EXECUTIVE SUMMARY

The following report represents four individual analyses that focus on research in Critical Industry Issues, Value Engineering, Constructability Review, and Schedule Reduction tactics. In addition to these construction-related areas of study, architectural engineering breadth topics including structural design and mechanical system efficiency will be explored to provide further validity to the proposed design changes as well as the final results.

Analysis #1 – Relocation of Structural Concrete Columns
The placement of the structural concrete columns at the edge of the floor slabs negatively affects the pace at which interior finish trades can place their work. In order to facilitate productive interior fit out activities, these slab edge columns could be relocated to facilitate faster interior trade work. The productivity of drywall installation and finishing are currently affected by close confines created by the proximity of the structural columns to the exterior façade. However, the structural ramifications of further cantilevering the slab-edge, the minimal effect of these activities on the overall drywall installation schedule, as well as the negligible effects on the quality of these installations may make the design alteration unappealing to some owners.

Analysis #2 – Brick Façade Simplification
Losses in productivity on the project were attributed to the multiple recesses in the exterior façade, and the custom brickwork corners associated with wrapping the brickwork around these recesses. A building facade redesign featuring minimal masonry returns and glass recessions reduces the productivity losses associated with the existing complex façade. This alteration also reduces solar gains, resulting in a reduction of annual energy costs. The replacement of the building's recesses with linear brick sections successfully maintains the architectural aesthetics of the structure, resulting in a time and money saving, architecturally consistent, and overall plausible design alteration.

Analysis #3 – BIM in the Field
A project-wide 3D model was produced by the design, engineering and mechanical subcontractor teams and was used to detect clashes between the architectural features, structural systems and mechanical equipment. However, these models were highly underutilized in the field, leaving contractors to obtain coordination information in a roundabout manner. The following study of BIM Kiosk implementation highlights the costs of such an undertaking, as well as the time savings accrued by minimizing the time each foremen spends troubleshooting in-field conflicts between the building systems. The possible savings are staggering, considering the relatively low initial costs of the BIM Kiosk infrastructure, and create a very appealing and convincing opportunity for construction teams on projects that utilize 3D modeling and coordination techniques.

Analysis #4 – Design-Build Team Selection
In today's evolving construction industry, owners are more commonly choosing the design-build method of project delivery over the traditional design-bid-build approach. The selection of a design-build project team that embodies the mindsets and personal tendencies required for the successful implementation of this growing project delivery method has proven to be challenging at times. Identifying the subcontractor teams and individuals that are most likely to assimilate with the atmosphere required to achieve design-build success is difficult. While the current process of design-build team selection focuses on the traits and abilities of the general contractor and subcontractors, it was found that little to no emphasis is put on the ability of the owner to embrace the unique requirements of a design-build approach. It is imperative that overly bureaucratic and hierarchical owner organizations begin to realize their own faults and take steps to improve their ability to properly participate in the design-build process.