

## Going "GREEN" Provides Silver Lining for Henrico School

A greener future awaits incoming students at two new schools scheduled to open in the Henrico County, VA district in 2010. The new middle school is expected to receive the U.S. Green Building Council's coveted LEED status and new high school is anticipating the first ever "silver" LEED certification in the county.

These state-of-the-art schools will be home to 1,800 students and will provide a nurturing environment for their education. Although not originally planned as a "green" building design, the pro-active school board of supervisors made a commitment to environment stewardship, conservation, and water recycle/reuse systems.

**The Leadership in Energy and Environmental Design (LEED)** Green Building Rating System is the "green" building design tool and establishes the criteria necessary to improve student well being, environmental performance and economic returns for buildings using innovative practices, standards and technologies. LEED silver certification, for example, has certain requirements based on the Green Building Rating System. The rating system represents the U.S.

Green Building Council's effort to provide a national standard for what constitutes a "green" building.

The philosophy of a "green" building is a minimalist approach to the environmental impact development, in this case the school, has on nature. The reduction of waste, pollution and resource degradation is the main focus of the concept. The spotlight in design is to create ways to live within the flows of nature. A good example is the development of rain water harvesting systems. A well engineered system design provides reduced flood occurrence, erosion control, storm water management, and reduced reliance on the municipal water supply.

Because the county understands that fresh water is one of our most important natural resources, a rainwater harvesting system will be an integral part of obtaining the points needed for LEED silver status at the new high school.

The proposed rain water system would involve using rainfall that would otherwise be collected as surface runoff and channeled through the municipal storm water system. The free rainwater will instead be stored in a cistern and used for flushing low flow toilets which does not necessitate the use of municipally treated water.

The use of an efficient collection and distribution system at the school not



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only promotes water conservation, but also promotes and aspect of sustainable development of such an irreplaceable resource.

The feasibility of a rain water collection system is the sum of its components. All components of the system must be environmentally efficient. In other words the system must work towards achieving the optimal use of the existing water resource.

The framework of the rain-water collection system consist of a cistern to collect water, transfer pumps to convey the stored water to the building, particulate filtration to remove sand/grit, and a disinfection system to kill bacteria and contaminants that may be present in the water.

## The Cistern:

The cistern at the new high school will be a rugged 50,000 gallon Highland Tank HighDRO™ protected steel underground Rainwater Collection Tank. The 100% recycled content of steel was a natural choice for the storage tank but other benefits of protected steel include compatibility of materials, inherent strength of the tank in order to withstand over ten feet of overburden, and, most importantly, the security of the stored water.

Unique features of the cistern include inlet diffusion baffle, NSF compliant polyurethane internal coating, HighGuard 30-year polyurethane external coating, overflow with trash skimmer, easy access man-way, and duplex pump package. The pumps utilize floating suction to convey clean water to the building. A level sensor will be designed to

control all aspects of the cistern's contents and send a continuous signal to the building management system (BMS).

## The Filtration System:

Particulate filtration is the first line of defense in a rain-water collection treatment train. The filtration system will consist of a staged removal process with a unique piping configuration so as to make the system redundant for ease of maintenance.

## The Disinfection System:

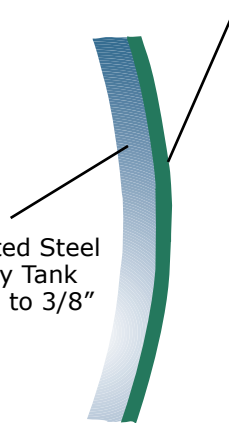
The primary means of disinfection will utilize UV (ultra-violet) light with a secondary chlorine drip to provide a residual means of disinfection detection. The piping system will also be configured in a redundant fashion to provide a secure flow of clean water on demand.

## The Day Tank:

Once the water passes through the complex treatment system, it will be stored in an indoor tank to provide water for the urinals. The tank will be a 1,500 gallon protected steel storage tank that includes an NSF compliant internal lining, overflow, and level sensor to

## HighGuard

A 75 mil (min) of coating is applied to the steel grit-blasted tank surface



UL-Listed Steel  
Primary Tank  
10 Ga. to 3/8"  
thick

*The HighGuard protective coating is a solvent-free, tar-free, two component polyurethane coating system that will provide permanent and effective corrosion protection for the effective life of the tank.*

*HighGuard's 75 mil coating is extremely resistant to surface damage due to impact or abrasion that may occur during transportation and installation.*

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control pumping sequence. A triplex booster pack will provide clean water to the fixtures with a maximum flow rating of 220 gal. /min.

The determination of the size of the system utilized complex engineering and involved accurate measurement of the rainwater catchment area. In this case, the roof served as the main collection point and was designed to supply sufficient amounts of rainwater to the cistern.

The sizing of the cistern was based on the annual rainfall, storage needs, and demand.

A well engineered system such as this will supply uninterrupted clean water to the fixtures during the entire school year.

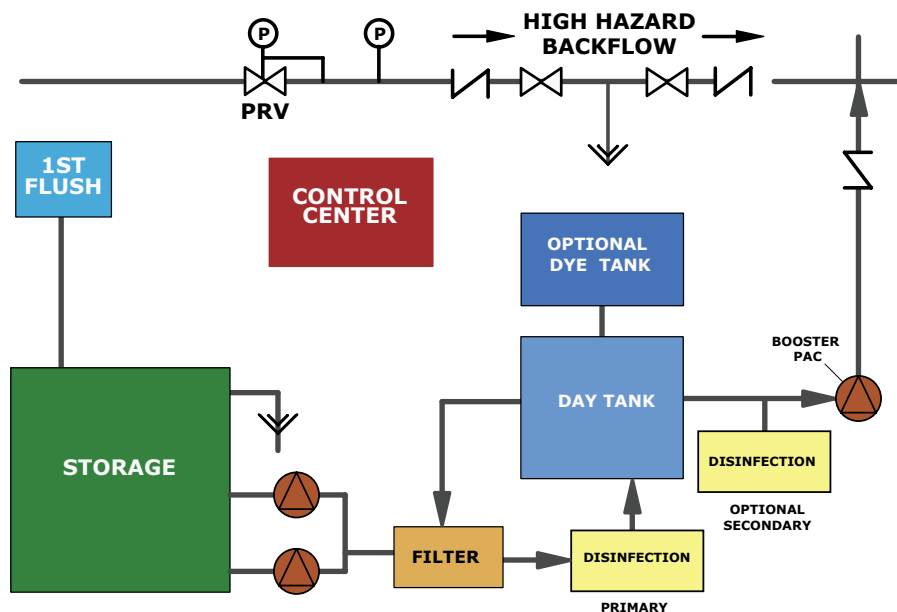
In today's day and age of increased environmental concern over sustainability, designing and constructing our buildings to reduce our ecological footprint is not only popular, but essential.

The introduction of "green construction" in the schools throughout the "Old Dominion" will not only reduce our schools ecological

footprint, but also set the stage for future sustainable developments.

The "green schools of Henrico County and their high-tech rain water collection systems will be the blue ribbon science project in environmental technology for the whole state of Virginia.

## Rainwater Collection System



## Highland Tank

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