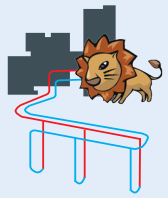
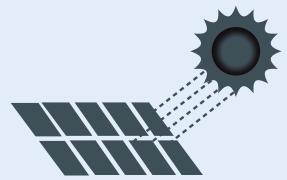
NET ZERO ENERGY SCHOOLS

INSULATED ENVELOPE **R-30 ROOFS R-25 WALLS**



GEOTHERMAL WELLFIELD **80 WELLS 400' DEEP**

SOLAR LAB W/ GREEN ROOF **2,000 SF**



PHOTOVOLTAICS **1800 PANELS, 695 Mwh**

Baltimore City Public Schools' new Graceland Park O'Donnell Heights Elementary/Middle School and Holabird Academy Elementary/Middle School buildings will be state-of-the-art 21st century learning environments that replace two existing PK-8 schools. Through a grant from the Maryland Energy Administration (MEA), the schools will be the first net zero energy (NZE) buildings for Baltimore City and the second and third NZE schools in the State of Maryland. The prototype schools demonstrate Baltimore's focus on project based learning, sustainability, and energy conscious design for schools in urban environments.

HIGH PERFORMANCE DESIGN/NZE STRATEGIES

Passive Design

- Exterior envelope of Insulated Concrete Form (ICF) walls for thermal efficiency and reduced outside air infiltration
- Clerestory windows and tubular skylights provide natural daylight to major interior spaces
- Horizontal louver screens and sunshade devices at windows reduce glare
- Classroom window sizes are optimized to reduce solar heat gain and eliminate the requirement for expensive or complicated daylight harvesting controls while preserving views for building occupants

Energy Efficiency

- Use of geothermal energy to provide heating and cooling
- Centrally located outdoor air handling unit
- CO2 monitoring through a centralized system provides demand control ventilation. Increased ventilation with fresh air has positive effects on cognitive ability and productivity

On Site Renewable Energy Generation

- Building roofs provide maximum surface area for 1800 photovoltaics
- Rooftop equipment reduce shadows on PV

Operations + Behavior

- Ongoing collaboration with maintenance, IT, and food services to reduce energy consumption through equipment and operation
- Web-based energy dashboard system integrated with an environmental literacy program will provide opportunities for students and others to easily access information on the buildings energy features and performance through multiple media devices
- Building designed as a teaching tool with areas of exposed wall construction and graphic design for curriculum tie-in
- Ongoing engagement activities with students and staff for them to understand the building's sustainable components and their role in achieving and maintaining NZE
- Outdoor roof top Learning Lab with a solar tracker and vegetated roof
- Site landscaping elements foster knowledge on use of native plants, bioretention and edible gardening with rain water cistern

QUICK FACTS

Building size	94,000 SF (each)
Construction duration	Summer 2017 - Summer 2019
Photovoltaic array	24,000 SF
Exterior envelope	5,400 SF of ICF
Energy Use Intensity (EUI)	Tracking 21 kBTU/sf/yr
LEED status	Tracking Gold

G+P GRIMM AND PARKER Creative Collaboration Sustainable Solutions Engaging Environments

BALTIMORE CITY PUBLIC SCHOOLS