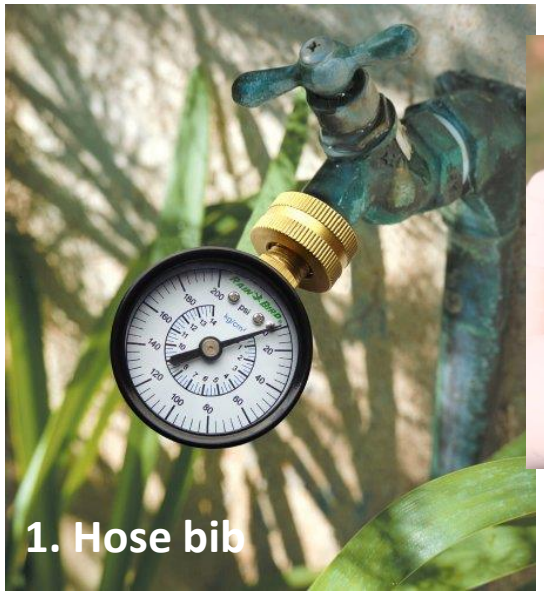
Column height of water pressure at the house when the water tower is on a hill.

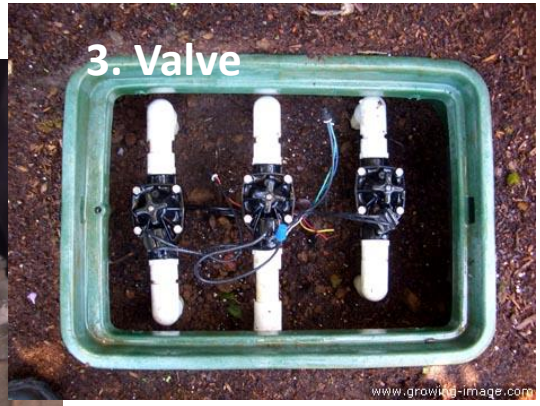


Column height of water pressure at the house for water tower on flat land.

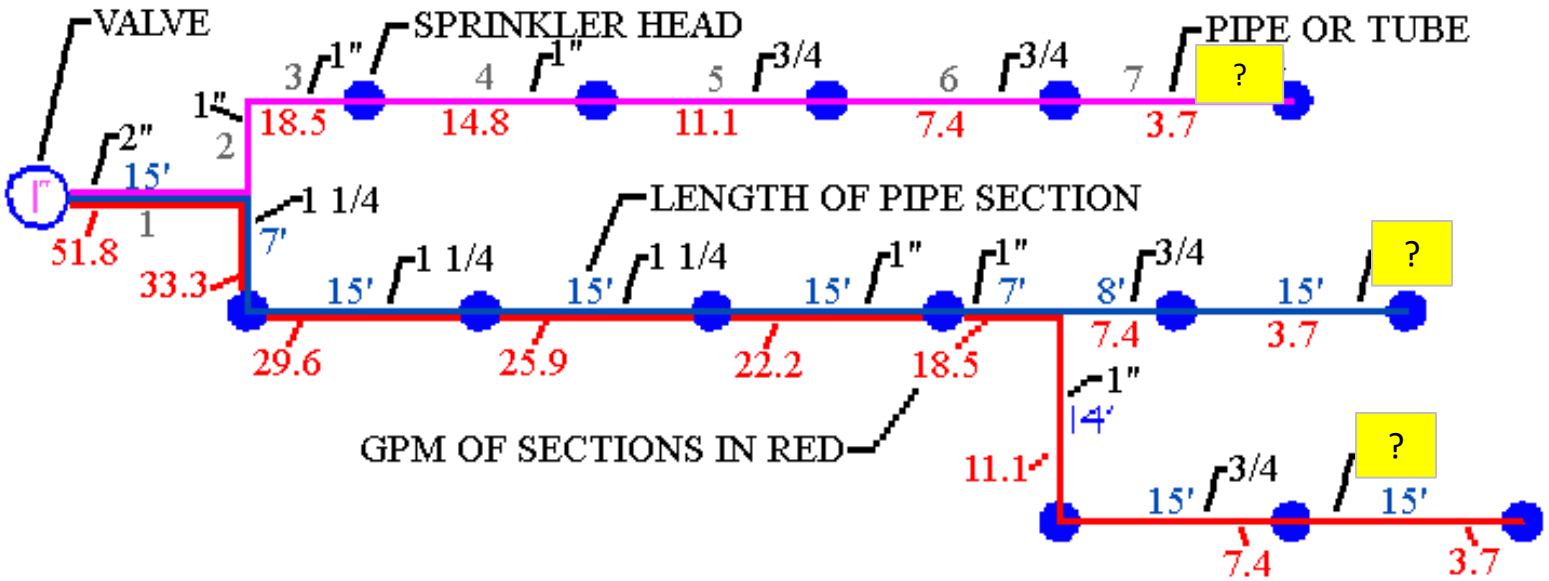


How do you check pressure?





