

# Thesis Proposal

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## Newseum and Freedom Forum Headquarters

Washington, D.C.



# Table of Contents

Executive Summary.....	3
Background.....	4
Depth: Lighting Design Analysis.....	5
Depth: Electrical Design Analysis.....	7
Breadth: Architecture.....	9
Breadth: Mechanical.....	9
Schedule.....	10

## Executive Summary

This proposed thesis is comprised of two depth studies and two breadth studies. First the redesign of the lighting system will take place in four spaces. They include the exterior porch entry, welcoming lobby, news history gallery, and Freedom Forum offices. Feedback from lighting designers after a presentation of the schematic design will be taken into consideration while redesigning these four spaces. The electrical system will also be designed for these four spaces. In addition to the redesign of these four spaces, electrical analyses include the change from standard transformers to energy efficient transformers, and adding wind turbines to assist in providing energy to the building. Breadth analyses for the Newseum and Freedom Forum Headquarters includes an architectural study and redesign of the roof level to help incorporate the use of wind turbines. The mechanical system in the News History Gallery will also be looked at and redesigned with a main focus being on the humidity controlled display cases.

## Background

The Newseum and Freedom Forum Headquarters is a new mixed use building located along Pennsylvania Avenue in Washington, D.C. It is owned by the Freedom Forum who also occupy the majority of the building for their offices and museum exhibits dealing with the first amendment and freedom of the press. Also used by the Newseum is a theatre and Newseum gift store. The building also contains residential apartments and a restaurant operated by Wolfgang Puck.

At 550,000 square feet, the Newseum makes a big impression along Pennsylvania Avenue with its modern architecture and glass façade. It stands out among its neighbors such as the U.S. Capitol Building and National Museum of Art. Construction on the Newseum began in 2003. The building is set to open to the public in the spring of 2008. When it does open, the Newseum will surely become a recognizable landmark in this important area of our nation.

## Depth: Lighting Design Analysis

The lighting design for the Newseum and Freedom Forum Headquarters building is a very complex system due to the variety of mixed use spaces. Overall it should show off the architecture of the building and also show off the purpose of the Freedom Forum, the freedom of the press. A modern and contemporary feel should flow throughout the building to go along with the modern architecture.

With a location right on Pennsylvania Avenue, the Newseum and Freedom Forum Headquarters has a chance to become a prominent American landmark, and something guests coming to Washington, D.C. look forward to seeing. The lighting design can help this to become a reality. The spaces chosen for redesign, were chosen because they represent a good feel for the variety of mixed use spaces in the Newseum. The spaces are the exterior entrance porch, welcoming lobby, News History gallery, and Freedom Forum offices. Recently a schematic design was presented to lighting designers at Lutron. Their feedback influenced this proposal. Comments from the designers can be found on my webpage under Technical Assignment #3.

### Exterior Entrance Porch:

The exterior entrance porch is the first thing that all visitors to the Newseum will see. It also had the potential to make people want to know and become curious about what is inside. I originally wanted to keep the exterior lighting toned down in order to not take away from surrounding architecture such as the capitol building. However the lighting designers suggested that this would be like holding back on the buildings potential. As a result I chose to illuminate the exterior more that initially thought, which will help the Newseum become a prominent landmark. A major feature of this space is a 60 ft. plane of marble on the façade with the First Amendment engraved onto it. This should be highlighted because is basically sums up what the Newseum is all about. The lighting in this space should also direct visitors to the main entrance. Therefore the entrance porch will be the most illuminated spot of the front façade, drawing guests into the building.

### Welcoming Lobby:

The first space guests come to after entering the Newseum is the Welcoming Lobby. A contemporary feel will be continued into this space from the entrance porch. Some elements to be highlighted in this space include the stone bases of the glass walls, structural columns, and maps guests can use to orient themselves with the building. The welcoming lobby also acts as a main hub where guests begin their journey in the Newseum. Light will be used to guide visitors to the atrium and information desk area. It will also guide them to the elevators which they will take to begin visiting the galleries.

### News History Gallery:

One of the many galleries is the News History Gallery. This space shows off the collection of news articles dating back to the 18<sup>th</sup> century. It also showcases journalists and news/broadcasting technology from the past. Areas to highlight in this space are a quote on the side wall, the entrance/exits of the space for egress, and of course the

exhibits themselves. In this space, I want to create a historic feel by using lamps with a low CCT to create a warm nostalgic feel. Another way to create this historic feel is to use an old-fashioned lamp post type fixture. I originally planned to have these lamp post fixtures along the wall and providing the ambient light. From designers feedback I realized that this would be a very bold design and there would also be reflection problems in the exhibit glass. I am now going to have the lamp posts be strictly decorative and very dim, going down the center of the gallery. In order to light the walls, I will create a cove with fluorescent strip lighting washing the walls.

