EXECUTIVE SUMMARY

This document proposes topics for my thesis research next semester. The four analyses include LEED components, metal panels and exterior framing, deep foundation system, and applying BIM to shell building designs. Each topic is analyzed in the areas of critical issues research, value engineering, constructability, and schedule reduction.

Analysis 1 – Building Skin

This analysis focuses on the metal panel configurations and the exterior framing. I am proposing to reduce the number of metal panels and implement platform framing rather than balloon framing. This analysis should provide a schedule and cost reduction. Bridgeside II has a large south facing glass wall therefore I am proposing to use photovoltaic glass to offset the high energy costs. Breadth analysis 1 will focus on the effects of the PV glass on the electrical system.

Analysis 2 – Deep Foundations

Since the current deep foundation system experienced issues when driving the piles, this analysis will propose micro piles instead of steel H-piles. The micro piles can be driven at a greater speed and will eliminate the need for some of the pre-drilling. The current deep foundation system created schedule delays and added costs. This analysis should create a schedule reduction and remove the added costs. Breadth 2 will analyze the structural capacity of the micro piles and pile caps so they can be sized accordingly.

Analysis 3 – BIM and Shell Building Design

Designing a shell office and lab building can be difficult because a tenant has not been arranged to guide the design team and project teams typically change. Therefore the architect and MEP engineer have to design the building and equipment based on assumptions and experience. This analysis will develop a process for how the BIM model could assist potential tenants in visualizing and planning their future space and how the model needs to be developed so that it is beneficial to the owner and the project teams.

APPENDIX A: BREADTH STUDIES

Breadth 1: Photovoltaic Glass Panels

Bridgeside II has a south facing glass wall that overlooks the Monongahela River. Therefore, for breadth 1, I am proposing the use of photovoltaic glass panels. The panels will have unobstructed solar views, however, an analysis will need to be performed to see if Pittsburgh has enough sunny days. Also breadth 1 will analyze the payback period and the necessary changes to the electrical systems and equipment. The PV glass has the potential to reduce energy consumption and lower the life-cycle costs of the building.

Breadth 2: Foundation Analysis

One of the issues when installing the deep foundation system was that existing foundations and steel debris prevented the steel H-piles from driving into the ground. Therefore each pile had to be pre-drilled which created schedule delays and cost increases. Analysis 2 proposes the idea to use micro piles and an alternative drilling method such as an auger. The micro piles were recommended by the geotechnical engineer because they can be driven faster and will require less drilling. An analysis will be required to determine the necessary size of the micro piles and how many are needed. Also the pile caps will have to be analyzed for any necessary changes in size and reinforcing.