Executive Summary

The first alternative in this report is aimed at reducing the energy consumption of the Life Sciences Building by decentralizing the air system for all but the laboratory spaces. The decentralized air system study encompasses calculations for chilled beams in the offices and classrooms as well as designing a new dedicated outdoor air unit and energy, first cost and life cycle cost analyses. The energy analysis illustrates the electricity consumption of the new chilled water pumps, new fans as well as the cost of chilled water from the campus loop. The first cost compares the differences in the existing VAV system and the new decentralized system and the life cycle cost compares the net present values of each system for a thirty year life cycle.

The second alternative is the addition of the chiller plant to the Life Sciences Building. This study was performed for two reasons: the Nassau County Central Utility Plant is nearing chilled water capacity and for educational purposes. The study centers about the comparison between primary/secondary and variable primary flow pumping configurations. The analysis is similar to the decentralized air system study in the effect that it compares energy consumption, first cost and the life cycle cost of each system.

Following the mechanical alternatives, two breadth topics were studied: daylighting and architecture. The daylighting analysis is centered about LEED Credit 8.1, which requires certain daylight levels during specified dates and times. The daylighting analysis leads into the architecture study, which is the design of permanent exterior shades on the Life Sciences Building in order to comply with LEED daylighting requirements as well as performing well throughout the year and maintaining continuity with the existing structure.

The following are main points determined by the depth analyses:

- Decentralized Air system
  - 49.9% reduction in supply airflow with a dedicated outdoor air system
  - 18% increase in chilled water flow with the chilled beams
  - 20% increase in energy costs with the chilled beam/DOAS system due to chilled water costs
  - $253,700 reduction in first cost with chilled beams/DOAS
- Chiller Plant Design
  - 5% decrease in energy costs with the variable primary flow chiller plant
  - $26,000 reduction in first cost with the variable primary flow configuration