CONCLUSIONS & RECOMMENDATIONS

The major lesson that can be drawn from this study is that carefully designing the mechanical system for actual loads is of critical importance. The operating cost of the laboratory space in the Landscape Building was reduced by approximately 21.6%. This does require more communication between the owner and engineer, but the results are well worth that effort.

Secondly, optimizing the lighting design can have a significant impact on energy use and causes a 3% decrease in the cooling load.

The first recommendation for changes to the Landscape Building would be to reduce the cooling load and replace the lighting fixtures in the laboratory and laboratory support spaces. Reducing the cooling load has no up front cost and replacing the fixtures saves money. This is a relatively simple alteration that can have a major impact on annual operation and maintenance costs.

Installing a ground-loop system to replace the cooling towers is not recommended. The first cost is extremely expensive due to the length of piping required. Using the ponds as heat sink is recommended, even if only used for pre-cooling or preheating. They are existing ponds are require little alteration to integrate them into the current mechanical system.

As has been previously discussed, Case 7 has both a lower first cost and operating cost making it the most economically feasibly alternative to the current system. This can be seen in both the simple payback and life cycle costs analysis where Case 7 had the best results compared to the other designs. Therefore, it is recommended that the system designed for Case 7 should be chosen. This results in a 30% reduction in annual operating costs and satisfies the goals of this thesis report.