Executive Summary

The following document contains information pertaining to the design and construction of the New Moon Area High School and District Administration Offices, Located in Moon Township, PA. In the first section, one will find information concerning the client, project delivery method, project team, overall construction schedule, and site layout. The next section provides a brief description of each of the building's systems, creating an overview of how the building is constructed.

Analysis One: BIM Planning with Multiple Primes

The first analysis is intended to help define how Building Information Modeling (BIM) can be incorporated in a traditional project delivery method that includes the use of multiple prime contracts. Throughout the past decade, the use of BIM has slowly started to become an industry standard. As Pennsylvania's required contracting approach, the multiple prime delivery is often one of the last to adopt current construction technology. Although the integration of the two will require overcoming many challenges in the way project specifications and contracts are written, these will be greatly outweighed by the benefits. Ultimately, the change will not occur overnight and it will take several years for designers and contractors to refine the process. For success to occur, it will be important to start slowly with only a few BIM uses to introduce new contractors to modeling.

Analysis Two: Concrete Foundation Wall Bracing Design (Structural Breadth)

The second analysis incorporates a structural breadth to determine a proper bracing design for the building's concrete foundation wall. Designed as a split-level structure, the ground floor requires the use of a substantial concrete foundation wall that cannot be backfilled until much of the steel structure is in place. This requires that the building be constructed in a disjointed sequence, further prolonging the completion of the superstructure. Through careful calculation it was determined that a bracing system provided by Mabey Bridge & Shore will allow the wall to be backfilled much earlier, saving 37 days in the overall time require to finish the building structure. Overall, the bracing rental and installation will cost the general contractor an additional $27,356, but this can be easily justified by the schedule savings it will provide.

Analysis Three: SlenderWall Precast vs. Traditional Brick Veneer (Building Envelope Breadth/ M.A.E Study)

The third and final analysis involves both a building envelope breadth and an M.A.E. graduate level study, involving course material from AE 542: *Building Enclosure Science and Design*. The analysis is focused around the substitution of a brick veneer cavity wall system for a precast architectural concrete façade. This analysis was considered in order to reduce the project's dependency on the masonry contractor remaining on schedule. The system selected for the analysis was SlenderWall, a non-typical lightweight precast panel that integrates the use of structural metal studs. Careful considerations were made to ensure that the thermal and moisture performance of the SlenderWall panels met that of the original cavity wall design. This included performing analysis of both the heat and moisture flow through the wall system. Final calculations determined that SlenderWall can be applied to the project resulting in a total savings of $277,034 while also reducing the project schedule by 32 days.