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Construction Management Option **Fairfax High School**

THESIS PROPOSAL

Fairfax High School Renovation & Addition
3500 Old Lee Highway
Fairfax, VA 22030

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A. EXECUTIVE SUMMARY

In this Proposal, you will find three analyses that are to be conducted on various aspects of the Fairfax High School Renovation and Addition project. This document is intended to give the reader a detailed view of these analyses, how they are to be conducted, and what tools will be utilized in the process. The research topic will involve developing a LEED® guide for the industry. Along with the research component, the other investigations will look at ways of improving the performance and constructability of several systems in Fairfax High School.

Below is a quick preview of each analysis:

Analysis 1: LEED® Guide

This will include research to develop a guide that can be used by owners and project managers to reduce the difficulty in obtaining LEED® certification.

Analysis 2: Phasing

This will look into re-structuring the phasing layout for the project to alleviate the use of contingencies and schedule delays.

Analysis 3: Pre-cast versus Cast-in-Place

An investigation will be performed to realign the use of cast-in-place concrete versus pre-cast concrete. The types of analyses that will be used include a structural analysis and constructability review to address the method of erection and cost / schedule impacts.

B. ANALYSIS #1 – LEED® GUIDE

Problem

While there is more focus on green design and obtaining a certain level of LEED® certification, it is still difficult to pursue the various points throughout the construction process as well ass maintain the certification over the years. Aligning the owner's goals with corresponding LEED® points can result in a better quality building for its intended use and a more structured approach towards obtaining the initial LEED® certification level. Developing a tutorial guide for achieving the various points will enable more projects to not only pursue the certification, but it would make the process itself much easier.

Goal

My research will be focused on developing a user-friendly guide that can be utilized from the very beginning of the project. It will be used from the very start of the design process, which will initially help them gain a working knowledge of the LEED® classification

system and what type of building to design based on the certification they are looking to obtain. I am pursuing this topic based on my intern experiences the past two summers. I worked for Grunley Construction on the Eisenhower Executive Office Building project, which is looking to obtain a LEED-EB rating. I worked with a Project Manager to develop an excel spreadsheet of all of the points that we were going for and the status of what still needed to be done. This guide will allow everyone on the project to be educated on the system and how to best utilize it on their own respective projects. An open forum will be included to allow everyone to give and receive open feedback and lessons learned from various projects.

Methodology

1. Literature review to become more familiar with LEED®.
2. Develop a list of interview questions to determine the owner's goals.
3. Identify and interview different owners on different LEED® Rated projects.
4. Provide a survey for owners and project managers to help further my research.
5. Develop an outline for a guide that will benefit owners and project managers from the start of a project.
6. Have several project managers test out the guide, obtain feedback, and develop a final version of the guide.

Tools

1. U.S. Green Building Council website (www.usgbc.org)
2. LEED® Green Building Rating System for New Construction and Major Renovations (LEED®-NC) Version 2.1
3. Microsoft Excel

Expected Outcome

The expected results of this research will help me to develop a guide that will reduce the difficulty in obtaining a LEED® certification. This should lead to an increase in the desire for owners to pursue these certifications. This will produce buildings that are safer for the environment, increase recycling and safe owners and general contractor's time and money.

C. ANALYSIS #2 - PHASING

Problem

54% of the $1.2 million contingency was used during Phase 1. The project was set-up in four phases and fourteen areas. Phase 1 included worked in nine areas. It was heavily front loaded, which I believe caused a lot of issues.

Goal

The goal of this analysis is to re-structure the layout of each phase and how the building was broken into Areas A through N.

Methodology

1. Analyze the phasing layout for the project.
2. Determine the best possible layout for the project.
3. Analyze the schedule change impacts to cost and schedule.
4. Select the best phasing layout for the project.

Tools

1. Penn State Architectural Engineering Faculty
2. Grunley Construction Company – General Contractor

Expected Outcome

The analysis should prove that if the schedule was not front-end loaded, the contingency use would be greatly reduced and impacts to the schedule would be eliminated.

D. ANALYSIS #3 - CONCRETE

Problem

There were several project delays that directly resulted on the concrete work for the project.

Goal

Analyze the types of concrete that was selected for the project and select a better solution to decrease schedule delays and also reduce the cost associated with this portion of the budget.

Methodology

1. Compile a master list of all of the concrete used on the project.
2. Contact concrete manufacturers to get more information on lead time and delivery concerns.
3. Perform a comparison between the old and new system.
4. Select the best solution.

Tools

1. R.S. Means 2005 Edition
2. Penn State Architectural Engineering Faculty

3. Grunley Construction Company – General Contractor

Expected Outcome

The analysis should prove that adjusting the use of cast-in place concrete versus pre-cast concrete would reduce the amount of materials and cost.

E. WEIGHT MATRIX

The following table is designed to illustrate the distribution of effort between the different analyses.

Description	Research	Value Engineering	Constructability Review	Schedule Red.	Total
Pre-Cast vs. CIP		5%	14%	14%	33%
Phasing		13%		20%	33%
LEED® Guide	34%				34%
Total					100%