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## **2.0 LIGHTING DEPTH INTRODUCTION**

The lighting for four different spaces, the business news open office, first floor cafeteria seating, east lobby, and east façade, were analyzed and redesigned. The existing conditions analysis of the design revealed that each of these spaces had an exceedingly high power density above ASHRAE Standard 90.1 2001 provisions. Thus, the lighting was redesigned to meet ASHRAE Standards for power density as well as maintaining and creating a functional, aesthetically pleasing space. Design criteria for illuminating of all four spaces were taken from the IESNA Handbook. Some of the criteria used for the redesign included ease of maintenance, luminaire appearance, color rendering, and horizontal and vertical illumination levels. These criteria will be further defined for the individual spaces in the lighting section of this report.

From the existing lighting conditions analysis, the business newsroom, east lobby, and east plaza did not meet the recommended IESNA illuminance levels. The business news office fell slightly below at 26 fc of the 30 fc recommended value. Furthermore, because the canopy was the only brightly lit surface in the plaza, the effects of glare can be exaggerated and cause visual discomfort. The lobby, although having low illuminance levels due to artificial light, has 3 story glass curtain walls that allow for much light during daytime conditions. Moreover, all the interior spaces studied exceed the power density standards of ASHRAE 90.1. The business news power density at  $1.5 \text{ W/ft}^2$  fell slightly above the recommended  $1.3 \text{ W/ft}^2$ . The cafeteria exceeded both the allowable power density for task lighting and for decorative lighting at  $3.4 \text{ W/ft}^2$ . Finally, the lobby's power density greatly exceeded the  $1.8 \text{ W/ft}^2$  with an existing power density of  $3.1 \text{ W/ft}^2$ .

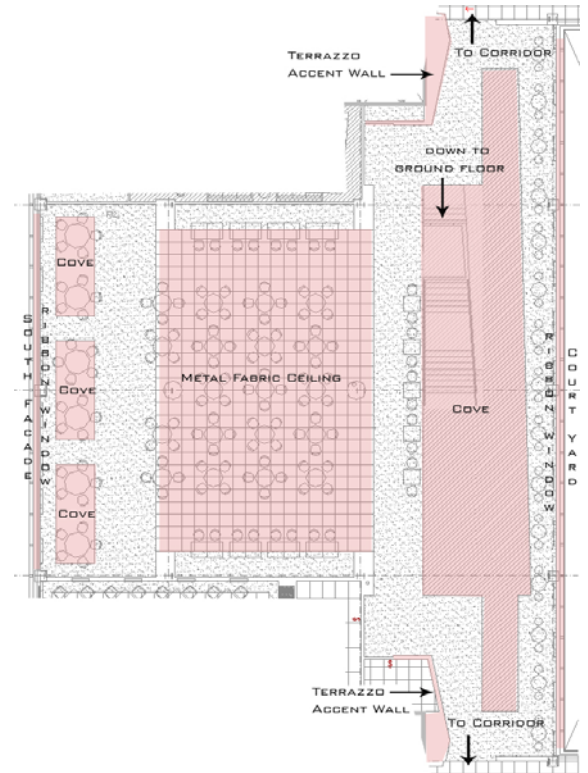
Lighting in each of these spaces were thus redesigned accordingly with a great effort in lowering the power densities. All lighting calculations in the spaces discussed were done by creating a 3-dimensional CAD model of the space, importing it to AGI 32, and applying the appropriate material reflectance and corresponding luminaire photometry files.



## CAFETERIA DINING

### Introduction

The 6,230 square feet first floor cafeteria serves as an extension of the cafeteria seating area on the ground floor for the use of the occupants of the entire building. This space is solely used for dining purposes and does not include the food preparation area, which is located on the ground floor. The cafeteria seating area is a very contemporary space with a sophisticated palette of finishes from anigure wood, metal fabrics, and terrazzo.



### Schematic Design

#### **Design Goals**

Promoting a relaxing dining ambiance is essential for this space, and thus creating an open spacious feel, through lighting, can help evoke this sense of comfort. Because of the use of distinct finishes: metals, wood, and stone, showcasing them will also add some liveliness, in what would otherwise be a plain common space.

#### **Photoshop Sketches**

Figure 2.1:  
Cafeteria North End  
This Photoshop rendering shows the basic lighting design concepts.

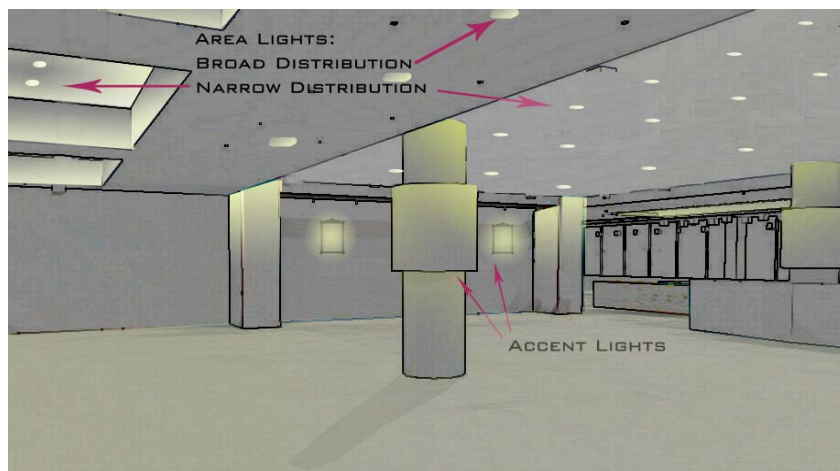




### Photoshop Sketches continued

Figure 2.2:

Cafeteria South End



### Design Criteria

(Per IESNA Lighting Handbook)

- Horizontal Illuminance – The recommended light level on the work plane is 10 fc. The first floor cafeteria functions as an extended seating area and there is no food service area. To create a relaxing effect, vertical surfaces and the perimeter should have higher illuminance, thus horizontal illuminance comes second.
- Vertical Illuminance – The recommended vertical illuminance is 3 fc. However, artworks hang on some of the wall that may need more illuminance. To create a more relaxing ambiance, perimeter lighting should be considered. Accordingly, the vertical surfaces should be the brightest in order to achieve a more relaxing effect. Thus, vertical illuminance levels in some walls can be increased up to 15 fc.
- Direct Glare – It is important to avoid direct glare for the visual comfort of the occupants. In addition to the artificial light, direct glare can also come from sunlight coming in from the north and south.
- Reflected Glare – Reflected glare from the glossy floor can affect visual comfort of occupants and should be taken into consideration.
- Color Appearance – The lighting system should render the food well to make them appealing to those dining. Therefore, lamps with color rendering index of at least 80. A neutral color temperature is necessary so that occupants feel comfortable in the space. A public dining space such as this shouldn't have low CCT lamps like for residential use, or a very high CCT and have the space appear cold and harsh.



