



Project Summary

The management of society’s waste, once overlooked as a burden to simply dump onto the Earth, has grown in public awareness during the last several decades as critical to sustainable planning. For the 2020 Solar Decathlon Design Competition, we are excited to work with a client that is setting the gold standard for contemporary waste management in our home state of Virginia. The Prince William County Landfill is currently designated as an Extraordinary Environmental Enterprise (E4) participant in the Virginia Environmental Excellence Program (VEEP), a title virtually unheard-of for active landfills. Their use of innovating recycling technology, landfill gas harvesting, and much more, attracts visitation from professionals around the globe. Their vision is to build the landfill as an Eco-Park, an important community resource. They desire a new center to house their administrative staff that doubles as a nexus for STEM education and community engagement. This is where we - team Compositive - propose the Eco-Park Learning Center.

Design Strategy

The design strategies approached within this project are inspired by the seven petals of the Living Building Challenge, which will establish the office building as the gold standard of Prince William County’s environmental and community stewardship. Our goal is to seamlessly integrate the Eco-Park Learning Center with its ecological and cultural fabric. We employ a macro strategy that optimizes the building’s relationship to sensitive ecological habitat, walking/biking trails, local schools, and cutting-edge landfill facilities. At the micro scale, we use responsible materials such as structural CLT panels and engineered wood beams/columns. Recycled glass appears as paver blocks, ground filter sand, and concrete aggregate. Efficient energy systems and a high-performance enclosure reduce the building’s carbon footprint over its lifecycle. Our multi-tiered design team, spanning the domains of architecture, landscape, engineering, and construction, carefully evaluates the financial implications of our design through detailed budgeting and cost-benefit analyses.

Project Data

Location	Prince William County Virginia, USA
Climate Zone	4A
Lot Size	4 acres
Building Size	31,293 ft ² , 2 stories
Occupancy	90 people, 282 ft ² /person
Target Source EUI	70 kBtu/ft ² /year
Average Utility Cost	\$4,500/month
Construction Cost	\$330/ft ²

Technical Specifications

Enclosure (R)	Walls (33), Slab (10), Roof (40), Windows (4)
HVAC	Displacement Ventilation Four-Pipe Hydronic FCU’s Radiant Flooring
Lighting	High Performance LEDs Smart Daylighting Occupancy Sensors
Renewables	110kW PV mounted over parking



Figure 1. 1: Visualization of the Eco-Park Learning Center.