

Executive Summary

Senior Thesis Final Report is intended to discuss the four analyses that could be performed on the Saint Vincent Health Center Addition. Each topic is centered on the central theme of improving efficiency in the construction industry: schedule reduction, efficiency, prefabrication efficiency

ANALYSIS #1: Schedule Reduction from Re-sequencing Construction Phases

The proposed sequence has multiple phases with demolition work overlapping new construction activities throughout the entire project schedule. Phased occupancies are planned for the Emergency entrance, connecting corridor and In-Fill Addition and the Existing Hospital to accommodate Saint Vincent's requirements. Ultimately, the overall project schedule starts with work on the new entrance for the emergency department and ends with the construction of the In-Fill Building, along with temporary construction and demolition in between.

The in-depth re-structuring of the project schedule and phasing can reduce schedule length by working on phase 1 and 2 unrelated tasks simultaneously. The best way to accelerate the schedule would be by working on two phases simultaneously. This could be done during phase 1 and 2. By starting construction on the temporary corridor (Phase2) during the construction of the new emergency entrance (Phase 1). This would save approximately 3 months in the schedule if Phase 1 and 2 were being worked on simultaneously.

The savings that could happen if this project finished several weeks ahead of schedule could help Saint Vincent as well as the project team. Things such as utilities and rented equipment can be returned earlier, which saves money. Another large savings is the personal savings of not having project managers, engineers and superintendents on the project any longer. They can move on to the next job. Above are the tables showing the estimated savings from finishing the project 13 weeks early. The savings for General conditions are around \$32,300, and the savings of personal on the project can be up to \$110,000. Saint Vincent could also start using the new patient and operating rooms. By doing this, it will create a huge revenue estimated anywhere around a few hundred thousand.

I recommend that Saint Vincent and the project team take these actions and work on phase 1 and 2 simultaneously. Although there will be a need for more quality workers, and the site will be more congested, I still think this is something worth doing. Reducing the schedule by 13 weeks and saving thousands of dollars makes it worth it for project.

ANALYSIS #2: Comparing Façade Systems: Hand laid masonry vs. Precast Architectural Panels

The proposed façade is currently a combination of many different materials including brick, stone, a curtain wall, and metal panels: white and stainless steel. The details for all of these connections are very time consuming and difficult to comprehend. Simplifying the façade to just one system would allow for less details and more consistency allowing the construction to run more smoothly. The materials would need to be researched to see if there are alternatives that have easier connections. The materials also need to have similar properties to perform the same. Precast masonry is also a possibility to decrease

construction time and site congestion. This analysis will be including a portion of the structural breadth by analyzing and designing additional supports and connections.

Implementing the alternative SlenderWall architectural precast concrete and steel stud panel wall system in lieu of the hand laid brick system would be a beneficial change to the exterior façade. The SlenderWall system allows the building skin schedule to be reduced by 20 days and begin after the superstructure is completed. When compared to the original schedule with the hand laid brick, which starts while the second floor slab is still being poured, the alternative SlenderWall system will greatly decrease site congestion during the superstructure phase. Also, the decision to use the SlenderWall system has been determined to reduce upfront costs by \$15,394 when compared to using hand-laid brick.

The Saint Vincent Heath Center Project Team do like keeping jobs in the area so that might be a reason why hand-laid masonry was used. Plus this would give more work for EE Austin and their carpenters. Because the overall schedule of the project isn't effected by the reduction in exterior enclosure, Saint Vincent and the project team might think the same savings that could save using SlenderWalls is NOT worth losing work with the locals. Local construction is the backbone of Erie and in an area of little construction work, it is necessary to keep as much of that work for local contractors. Ultimately, the decision is up to Saint Vincent and the project team. I think they should keep the original plan and use hand-laid mansory.

ANALYSIS #3: Develop an Infection Control Risk Assessment (ICRA) Plan

There are many considerations in the design and construction or renovation of the health care facility. The environment must cultivate a safe, caring, healing environment for patients and their loved ones, while also being efficient, functional and safe for staff. Improperly designed and maintained environments pose numerous risks for patients, including hazards from fires, chemical exposures, or contaminated air, water or environmental surfaces. The precaution class needed for this project is from a matrix that says this construction project with Saint Vincent is a type IV patient risk. These pre-cautions required are listed in this section. Mechanical breadth calculations are also in the analysis.