



# Rainwater Harvesting as Stormwater Management

## Sizing Recommendations

Rainwater is clean, cheap, and plentiful. And in most cities in Georgia we have to keep the first inch. So let's use it! This is our one-page guide for how to comply with Georgia Stormwater Management Guidelines, and maximize your investment.

### Calculate Storage Volume Target

Code requires keeping the first inch of rainfall from impervious surfaces from leaving the property. Some codes go further for Rainwater Harvesting and require an additional 35% volume. Why? Because when the Stormwater management method is rainwater harvesting, we empty the tank based on demand. Demand can vary from time to time, especially if that demand is mostly irrigation or cooling tower make up. So the model code decided on a 35% increase in volume to compensate.

At this moment, the Volume calculations are as follows:

City of Atlanta: impervious surface x .6 for all residential and small commercial.

Most other areas: impervious surface times x .6 × 1.35.

The Georgia Water Tanks recommendation is approximately 1 gallon of storage per square foot of impervious surface, which is just a bit more that the codes require.

With a minimum and an optimum volume in mind, choose your tank type, and find the volume that's right for this project.

### Tank Location

The next question is, once we have determined our approximate volume, is where to put the tank. And most new construction projects, underground is a better choice. It's easier to route the drainage piping to the tank, and we don't have to worry about existing landscaping. Also freeze protection is easier when all the piping is underground. Above-ground tanks are generally less expensive, but the piping and location can be more challenging.

### Tank Type Recommendations

The chart below is our recommendation for different projects

Underground tanks: up to 5000 gallon, use Infiltrator tanks if possible. If traffic rating is required, use Cultec model 902.

Larger underground tanks: Cultec model 902 is lowest cost and most flexible design. Maximum tank depth is approximately 8 feet of cover plus 8 feet of tank depth.

Underground fiberglass is more expensive, but more space - efficient. It also has the longest warranty and is easiest to repair.

We know that they are popular, but we cannot recommend concrete tanks. We just see too many that leak. While a crack and a leak might be okay for a stormwater management vault, we want to use our water.

Above ground tanks: plastic tanks are least expensive up to approximately 10,000 gallon. Use multiple 2500 or 3000 gallon tanks instead of the larger ones. They are less expensive and easier to handle. Use flexible pipe between them, and set them 2' in the ground if possible.

We recommend corrugated steel tanks above 10,000 gallon. Keep eave height below storm pipe level.

For all above ground tanks, avoid a "wet system," with a loop of downspout water, if at all possible. Georgia Water Tanks has a solution to prevent freezing and contamination, if necessary, but better to not need that.

### Rainwater Prefiltration – The Most Important Step

The next step is to place the rainwater pre-filter. For residential jobs, the Leaf eater is a cost-effective, simple, and reliable device. Locate one on each downspout, at least 6 inches above the overflow height of the tank.

For commercial applications, or if the aesthetics of the Leaf eater are undesirable, then use the Intewa Purain. The Purain can be located inside most tanks, and is integrated with the overflow. Generally the Purain should be sized the same as the stormwater piping, but check the Georgia Water Tanks website for specifics.

Good piping practices in the tank are critical to maintaining water quality and preventing mosquito growth. Some key components are the calming inlet and skimming overflow. See the drawing sections at Georgia Water Tanks.com, or follow the ARCSA guidelines.

Tank overflow should be directed to a rain garden or other Stormwater detention BMP.

### Pump Sizing

Pump sizing could be another white paper, but here is the summary.:

A 1 hp pump is generally sufficient only for the smallest of irrigation loads, or for garden hose – only irrigation. A 2 Horsepower pump will generally be sufficient for irrigation up to a 2 acre lot.

For commercial jobs, cooling towers are an excellent use for rainwater. A building seven stories tall will use all the rain water available, just on cooling tower make up!

If cooling towers + irrigation is not a sufficient demand, then toilet flushing is the next – best alternative. It's more expensive, but has a very high savings on water cost. A five story building will use all the water available just on toilet flushing.

A three-story building with cooling tower load will use all the rainwater available.

A two-story school, with both toilet flushing load in the winter and cooling tower + irrigation load in the summer, will utilize all the rainwater available.

### Pump Recommendations

Residential pumps can generally be submersible. We like the Pedrollo UP for many reasons, including flow/pressure characteristics, tank utilization, and available power choices.

Control for these pumps can come directly from the irrigation controller, if one is used. Otherwise use the ElectroVarem pressure – based pump controller. Go to QuantumFlo.com for Pump sizing for larger projects, both Plumbing and Irrigation.

### Standby Water Connection

Many early rainwater designs did not take advantage of the high water pressures that we have for most projects in Atlanta. This leads to increased initial and operating costs, and reduction in reliability.

If city water pressure is at least 20 pounds higher (before backflow preventer), then a PRV is the best choice for standby connection. It can be piped to the downstream side of the pump. Set the PRV 10 pounds less than the pump setpoint.

If street pressure is borderline, then an irrigation zone valve will provide less pressure drop. This will need to be integrated with the irrigation controller. Refer to the drawing section for details.

Contact us for specific recommendations for high-rise buildings that require domestic water boosters.

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