



1.0 EXECUTIVE SUMMARY

Senior Thesis Final Report is intended to discuss the findings and conclusions of the three analyses performed on the Office Building Renovation. This project includes 550,000 SF of renovation work to an existing office building. Each topic is centered on the central theme of energy and improving efficiency in the construction industry.

ANALYSIS #1: Critical Industry Issue – Integrated Project Delivery

Integrated Project Delivery (IPD) is an up and coming delivery method that could really impact the design and construction of the Office Building. This analysis will be conducted by speaking with industry professionals that have experience with IPD and by researching case studies of projects that have been completed by using IPD. Additionally, the faults and shortcomings of the design-bid-build delivery method will be examined in the coming semester.

ANALYSIS#2: Feasibility and Design Study for Photovoltaic Panels on the Green Roof

The Office Building project is slated to achieve LEED Gold Certification upon completion. However, as a public funded project, the Office Building should be doing everything possible to achieve LEED Platinum Certification. It should lead by example and take the extra steps to achieve this. The goal of this analysis is to perform a preliminary design of a building integrated PV energy system on top of a green roof and determine the financial feasibility to incorporate the system into the SmartGrid to reduce energy costs for the owner. This analysis will include the second part of the Critical Industry Issue research by analyzing how the PV panels can be incorporated in the SmartGrid. A structural breadth study will also be performed for analyzing load requirements and additional structural support for the PV panels. Also, an electrical breadth study will be performed to determine a system tie-in location along with electrical equipment and connection requirements for the renewable energy system.

ANALYSIS #3: Digital Modeling and Coordination of the Chilled Water Plant

The interior of the Office Building was completely demolished with the exception of an existing chilled water plant located on the Subbasement level, which provides chilled water for an adjacent building and must remain in operation 24/7. The chillers in the subbasement are eventually going to be replaced, but they are being replaced in the exact location of where they sit now. The project manager identified this as the largest constructability challenge. Building Information Modeling (BIM) was used on this project, but it could have been used more effectively to deal with this problem.