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## ENVIRONMENTAL RESPONSE: DELAWARE COMMUNITY COLLEGE'S STEM COMPLEX

DCCC USED ENERGY MODELING TO AID IN THE DESIGN OF THE NEW STEM COMPLEX.

BY BURT HILL



*DCCC used energy modeling to aid in the design of the new STEM complex.*

The Delaware Community College Science, Technology, Engineering and Mathematics (STEM) complex includes a technology building to house facilities for the vocational trades, including carpentry, HVAC/plumbing, electronics and auto labs. A science facility will include chemistry, biology, physics, astronomy, computer and CAD labs, general classrooms and a lecture hall, in addition to a fitness center. Situated adjacent to the existing academic building, the complex will provide a new gateway to the college and create a student-friendly courtyard.

The STEM Complex is going to be a 100,000 square-foot science, engineering and math building and 32,000 square-foot technology

building which will house facilities for the vocational trades (carpentry, HVAC/plumbing, electronics, manufacturing and auto labs). Part of the plan for the facility is to reaffirm DCCC's commitment to enhancing scientific mastery among the local workforce and offer better support for vocational training.

Designed to support modern educational trends such as small-group collaboration, hands-on learning, the use of multimedia tools, smaller class sizes and multidisciplinary approaches, while remaining flexible enough to respond to future pedagogical innovations, The Science Center will be four stories, with a metal panel screened mechanical area at the fourth floor level. There are

wetlands north of the building and a stream at the western edge of the building. The center will have two hydraulic passenger elevators and one hydraulic service elevator. There will be two egress stair towers, one at each end of the building, and one monumental stair at the center. The stair and elevator shafts are going to be constructed of CMUs, as are the first-floor mechanical and electrical areas. There is a loading dock with dock leveler and four entry vestibules with sliding doors. Cladding on vestibules will be a wood veneer (Trespa or equal).

The building cladding is to be a combination of metal panel (Alucobond or equal) with operable windows and curtain wall (Kawneer

or equal) with Viracon Super Low-E glazing or equal. Metal panels will be recessed at operable windows. The first-floor steps down from east to west, with stairs and ramps to achieve the floor height difference. A green roof will be placed over the main lobby area, and maintain a soil depth with a minimum of 9-inches deep. Additionally, a skylight will be placed through the green roof to allow for more natural daylight. There are offices and open areas at the second and third floor atrium that project into the atrium. Offices have windows into atrium while open areas have fire shutters. Large windows between the corridors and the labs will allow those who visit to witness science and technology education in action.

Stained concrete floors and painted impact-resistant G.W.B. partitions will adorn the first floor. The auditorium and regular classrooms will all have carpet tile floors. Linoleum floors, painted impact-resistant G.W.B. partitions and Tectum ceilings will be used in every other room. Toilet rooms shall have ceramic tile floors and wainscoting. The locker room showers will have terrazzo bases.

There will be custom-shaped wood benches in the first-floor lobby. All laboratory and classroom benches and counters shall have epoxy tops and wood cabinets. The egress stair towers shall have exposed painted C.M.U. walls, and the stairs are to be concrete-filled metal pan with painted metal hand and guardrails. Monumental stairs shall have metal stringers and stained concrete-filled metal pan treads and the underside of stairs will be finished G.W.B. Hand and guardrails here will be composed of stainless steel.

Projectors and screens will be in all classrooms and the building shall have wireless Internet access.

The is a two-story custom pre-fabricated metal panel structure by or equal. The building will have one hydraulic passenger elevator. There will be two egress stair towers and the building cladding will be a combination of brick at the main entrance (north side) and the building system's metal panels. The site slopes from north to south, with building entry at the second level.

The ground level is planned to have sealed concrete floors, exposed metal panel at exterior walls and painted impact-resistant G.W.B. interior partitions.

Extensive early energy modeling drove many of the architectural decision-making as the building was designed in direct response to its environmental conditions and performance requirements.

#### SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS COMPLEX (STEM)

- To be completed in December 2009
- Targeting LEED Silver certification
- A \$59 million project
- The building design encourages non-science students and the Delaware County Community at-large to enter and utilize the facility.
- The out-of-classroom experience is enhanced with the use of pocket lounges, collaboration rooms and a computer lounge.
- The will house state-of-the-art laboratories and shops that will maximize the technology education programs.
- The STEM Facility science laboratories are designed to optimize the science students' education enabling them to successfully enter into the technological marketplace.

#### SUSTAINABLE DESIGN ELEMENTS

- Green roof
- Energy-efficient systems
- Recycled materials
- Daylight harvesting
- Partial vegetated roof to reduce stormwater run-off
- Remaining roof is a white membrane that reduces heat gain into the building.
- All wood products meet Forest Stewardship Certification Chain of Command (environmentally and socially responsible forest management).

- Building is 15 percent more energy efficient than a standard baseline science facility.
- Low emitting carpets, paints and adhesives.
- 75 percent of the occupied spaces receive natural daylight thereby reducing the artificial lighting load.
- 10 percent of the building products contain recycled content thereby reducing the landfill impact.
- Enhanced commissioning optimizes equipment efficiency.
- Construction waste management reduces the amount of construction waste going to the landfill by 50 percent.
- Design eliminates the use of CFC's, HCFC's and halons.

#### GREEN MATERIALS USED

- Structural Steel is 100 percent recycled content
- Cast-in-Place Concrete has high fly ash content (recycled waste material)
- All wood products (wood science laboratory casework and doors) are forest stewardship council (FSC) certified (chain of custody proven to be extracted from responsible managed forests)
- All carpeting and paint is low volatile organic compounds (VOC)
- All laminate products (non laboratory counters and cabinetry) contain no urea formaldehyde
- Ceramic tile in the toilet room flooring and wainscots contain recycled content
- All laboratories and corridors have linoleum flooring - made from natural products
- Vegetated roofing on 25 percent of the roof reduces stormwater runoff and heat gain into building
- Remaining 75 percent of roofing is a white EPDM Membrane - reduces heat gain into building
- Ceiling Panels (75 percent of the building) are made from recycled content (newspaper)
- All Gypsum Wallboard is made from recycled gypsum (minimum 25 percent)
- South-facing glazing is shaded by either horizontal sun shading devices or by translucent fritting on the glass
- All adhesives and sealants including calk and glue are low VOC.
- Indoor air quality management plan that will completely flush the toxins from the building before occupancy.
- Lounge carpet tiles contain minimum 35 percent Post Industrial material
- Carpet tiles throughout the building have backings made with a percentage of post industrial/ post consumer material
- Flooring in the fitness area is made from recycled tires.

#### BURT HILL PROJECT TEAM

- Anton Germishuizen, AIA - Partner-in-charge
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