Executive Summary

Senior Thesis Final Report:
This report is intended to discuss the findings and conclusions of the four analyses performed on the Unknown Data Center on. This project includes a 17,500 SF new addition. The topics are centered on a theme of improving efficiency in the construction industry: project procurement efficiency, construction efficiency (schedule and cost), and energy efficiency.

Analysis #1 – Alternate Roof Type:
Based on the information in this analysis, a PV array design is recommended to the owner. The design should be based on the one in this analysis. This system's upfront cost is roughly $160 thousand and has a potential buyback of 17-18 years which is pretty reasonable.

The green roof is not recommended because the Data Center has a mass amount of mechanical equipment therefore making it virtually impossible to create an adequate design. The design that is given in this analysis was based on open space on the roof. This design could potentially work, but not in the Data Center's case. If the owner would want to pursue a green roof system, an extensive, modular green roof would be recommended.

Analysis #2 – Risk Management (Long Lead Items):
After performing the cash flow analysis, it concludes that the construction management firm takes on a lot of risk and must be very organized and detailed when taking on this method. The risk increases when the construction management firm has to borrow money to pay the upfront cost of the long lead mechanical and electrical equipment.

In addition to this analysis, it is recommended to all construction management firms to look into procuring long lead mechanical and electrical items with the method explained in this analysis. It is highly recommended for firm with excellent in house engineers and is financially large as a company to use this method because the company will take on less risk.

Analysis #3 – Façade Redesign (Implement Tit-up):
Based on the information in this analysis, Utilizing tilt-up as the primary method for erecting the façade is highly recommended. The cost of savings is very substantial, $326,480. In addition, the speed at which the concrete trade is beneficial, 33 panels in a 9 hour work day.

As for the redesigning the façade, the owner definitely look into it. The savings of 184,000 of reducing the parapet wall could go into paying for the PV array system from analysis one. In addition, the current design is losing opportunity to utilize the sun for energy. One drawback to note is the walls of the penthouse can be seen from a distance, therefore, Architectural analysis will need to be done.

Analysis #4 – Implement Tablet PC's (Commissioning):
After conducting the research, tablet PCs bring a lot of benefits to the construction industry. It is recommended for all construction management firms to learn the product and integrate it into the construction process. From a commissioning standpoint, it is highly recommended to use tablet PCs on projects that have a vast amount of complex MEP systems. Most projects like data centers, hospitals, and power plants would benefit greatly by using tablet PCs for the commissioning process.