- System Control and Flexibility – The cafeteria seating area is a large space that can be also be used for other functions. The lighting layout must then be able to accommodate the possible displacement or rearrangement of the cafeteria tables and chairs.

(Per ASHRAE Standard 90.1)

- Power Allowance – ASHRAE Standard 90.1 recommends 1.4 W/sf of power for dining areas in office buildings. However, there is also an allowable 1.0 W/sf for decorative lighting.
- Control Requirements – The standard mandates an automatic control device to shut off lighting by time of day basis. Override switch shall also be provided to override the automatic control device for no more than 4 hours. Controls for the cafeteria space should also be inaccessible to the occupants to prevent tampering with light levels.

**Equipments**

**Luminaire Schedule**

Fixture Designation	Description	Mounting	Lamp Qty	Lamp Type	Voltage	Ballast Type	Ballast Watts	
C1	7 3/8" Louvered Downlight	Recessed Ceiling	1	CFTR32W/GX24q/835	120	Dimming	33	
C2	7 3/8" Adjustable Accent Downlight	Recessed Ceiling	1	CFTR32W/GX24q/835	120	Dimming	33	
C3	Low Profile Compact Fluorescent Cove Lights	Surface Mount	1/ft	CFT9W/G23/835	120	Magnetic	11	
F1	Flourescent Wall Washer	Recessed Ceiling	1	F28T5/835/ALTO	120	Electronic	30	
L1	Low Voltage Spot Light with Integral Transformer	Recessed Ceiling	1	50MRC16/CC/NFL24	12/120	N/A (xfmr)	55	
L2	Low Voltage Directional Uplight	Recessed Floor	1	20MRC11/FL38	12/120	N/A (xfmr)	22	
Notes: 1. See Appendix A for luminaire cutsheets 2. Emergency fixtures shall have battery packs and emergency ballasts							Total Power:	9852 W
							Power Density:	1.58 W/sf

Note: Fixtures F1, L1, and L2 serve as accent lighting (1118 W or 0.18 W/sf). Therefore, the space meets power density requirements of 1.4 W/sf plus and addition 0.18 W/sf of the allowed 1.0 W/sf for accent lighting.



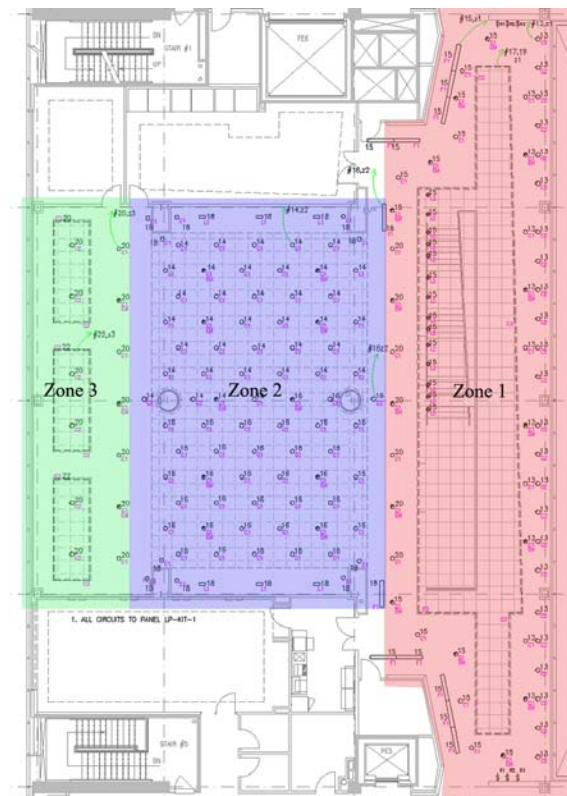
**Light Loss Factors**

Fixture Designation	Maintenance Category	Cleaning Interval	RCR	RSDD	LDD	LLD	BF	Total LLF
C1	IV	Clean, 24 mos.	1.2	0.97	0.80	0.85	0.99	0.65
C2	IV	Clean, 24 mos.	1.2	0.97	0.80	0.85	0.99	0.65
C3	I	Clean, 24 mos.	2.1	0.84	0.88	0.85	0.91	0.57
F1	IV	Clean, 24 mos.	1.2	0.97	0.80	0.95	0.98	0.72
L1	IV	Clean, 24 mos.	1.2	0.97	0.80	0.95	1.00	0.74
L2	VI	Clean, 24 mos.	1.2	0.97	0.75	0.95	1.00	0.69

**Controls**

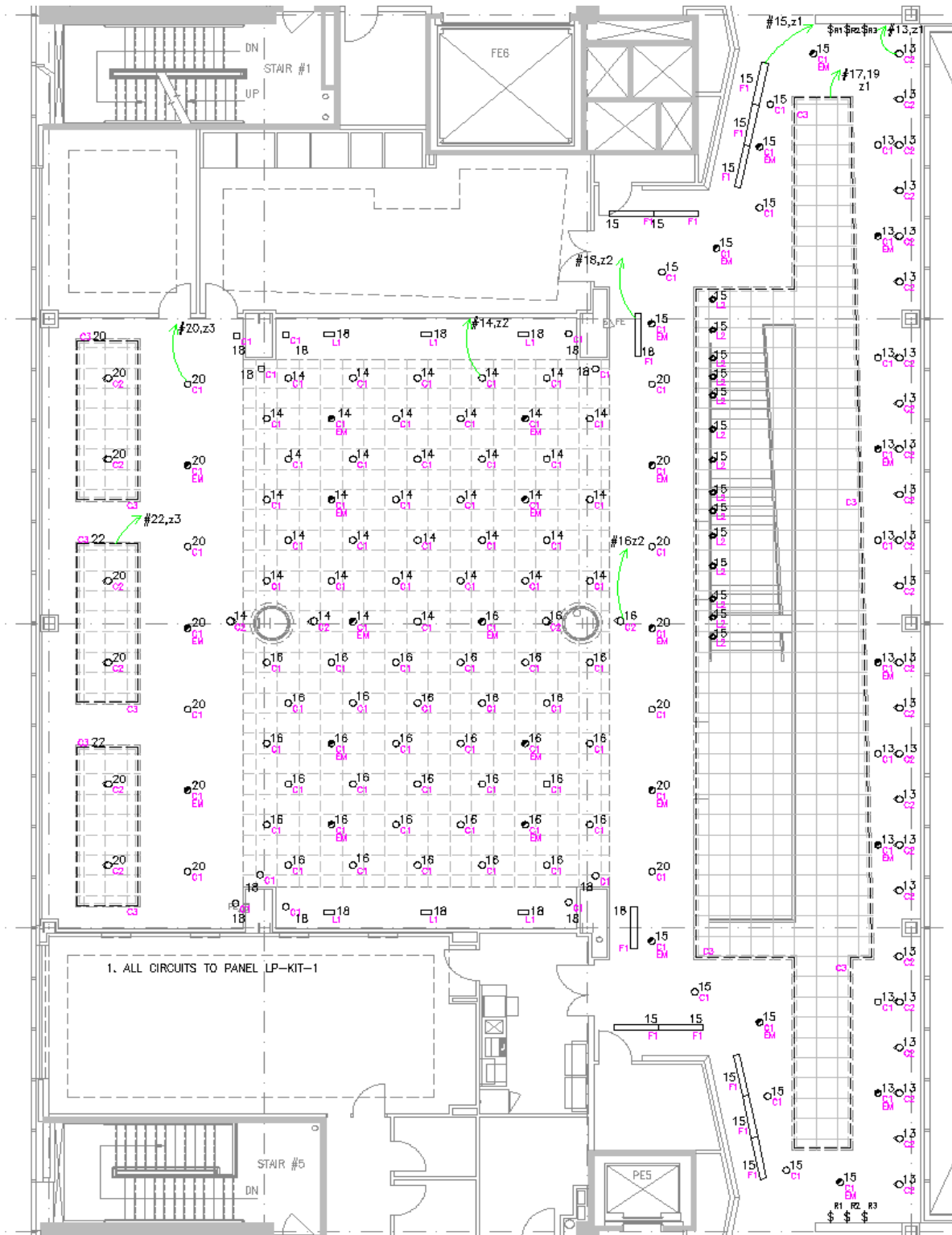
Automatic digital time switches will be used for all the three different zones in the cafeteria. The TS-400 digital time switch from Watt Stopper will be used in conjunction with the existing building time clock for automatic on/off from 7am to 9pm. The digital time switch can also act as an override to the building time clock for after hours custodial use.

