
EXECUTIVE SUMMARY

This document is a proposal for the scope of senior thesis research to be completed in the spring semester of 2009. Two depth studies, two breadth studies, and an additional MAE study will be performed for *Natural Sciences Unit 2* in Irvine, California. A description of each proposed research topic is presented here, along with a general description of the project and a planned timeline for the spring semester.

The lighting depth study will focus on the redesign of architectural lighting systems for four selected spaces within the building: the north exterior façade and plaza, the first and second floor lobbies, the first floor conference room, and the third floor open office. The goal of the redesign will be to create a unified, modern aesthetic for the building while maintaining a comfortable and efficient lighting system for the occupants.

An electrical depth study will also be completed. This will involve a partial redesign of the branch distribution system, a protective device coordination study, and a short circuit analysis. In addition, the economic and performance feasibility of two design modifications will be researched. The first design modification is the addition of a photovoltaic array for power generation on the roof of the facility. A building-wide replacement of copper feeders with aluminum feeders will also be considered.

The proposed breadth study topics include a thermal impact study of the large north-facing curtain wall in the lobby space. Possible glazing and mechanical system changes will be analyzed. The second breadth topic concerns the evaluation of acoustic conditions in the lobby and conference room spaces. Analysis and recommendations will be presented. Finally, as required by the MAE program, knowledge gained in *AE 565: Daylighting* will be used to propose an integrated daylight control system for the open office space.