

Rain & Reclaim Water Harvesting: Factors for Success... or Failure

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Think Rain & Reclaim Water Options!

Alternative water sources: RWH, condensate, non-regulated GW



SAWS main building is surrounded by an attractive landscape watered with cooling tower blow-down and rain water.

- The system has been working well through drought for over five years!
- Reality Check: Not Easy
 - When SAWS moved in, the scheduling of the system was causing water waste!
 - Backflow on system had to be corrected
 - Faulty potable water back-up wasted one million gallons in a month

Four Opportunities to Succeed...or Fail

1. Design
2. Construction
3. Commissioning
4. Maintenance & Operation

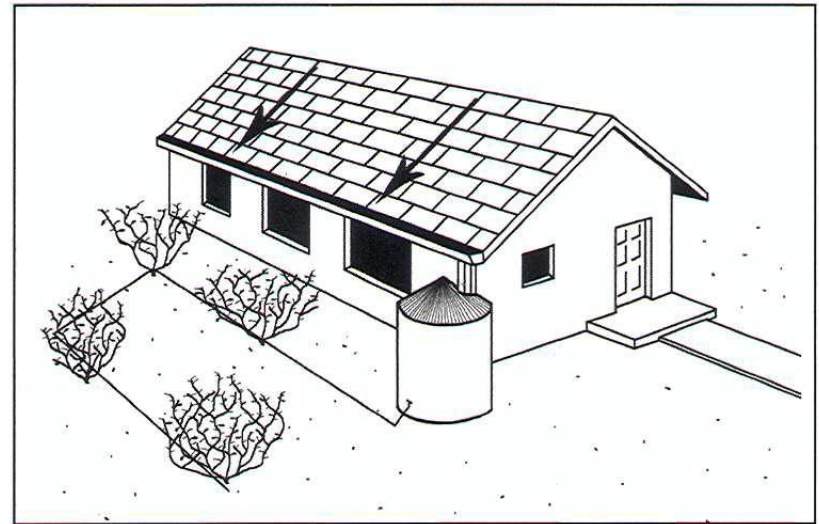


Success Starts with Good Design!

American Rainwater Catchment System Association

How can people in my city find a qualified designer and installer for a rainwater harvesting system?

The ARCSA website menu includes a robust member search engine, [Find a Pro in the ARCSA Resource Guide](#) which effectively identifies members within a selected radius of a zip code.



Complex water harvesting system with roof catchment, gutter, downspout, storage and drip distribution system.

Certified RWH Designers Prevent Problems



- Design should take scope of landscape/irrigation into account
- Should require specialty training & testing in RWH
- Checklists for minimum standards for plan review

Design and installation challenges be resolved before construction begins.

This rustic raised tank requires water to be pumped up a small pipe at a slow rate from an underground tank where it is initially collected.

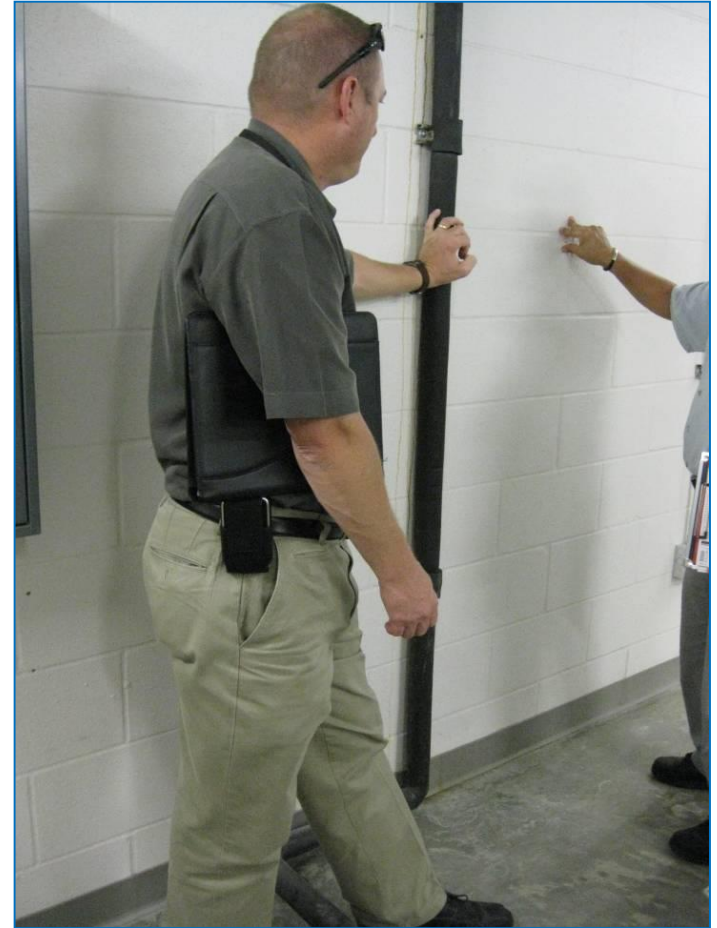
The system quickly developed problems and was operational for only a short time.