Figure 2.3:  
Zoning structure for the cafeteria. Each zone to be controlled by the automatic time switch and tied into the building automated time clock system. Switches are located on the east and west entrances to the space.





**Reflected Ceiling Plan and Circuiting**

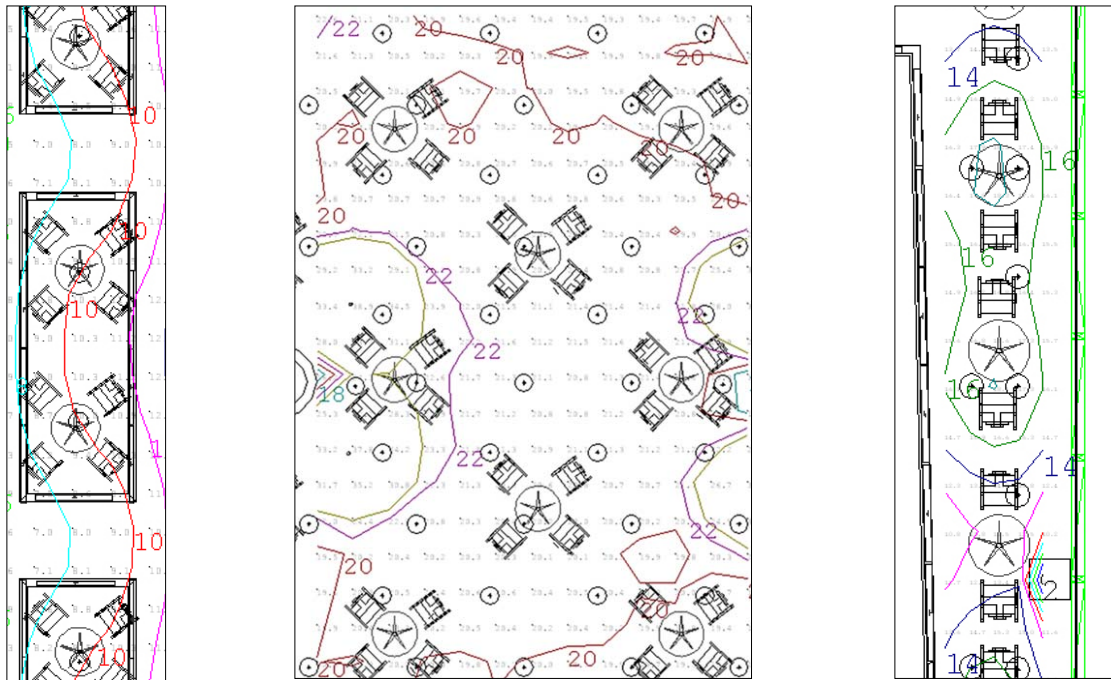


**Note:** Panelboard and relay schedules are located on the Electrical Depth portion of the report.



### Calculations

Figure 2.4: (left to right: south, middle, north tables). The north end tables receive an average of 14.4 fc of horizontal illuminance and an average of 4 fc for vertical illuminance. The middle section of the cafeteria receives an average of 21.3 fc for horizontal and 9.2 fc for vertical illuminance. The south section receives an average of 10 fc for horizontal and 6.9 fc for vertical illuminance. All of these illuminance levels meet the 10 fc of horizontal illuminance criteria for dining areas and the vertical illuminance criteria of 3 fc.



### Renderings

Figure 2.5: North end of the cafeteria. As in the design goals, the different materials are brought out by accents of light and help create some interest in a rather plain, white space. The addition of the brushed aluminum metal fabric within the cove also helps heighten the ceiling and gives the impression that the space in the cove extends upwards.







Figure 2.6: Middle section of the cafeteria. The metal fabric ceiling is used as the recurring theme and helps create a sense of continuity within the space. Spotlights are used to accent artwork that would hang on the walls, as well as the metal columns.



Figure 2.7: South end of the cafeteria. The use of coves and metal fabric ties in the final section of the space, again helping in creating a sense of continuity. The metal and terrazzo columns are also accented with light.



## **Conclusion**

The new lighting design for the first floor cafeteria was a great improvement on both the appearance and the power density of the space. The new power density of 1.4 W/sf for general lighting meets the ASHRAE 90.1 power allowance requirement of 1.4 W/sf, and the 0.18 W/sf for accent lighting is under the allowed 1.0 W/sf for accent lighting. The new combined power density of 1.58 W/sf is a 53% reduction of the existing power density of 3.4 W/sf. The new lighting layout also organized the existing cluttered lighting plan of the space. The use of indirect cove lighting and simple down lights give a cleaner and a more sophisticated modern space.

