



# RAINWATER HARVESTING

**RW-1** | Tank and Installation Checklist

**RW-2** | System Typical Detail



[www.watershedprogressive.com](http://www.watershedprogressive.com)



[www.watertoolkit.org](http://www.watertoolkit.org)

# Rainwater Harvesting Tank and Installation Checklist



The following are typical best practices for on-site rainwater harvesting systems, adaptable to fit your space.

## 1. Feasibility & Design

- ✓ Identify your rainwater source and size tanks:
  - a. How many square feet is your roof/catchment area? A typical Ventura county home (2,000 sq. ft. roof) can capture up to 21,243 gal/year\*
  - b. One simple approach is to size tanks based on a typical large rainstorm:  
Rain capture volume = Roof area (sq. ft) \* rainfall (ft) \* runoff coefficient \* 7.48 (conversion to gal) \* 1.2 (20% climate shift)  
  
Ojai Example:  
Typical Roof area = 2,000 sq. ft  
95th percentile storm = 2.5 inches (.2 ft)  
Standard Runoff coefficient = .9  
  
Capture volume = 2,000 sq. ft \* .2 ft \* .9 \* 7.48 gal \* 1.2 = 3,231 gallons per storm.  
To capture a large storm the tank volume should meet or exceed 3,231 gallons.
  - c. Rainwater systems under 5,000 gallons with no cross-connections do not require a permit.

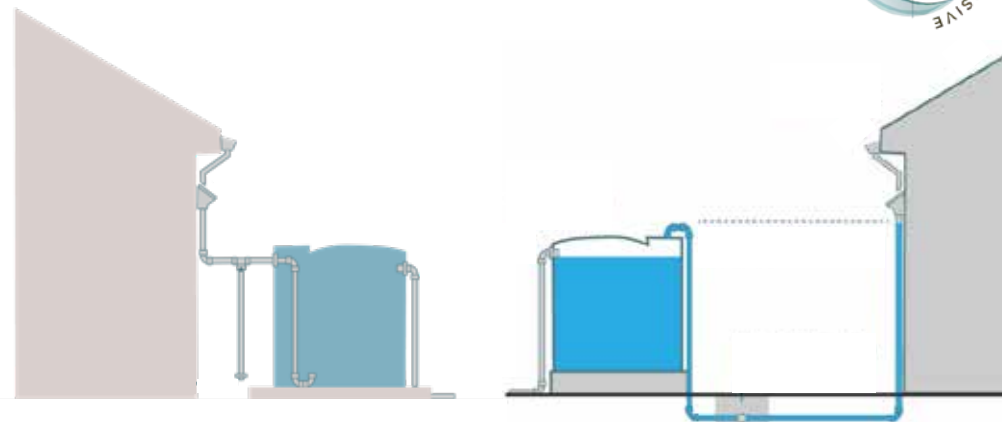
- ✓ Identify your water needs: How much water do you need? Harvested rainwater can be used for irrigation, car washing, livestock watering, toilet flushing, laundry and fire suppression.

- ✓ Locate tanks close to the rainwater source and destination: Identify a location close to the source (downspouts) and close to the irrigation destination (plants). Ensure a setback of 3 feet from any buildings and not blocking windows.

- ✓ Make sure water flows downhill: Check that your rainwater tank site is situated so that it can fill, supply plants, and overflow all by gravity to a desired location.
- ✓ Allow for overflow to a rain garden: When tank is full, water will find a way out. Design a rain garden downslope for rainwater overflow to empty into.
- ✓ Install tank(s) on compacted and level footing: Tanks with height to width ratio greater than 2-1 must be mounted to a structure.
- ✓ Multiple tanks together: Tanks may be plumbed together to fit on a site where one larger tank would not.