LEEDs can cause problems

Bexar County Justice Center



Maintenance relates to design. Condensate from several floors drained into one area to feed system. No meter to measure yield to plan operation of fountain from reclaim system.

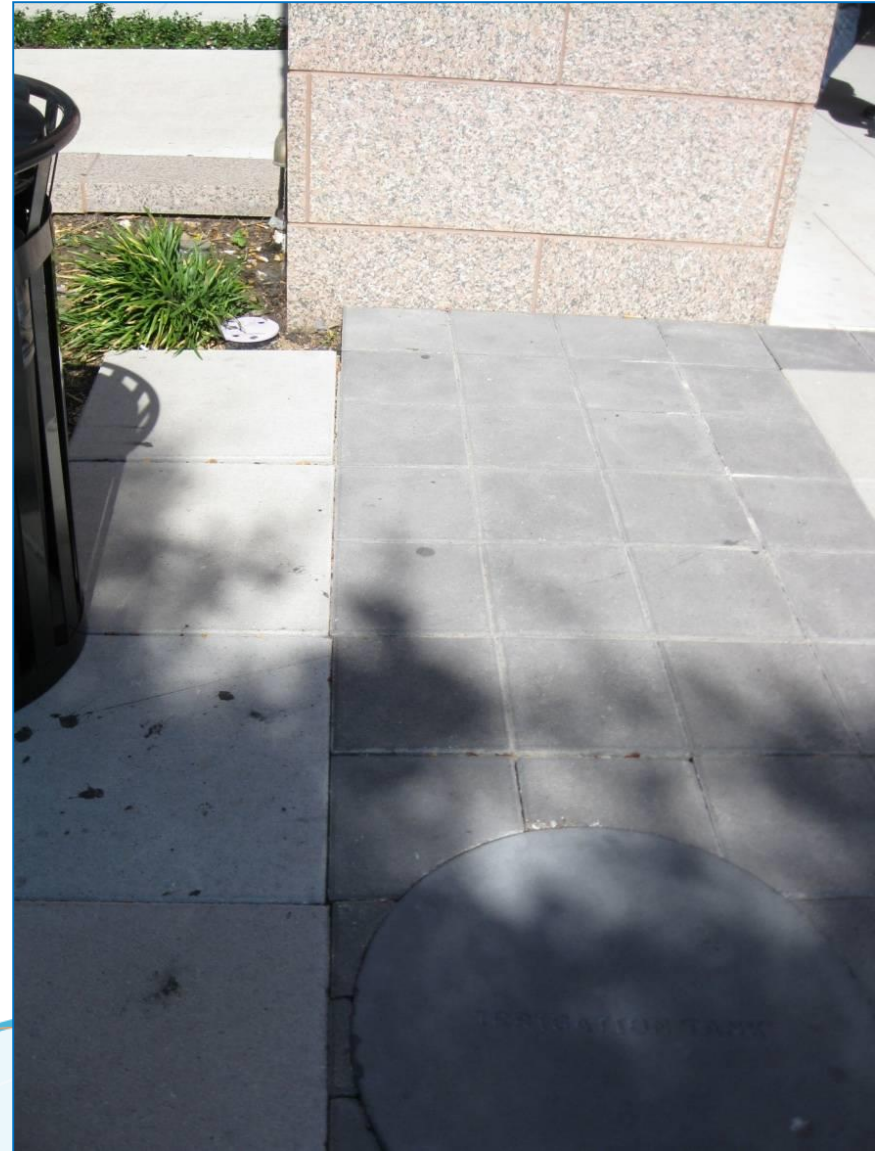


Don't Forget Access in Design

Bexar County Justice Center



Critical equipment located under heavy stone lid that cannot be moved.



Insist on Sustainable Landscape RWH

Set design goal of how much potable water to offset

- Goal: No more than 25% potable make-up
- Options:
 - Increase cistern size
 - Efficient irrigation application methods
 - Modify landscape to sustainable levels
 - Add reclaim water sources



- **This attractive tank holds 6,000 gallons**
- **One irrigation cycle of the irrigation uses 30,000 gallons**



Design & Installation

Design

- Location – access to plumbing & make-up
- Roof composition & square footage
- Tank composition
- Dry or wet line
- Multiple storage tanks?
- Screens
- First Flush
- Overflow

Installation

- **Ensure cistern is level!!!**
- Make-up? maximum and minimum float levels
- Flow or pressure sensors
- Pump – variable speed
- Appropriate controller
- Sight tubes
- **Air gap & backflow device**
- Access!!!!
- **Purple pipe**

Why Require Commissioning?

This is required testing and operations by contractor

- Surprising numbers of alternative water systems never worked
- Alternative water system is often last thing added at the end of high profile projects
- Contractors at fault are long gone once problems discovered

Cautionary Tale:

A builder association put their reclaim tanks under a patio with no reasonable equipment access. Was not tested before contractor was paid.

Case Study – Mission Library

- System installed during extended dry period
- Good design on first flush, but not installed to plan
- Extensive dirt and dust from construction washed into tank after first rain
- Liner had to be rinsed many times...with potable water.



Commissioning to Ensure Function



