

I. Executive Summary

The thesis proposal for Main & Gervais includes background information of the building, four analyses that suggest improvements to the current design, a conclusion summarizing the key points to the analysis including a weight matrix, and an Appendix indicating the specific breadth options within the proposal. The first analysis takes a close look at pre-fabrication and how it could apply to Main & Gervais. The second analysis attempts to simplify construction by altering some of the columns' properties in terms of concrete and formwork. The third analysis examines the curtainwall and the potential cost reduction and schedule acceleration opportunities. The fourth analysis looks at the curtainwall as well and suggests additional methods to prevent heat loss in the winter and heat gain in the summer.

The first analysis raises the concern between stick-built construction and pre-fabrication of curtainwall systems. The current method is stick-built, which means the curtainwall is to be constructed on site. This method slows up the process of enclosing the building, which prevents the inside trades from beginning. The quality is less due to the uncontrolled environment that goes along with onsite construction. Pre-fabrication is gaining traction in today's construction industry because it can increase the quality of the final product and save time/money in the process. With this in mind, it is worth applying the advantages to Main & Gervais.

Main & Gervais is primarily a cast-in-place concrete structure with post-tensioning. The concrete columns for the structure vary in shape and size. There are rectangular, square, and circular columns for the structure. The concrete compressive strength for each of the columns varies as well. Replacing the circular columns with square ones would eliminate the circular formwork and the square formwork already on the jobsite could be utilized. Choosing one particular concrete type could simplify construction on site when it comes to the point to place the concrete. The second analysis dives into this topic and elaborates on the points just laid out.

The third analysis refers to Main & Gervais' façade, which is primarily a glazed aluminum curtainwall with the exception of some areas around the parking garage. On the west elevation, the curtainwall is sloped outward at 5.63° all the way from lobby floor up to the roof of the building. This design adds to the complexity of constructing the curtainwall and removes some floor area of the building. Eliminating the slope could relieve some of the difficulty when constructing this side of the building. It could also provide some cost savings and offer more square area to the building.

Another point to consider with the curtainwall is its thermal properties. The glass assembly for the curtainwall does provide some insulation but compared to most wall assemblies, it is not that great. The final analysis proposed considers additional equipment that could provide some energy savings. By introducing an automated lighting system, the lights can shut on/off to accommodate the natural light. Also, automatic shades could be linked to the system to prevent extra solar gain or heat loss.