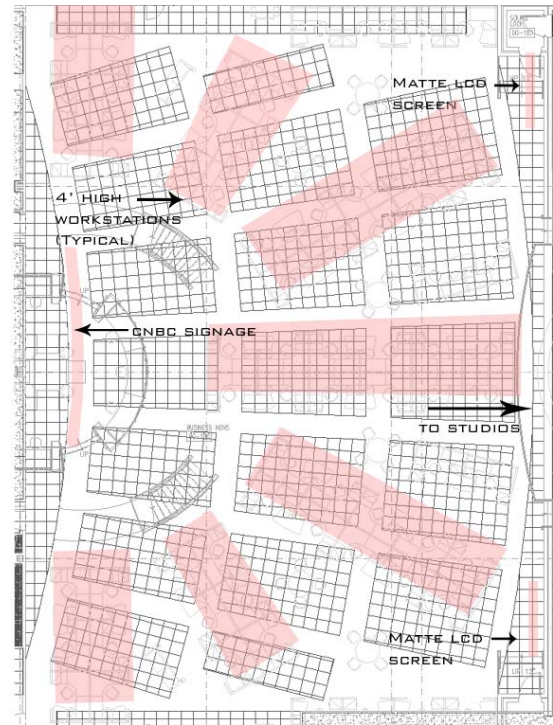


## **BUSINESS NEWS**

### **Introduction**

The 9,600 square foot Business News space located on the ground floor is a large open office area serving the 3 adjacent broadcasting studios. Support staffs for CNBC's signature newscasts are the primary users of the space. There is a heavy use of VDT screens (flat screen monitors) in this area as well as tasks needing horizontal illuminance. Curved stairs led up to the business news conference room and the CEO's office. The walls have an abstract CNBC mural composed of mainly dark blues and golden yellow tones. Moreover, large screen monitors hang on the north wall to show the live recording at the adjacent broadcasting studio.

### **Schematic Design**



### **Design Goals**

Promoting a conducive working ambiance is essential for employee performance in this fast pace environment. The lighting should make the occupants feel comfortable with visual tasks they need to perform. The lighting also needs to look intrinsic to the space and follow the general patterns present creating a visually streamline lighting design. Lighting the colorful murals on the walls can also liven up the space to reflect the dynamic fast-paced interactions in the day-to-day studio taping or broadcasting tasks.

### **Photoshop Sketches**

Figure 2.8:  
Business News south end. This Photoshop rendering shows the basic lighting design concepts.





### **Design Criteria**

(Per IESNA Lighting Handbook)

- Horizontal Illuminance – The recommended light level on the work plane is 30 fc. Task lighting will not be used in this area to stay within the power density requirements.
  
- Vertical Illuminance – The recommended vertical illuminance is 5 fc. Due to the extensive use of VDT screens, proper attention must be attended to the luminance ratio between the screen and the remote room. Vertical illuminance along the walls is also desirable to accentuate the murals and help produce a relaxing ambiance. Thus, vertical illuminance on the walls should be the second brightest.
  
- Direct Glare – It is important to avoid direct glare for the visual comfort of the occupants. Problems from direct glare can arise from artificial light only because the space is isolated in the core of the building.
  
- Reflected Glare – Reflected glare from luminaires on the VDTs on the workstation should be avoided because of heavy computer use. Occupants of this space also rely on two large screens on the north end of the room to monitor the progress of the broadcast in the adjacent studios.
  
- Source/Eye/Task Geometry – Heavy use of VDT screens on the individual workstations calls for proper geometries in order to reduce or eliminate reflected glare. Careful consideration of this geometry is also essential so that the two screens on the north wall can be viewed from the entire room with little glare.
  
- Light Distribution on Task Plane – Uniform light distribution on the work plane is essential for the occupant’s visual comfort when performing visual tasks such as reading. This is also essential in being able to achieve proper luminance ratios.
  
- Color Appearance – The walls surrounding this space have very bright and colorful abstract murals. Lamps with a color rendering index in the 80s and neutral color temperature should be used to illuminate both the blue and yellow colors. Neutral color temperature is necessary so that occupants feel comfortable in the space. An office space such as this shouldn’t have low CCT lamps like for residential use, or a very high CCT and have the space appear cold and harsh.



- Light Distribution on Surfaces – Even distribution on the workstation partition is important because it is part of the surrounding that would need to be considered to achieve proper luminance ratios. Parts of the wall that have the large VDT screens should have lower illuminance so that the screens can be clearly seen. However, because of the fancy murals on the walls, those without the large VDT screens should be well lit as to showcase them.
- Luminance ratio – The recommended maximum luminance for task and background is 3:1, while task to field of view is 10:1.
- Appearance of Space and Luminaires – This space is visible from the main broadcasting studio, thus the space must appear visually pleasing for both television guests and office occupants. Even though the space is not included as a background image for broadcasting, it should still remain aesthetically pleasing and not distracting to the live newscasters that can see into the space.
- Shadows – Care must be taken in placing the luminaires. Reading and writing tasks that occur on the desk can be shadowed if the occupant leans over and luminaires are improperly located. Facial shadows must also be avoided to give occupants a more refreshed appearance.

(Per ASHRAE Standard 90.1)

- Power Allowance – ASHRAE Standard 90.1 recommends 1.3 W/sf of power for open spaces in office buildings.
- Control Requirements – The standard mandates an automatic control device to shut off lighting by time of day basis or through the use of occupancy sensors that shall turn off after 30 minutes of inactivity. Override switch shall also be provided to override the automatic control device for no more than 4 hours. Because this is a large space with numerous occupants, general lighting controls should be inaccessible.



**Equipments**

**Luminaire Schedule**

Fixture Designation	Description	Mounting	Lamp Qty	Lamp Type	Voltage	Ballast Type	Ballast Watts
M1	2x2 Static Lensed HID Luminaire	Recessed Ceiling	1	MHC100/C/M/4K/ALTO	277	M90/M140	118
M2	Metal Halide Spot Light	Surface Ceiling	1	CDM70/PAR38/SP/4K	277	R-HPF	85
M3	Metal Halide Wall Washer	Surface Ceiling	1	CDM70/PAR38/FL/4K	277	R-HPF	85
F2	2x2 Fluorecent Lensed Troffer	Recessed Ceiling	2	FB32T8/TL841/6/ALTO	277	Electronic	64
Notes: 1. See Appendix A for luminaire cutsheets 2. Emergency fixtures shall have battery packs and emergency ballasts						Total Power:	10948 W
						Power Density:	1.14 W/sf

**Light Loss Factors**

Fixture Designation	Maintenance Category	Cleaning Interval	RCR	RSDD	LDD	LLD	BF	Total LLF
M1	V	Clean, 24 mos.	2.3	0.97	0.83	0.75	1.00	0.60
M2	IV	Clean, 24 mos.	2.5	0.97	0.80	0.80	1.00	0.62
M3	IV	Clean, 24 mos.	2.5	0.97	0.80	0.80	1.00	0.62
F2	V	Clean, 24 mos.	2.3	0.97	0.83	0.91	0.88	0.64

