Irrigation System Audit

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The Intelligent Use of Water.™
What We’ll Cover Today

- Overview
- What is an irrigation audit?
- What is the benefit of an irrigation audit?
- Conservation through Efficient Irrigation
- Encouraging Water Conservation
History

- Founded in 1933
- Rain Bird manufactures and sells over 4,000 irrigation components
- Worldwide leader in irrigation innovation and technology
- “Intelligent Use of Water”
- 130 patents and 30 trademarks
- One of the largest irrigation testing facilities in the world
There is no new water.
What is an irrigation audit?

- An irrigation audit is the method of inspecting and measuring how effective the sprinklers are working together to apply the water within each individual irrigation zone or test area.

- Results are compiled and used in combination with other observations and measurements to facilitate irrigation management.
Irrigation Auditors

- An auditors job is NOT to manage water, design systems, or even install.
- An auditors job IS to compile data that is then used by designers, installers and managers.
- Should have knowledge of irrigation products and practices.
- Should be able to effectively create an irrigation schedule.
- An audit is not something you do once a year and then forget about. Irrigation systems must be managed consistently and regularly to account for the changes that happen in the weather and the landscape.
An efficient irrigation system is affected by four components:

1. The correct selection of equipment and location
2. Proper installation
3. Long-term maintenance practices
4. Management of the system
Improved efficiency as a result of a properly performed irrigation audit provides the following:

1. A reduction in water use and consequently financial savings
2. A more consistent distribution—fewer wet and dry spots
3. A smaller amount of water wasted below the root zone
4. Less of a need for fertilizers and chemicals
5. Less runoff
Useful Equipment
Irrigation marking flags

Soil probe

Catch-can

Hand-held anemometer
Steps to Irrigation Auditing

1. Site and system evaluation
2. Irrigation system tune-up
3. Irrigation system testing
4. Calculate system performance
5. Report of findings
Site and system evaluation

- Make notes about the system (backflow, water source, meter, controller setting)

- Activate each irrigation zone to visually inspect for proper operation or problems

- Use water meter to measure flow during the audit

- Determine sprinkler spacing
Site and system evaluation

Also make note of:

- Irrigated area
- Plant material
- Microclimate
- Hydrozones
- Soil and root zone
- Slope
Irrigation System Tune-up

1. Why?
2. How?
3. Process

If possible, it is very useful to do a before and after audit to have data to illustrate the importance of maintaining an irrigation system in optimal condition.
Irrigation System Testing
Irrigation System Test

Audit Procedures

- 5 MPH winds or less
- Normal operating conditions (pressure)
- Uniform catch cans
- Minimum of 24 catch cans (unless small area)
- Appropriate and consistent test run times
Irrigation System Test

Catch can spacing:

- Arrange in a grid pattern
- 12-24 inches from the edge
- Sprays spacing should be 5-8 ft. on center
- Rotor spacing should be 10-20 ft. on center
Irrigation System Test

Data to record:

- sprinkler head location
- sprinkler head spacing
- sprinkler make, model, and nozzle
- catch can locations
- test run time
- meter readings
- pressure readings with locations
- wind speed readings
- soil types and root zones
- date and time of testing
Irrigation System Test

Run stations

- Average amount of water should be 1.5 times the throat area of the catch can

- Spray heads - approx. 3-6 minutes

- Rotors - approx. 10-20 minutes

- At least 5 full rotations for large rotors
Irrigation System Test

Compile data

- Measure (in mL) catch can by holding at arms length at eye level. If there are no measurements on catch device, pour into a device with measurements.
- Record:
  - volume of water
  - test run time
Irrigation System Test

Distribution Uniformity

A measure of how uniformly water is being applied to the plants in the measured area.

Lower Quarter Distribution Uniformity

Average water applied in 25% of area receiving the least amount of water divided by the average water applied over the total area.

Scheduling Multiplier

Equation used to estimate the additional run time needed to achieve an acceptable appearance.

Precipitation Rate

Rate at which the irrigation water is applied per unit of time.
Report findings

Compile all of your data, photos, charts, etc into a concise report that will provide the client with the information needed.

- Typically a 1-2 page summary

- Should be replicable
Issues with current system:

Misting due to high pressure
Puddling of water

Runoff
IRRIGATION WATER USAGE BEFORE RETROFIT:

BEGINNING
1,401,081

END
1,401,291

DIFFERENCE:
210

IRRIGATION WATER USAGE AFTER RETROFIT:

BEGINNING
1,401,242

END
1,401,309

DIFFERENCE:
67

TOTAL SAVINGS:

210-67=143 x 7.48 gal/ft3 = 1069.64 gallons (per 10 minutes)

106 gallons per minute savings
Over the course of a year, total savings for this turf area would be over 95,000 gallons.
Rain Bird RD1800 Spray head with SAM/PRS

Rain Bird Rotary Nozzle
BEFORE

AFTER
Now What?

- Continue to maintain the irrigation system
- Consider additional water conserving products
Key Steps to Implement Water-Efficient Irrigation

- Proper irrigation system design
- Use the most water-conserving products
- Proper system installation
- Proper maintenance and usage
Proper Irrigation Design

- Different plants require different amounts of water
- Understand exactly what will be irrigated
- Divide by zones
- Use the right products for the right applications
- Consult a licensed professional
Automatic Controllers with Water Conserving Features

- Multiple start times and multiple independent programs
- Cycle+Soak™
- Water budget
- ET Programming
- Rain Delay
Add an Automatic Shut-Off Device

- Rain and moisture sensors automatically suspend watering
- 15-20% or more in water savings
- A number of states now require a rain shut off device
Use Low Volume Irrigation

- Very efficient for non-turf applications
- Apply precise amounts of water slowly and evenly at the root
- Helps reduce weeds and plant disease
- Helps eliminate runoff
- Helps plants thrive
Provide Optimum Water Pressure

- Use pressure regulating devices in high pressure situations
- Every 5 psi reduction results in 6-8% lower water usage
- Prevent misting & fogging
- Use booster pumps in low pressure environment
Use High Efficiency Nozzles

- Provides uniform coverage
- Can reduce water usage by up to 30%
- Provides even watering at close-in, medium and far distances
- Without uniform coverage, some areas get overwatered to compensate for dry spots
Proper Maintenance and Operation

- Set systems to operate in early morning
- Periodic monitoring is important
- Routine inspections to discover problems
- Adjust schedules when the seasons change
- Adjust schedules when plants change
Additional Resources:

Rain Bird Academy (training)
www.rainbirdacademy.com

Irrigation Association (forms, etc)
www.irrigation.org

*information herein adapted from the Irrigation Association CLIA course*
Questions?