

NORTH FEATURES

Going Vertical

Longwood Gardens grows up and out

by Patrick White



This rendering shows what the vertical green wall—the largest of its kind in North America—will look like once it is completed and open in early October.

PHOTOS COURTESY OF LONGWOOD GARDENS.

Longwood Gardens (www.longwoodgardens.org) in Kennett Square, Pa., is one of the wonders of the horticulture world. With more than 1,000 acres in its possession, including some 20 outdoor gardens featuring everything from vegetables to topiaries to flowers, and four indoor gardens containing more than 11,000 different plant types, you wouldn't think there would be much else Longwood Gardens could do to attract the attention of horticulture professionals and the general public. However, a new East Conservatory Plaza has been constructed that is sure to further amaze and intrigue the 750,000 visitors who come to Longwood Gardens every year. Two of the highest profile features of the East Conservatory Plaza are very different (one indoor and one outdoors, one made of turfgrass, the other of ferns), but share one thing in common: they take on the challenge of growing on vertical surfaces.

A turfgrass amphitheater

Perhaps inspired with the success it has achieved growing turf and plant material on traditional, level surfaces, Longwood Gardens has decided to up the level of difficulty. "The amphitheater is made completely out of turfgrass," explains Shawn Kister, grounds division leader at Longwood Gardens. "The risers are turfgrass, and the seats are turfgrass." The tricky part, of course, is the vertical risers.

Tuckahoe Turf Farms was contracted to grow a specially selected sod for the project. “They grew the sod for about a year and a half for us,” says Kister. Tuckahoe also worked on the installation alongside Kister and his grounds team. The mix is 90 percent tall fescue and 10 percent bluegrass. “I worked with the U.S. Golf Association on the selection of the turfgrass cultivars, and we came up with a mix,” he says. “The amphitheater is going to get a lot of use. We chose the tall fescue because of its wear tolerance and the fact that the area is in shade until about 10:30 a.m. We didn’t think a [straight] Kentucky bluegrass would be a good fit for this application.”

Compounding the growing challenge is the fact that the subsoil is 95 percent compacted to achieve the necessary shapes and edges. On horizontal surfaces (i.e. the seating and stair treads), 4 inches of topsoil with StaLok (a synthetic fiber that strengthens soil) in it was used, and these areas will be serviced by traditional overhead irrigation. On the vertical surfaces that make up the risers, drip tube was placed behind the layer of StaLok, which was topped by 2 inches of topsoil.

The project involved significant amounts of sculpting, and because of the sharp (nearly 90 degree) angles joining the riser and seat areas, sod was installed quickly once a given area had been sculpted. “We had to get on it and sod it quickly,” says Kister. After several weeks of prep work, the final shaping and sod installation took place in about three days in early September.



As if traditional turf care doesn’t provide enough challenges, construction of an all-turf amphitheater at Longwood Gardens introduced the added challenge of installing and maintaining grass on vertical surfaces.

The hardest part was placing turf on the vertical faces. Sod was laid down on the seat area and draped over the edge, and to ensure a sharp, crisp angle, the sod was cut on the corner and some soil removed on the back of the sod so that the two pieces could be brought together perfectly, similar to the coping technique a finish carpenter might use on outside corners. Biodegradable sod staples were used to hold the sod on the vertical walls in place until it could root-in. “It was extremely slow and meticulous, it was a very unusual project,” says Kister.

Post-installation mowing will require a similarly painstaking process. The horizontal surfaces range in width from 8 inches to about 7 feet wide and can be mowed with a push mower. The vertical surfaces will be mowed using a 16-inch Hover (fly) Mower. “We did a mock-up last fall that we

played around with to figure out how to maintain it and what the watering requirements will be. We found that by using a smaller Hover Mower, we had a better chance of not scalping the edges,” explains Kister. “The operator will stand above and lower the Hover Mower down onto the vertical slope.” It’s a steep challenge, no pun intended, but Kister says the grounds crew is up to the job.