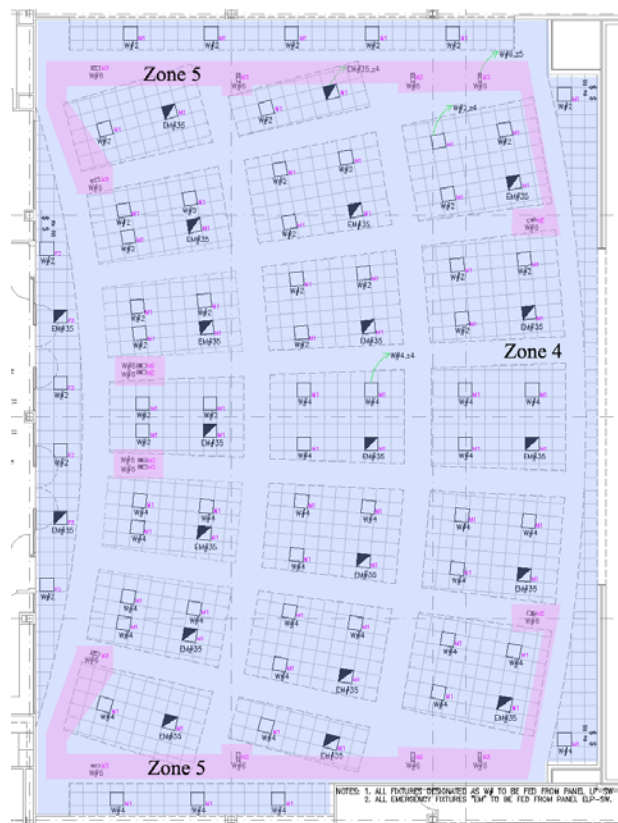


**Controls**

Automatic digital time switches will be used for the two different zones in the open office: area lighting and accent lighting for the murals. The TS-400 digital time switch from Watt Stopper will be used in conjunction with the existing building time clock for automatic on/off from 7am to 9pm. The digital time switch can also act as an override to the building time clock for after hours custodial use.

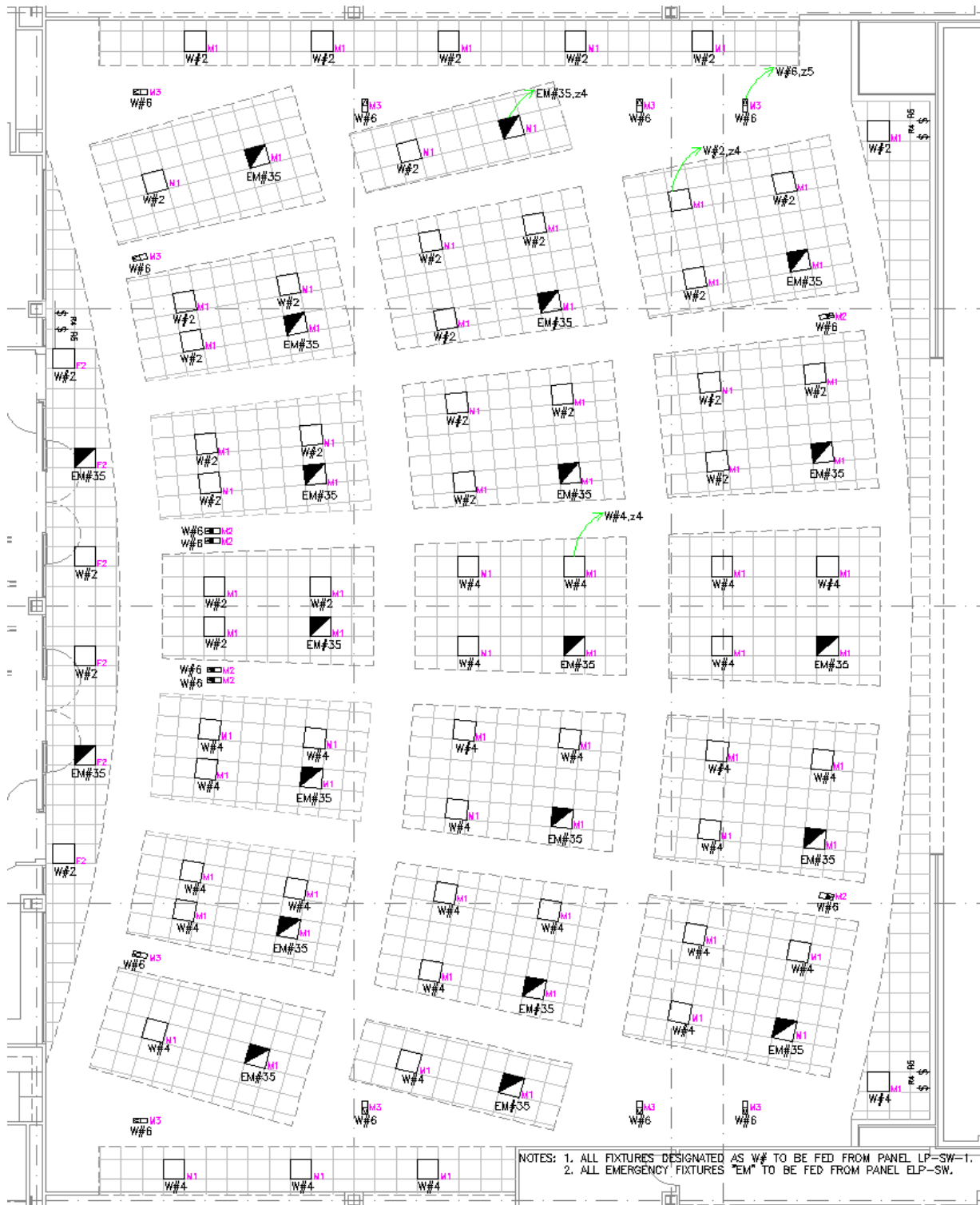
Figure 2.9:

Zoning structure for the business news open office. Each zone to be controlled by the automatic time switch and tied into the building automated time clock system. Switches are located on the east and west entrances to the space as well as the second floor balcony.





