

## Executive Summary

This report is a proposal for the continued study of the DASCO Medical Office Building into the spring 2008 semester. Architectural Engineering senior thesis projects incorporate a depth study of the building evaluated throughout the fall semester and the associated technical assignments. Depth studies are focused in the option area of each student; in this case the depth study is related to the mechanical system redesign. Redesign is intended to make improvements to the current engineered system based on observations made about its performance, efficiency, cost or quality noted throughout the past assignments. Breadth studies are intended to take each student out of their concentration and explore improvements that can be made to another engineered system in the building. Whether these ideas are of interest to the student or happen to be a result of depth study redesign being integrated with the installed structural or electrical system.

Currently the DASCO building has three direct expansion packaged roof top air handling units that serve the 64,000 square foot facility with 20% outdoor air. Heating is accomplished through variable air volume terminal units equipped with electric reheat. Based on modeling this system in Carrier's Hourly Analysis Program (HAP), it is an inefficient consumer of energy in the form of electricity. However, due to the original design of this building as a shell and core space intended to be fit-out in later phases based on tenant needs, the systems adaptability allows for easy adjustment as rooms are built into the open floor plan. Also, given that this building's design was oriented to ensure low first cost for the owner, there is much room for improvement assuming that budget constraints can be neglected.

In order to redesign the existing mechanical system to create a less energy intensive alternative to what is currently installed; the Saint Joseph Medical Center energy plant will be utilized. There is a central chilled water production plant on the campus of Saint Joseph Medical Center that serves other buildings on the grounds. Depending on its production capacity, and that needed to create a comfortable, quality environment in the DASCO building, the central plant can be used to satisfy the cooling load in the redesign. Also, to reduce the amount of electricity consumed by the building, a gas fired boiler generating hot water will be installed in the building. This will serve two purposes; one is to provide service hot water, therefore eliminating the domestic water heaters currently installed throughout the building, and another provide perimeter heating through the use of fin tube radiators. Changing the mechanical system to that just described should prove to be less costly to operate than the current system, and also reduce the environmental impact of consuming as much energy as the current system.

Breadth study will be in the area of selecting and sizing an emergency power system. The building shell and core was not engineered with emergency power based on the original proposal from the engineering firm. In addition to emergency power, acoustic concerns will need to be addressed since additional mechanical equipment will need to be installed in the building. Other acoustical considerations are with existing rooms that house nuclear radiation equipment and diagnostic imaging which are adjacent to offices, waiting rooms and patient exam rooms.