

Design and Operation of a  
Residential Rainwater System for  
Potable Water and Fire  
Protection - Perspectives of  
Designer, Builder and Owner

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# Rainwater Catchment Components

- 6000 square foot metal roof
- 40,000 gallon underground cistern
- Roof Washer
- Ultraviolet disinfection system

# Metal Roof



# Underground Cistern



# Ultraviolet Disinfection



# Roofwasher



# Roof Washer Lids



# Rainwater Catchment Design Parameters

- Sustain 1 year drought (no rain for 10 months) for 4 people
- 24 inches of average annual rainfall
- 10 GPM potable water
- 26 GPM fire protection
- 5000 gallon minimum fire protection
- 2 inches per hour maximum rainfall



# Rainwater Catchment Operation

- High Maintenance during rainy season
- Metal roof slippery – dangerous to clean gutters
- Insects/earthworms enter the roofwasher
- Pollen clogs the mechanical filters
- Collecting water during heavy rain yields good quality water
- Collecting water during light rain yields poor quality water

# Rainwater Catchment Results

- System has been running since 2005
- 40K Cisterns are filled to capacity by early winter (December/January)
- 40K Cisterns maintained to capacity to Spring (April/May)
- 40K Cisterns are drained to 50% by late fall (October/November)
- Tested water quality is good
- Recent improvement to water proof/bug proof roof washer lid to reduce maintenance

# Costs and Alternatives for Rainwater Catchment

- 5X to 10X more expensive than conventional well system
- Underground water storage more expensive than above ground water storage
- Potable water quality more expensive than landscape water quality
- Automation of water catchment/filtration more expensive than manual operation