Corbin Building

Thesis Proposal

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Lighting/ Electrical
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Executive Summary

The Corbin Building is a historical building that is being renovated and integrated into the Fulton Street Transit Center. The lighting design needs to supplement the architecture and patrons to create the desired atmosphere. Spring semester work will include a lighting depth, electrical depth, MAE study, architectural and mechanical breadths.

The lighting depth will include lighting designs for the following spaces:

- Exterior Façade- An Outdoor Space
- Retail Space- A Special Purpose Space
- Subway Lobby- A Circulation Space
- Open Office - A Large Work Space

The electrical depth will include a new branch circuit distribution for the spaces listed above. There will also be a short circuit analyst conducted. The two depth topics will investigate bus ducts vs. conduit and wire and also a full system study using SKM software.

The MAE study will use the information learned in daylighting to evaluate the difference in the amount of daylight penetration on the third floor office vs. the eight floor office.

The two breadth studies will be architectural and mechanical. An architectural breadth will focus on designing the retail space's architecture. It integrates the lighting design and mechanical systems together to provide a clean and functional high end retail space. The mechanical breadth will take the existing system and integrate the diffusers into the architectural in the retail space while providing adequate heating, cooling and ventilation.

Table of Contents

Building Overview

Corbin Building includes retail shops at street level and open office space in the upper seven floors, in the heart of lower Manhattan. The Corbin Building is being restored because the new construction of the Fulton Street Transit Center (FSTC), which is connected to the north façade. One of the improvements to the building is a new lobby which will incorporate two escalators to take subway passengers down to the subway platform level in the FSTC. The design of the Corbin Building restoration is to restore the exterior façade and interior so it looks just like it did in 1910-1917. The renovation of the building will cost about $59.5 million dollars and take about two years to finish.

In 1889 the terracotta building was one of the tallest buildings in New York City built by Francis Kimball. The building was named for Austin Corbin the president of Long Island Rail Road. Preservation work will begin to restore the ornate reddish brown façade, intricately decorated grand stair case will be restored and the original boiler will be displayed. The subway riders will see the exposed inverted brick arches and the century old boiler as they ascend massive thirty-eight foot high escalators through the Corbin Building.

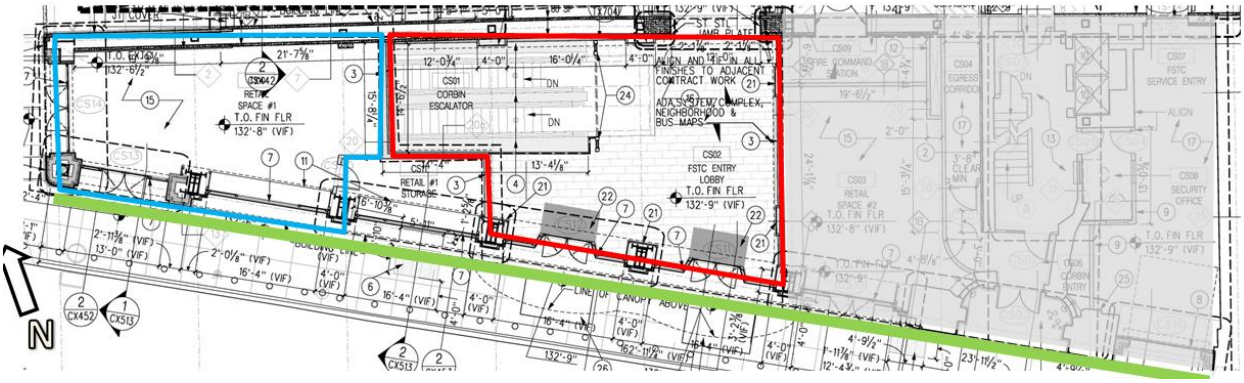
Areas of Interest

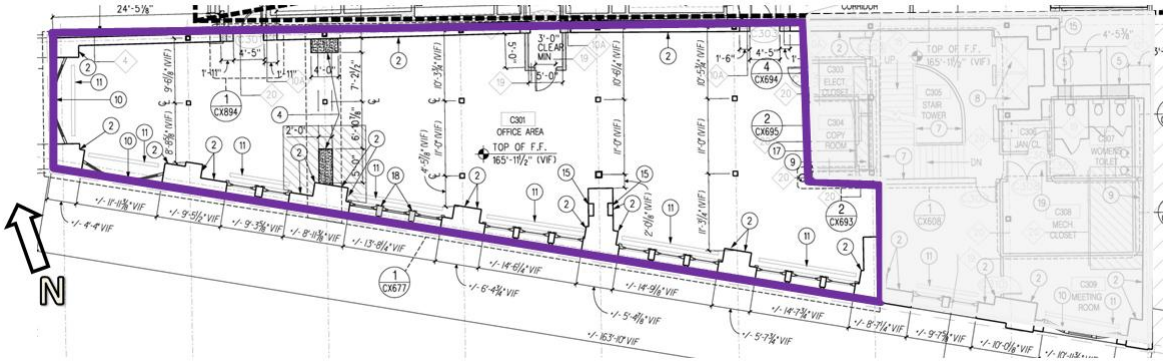
Exterior Façade: Outdoor Space

Retail Store: Special Purpose Space

Lobby: Circulation Space

Open Office: Large Work Space
3rd floor





Depth Proposal | Lighting

Overview

The lighting design for Corbin Building will reinforce the client's vision of renovating and integrating the design of the transit center while preserving its historic character. The design of the lighting system will focus on four spaces:

