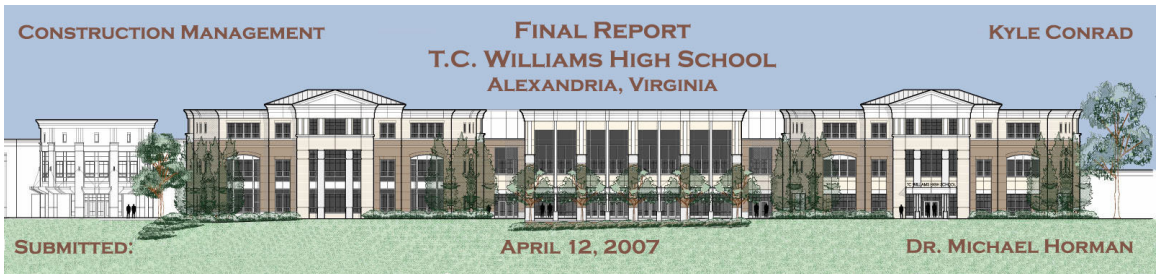

A. Executive Summary :

The final report for the T.C. Williams High School Replacement Project revisits the technical analyses pertinent to the development of a value engineering exercise that proposes an alternate to the original design and initial construction sequencing of the project. The analyses are tied together by the implementation of a Building Information Model that focuses on the interoperability between different software platforms required to perform all aspects of the exercise.

Extensive building material research has uncovered a partially prefabricated structural insulated concrete panel that will significantly improve the energy efficiency and erection time of the superstructure for the auditorium, gymnasium, mechanical/electrical wedge, and automotive strip of the T.C. Williams High School which was initially designed with CMU load bearing walls. A detailed description and construction sequence of the Solarcrete system exposes the potential for off-site controlled environment fabrication and just-in-time delivery to reduce field labor and material storage. The Solarcrete wall system will provide enough flexibility in the erection sequence of the aforementioned areas to allow the general contractor, Hensel Phelps Construction Company, to capitalize on a re-sequenced superstructure plan to alleviate site congestion and improve project safety.

A cost comparison exposes the Solarcrete system's higher initial cost while pointing out areas of potential cost savings due to the system's superior energy efficiency over the traditional CMU design. The analysis leads to redesign of the gymnasium acoustics to maintain the reverberation levels of the original design. An economical solution is presented through to procurement of FABRISORB™ high impact resistant acoustical wall panels. While the acoustics of the auditorium would generally be of greater concern due to the type of events held in the space, they were not considered since the initial design sought to improve the aesthetics of the space by completely covering the structural CMU walls with higher end finish materials. Therefore, the redesign of the structural system would have a minimal effect on the room acoustics in the auditorium.

Interoperability between the architectural and structural models is explored further through the design of a structural moment frame for the gymnasium. Research uncovered the standard practice of erecting a moment frame for the Solarcrete system when tall panels are employed that will be exposed to lateral loading.

The project aims to reveal the effectiveness of Building Information Modeling in value engineering, work sequencing, and site logistics while expressing the importance of BIM in our industry and the potential for implementing non traditional building materials to increase project value.