

Residential Cistern Project

Low Volume Irrigation & Non-Potable Usage

Pasco County, Florida

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Getting Started

- Learn about rainwater collection
 - Cistern Workshops
 - Rainwater Harvesting Guides & Manuals
 - Florida Rainwater Harvesting Initiative
 - Arizona
 - Oregon
 - Texas
 - Virginia

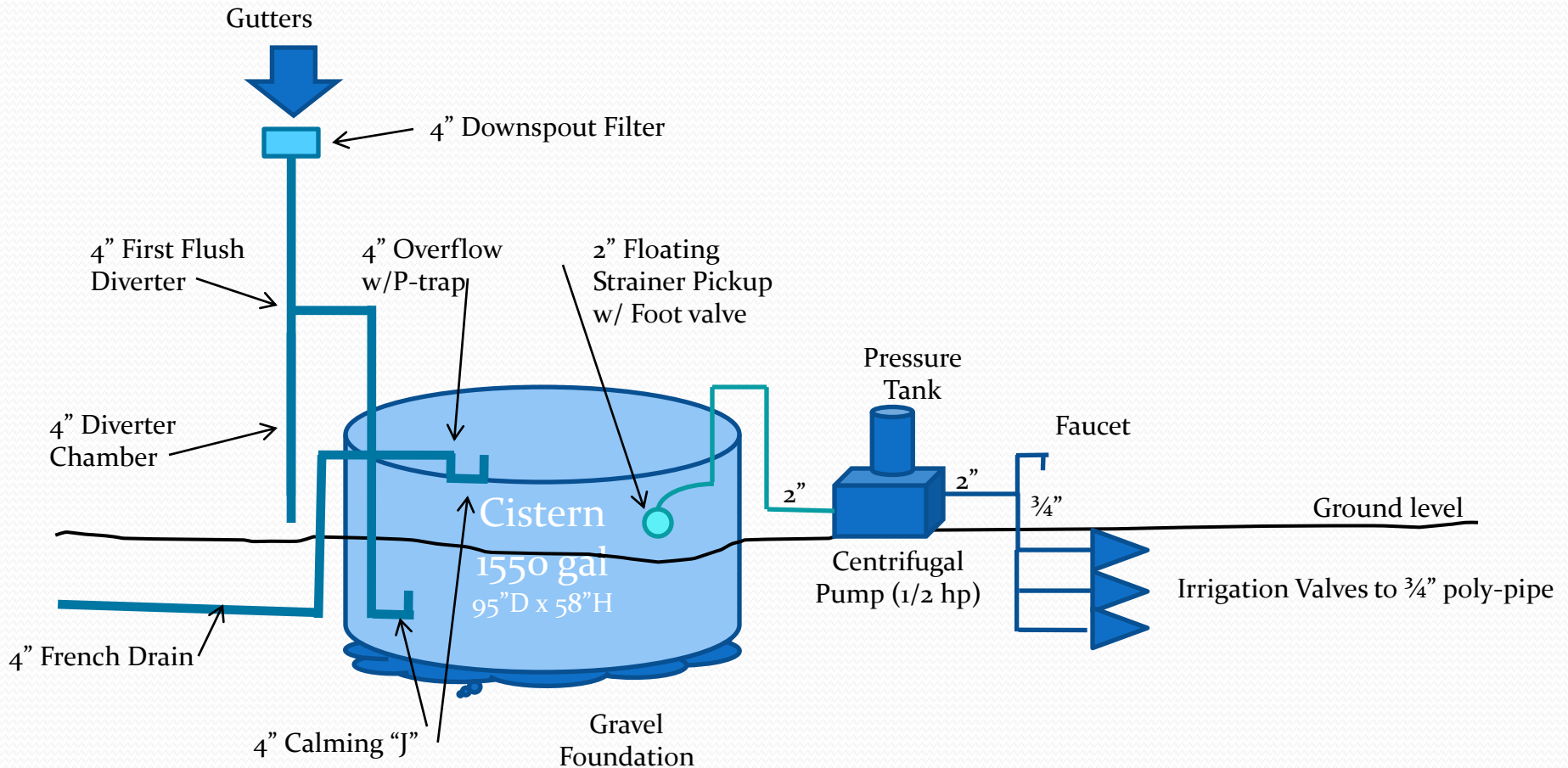
Assessing Capabilities

- Catchment Area
 - Tile Roof of 3100 square feet (~1900 ft² for collection)
 - No overhead trees, so water relatively “clean”
- Storage Capacity
 - Tank of 1550 gallons (due to space limitations)
- Water Usage Target
 - 3 weeks low volume irrigation usage @ twice per week
- Project to be performed by one person

Project Considerations

- Storage tank placement
- Rainwater collection abilities
- Rainwater distribution & pumping
- Other interdependencies
 - Full utilization of catchment area
 - French drains (140') for remaining catchment area (~1200 ft²)
 - Low volume irrigation requirements
 - 1000 feet of 3/4" poly-tubing for 3 zones
 - 600 feet of 1/8" emitter tubing for emitters & drip
 - Automatic controller with rain sensor

Conceptual Design



Storage Tank Placement

- Consider final aesthetics
- Take advantage of existing gutters
- Minimized visibility to neighbors
 - Excavated “34 below grade
- Installation involved:
 - Watering dry sandy soil to stabilize excavation & minimize collapse (excavation diameter was ~12” > tank)
 - Leveling & placing two inches of ½” river rock as tank foundation
 - Verifying lower tank outlet is sealed
 - Orienting hatch for ease of access
 - “Tipping” tank into place (roll ~half of tank over hole & tip into place)



Rainwater Collection

- Consider final aesthetics
- Clean rainwater before the tank
 - Downspout leaf filter with insect screen
 - First flush diverter (~2.5 gallon)
- Inlet “J” to reduce tank turbidity
- Overflow “p-trap” to inhibit insects & prevent entry by rodents
- Installation involved:
 - Determining gutter & pipe angles to assure adequate “fall”
 - Fabricating 4” bulkhead fittings from toilet flanges to save \$\$\$
 - “Dry-fitting” pipes before gluing



Rainwater Distribution

- Consider final aesthetics
- ½ HP centrifugal pump w/ 5 gallon pressure tank
- Used 1-1/2” flexible marine hose w/ foot valve & toilet floats as pump inlet
- Installed 200 mesh screen filter to assure low volume emitters stay clean
- Installation involved:
 - Placing 180’ of ¾” pipe for three hose bibs
 - Check valve inserted before irrigation components to prevent fertilizer backflow
 - Venturi fertilizer injector
 - Three low volume irrigation zones



Other Considerations

- 4" French drains were placed in areas on opposite side of house not utilized for catchment
- Provides supplemental irrigation and completely eliminates property run-off into nearby water bodies
- Plant beds were placed in areas without gutters or french drains
- Installation involved:
 - Digging 140' of trench from ~12-18" deep
 - Used drain sleeves to reduce sand infiltration near down spouts



Results & Lessons Learned

- Storage tank will completely fill with 1-2” of rainfall
- Tank size matches irrigation needs
 - Needed to supplement tank water manually for new landscaping
- Redesigned pump inlet, changing hose type & strainer, to eliminate irregular pressure switch cycling
- Extended french drain 20’ when six inch rainfall event caused erosion
- Was glad tank overflow was sized correctly after heavy rain event
- Investment with shipping:
 - Tank/plumbing: \$1175
 - Pump/distribution: \$600
 - Irrigation system: \$475

