Executive Summary

This report examines three depth analyses related to the construction of Atrium Medical Corporation's new headquarters facility; a 101,200 SF addition used for the manufacturing, storage and shipment of medical equipment and supplies. The depth analyses within this report are directly related to the methods and ideals taught in the construction management program of architectural engineering. The purpose of this report is to examine and analyze possible systems and constructability methods to improve the construction of this building.

Depth Analysis 1 – Alternate Structural System (Precast Concrete):
This analysis was developed to show the cost and schedule implications of imposing a new structural system, in the form of precast concrete. The breadth portion of this analysis looked into the design for each of the precast concrete members needed in a typical bay of Atrium Medicals footprint. The most conservative approach was used to develop a design that could withstand all gravitational loads; actual and assumed.

With the designs chosen for the new structural system, a cost and schedule estimation was performed and compared with the original system. The results showed that the precast system cost about 1,546,053.00 and took a minimum of 40 days to install. Since the costs was greater than the steel and the installation time only a mere 5 days shorter to install, the idea to bring in another crane came about. This brought the total system cost to $1,564,053.00 and installation time of about 20 to 27 days, which proves to be a more beneficial approach for the owner. The overall system cost is about $290,000.00 greater than steel but takes approximately 25 days less to install. This is the recommended choice for structural system.

Depth Analysis 2 – Alternate Building Envelope (Precast Insulated Wall Panels):
This analysis looks into the possibility of changing the original insulated metal panel envelope, surrounding the warehouse area of this building, into a precast insulated panel system. The breadth portion of this analysis shows the thermal performance for each system, each in regards to the heat distribution across their respective cross sections. The breadth analysis results conclude that the insulated metal panel system has an overall R-value of 22.14, while the precast insulated panels have an R-value of 23.89, showing that the proposed system has a slightly greater thermal efficiency.

Based on these results and the data provided by James G. Davis Corporation, an estimation of the cost and installation times of each of these systems was performed. The precast insulated panels ended up having a total cost of $444,219.00 and a minimum install time of 12 days. The precast system cost about $75,000 more to install but ended up saving 35 days on the project schedule which would be beneficial for the owner and is recommended.

Depth Analysis 3 – Safety Design Guide:
This analysis looks into the various tactics and methods presented by the Prevention through Design industry and the NISD (National Institute for Steel Detailing) for ways to design for construction safety. Within this analysis, a design guide was prepared for the proper installation of steel, geared towards the steel connections and framing details found in Atrium Medical.