- Exterior Façade- An Outdoor Space
- Retail Space- A Special Purpose Space
- Subway Lobby- A Circulation Space
- Open Office - A Large Work Space

Based on the comments received from a board of lighting professionals at Lutron presentations, the proposed schematic lighting design concepts presented for technical assignment three need to be further developed. The design criteria and goals will be merged together to finalize concepts and continue the design process. Luminaires will be selected and controls systems will be developed and zoned for each space. The designs will be input into the computer software to analyze the desired lighting design.

Exterior Façade

The exterior façade of the Corbin Building needs to make a presence to show off the restoration. There is two viewing points for the façade, one is along the street level which gives you the view of just the lower part of the building and the other is across the street which will give you the view of the whole building. The building has a lot of ornate details on the windows, doors and façade. The material plate for the building consists of terracotta, bricks, cast iron doors and windows. The façade light will graze the two towers at the ends of the building while having a bright entrance for the subway lobby and retail stores. The bright lobby entrance will help people be guided to the entrance and also promote safety. This space needs to make the building stand out but not over power the transit center behind it.

Retail Space

The store is contracted with tenant to be fit out in a different contract. The retail space was designed for a high end boutique clothing store. The store is going to sell clothes such as shirts, pants and some accessories like shoes and jewelry. A comparison for the store would be Giorgio Armani.

The store windows will be bright to help draw attention to the window and then the merchandise to draw people in. Once inside the store the casework for the merchandise was designed to fit the store design and merchandise being sold. The store has an upscale feeling which means the architecture and lighting needs to be integrated into the casework and recessed into the ceilings to provide a clean appearance. The lighting in the casework is meant to draw people's attention to the merchandise and provide ambient light for searching for sizes. The lighting will be concealed so it does not take away from the items being sold. The general lighting needs to highlight the merchandise and

make it appear visually appealing, while also providing enough ambient light to move around safely. Decorative pendants will hang over the checkout register to provide task lighting for handing money.

Subway Lobby

The subway lobby is the first experience as someone enters the subway system. This lobby is connecting the historical Corbin Building with the modern transit center. The lobby has a variety of materials copper metal sheets on the walls with a dark terrazzo floor with a white plaster ceiling. The appearance of the space should be welcoming and promote safety with the lighting design emphasizing this experience and unique materials within the space.

The proposed lighting design will create an impression of visual clarity. This includes using cove lighting and recessed lighting to create an even illuminance across the space. Using a glowing band of light will help people circulate into the transit center or down the escalator. The lighting scheme developed for the lobby should emphasize the use of modern lighting here to tie the transit center with the historic Corbin Building.

Open Office

The open office is located on the 3rd floor with windows on the south façade and a plain solid wall on the north. Employees will spend long hours in the space. The desks are not permanent and can be placed in a variety of configurations depending on the tenant in that space. The lighting must be flexible to meet the needs of various task and accent the main architectural of the arched vaulted ceiling. To draw attention to the ceilings the proposed lighting design will implement an indirect/direct linear lighting system and provide uniform lighting. Pictures will be hung on the north wall and will have accent lights to brighten up the north wall. The controls will be coupled with occupancy sensors and or photosensors to control zones of lights.

Lighting Professional Comments | Lutron Presentations

Sandra Stashik

- Nice presentation
- Appreciated consistent graphical layout, but some of the black and white images were difficult to understand
- Wash light on doorway = glare?
- Why light the towers only and the 1st floor? Will there be features that will be unseen
- Way to tie towers together at the top?
- Good to show on opening slide that the picture is one of the important vistas
- 1st retail graphic was hard to understand
- Human perspective was more effective than bird's eye view
- Would the touch tiles be all off when it is filled to capacity?
- Like that you looked at the office space vaults
- Overall: very nice well thought out presentation

Kari Nystrom

- 1st retail optical illusion
- What merchandise are you selling (specifically)?
- Move touch tiles into retail, they won't last in the lobby
- Lobby wall band of light hard to see what is going (weird perspective)
- Flexibility workstation – talk more about this
- LED panel picture looks odd
- Look at shape of fixture underneath the arches

Shawn Good

- Perhaps use plans or photo instead of cad perspectives
- Lots of modern, little of preserving historic elements
- Graze instead of wash doorway
- Fixture and effect matchup on façade arches
- Hierarchy between the building and the main transit center building
- Too much stuff as you move through building "number 2 and 3 were much cleaner and easier to understand"

Task and Tools

Schematic Lighting Design:

Finish and develop and the final lighting design based on comments from the design professionals

Model Spaces:

Model spaces in AutoCAD and export into AGI32, 3DStudioMAX, and/ or DAYSIM

Design Development:

All fixtures and lamps need to be specified and located within the space in order to create the schematic design concepts and fulfill design goals and criteria

Lighting Calculations:

AGI 32 will be used for calculations to ensure that the design meets illuminance levels set by IESNA for each space. Also check that power densities meet ASHREA 90.1.