## 2. Build It!

- ✓ Hire a professional if you intend to install a large-scale, complicated system or to check correct installation of a small, simple system.
- ✓ Abide by building codes: Ensure that all gutters, roof drains, and associated piping complies with relevant California & County building codes. Over-size conveyance and tanks by 20%+ to accommodate for climate shifts and regional storm intensity.
- ✓ Include a First Flush Diverter: The first wash of rainwater may contain leaves, dust, bird droppings, and other debris. Keeping this part of the rainwater flow out of your rain tank helps keep the tank and supply clean.
- ✓ Ensure that the overflow route is at least as big as the inflow: Your tank may overflow in an uncontrolled way if not sized appropriately. This can cause erosion and/or flooding



### Downspout to Rain Tank - "Dry" System

There are two methods for conveying rainwater to a tank: 1) A dry conveyance system fully drains collected rainwater using gravity and slope. These systems work best when the tank location is closer to its collection roof. 2) A wet conveyance system enables a rain tank to be further from the building. Pipes to the tank go down and then back up in a closed system, using water's desire to find it's own level to push water back up into the tank. Source: Watershed Progressive

### Downspout to Rain Tank - "Wet" System

- ✓ Install spigot or tank outlet 4" above the bottom of tank: This prevents sediment from entering the supply.
- ✓ Paint all installed, exposed PVC pipe: UV rays will break down exposed PVC material.
- ✓ Label rain water pipes and spigots: Use "DO NOT DRINK" label shown below and access points to the tank should be marked with "Danger - Confined Space".
- ✓ Install proper filtration on the supply-end of your rainwater system:
  - a. A gravity-fed hose may not require any filtration.
  - b. Sub-surface drip-line should have a simple sediment filter.
  - c. Rainwater pumped through sprinkler systems must be treated with mechanical and UV filtration.
- ✓ If a pump is required:
  - a. Use an on-demand pressure pump to convey rainwater.
  - b. Ensure the pump is approved by a listing agency and that it is sized sufficiently for the use.
  - c. Consider installing potable make-up water in the event that rainwater is not present.

## 3. Maintain Your System

- ✓ Check your local code provisions for testing of potable water systems and storm drainage systems.
- ✓ Clean and inspect all inlets, outlets, filters and valves on the system.
- ✓ Drain first flush diverter of captured debris.
- ✓ Wet conveyance line systems should be drained after the rainy season.
- ✓ If you live in an area prone to freezing, ensure that your tank has adequate freeze protection.

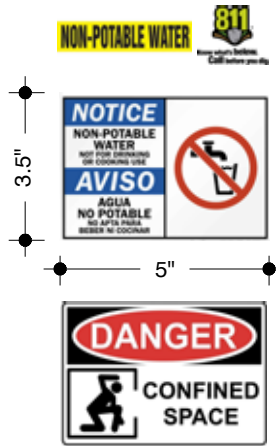
\*[Average rainfall/year (1.42 feet)] x [Average Roof Size (2,000 sq. ft.)] x [7.48 gal/cu. ft.] = 21,243 gal/year

