

2009

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Lighting/Electrical

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Science Building-Phase 1

Buffalo State College-Buffalo, NY

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Breadth Proposal



BREADTH ONE: DAYLIGHTING (MAE)

The design for the New Science Building incorporates daylighting by means of sidelighting and toplighting in the atrium, but there is no direct exposure of any working space to the outdoors. As such, there is minimal exposure of inhabitants to daylight and exterior views. Existing glazing is sporadic, partly due to the aesthetic design and partly due to the layout of the building and major equipment. An analysis will further study the existing daylighting systems and façade to determine where it performs well and where it can be improved.

Specifically, the efficiency of the specified skylights will be studied. It is possible that a skylight model with a rounded top and splayed well, when applied in a series of 13, could improve efficiency of light transmission into the space. A cost-benefit analysis will be conducted based on calculations and simulations conducted in Daysim and/or AGI32.

BREADTH TWO: BUILDING ENCLOSURES

The western, curtain wall façade of the New Science Building is perhaps its most defining element. As such, its aesthetic integrity should be respected but its performance can be enhanced. To dovetail with Breadth One, an analysis of the materials used in the building envelope will be conducted with simulations/calculations developed in the Heating Air and Moisture (HAM) Building Science Toolbox software program. Specifically, research will be conducted on the utilization of an alternative glazing material, such as spectrally selective low-e glass, in order to obtain lower values for the U-factor and solar heat gain coefficient (SHGC).

BREADTH THREE: MECHANICAL

The mechanical breadth will include a study of adjustments to the façade and their impacts on the mechanical loads. Additionally, there is the coordination that will be conducted with the electrical system for the motor controller center design.

BREADTH FOUR: LED LUMINAIRE OPTIONS (HONORS)

This additional breadth will analyze the options for LED luminaire utilization within the building. Aside from emergency and sign lighting, there is one LED step light specified in the existing design. This study would propose a luminaire for ambient lighting within a classroom or lab space and analyze the benefits and disadvantages to specifying such a luminaire. Items for study and analysis include:

- Durability
- Lamp Life
- Maintenance
- Cost

- Performance (distribution, optics)
- Color rendering properties
- Matching CCTs with other luminaires in the building