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As an owner, the Washington Christian Academy is seeking to build a high quality educational facility that promotes healthy and valuable learning for its students. According to the Governor's Green Council, there are three areas of a school that should be improved upon to make them above average in acoustics, lighting, and air quality. The owner is interested in constructing a quality building at a reasonable cost and the analyses discussed in this thesis reflect adding value without dramatically increasing cost.

The critical issue facing the construction industry in and around Washington, D.C., which is mostly an open shop labor market, is a language barrier created by the English and Spanish speaking workers. The number of Spanish speaking laborers is on the rise and growing at an exponential rate. Through surveying industry members a lot of information was gathered concerning the status and consequences of the barrier today. To highlight only a few conclusions from the analysis, 95% of the 65 people who responded believe that a language barrier does exist and affects a project's success. The participants were split almost equally on whether teaching English to Spanish speaking people or the inverse is more likely to happen. One thing is for sure; something needs to happen. The survey concluded that the largest problems stemming from the barrier are the difficulty in giving basic jobsite instructions and increased safety hazards. To begin solving this problem, there are programs that teach both languages to workers. These programs are being slowly incorporated into the industry through company offered courses and university courses.

The first technical analysis replaced the sheet metal ductwork in the WCA Gymnasium with fabric ductwork. This was done to improve the acoustics of the space. There are also many other advantages to using fabric ductwork such as cost and schedule reduction, color selection, easy maintenance, light weight, and better air distribution. No structural redesign was necessary for the space. In the end, the fabric duct had a minimal improvement on the acoustics of the space. The cost savings was \$9,650, and when compared to the current sheet metal system resulted in a 74% reduction. Most of the money saved was on shipping and installation. The schedule reduction was an astounding 21 days, which is an 84% reduction. While the acoustical benefits of the new system would not alone be enough to recommend the change, when compounded with the many benefits and cost and schedule savings the new system seems like the best solution for the gymnasium.

The second technical analysis examined using daylighting techniques in the WCA Flagship classrooms. The analysis was conducted using a three dimensional model in a lighting design software. After the calculations were run, it was found that the current room design is not acceptable for daylighting practices. If each room were to have four windows rather than two, daylighting could be used and the lamps could be reduced from four to three per luminaire. While exact cost data was difficult to obtain, the reduction of lamps alone would result in a 25% energy cost savings to the owner. The analysis also concluded that using switching rather than dimming would benefit the owner with cost savings and benefit the students with a learning opportunity. This system will raise students' awareness of the uses of daylighting and help them identify situations when electrical lights are not needed.