



## Ridge Road Water Tank Improvements

Perkasie, PA

### Perkasie Regional Authority

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In 2001, following the tragic events of 9/11, the Perkasie Regional Authority set about analyzing the security of their water supply system and came to the conclusion that the existing reservoir was the place where they were most vulnerable. As a result, when the time came for the reservoir to be repaired, the Authority elected to instead replace the reservoir, leading to the construction of a new pre-stressed concrete tank (above). The new concrete tank, constructed by Preload LLC, is a drastic improvement over what was previously in place. With a longer lifespan, heightened security, and a “set and forget” mixing system, the new tank allows for continued service to the town of Perkasie with less stress for the Authority.

**Existing Conditions** - Built in 1896, the existing reservoir was created to service the existing Borough of Perkasie. Built with a brick and concrete foundation, the tank was split down the middle by a dividing wall in order to allow for easier maintenance and upkeep. As such, the structure lasted over 120 years and was still in decent shape.

However, the increase in technology and threats that came over the course of the century led to the need for a cover, which was implemented in the 1970s. With a fabric cover that had decomposed egregiously (outliving its expected lifespan by nearly two decades), the tank was in dire need of repair, and given the relative vulnerability of an unsecured tank, the Authority decided to simply replace the entire structure. Of the various options available, a pre-stressed concrete tank was selected due to its ease of use and its durability, with the intention for it to last another hundred years.



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**Building Process** - After the original reservoir was demolished and the subgrade prepared, the foundation of the tank was poured. While the floor cured, the tank wall panels were precast on-site around the perimeter of the tank. The panels were constructed through an efficient stack-casting process in casting beds shaped to the curvature of the tank wall. A crane was then utilized to erect the panels, and shotcrete was used to fill in the seams.

For the construction of the roof, reinforcing steel was placed in perpendicular directions throughout the dome shell, and then the concrete was poured onto the form. Shotcrete was again used to coat the outer layer of the tank, insulating the metal panel reinforcements. And all this was ultimately followed with a few layers of Tammscoat, a LEED-approved coating used to extend the life of the tank (as well as to recolor it).

**Mixing System** - One of the more recent concerns among water systems is the problem of water age - that is, the amount of time water sits in a tank before being used by the system. This is important because the chlorination of the water can fluctuate over time, and so the tank must be designed with a "first in, first out" mentality. As such, we utilized Landmark to create a computational fluid dynamics (CFD) model, which determined the best design for our tank's mixing system. Landmark then shipped the system in pieces to our site to be assembled inside the tank. Their mixing system used the inflow forces to thoroughly mix the tank automatically, creating a "hands off solution" to water age in the tank.