Calculating Friction Loss

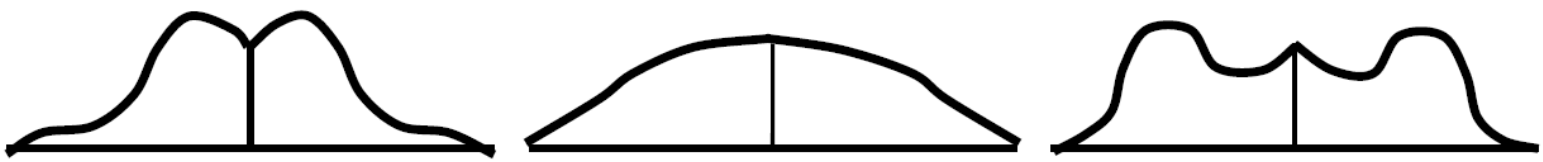


www.irrigationtutorials.com

Water Distribution

Nozzle Pressure versus Water Distribution Pattern

Too High **Correct Pressure** **Too Low**



High pressure= water comes out in small droplets or a mist and tends to fall close to the sprinkler head.

Correct pressure= there is a good mix of droplet sizes so the distribution pattern is good.
More water will fall close to the sprinkler head than far away = reason sprinkler heads must be overlapped to get uniform distribution

Low pressure= water falls more heavily in one part of the circle, making donut-like extra-wet areas

Ross, D.S. 2006. Understanding an Irrigation System: Pressure and Flow

Water Auditing

- Measures the distribution uniformity of sprinklers installed in the field, where they are affected by wind, obstructions, etc…
- Catch cans are placed in a pattern between sprinklers operating on a single zone
- Sprinklers operated for a certain time
- Amount of water in catchment is measured and recorded
- Data is used to determine the performance of the zone

Troubleshooting

- Incorrect pipe size
- Broken line
- Missing heads
- Too many valves on at same time
- Low pressure
- Partially closed valves
- Damaged/ clogged lines
- Elevation change
- Nozzles too large
- Running pipes too far
- Mixing different kinds of heads (var. pressure & PR)
- Water hammer

Troubleshooting Sprays:
Symptoms of a Pressure Problem

Symptoms:

- Water not reaching specified distance
- Stem is not popping up all the way
- Misting and fogging

Possible Cause:

- Number of sprinklers on a zone exceeds the available GPM
- Too high of pressure
- Too low of pressure

Possible Solution:

- Reduce the number of heads in the zone
- Replace with nozzles that require less water

Troubleshooting Closed Case Rotors

Symptoms of a Pressure Problem

Symptoms:

- Rotor will not rotate
- Water not reaching specified distance
- Rotor is not popping up all the way

Possible Cause:

- Number of rotors on a zone exceed the available GPM
- Nozzles too big

Possible Solution:

- Install smaller nozzles
- Reduce number of heads in the zone

Other Troubleshooting

Symptoms Indicating Debris

Symptoms:

- Water spray seems to come out in an irregular pattern
- Stem pops up but water only dribbles

Possible Causes:

- Water source is other than drinking water supply
- New installation- pipes not flushed
- A break in the plumbing was recently repaired

Possible Solution:

- Filtration
- Flush system
- Unscrew nozzle and clean screen

Types of Filtration

Water Source	Suggested Filter Types
Municipal Water System	Screen Filter, Centrifugal Filter, or Disk Filter.
Well	Screen Filter, Centrifugal Filter, or Disk Filter.
River or Creek	Disk Filter, Media Filter and Screen Filter, Centrifugal and Media Filter.
Pond or Lake	Disk Filter, Media Filter and Screen Filter, Centrifugal and Media Filter.
Spring or Artesian Well	Screen Filter, Centrifugal Filter, or Disk Filter.
Organic material in water	Disk Filter, Media Filter and Screen Filter, Centrifugal and Media Filter.
Sand in water	Screen Filter, Centrifugal Filter, or Disk Filter.

http://www.irrigationtutorials.com/filters.htm

Sprinkler Performance

Calculations & Testing

Terms to know:

- Distribution Uniformity (DU)
  - Low quarter
  - Low half
- Precipitation Rate (PR)
- Scheduling Multiplier (SM)

Time to Get to Work!

- Class split into 2 groups…
  - Javelinas will head outside, south of this building for **electrical.**
  - Mountain lions will stay in this room for **design.**

Then

  - Class will meet back in the classroom to review **hydraulics.**

You will spend 75 minutes at each station. Short breaks will be offered during station changes.