# Rainwater Harvesting System with Make-up Water Valve Typical Detail

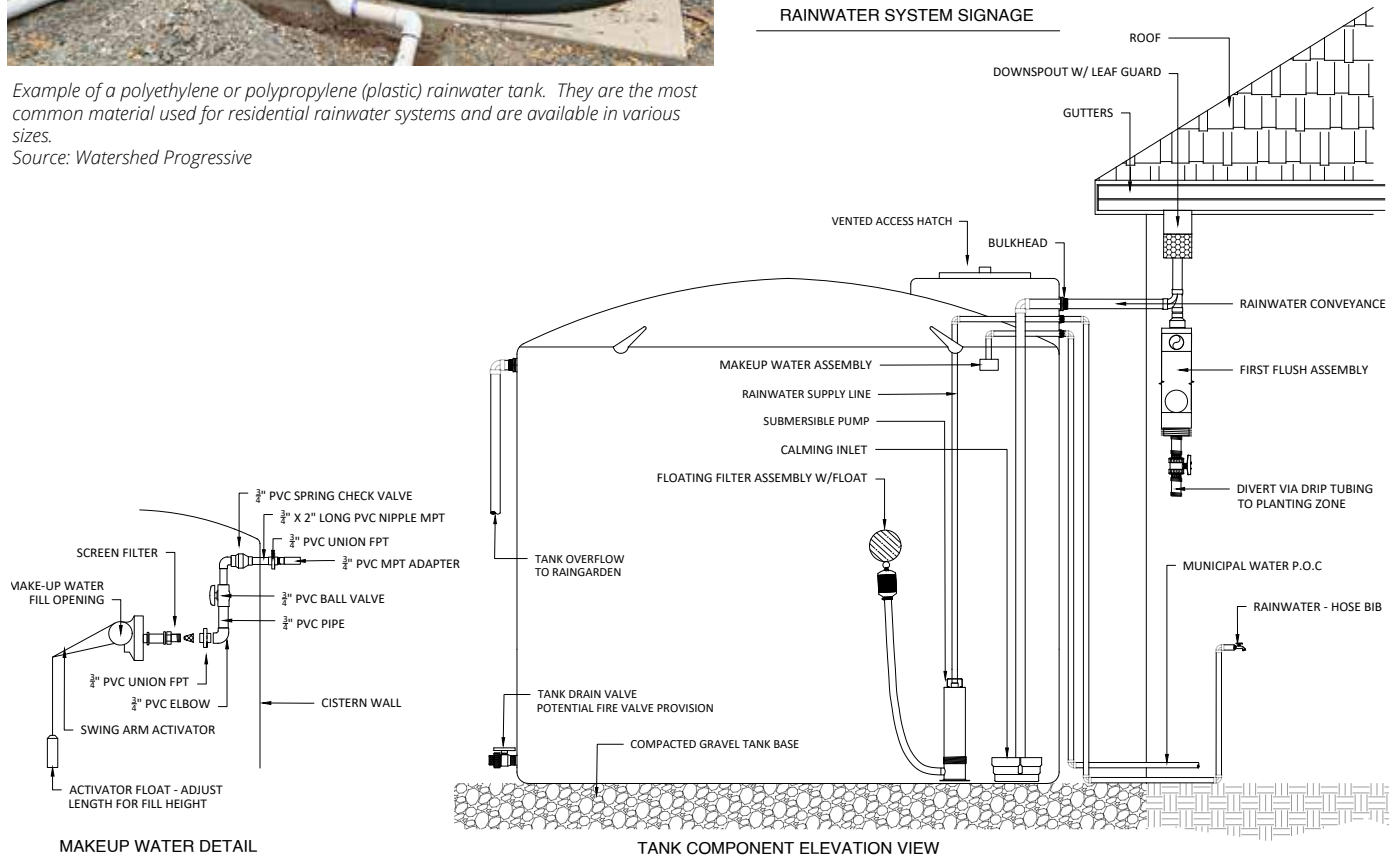


Example of a polyethylene or polypropylene (plastic) rainwater tank. They are the most common material used for residential rainwater systems and are available in various sizes.

