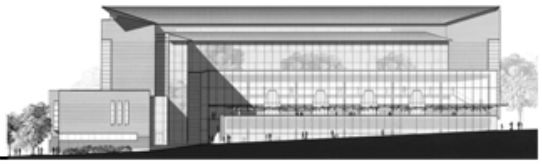

Executive Summary

The William H. Gates Hall Thesis Project looks at several designs and studies of systems throughout the building and the potential effects they will have on the operation of the system, cost of construction and operation, and building energy and water consumption.

The Lighting Depth focuses on creating lighting designs for several areas of the building following the design criterion set forth by ISENA and the power density allowances allotted in ASHRAE 90.1. The lighting for four spaces throughout the building was designed; this includes the Jeffrey & Susan Brotman Galleria, the terrace, the Senator Warren G. Magnuson & Senator Henry M. Jackson Trial Courtroom, and the Marion Gould Gallagher Law Library (main reading area). For each of these spaces the lighting design strives to create an aesthetic that is complementary to the outstanding new facility and its architectural uniqueness, while providing a design that is conducive to a productive learning atmosphere and minimizes energy consumption in the building. Additionally, daylighting considerations are taken into account and daylight studies are conducted for two of the spaces to determine the how to maximize the buildings daylighting potential while ensuring comfort to building occupants.

Throughout the Electrical Depth there are several areas of study and design. First, a panelboard coordination that looks to ensure coordination between the lighting design and its corresponding loads on the panelboards is conducted. All new lighting loads are added to the panels, and in some instances, the panel size is able to be reduced. The Electrical Depth also includes a transformer redesign that looks to replace several of the building's larger, central transformers with smaller distributed transformers in order to decrease the overall system cost, primarily by reducing the size of copper wire running through the building. By redesigning the building transformers and its respective equipment and feeders, significant cost savings are able to be achieved. Additionally, a motor control center that allows for localized control of the building's air handling units was designed. Lastly, a protection device coordination study looks at the coordination of protection devices along a single feeder, and determines that the protection along the particular feeder being analyzed is not properly coordinated.

The breadth topics allow for the opportunity to explore other systems in the building and possible impacts or changes that will result. The LEED Breadth studies the feasibility of implementing a rain water catchment system to offset the cooling tower makeup water in the building. This study looks at the cooling tower's makeup water requirements along with the potential rain fall that could be collected in order to offset water usage, and determines approximately 1.1 million gallons of water a year can be saved. The Construction Management Breadth coincides with this feasibility study by providing a chance to analyze the system and water cost, to determine the extent of water savings and the payback period of this system. This breadth allows for concrete justification of implementing such a system, with a pay back period of 6 ½ years and a yearly water cost savings of approximately $5,000.