The large storage tanks from this parking structure have great promise, but the system functions poorly based only on gravity because the pumps installed never worked properly after installation. This should have been better tested after project completion.

- What happens after the ribbon cutting is over?
- Maintenance staff need support for complex systems
- Best intentions will not yield results without operations plans!

Maintenance Plan & Budget



- Design required manual addition of biocide to condensate tanks
- No easy access to tanks and no staff time allocated
- Water fouled and there were health concerns with spray irrigation

This system collected condensate from a large public library. It ceased functioning after a few years due to a lack of support from library maintenance staff. It is hoped that a new planned system has resolved this with a long-term maintenance agreement.

Case Study – CoSA Development

Services — obsolete controller, no training, no air gap, no flow meter



Maintenance Concerns

- Clean Water
 - Roof
 - Screens
 - First flush units
 - Biocide option
- Access to Equipment
- Operational Parts
 - Floats
 - Air gap for potable back-up
 - Pump
 - Controller
- Scheduling
 - Sustainability
 - Balancing availability with run times & water windows
- Standard irrigation problems
 - Irrigation attached to reclaim must be maintained as well
 - Typical problems can double water usage

Success Case Study – Eco-Centro



Match site/plant palette to cistern



SUMMARY

- We can help ensure alternative water works
 - Design
 - Construction
 - Commissioning
 - Maintenance Budget & Plan
- Sustainability? Yes!
 - Match landscape & irrigation to project
 - Project must actually work...not for “green bling”



For more information

- American Rainwater Catchment Systems Association

<http://www.arcsa.org/>

- Texas Water Development Board

<http://www.twdb.state.tx.us/>

- The Texas Manual on Rainwater Harvesting

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