

# WATER AUDITS: Programmed savings

**Want to save your commercial and residential customers money?  
A water audit might be the first step**

BY ROBERT E. REAVES

**W**ith an average annual rainfall of 50 inches, you would never guess the City of Houston would need a water conservation program. Guess again. Groundwater tables have dropped as much as 10 feet in some areas of this sprawling city. Commercial and housing construction continues to grow, increasing the amount of water used for irrigation. Beyond Houston, the entire state of Texas faces an alarming 16.43% water deficit in the next 50 years.

Houston has implemented aggressive conservation efforts, including free irrigation audits for customers with large irrigated landscapes. One licensed Texas irrigator and Certified Landscape Irrigation Auditor (CLIA) is David W. Smith, who is reshaping the way property managers look at water management.

He helped develop the Texas Landscape Irrigation Auditing & Management Short Course while he was with the Texas Agricultural Extension Service (TAEX). "After teaching the course to so many people, I realized what a huge issue water management is in Texas.

He left TAEX and started Texas Water Audits, based in Bryan. In January 2000, Smith signed a three-year contract with the City of Houston to conduct water audits for large water customers. One of the first customers Smith contacted was Camden Property Trust, a Texas real estate management and investment firm with 19 properties in the Houston area.



David Smith reads the volume from a catch device to determine sprinkler precipitation rate.

## Camden's irrigation challenges

It wasn't difficult to convince Michael Binns, central region landscape manager for Camden, of the value of water audits. While previously managing Camden's Las Vegas landscapes, Binns saw impressive savings from water audits. He also is a CLIA.

"Before we took advantage of the irrigation audits, on-site maintenance staff scheduled irrigation," he says. "It was difficult to program the controller clocks properly to the time of year or site condition."

Things have changed. "Once Smith provided us with the recommended scheduling, accountability for the irrigation scheduling and maintenance was transferred to the landscape maintenance contractor. He is expected to follow the schedules exactly, monitor the landscape



and make adjustments to the scheduling as necessary," he adds.

Current controller equipment has challenged Binns. "Many of our Houston properties still have the old mechanical clocks. It's difficult to get run-time precision with them. If you set a run time of eight minutes, you're likely to get 12 minutes of irrigation," he says.

"The existing mechanical clocks are being replaced with digital clocks. They provide the precision and flexibility we need." Binns hopes to integrate modern controller technology into all Camden properties in Houston.

"One of our Houston properties has a central control irrigation system," Binns adds. "It measures ambient air temperature, wind speed, relative humidity and precipitation. All of these measurements are combined to irrigate according to plant requirements and system efficiency."

Central control is a computer system operating multiple controllers, sensors and other devices from a central location. "The new system was installed in June 1999 in the middle of a drought," he explains. "We had twice the rainfall in 1997 and 1998. Even with half that during 1999, we showed a worthwhile savings in water."

#### Apartment problems

Smith says some apartment complexes average 50 to 60 irrigation zones and have these problems:

- ▶ Apartment maintenance



A precipitation rate test is performed on an apartment complex as part of a water audit. The results will be used to establish proper irrigation schedules.

staff or landscape contractors with little knowledge of irrigation scheduling or setting irrigation controllers. Irrigation repair knowledge can be limited, too.

- ▶ No rain sensors or rain sensors improperly located.

- ▶ Irrigation hardware problems (broken sprinkler heads, broken pipes, mismatched sprinklers, etc.).

- ▶ Poor system design problems that were inherited.

"Right now, the hardest part is selling the service to commercial businesses," admits Smith. "Since landscape contractors manage the landscape, property owners assume the contractor manages the irrigation system properly. That's a bad assumption. However, I believe more landscape contractors will include water auditing for their customers in years to come."

#### Big water savings

Can water audits make a difference? "Water savings can be impressive," notes Smith. "From the

audits I've conducted, water savings are at least 30% and often up to 50%. Much of the time, reductions can be achieved simply by resetting the irrigation schedule. Without an audit, there's no way to know the precipitation rate of each zone or how much water you are actually applying."