Daylighting Conditions:

Daylight controls will be selected and calibrated using DAYSIM

Final Renderings:

Using AGI32 and or 3DStudioMAX to show final renderings of completed designs

Depth Proposal | Electrical

Overview

The electrical depths of the spring semester thesis consist of a redesign the branch circuits, a short circuit analysis, and two depth topics.

The electrical distribution system in the Corbin Building is provided by Con Edison. The service entrance comes from the fifth floor of the Fulton Street Transit Center, which is the neighboring building on the north-side. The service entrances enters the Corbin Building on the fifth floor and goes down to the basement to feed a 1200A switchboard with a AIC rating of 100K which than services other branch circuits of the electrical system.

There are two voltages in the building, the primary voltage is 265/460V, 3PH, 4W and the secondary voltage is 120/208V, 3PH, 4W. The mechanical, escalator and elevator systems run on 460V. The lighting and plug loads run on 120V. The emergency backup system consists of a UPS to operate the emergency lights.

Branch Circuit Distribution

Overview

Branch circuit distribution systems will be redesigned for each space which is having the lighting redesigned. This includes the subway lobby, an open office, retail space, and the exterior façade. Feeders and panelboards will be resized where necessary for the proposed lighting design.

Exterior Façade

The exterior façade is a highly detail façade and is being restored. The exterior façade is currently not light. The proposed lighting uses metal halide wall grazers. The entrance to the lobby is going to use fluorescents to highlight the lobby entrance.

Retail Space

The retail space is going to be a high end boutique clothing store. The space is to be fit out by tenant in another contract. The proposed lighting design is going to include casework with integrated lighting fixtures use either fluorescent or leds sources. The general lighting is going to be halogen or metal halide for highlighting displays.

Lobby

The lobby is an entrance into the subway system by using two express escalators and also has an entrance into the Fulton Street Transit Center. The lobby has existing compact fluorescent lamps and I am proposing using linear fluorescent inside a cove and compact fluorescent downlights.

Open Office

The open office is located on the third floor and has arched vaulted ceiling. The use of suspended linear fluorescent fixtures draws attention to the ceiling while providing even lighting. There are also accent lights added on the walls to highlight pictures hanging.

Short Circuit Analysis

A short circuit analysis will be performed through a single path along the distribution system. The study will start at the main switchboard DBC and go through feeder 9 to transformer T6-CS4 and stop at distribution board DB-S/4.

Depth Topic 1 | Bus Duct vs. Conduit and Wire

The service entrance will be analyzed by changing the conduit and wire to bus duct. The service entrance runs down a vertical shaft six stories. The comparison will be made looking at cost and labor to decide which one is a better option. The tasks to complete in the analysis are to list the size and lengths of feeders into the building, for each the conduit and bus duct and find prices for materials, research labor cost and time of installation.

Depth Topic 2| SKM Analysis

A complete analysis will be performed for the entire electrical distribution system. SKM software provides a short circuit analysis, coordination, and arc fault study. These studies will be conducted and compared to the existing system. The loads will include all the redesigned lighting loads and mechanical loads.

M.A.E. Focus | Daylighting – AE 565

The south façade is covered mostly with windows. The Corbin Building is surrounded by forty-five and fifty story buildings creating many shadows on the building but should still allow enough diffused sunlight into the space. The building consists of the same office floor plan for eight stories. An exploratory analysis will be conducted to see the difference of daylight penetration on the third floor and on the eighth floor to see if the height makes a difference in the amount of sunlight entering the spaces. The criteria being compared will be average illuminance over a year and daylight autonomy. This will be calculated using daysim or another daylighting simulation program.

Breadth Proposal | Architectural

The architectural breath will focus on designing the first retail space on the street level. The retail space is to be fit out by the tenant which is not currently leased. The architecture will be custom designed to fit a upscale boutique clothing store. It will be a very clean high end feeling. The final product will be a functional store that captures the essence of the luxurious merchandise being sold. The deliverables for this breadth will be shown as rendered drawings and also presentation graphics. The renders will show the integration of the architecture, lighting and mechanical into the space.

Breadth Proposal | Mechanical

The mechanical breath will focus on redesigning the mechanical system in the retail space to complement the architectural breadth and lighting depth. The system will be fed from the existing mechanical equipment and must provide enough heating, cooling and ventilation for the retail space. Locations of the diffuser will be integrated into the architectural design and the lighting design.