BREADTH TOPICS

The following topics involve a more detailed analysis in distinct technical disciplines within the major. Each topic contributes to one of the previously mentioned analyses, which are indentified accordingly.

STRUCTURAL BREADTH: *Contributes to both Technical Analysis #2 and Technical Analysis #3*

The current roof of the new Centennial Gymnasium is metal decking atop 107' long span steel trusses with no additional equipment housed on the roof structure per the contract documents. The remainder of the superstructure is cast-in-place concrete columns, beams and elevated slabs with load bearing masonry walls.

The substitution of load bearing masonry walls with precast panels, as proposed in *Technical Analysis #2*, will be analyzed to determine the effects on the existing structure. As proposed in Technical Analysis #3, the addition of photovoltaic panels on the roof will require a structural analysis to determine loading and support requirements. Any additional support and connections that are determined to be required for both the precast panels and photovoltaic array will be designed and evaluated for cost/schedule impacts.

RENEWABLE ENERGY/ELECTRICAL BREADTH: *Contributes to Technical Analysis #3*

The power distribution system for the Centennial Gymnasium is an existing 480Y/277, 3-phase, 5-wire, 60 hertz feed supplied by an exterior Dominion Virginia Power Company transformer. Currently, all energy is pulled off of the public power grid and channeled throughout the facility.

Integrating renewable energy from a photovoltaic array into the existing energy system will be analyzed to determine the electrical equipment and connection requirements. The electrical system shown on the contract documents will be altered to allocate a tie-in location for the renewable energy source. Additionally, a constructability review will be performed to ensure that the current electrical system is suitable for the requirements of the photovoltaic array.

MAE REQUIREMENT

The MAE requirements of this project will be fulfilled through the feasibility analysis and design of the photovoltaic system. Methods taught in AE 572: Project Development and Delivery Planning will be used to create a life-cycle cost analysis to determine the feasibility of the system and financial benefit to the owner. Additionally, topics discussed in AE597D: Sustainable Building Methods will be utilized to design the photovoltaic array for optimum performance.