Smith gives each customer a summary of the irrigation system on a station-by-station basis as part of his audit. This includes:

- ▶ a description of the current

physical condition of the system,

- ▶ a performance summary (i.e., precipitation rate from each zone) based on a catch-can test,
- ▶ recommendations for irrigation scheduling and
- ▶ estimated percent water and cost savings based on following audit recommendations.

Once a property makes his recommended changes, Smith says it is less likely that plant materials will need to be replaced.

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## Property at a glance

**Company:** Camden Property Trust

**Headquarters:** Houston, TX

**Business:** Owns and operates 156 properties dispersed throughout the Sunbelt, from California to Florida, as well as Midwestern markets, including 19 properties in Houston

**Assets:** \$2.5 billion of gross real estate

**New developments:** Multi-family communities in downtown areas





This flooding was caused by a broken underground pipe. It was detected during the site inspection phase of the irrigation audit.



A precipitation rate test is performed on apartment property. The results are also useful to assess distribution efficiency.

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Damage to sidewalks and foundations from erosion and standing water will decrease, too.

Another benefit is better health and appearance of the landscape. "There are fewer disease and insect problems, as well as more efficient use of fertilizer," Binns adds.

Is there a return on repair costs? Yes. "Smith told us if we spend minimal dollars for parts and labor, we should be able to pay back this amount in lower water bills within two months."

The audit process has taught Binns some valuable lessons. "Most irrigation design problems could be avoided through proper planning," he advises. "Before the first plans are drawn, the irrigation designer needs to work closely with the architects and landscape designer."

He says once you get to the installation level, it's too late. Most apartment complex projects tend

to go with low-bid contractors to keep construction costs low. But Binns believes you can head off problems during the early planning stages by:

- ▶ Placing water mains where they are less visible to vandals.
- ▶ Avoiding irrigating long, narrow strips and other areas that can't be irrigated efficiently.
- ▶ Factoring soil type and depth into the design process.
- ▶ Designing irrigation zones according to the plants' water requirements, hardscape and sun.

With irrigation schedules set, this doesn't mean Camden is home free. An irrigation audit only provides a snapshot of the system at a particular time. Tomorrow, there could be electrical problems or broken parts.

### Niche angle for you

Are you interested in providing irrigation audits? With many places around the country in a water supply crunch, the demand for your services is strong. Who are key prospects?

- ▶ Motivated customers looking to save money.
- ▶ Sites with significant water savings potential.
- ▶ Customers with tiered water rates based on water budgets (as in California). Penalties apply to customers who exceed their water budgets based on property size.

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## What can irrigation auditing do?

Irrigation auditing is a three-step procedure to improve irrigation system efficiency and reduce landscape water use. The audit ensures that your landscape receives just the right amount of water, when it needs it and in the most efficient manner possible.

### Step 1: Site inspection

Irrigation system maintenance is an important part of landscape water efficiency. The first step in irrigation auditing is a site inspection to examine the physical condition and operating characteristics of the system. Problems such as broken or leaking sprinkler heads, breaks in lateral piping and misaligned spray patterns are identified.

### Step 2: Performance test

Landscape irrigation systems commonly consist of several sprinkler zones to operate separately. To establish an efficient irrigation program, know how fast each zone applies water (precipitation rate).

A "catch can" test determines actual precipitation rates in each zone. The irrigation controller is programmed to apply specific quantities of water, depending upon the water needs of individual landscape plants.

This test also examines how efficiently water is applied to the landscape. Poor distribution means problems with the system design, excessive or insufficient water pressure or misaligned sprinkler heads.

### Step 3: Irrigation scheduling

The final step in irrigation auditing is developing a customized irrigation schedule that considers individual zone precipitation rates, water requirements for different types of plants, soil type, soil depth and climatic conditions. The plan develops seasonal water demands for landscape plants based on historic climate and rainfall records. Zone run times are then adjusted on a month-to-month basis to apply only the amount of water needed.