### Reflected Ceiling Plan and Circuiting

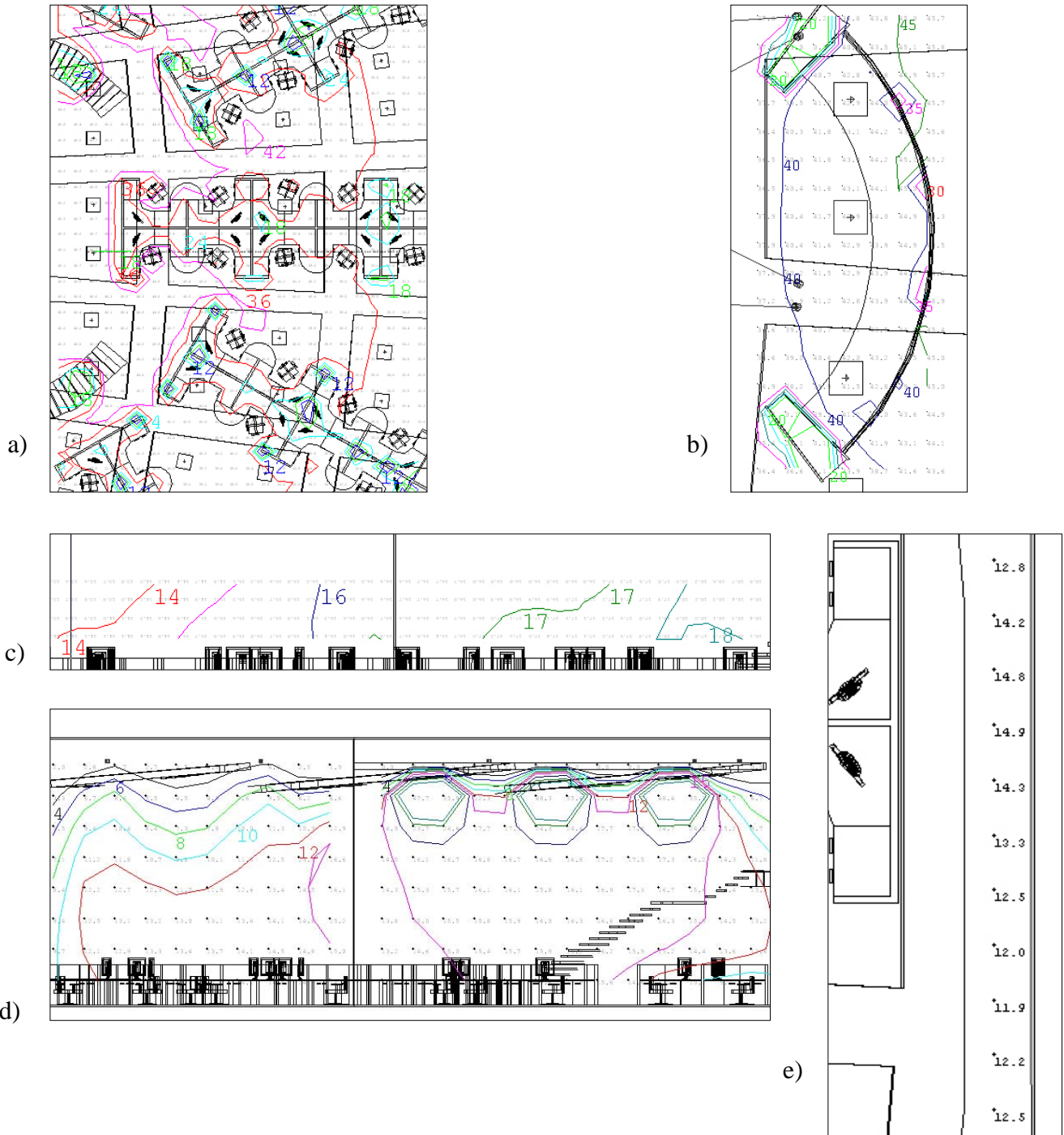


Note: Panelboard and relay schedules are located on the Electrical Depth portion of the report.



**Calculations**

Figure 2.10: a) The work stations receive an average of 34fc on the work plane with a fairly even light distribution. b) Horizontal illuminance for the central desk receives 40 fc. c) Shows the vertical illuminance for the faces in the workstation and averages at 15fc. d) and e) all show the vertical illuminance for the west, and north walls, respectively. The vertical illuminance for the vertical surfaces averages at 12fc. This is enough light to showcase the colorful mural walls.







## Renderings

Figure 2.11: South end of the cafeteria. The space is uniformly lit by 2x2 lensed metal halide luminaires. Because of the high 26' ceiling height, these luminaires were chosen to efficiently bring light down to the work plane. The new layout of the luminaires also helped in achieving uniformity on the work plane as compared to the old lighting layout that left darker areas in the room. The overall uniform feel of the space provides a conducive working atmosphere.



Figure 2.12: West view of the open office. The new layout of the luminaires in the ceiling gives the impression of length from the east entrance. The walls are also brightly lit to bring out the colors in the murals.



## Conclusion

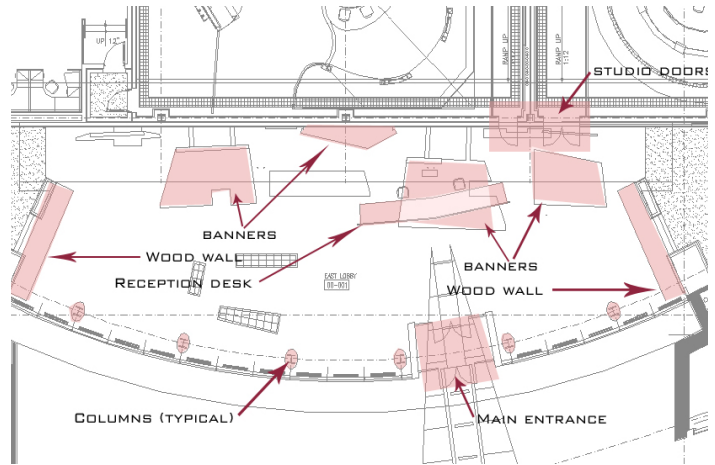
The new lighting design for the business news open office was a great improvement on both the illuminance uniformity and the power density of the space. The new power density of 1.14 W/sf for general lighting meets the ASHRAE 90.1 power allowance requirement of 1.3 W/sf. This is again another improvement to the existing power density of 1.5 W/sf. The new lighting layout also helped improve the uniformity of the space. Even though the same wattage luminaires were used, the more efficient luminaires were able to deliver about 8fc more than the existing system. The new layout also helped the uniformity of the space because the luminaires are more evenly spaced out compared to the existing layout that left some areas of the room darker, some of which areas fell on the workstations. Overall, the new design was an improvement from the energy consumption and functionality of the space.



## **EAST LOBBY**

### **Introduction**

The East Lobby serves the main entrance of the building. There are 3-story tall art panels with abstract prints of blues and yellow that line the lobby wall, behind which are entrances to the Business News studio and the Auxiliary Studio. The east wall of the lobby is composed entirely of a curved tinted glazed glass curtain wall. Perforated metal fabric sheet line the ceiling, while blue terrazzo tile line the floor. Two sidewalls that run 3 stories are covered with Anigure wood veneer. This is a high profile space where visitors and studio guests may enter.



