

## ABSTRACT

This thesis report was conducted on the Houston Museum in New York City, New York. The Houston Museum of American Art is located at the west side of Manhattan, in the Meatpacking district. The building takes an asymmetrical form with upper stories of the building stretching toward the Hudson River on the west side and step back gradually to the elevated park of the High Line on the east side. The project includes more than 50,000 square feet of indoor galleries and 13,000 square feet of outdoor exhibition space on a series of rooftops facing east. The building also includes an education center, a multiuse black box theater, a study center, conservation lab and library reading room.

This Thesis report discusses the topics, methods, and results that were investigated during a yearlong capstone study on the Houston Museum of American Art. Existing designs were studied in the first semester to examine and find potential spaces to be further studied in the second semester. Engineering and architectural design alternatives were developed in the following semester with the objective of forming an in-depth thesis on building system design.

This thesis is comprised of lighting and electrical depth topics, as well as four additional breadth topics focused on mechanical, acoustical, and architectural engineering. The lighting depth is an investigation into design alternatives for a large work space, a circulation space, a special purpose space and building facade based on the re-imagined lighting concept. The electrical depth is interrelated to the CHP system to change the system voltage from 208Y/120V to 480Y/277V.

The first breadth is an investigation of the daylighting integration for the 8<sup>th</sup> floor gallery space. The second breadth is an investigation of the social aspects that can contribute to the re-imagined lighting concept, include self-congregation, motivation as well as scale perception. The third breadth is an investigation of the acoustical property of the theater space. The findings were coordinated with the alternate lighting design for the space. The fourth breadth is an investigation on the application of on-site energy production and waste heat recovery, also known as combined heat and power or cogeneration. The study will investigate the feasibility of cogeneration for the project based on EPA recommendations.