Indoor green wall

Given Longwood Gardens’ devotion to all things gardening, and its existing incredible indoor plant collections, it’s not surprising that it wanted to plant nearly every inch of its new East Conservatory Plaza, including perhaps the most unlikely of areas: vertical, interior walls. Using a

specialized system, the installation represents the largest “green wall” ever installed in North America: a massive 3,590 square feet worth of vertical surface.

“The size and beauty of the green wall will amaze our guests, as well as advance our continuing commitment to sound environmental practices,” says Paul Redman, director of Longwood Gardens. The project was designed by British-based Landscape Architect Kim Wilkie, along with the firm Wells Appel of Philadelphia. Installation was handled by Bancroft Construction and green wall specialist Ambius (www.ambius.com).

Denise Eichmann, senior project manager with Ambius, says the vertical wall at Longwood Gardens has a “very organic” feel to it. “There’s really two ways that you can go: either a very manicured look where everything is trimmed very tight like a hedge and companies can even add their logo in the plant material, or a more natural, organic approach,” she explains.

The Longwood installation features some 47,000 plants, so there’s plenty of opportunity to add color and depth. “The colors and patterns run in waves, and it’s not flat to the wall, the plants come out a good foot from the wall,” says Eichmann.

The G-Sky green wall system is a “modular, panelized system,” says Eichmann. Stainless steel grids are hung on a wall, and 12-by-12-inch stainless steel panels are hung onto that grid. Those panels are about 4 inches deep, which provides the space for the growing media. “The growth media sits inside a type of landscape bag, and the front side of the panel has 13 holes cut into the growth media, about 2.25 inches each. That’s what we plug the plants into. We buy 2-inch liner plants and plant them into those holes,” she explains.

Typically, with this type of system, the plants are grown in the panels at the nursery for some time prior to actually being installed on the wall. In the case of the Longwood Gardens green wall, the plants were grown for about six months at a nursery in Florida prior to being trucked to Pennsylvania for installation. “So, it was really nice and full by that time,” says Eichmann.

Even with the modular system, installation can be tricky, especially in cases, like at Longwood, where the panels must be installed in precisely the right location on the grid in order to achieve the patterns called for in the design. Each panel is numbered and has to be hung in sequence. “They clip onto the framework, and when you hang it on the wall we do one row going across the bottom, and then install a piece of custom dripline with emitters spaced every 4 inches, so every panel has three emitters going into it,” says Eichmann. After that, another row of panels is hung, followed by another piece of dripline. The growth media used is not a traditional soil, so nutrients are supplied via the irrigation system using a hydroponic-like approach.

Once installation is complete, the irrigation system must be operated and each panel felt by hand to be sure it is getting the correct amount of water. “It’s really a lot of hands-on work for the first month or so,” says Eichmann. The Longwood Gardens installation is so large that two people have been assigned to work full-time on its maintenance, which includes significant clipping and grooming of the ferns and other gardening work.

The design of the wall and the dripline was broken up into 24 different zones, based on a number of factors, such as the amount of sunlight each area of the wall receives, as documented in a “light study” about how light comes into that room. “Each zone runs separately, so we have the

capability of changing the timing and frequency on plants that are, say, on the bottom of the north-facing wall versus those on the top of a south-facing wall. It allows us to control and deliver the correct amount of water to the plants,” says Eichmann.



Once installation is complete, the turf amphitheater will be maintained with a combination of push mowers (flat surfaces) and Hover Mowers (vertical surfaces).

The drip system is also monitored remotely from G-Sky’s headquarters in Canada to ensure it is performing properly. “They can see if the power has been off at any of the systems. There are also moisture sensors, so if it gets too dry in the wall, it will turn that zone on,” says Eichmann. “On outside walls there are even freeze-thaw sensors built into the wall. If the temperature drops below 35 degrees, it will automatically drain the entire system. When it warms up during the day, it automatically recharges the system.”

Vertical green walls can be installed in interior or exterior spaces. “It just changes the plant material, but the system is the same,” says Eichmann. “It’s good for the environment-in cities they can get rid of carbon dioxide and clean the air just like trees do. And, we always say there’s only one rooftop on a building, but there are four vertical walls.”

Patrick White is a freelance writer and editor who has covered every aspect of the green industry in the past 13 years. He is based in