### **Schematic Design**

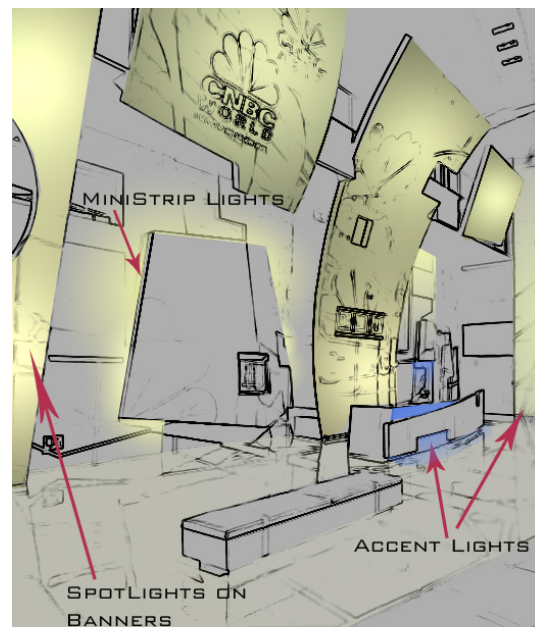
#### **Design Goals**

This space receives a lot of traffic from both the building occupants and guests for the broadcasting shows. The lighting in the space should reflect great aesthetic quality to complement CNBC's reputation as one of the nation's largest networks. Guest should feel a sense of awe when entering the space. Therefore the lighting will be designed to accentuate the verticality of the space, bring out the colors of the three story art panels to help create a grand, modern entry space.

#### **Photoshop Sketches**

Figure 2.13:

This view shows the east lobby indicating how the 3-story panels will be lit to bring the primary focus on them thereby giving emphasis to the verticality of the space and evoke a sense of awe in the great scale of the space.





### **Design Criteria**

(Per IESNA Lighting Handbook)

- ❑ **Horizontal Illuminance** – The recommended light level on the work plane is 10 fc. The reception/security desk, however should receive 30 fc for reading tasks.
- ❑ **Vertical Illuminance** – The recommended vertical illuminance is 3 fc. This space is highly visible from the outside and features 3-story art/banners. Therefore, greater illuminance is needed to accentuate the banners. An illuminance of 10 fc should be available for displays on vertical surfaces.
- ❑ **Direct Glare** – The entire east wall of the lobby is composed of glass. Large amounts of sunlight penetrate the space during the day, therefore, consideration of direct glare from sunlight should be taken into account.
- ❑ **Reflected Glare** – There are VDT screens imbedded in the banners of the lobby, thus reflected glare can be an issue from both artificial and natural light. This is a very big problem because the VDT screens that play programming being done in the studios are directly facing the glass curtain walls.
- ❑ **Source/Eye/Task Geometry** – The VDT screens are intended to be viewed from all parts of the space, and source/eye/task geometry must try to limit, direct, reflected, and veiling reflections on the screen from the entire space.
- ❑ **Appearance of Space and Luminaires** – This space receives a lot of traffic from both the building occupants and guests for the broadcasting shows. The lighting in the space should reflect great aesthetic quality to complement CNBC’s reputation as one of the nation’s largest networks. Guests should feel a sense of awe when entering the space. Therefore the lighting should help accent the 3-story banners both during the day and night. Furthermore, the wall behind the banners where the studio door is located should also be washed to direct guests to that area.
- ❑ **Color Appearance** – The colorful banners should be lit with lamps with good color rendering index of at least 80 to accurately and brightly render its colors. This space is receives high profile traffic, and material used should appear rich and vibrant for aesthetic reasons. Neutral color temperature is necessary so that occupants feel comfortable in the space. A corporate lobby space such as this shouldn’t have low CCT lamps similar in



residential use, or a very high CCT and have the space appear cold and harsh.

- Daylight Integration – Because of the great amount of natural light available in this space, the integration of daylight in designing of the lighting system can call for dimming of artificial light when required light levels are reached through natural light.
- Modeling of faces and objects – The lobby is where a lot of personal interaction takes place when building occupants meet with guest or clients. Faces must then be lit evenly to avoid shadows in the face.
- Points of Interest – The entrances to the main studio are located behind the 3-story panels. For easy accessibility to guests, lighting should direct them to these spaces. The wall where the doors are located should be washed to accent them. The reception desk, although a major part of the lobby, shall take a secondary importance compared to the back wall with the studio doors, which are much harder to locate.
- Maintenance – Due to the 39' high ceiling, lamps with longer lamp life should be chosen to reduce the frequency of re-lamping luminaires. It is also best to consider group re-lamping of the luminaires in order to reduce the cost of labor and equipment.

(Per ASHRAE Standard 90.1)

- Power Allowance – ASHRAE Standard 90.1 recommends 1.8 W/sf of power for lobbies in office buildings.
- Control Requirements – The standard mandates an automatic control device to shut off lighting by time of day basis or through the use of occupancy sensors that shall turn off after 30 minutes of inactivity. Furthermore, each device within an enclosed space shall control only a maximum of 2,500 sf for spaces less than 10,000 sf. Override switch shall also be provided to override the automatic control device for no more than 4 hours. Switching for this space shall be inaccessible to the public. However, the receptionist should be able to easily control the task lighting on the desk.



**Equipments**

**Luminaire Schedule**

Fixture Designation	Description	Mounting	Lamp Qty	Lamp Type	Voltage	Ballast Type	Ballast Watts
M4	Metal Halide Directional Spot	Recessed Ceiling	1	CDM70/T6/830	120	HX-HPF	94
M5	Metal Halide Directional Uplight	Recessed Floor	1	CDM70/T6/830	120	HX-HPF	94
M6	Metal Halide Directional Uplight	Recessed Floor	1	CDM39/PAR20/830FL	120	HX-HPF	53
F3	Flourescent Wall Washer	Recessed Ceiling	1	F54T5/835/HO/ALTO	277	Electronic	62
F4	Flourescent Task Light	Surface Mount	1	F32T8/835/ALTO	277	Electronic	30
D1	LED Cove Strips	Surface Mount	2/ft or 1/ft	LED Strips - 6" at 4.2W or 12" at 6W	24/120	N/A (xfmr)	10W
Notes: 1. See Appendix A for luminaire cutsheets						Total Power:	4306 W
						Power Density:	1.20 W/sf