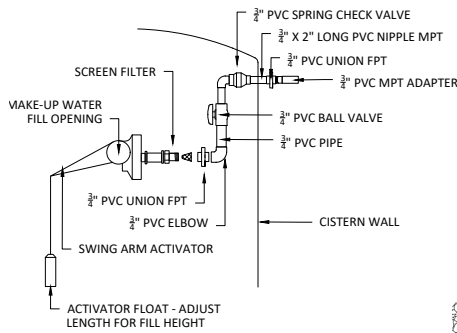
Source: Watershed Progressive



RAINWATER SYSTEM SIGNAGE



TANK COMPONENT ELEVATION VIEW



MAKEUP WATER DETAIL

## General Notes:

- A. The drawings are diagrammatic in nature and are created to represent the concepts as associated with on-site water reuse and storm water management / basin installations. For all site dimensions and exact relative locations, field condition as-builts should be requested from the property owner.
- B. Above ground rainwater tanks:
  1. Each outlet shall be marked "Caution Non-Potable Rain Water, Do Not Drink" in black, capital lettering.
  2. Rainwater piping shall be marked "Caution Non-Potable Rain Water, Do Not Drink" with the international do not drink symbol of a circled water glass with a diagonal slash through it.
  3. Tanks installed aboveground shall be of an opaque material or shielded from sunlight.
  4. Rainwater tanks must be installed with a means of sufficient venting, draining and cleaning, including access for cleaning/inspection.
  5. Overflow sizing shall match or exceed the area of all the inflow piping. Backflow prevention for overflow shall be equipped if the tank discharges directly to the storm drain system.
  6. All tank inlets, vents and overflows shall be protected with a 1/16" or smaller screen.
  7. Seal all gaps in metal sheeting greater than 1/16"
  8. Tank marking: Tanks shall be permanently marked with "Non-Potable Rainwater", personnel tank entrances shall be marked "Danger-Confined Space"
  9. Rainwater pumps serving rainwater catchment systems shall be listed (approved by a listing agency for expected use).
  10. If the rainwater use within a building exceeds 80 psi, a pressure reducing valve shall be installed to reduce the pressure to 80 psi or less.
  11. All gutters, roof drains and associated piping must comply with relevant California building codes.
  12. Rainwater treatment devices must perform to the minimum standard determined by the authority having jurisdiction.
  13. All equipment used for rainwater quality treatment shall be listed or labeled by an accredited listing agency and have approval for the intended purpose.
  14. Tanks and piping installed in regions known to freeze must be provided with approved means of freeze protection.
  15. Rainwater catchment inflow piping or conveyance piping must have a "debris excluder" or "leaf catcher" installed to prevent leaves, needles and sediment from entering the tank.
  16. Prevention devices must be sized correctly for the system, accessible, and installed according to the manufacturer's guidelines.
  17. Rainwater signs in buildings must follow the guidelines of sections CPC 1602.10.1 and 1602.10.2 and other requirements in the California Plumbing Code
  18. Inspection: Rainwater catchment systems shall be inspected and tested in accordance with CPC sections 1602.11.1 and 1602.11.2.
  19. Inspection inclusions: rainwater catchment systems shall be inspected and tested in accordance with code provisions for testing of potable water systems and storm drainage systems. Storage tanks shall be filled with water to the overflow line for a period of 24 hours and during inspection. Seams and joints shall be exposed during inspection and checked for watertightness.
- C. Trenches will be covered during end of work day and crossing boards laid every 4 feet during work day. Trenches to be filled in and set properly.
- D. All above ground pipes shall be protected from human/animal traffic before, during and after installation.
- E. Devices installed shall be ANS/NSF approved. All devices should be accompanied with reference and maintenance instructions as listed in maintenance contract.
- F. "Wet Conveyance" plumbing pipes/systems shall be drained after the rainy season.
- G. First Flush diverter shall be sized according to roof sq. ft. area and expected sediment levels.

## Sheet Notes:

1. Provide leaf guard assembly at each downspout location (A/R per specifications)
2. Provide first flush filter assembly - wall mounted
3. Provide conveyance to rainwater tank w/ appropriate bulkhead size - matched to conveyance pipe size.
4. Rainwater tank specifications or approved alternate:
  - 5,000 gallon nominal
  - Make \_\_\_\_\_ Model \_\_\_\_\_
  - Dimensions \_\_\_\_\_ - NSF certified
  - 24" vented manway access
5. Rainwater pump specifications:
  - Grundfos SBA-3-45 submersible pump w/ floating extractor.
  - 25 gpm, 147 total head
  - 1.4 hp @ 120 vac
7. Tie in tank overflow to bio-swale or equivalent overflow provision/zone.
8. Provide conveyance line to irrigation valve(s) - (A/R per specifications)
  - 5 zone irrigation valve set w/ 24" valve box (typ.)
  - Valve(s): 3/4" Rainbird inline valve w/ flow meter
  - Filter: 100 micron
9. Provide bulkhead with air-gap for municipal makeup line
10. Provide wall mounted rainwater conveyance line from downspout(s) @ 1% slope.
11. Provide "Silent-J" on tank pipe inflow.
12. Irrigation clock: Rachio generation 3 or approved equivalent (A/R per specifications)
13. Route 3/4" municipal makeup water line in trench from hose bib and provide stub-out and 3/4" gate shut-off valve for future p.o.c access.
14. Makeup water valve should be installed higher than the top of the overflow piping to create an air-gap and prevent back flow + a non-return check valve.
15. A dedicated 20-amp 120vac outdoor rated outlet to be installed per all applicable electrical codes.
16. Rainwater tank placement is diagrammatic. Project lead to coordinate placement of tank in field prior to installation of components.