#### Freedom Forum Offices:

The freedom forum offices are more of a behind the scenes space that most visitors will not see. However, the design must allow for a very productive work environment. This space is almost strictly computer work. Each cubicle will have a combined fixture which combines task lighting with an indirect source. The designers pointed out that I should have each workstation be controlled separately to increase energy efficiency.

The design process will involve selecting lamps and luminaires to successfully accomplish the design goals. Tools used will include ASHRAE 90.1 and the IESNA handbook. These will help establish lighting levels and wattages per square foot. After designs are complete, AGI32 will be used to calculate light levels to ensure that the designs are appropriate. Photoshop and AGI32 will be used for renderings of the final designs and AutoCAD will be used for lighting plans.

## Depth: Electrical Design Analysis

1. With the redesign of lighting systems for the Newseum entry, Welcoming Lobby, News History Gallery, and Freedom Forum Offices, it will also be necessary to redesign branch circuit distribution for these four spaces. Panel boards will be changed and the distribution equipment will have to be resized to suit the new lighting design and its loads.
2. A protective device coordination study will be performed for the new design of the Newseum exterior entry. It will follow the path from the main switch gear to the panels serving this space. Along with this study, calculations for the short circuit current will also be shown.
3. Depth topic: energy efficient transformers vs. standard transformers.

With the amount of electrical and audio/visual technology in the Newseum including computers, televisions, interactive galleries, theatres, and broadcast equipment, it is important to think about saving energy where possible. I propose to consider the use of energy efficient transformers vs. the standard transformers.

In order to conduct this study, research of energy efficient transformers will first be conducted. I will look at the existing transformer layouts and calculate the amount of energy being used by them. I will then choose suitable energy efficient transformers based on my research to replace the existing standard transformers. This will be followed by a recalculation of the energy used by the new transformer layout. A cost study will also have to be performed on the changing of transformers. A conclusion can then be found based on the previous findings and calculations.

4. Depth topic: using a wind turbine.

With three service entrances in the Newseum building, there is a lot more incoming electricity than that of a typical building. The Freedom Forum will be faced with very high electric bills. With this problem in mind, I propose the use of wind turbines to allow the Newseum to produce some of its own electricity, thus reducing the cost for electricity.

For this study, the first step will be researching wind turbines to familiarize myself with different styles and types. When a particular type is chosen, I will look at different possible layouts in order to have a maximum production of electricity. Based on the level of production, I can then find out how much energy will not need to be provided by PEPCO. This will result in a calculation finding how much money is can be potentially saved with the addition of wind turbines. A cost study will also be performed in order to find out how long it will take for the wind turbines to pay for themselves.

Tools used in these studies will include the National Electric Code, PEPCO rate charts.



## Breadth: Architecture

With the incorporation of wind turbines with the electrical system, an analysis of the architecture of the roof will have to be performed. It will also have to be changed in order to allow the turbines to fit into the overall architecture of the building. They can not just be placed on top of the building and expected to work with the overall feel. I will conduct a cost study looking at the additional materials needed to make the new design work and combine it with the cost study of the turbines themselves to see how long it will take for the whole addition to pay for itself.

## Breadth: Mechanical

The News History Gallery has an interesting mechanical systems because it must incorporate the use of controlled humidity exhibit cases for the historic artifacts. I will perform an analysis of the existing system and look into any better ways to supply these cases with controlled air. The redesign of the cases might also be an option to create a better system. After the redesign, a cost-benefit analysis will be performed to determine if it will be a better option.

## Schedule

<b>Week</b>	<b>Objective</b>
Winter Break	Work on modeling of spaces
Jan. 14 – Jan. 20	Modeling spaces , begin research of wind turbines and energy efficient transformers
Jan. 21 – Jan. 27	Complete modeling, complete research, chose lighting products
Jan. 28 – Feb. 3	Begin AGI work
Feb. 4 – Feb. 10	AGI work , renderings
Feb. 11 – Feb. 17	Final lighting renderings , begin electrical work
Feb. 18 – Feb. 24	Electrical work
Feb. 25 – March 2	Start work on wind turbine
March 3 – March 9	Start work on energy efficient transformers
March 10 – March 16	Spring Break , start breadth work
March 17 – March 23	mechanical breadth work, finish electrical work
March 24 – March 30	Finish mechanical breadth , architecture breadth work
March 31 – April 6	Finish architecture breadth , Begin report and presentation
April 7 – April 13	Finish report and presentation , practice presentation
April 14 – April 18	Final Presentaions