A KY EXCEL CASE STUDY

LOCUST TRACE AGRISCIENCE CENTER

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Students learn about sustainability firsthand at Locust Trace.

The academic building contains many energy-efficient features and a green roof on the porch.

In 2005 when Fayette County School System officials conducted a survey of local students, the results indicated there was an interest in and need to expand the existing horticulture program. After years of research and development, an opportunity to acquire property resulted in 82 acres of prime real estate being acquired by the school district through a federal land grant. As a result of thoughtful planning with consideration for the environment, Locust Trace AgriScience Farm, was opened in August 2011.

Locust Trace campus, now called the Locust Trace AgriScience Center, features an arena, academic building, automated greenhouse and a livestock barn. There are 310 students, with the majority of them from Fayette County, who learn in a variety of settings that extend beyond a typical classroom—from an outdoor classroom to pastures and the barn to the operating on-site veterinary clinic.

Animals living at Locust Trace include horses, miniature donkeys, goats, hogs, cows, cats and baby chicks. Hay, feed and farm equipment storage areas are in the barn. The nearby arena building has 11 barn stalls, a show arena, office space and an apartment for the off-hours farm caretaker.

Composting and muck bins on the property provide fertilizer for the gardens and planted fields. In the aquaculture lab, attached to the greenhouse, there are tanks of tilapia being raised and sold to the public. Each area provides learning opportunities for the students.

“This facility leads the way in our district by pursuing net-zero energy usage and sitting lightly upon the land,” says Sara Tracy, Community Liaison at Locust Trace. “The campus provides students with a rare opportunity to research the impact humans can have upon the natural land and animals that inhabit the untouched areas.”

Locust Trace uses far less energy per square foot than any other building in the school district, which can be attributed to the green features at Locust Trace, such as the solar thermal heating system, solar hot water heater and solar photovoltaic panels, in addition to using natural daylighting and cooling many of the rooms with high-volume, low-velocity fans. A digital Plug Load Control minimizes energy usage during nonoperational hours. The academic building was constructed so the majority of the roof surfaces face south to benefit the solar panels.

Key to Success

Examine everything you do to determine how to lessen your impact on the environment.

Logan S. Poteat, Energy & Sustainability Manager for the Fayette County Public Schools, says the solar panels at Locust Trace will produce around 9,000 kWh monthly, which is enough to power 10 homes. In the summer when the sun is bright and there is minimal cloud cover, the panels have produced over 15,000 kWh. In winter months, they have produced as little as 3,000 kWh.

"Locust Trace is comparable in size, usage and facilities to our other two technical schools, but the difference in the total energy cost of Locust Trace versus our other technical schools is astounding," says Poteat. "The annual energy costs alone for Locust Trace are more than $30,000 LESS than either of the two other technical schools. This does not include the cost savings from other green features at Locust Trace."

In the greenhouse, each of the three bays has programmable controls that manage the plant watering, fertilizer content, zone temperature, ventilation and sunshade position, depending on the type of plants that are being grown.

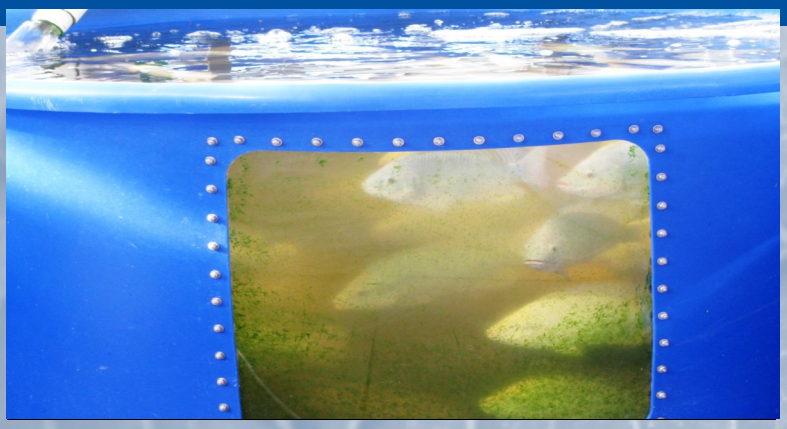
Locust Trace uses a minimal amount of water from a municipal utility. Low-flow plumbing fixtures help reduce the center's water usage. Rainwater is collected from building roofs and stored in underground tanks for irrigation and livestock watering. Well water is stored in a 20,000-gallon tank as a backup to rainwater catchment. Rain gardens on the property manage the stormwater, and constructed wetlands clean the gray water and wastewater, gradually releasing it underground.

All roads and paths consist of permeable pavement to allow for natural drainage of rainwater, which makes it unnecessary to maintain any type of storm sewer system on the site. These measures saved the school system the cost of bringing in sewer utilities, which was an immediate payback on the investment.

Locust Trace is a member of KY EXCEL, Kentucky's voluntary environmental leadership program. For its environmental project, Locust Trace constructed the facilities to meet LEED-certification standards, although the school system did not have the center certified.

"Locust Trace is happy to be a part of KY EXCEL, which is focused on protecting the environment," says Tracy. "It may seem like a daunting task to make changes on your own, but, when we work together, incredible things can be accomplished. KY EXCEL is an opportunity to bring organizations together for this common goal."

At Locust Trace, environmental awareness does not stop with construction of the facilities or membership in environmental protection organizations. Instead, it continues by closely monitoring migratory patterns and wildlife habitats, as well as studying the school's impact on soil, vegetation and underground water tables. The use of photovoltaic cells, smart design and monitoring allow students to take ownership in the net-zero vision for the campus. Students are engaged in sustainability in action and make this a part of their everyday lifestyle.



Caption Left: Tilipia are raised at Locust Trace and sold to local restaurants. Right: Permeable pavement allows rainwater to drain naturally.