**Light Loss Factors**

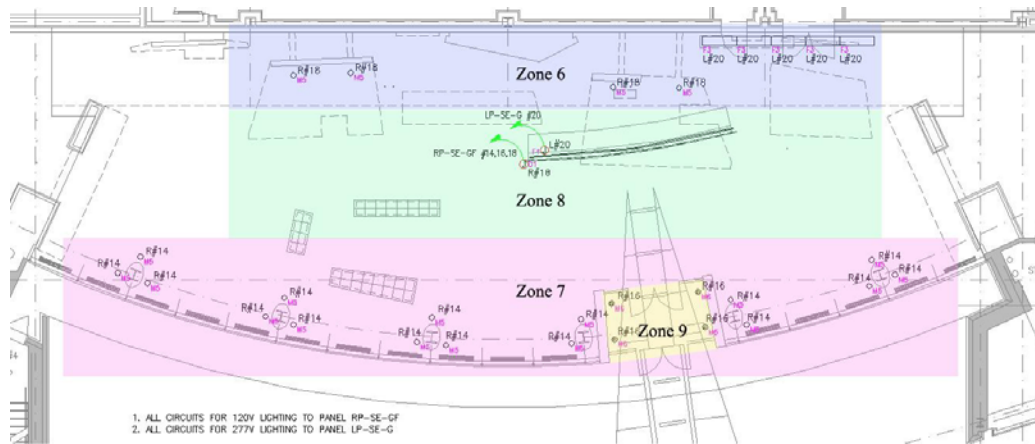
Fixture Designation	Maintenance Category	Cleaning Interval	RCR	RSDD	LDD	LLD	BF	Total LLF
M4	IV	Clean, 24 mos.	9.5	0.93	0.80	0.75	1.00	0.56
M5	VI	Clean, 24 mos.	9.5	0.93	0.78	0.75	1.00	0.54
M6	VI	Clean, 24 mos.	9.5	0.93	0.78	0.80	1.00	0.58
F3	IV	Clean, 24 mos.	9.5	0.93	0.80	0.95	1.02	0.72
F4	I	Clean, 24 mos.	9.5	0.93	0.88	0.95	0.98	0.76
D1	I	Clean, 24 mos.	9.5	0.93	0.88	1.00	1.00	0.82



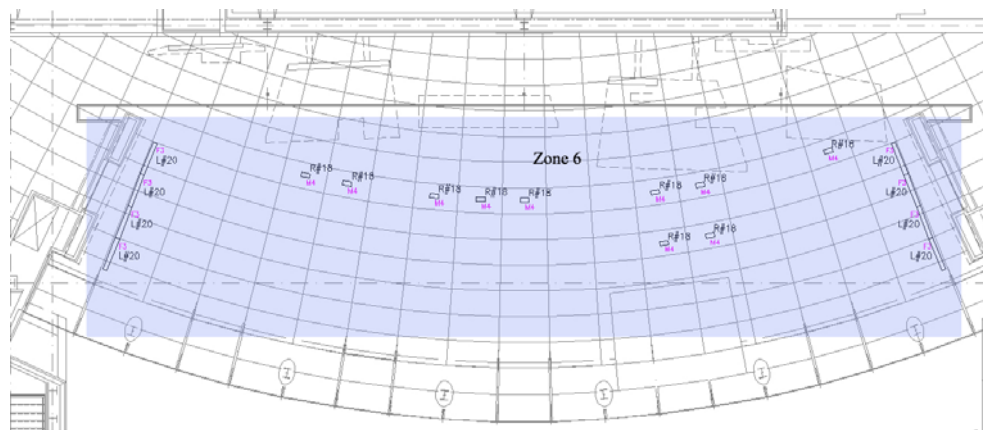
### Controls

Automatic digital time switches will be used for the different zones in the east lobby. The TS-400 digital time switch from Watt Stopper will be used in conjunction with the existing building time clock for automatic on/off from 7am to 9pm. The digital time switch can also act as an override to the building time clock for after hours custodial use.

Figure 2.14: Zoning structure for the east lobby. Each zone to be controlled by the automatic time switch and tied into the building automated time clock system. Switches are located behind the reception desk. Zone 9, which is the foyer and the under canopy lighting will be switched by the building time clock only.



Ground Floor

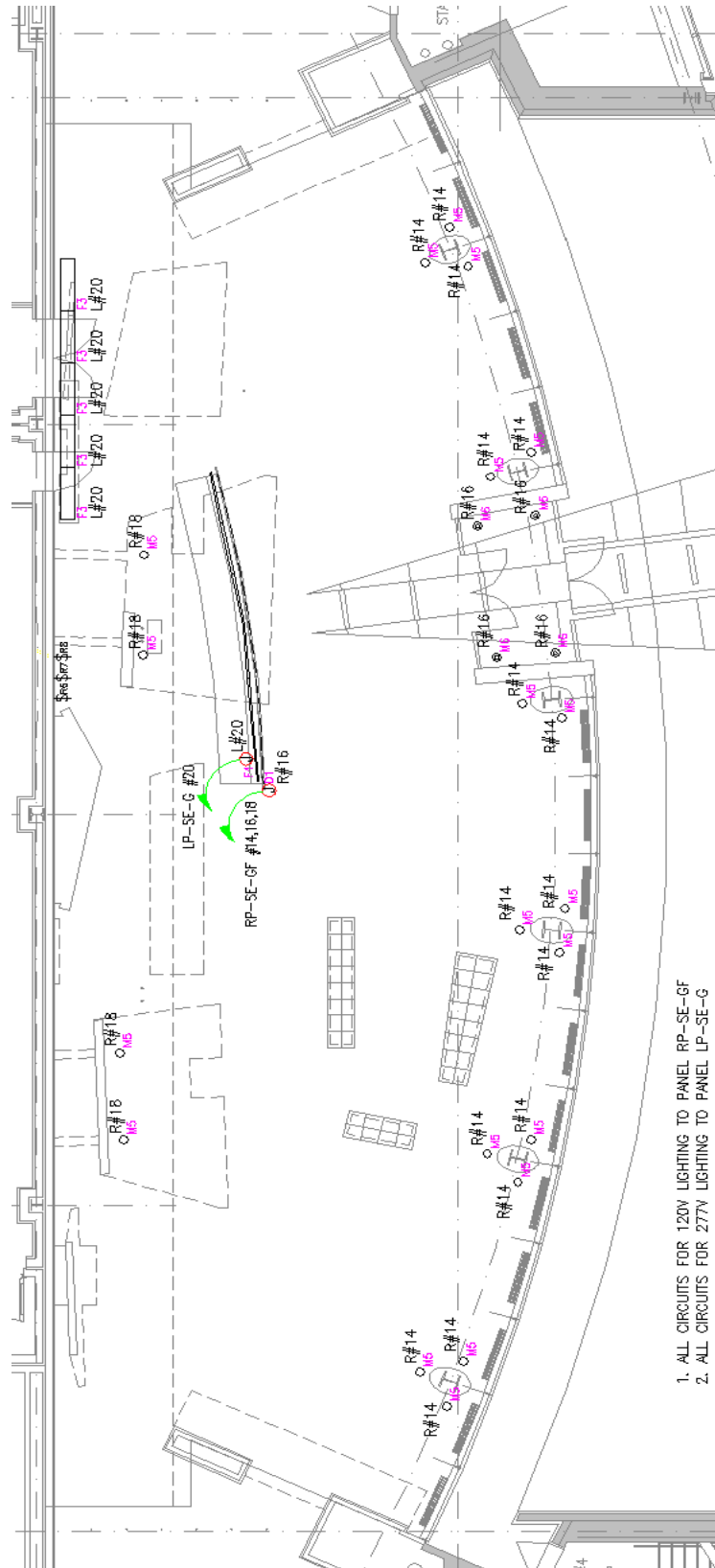


Second Floor



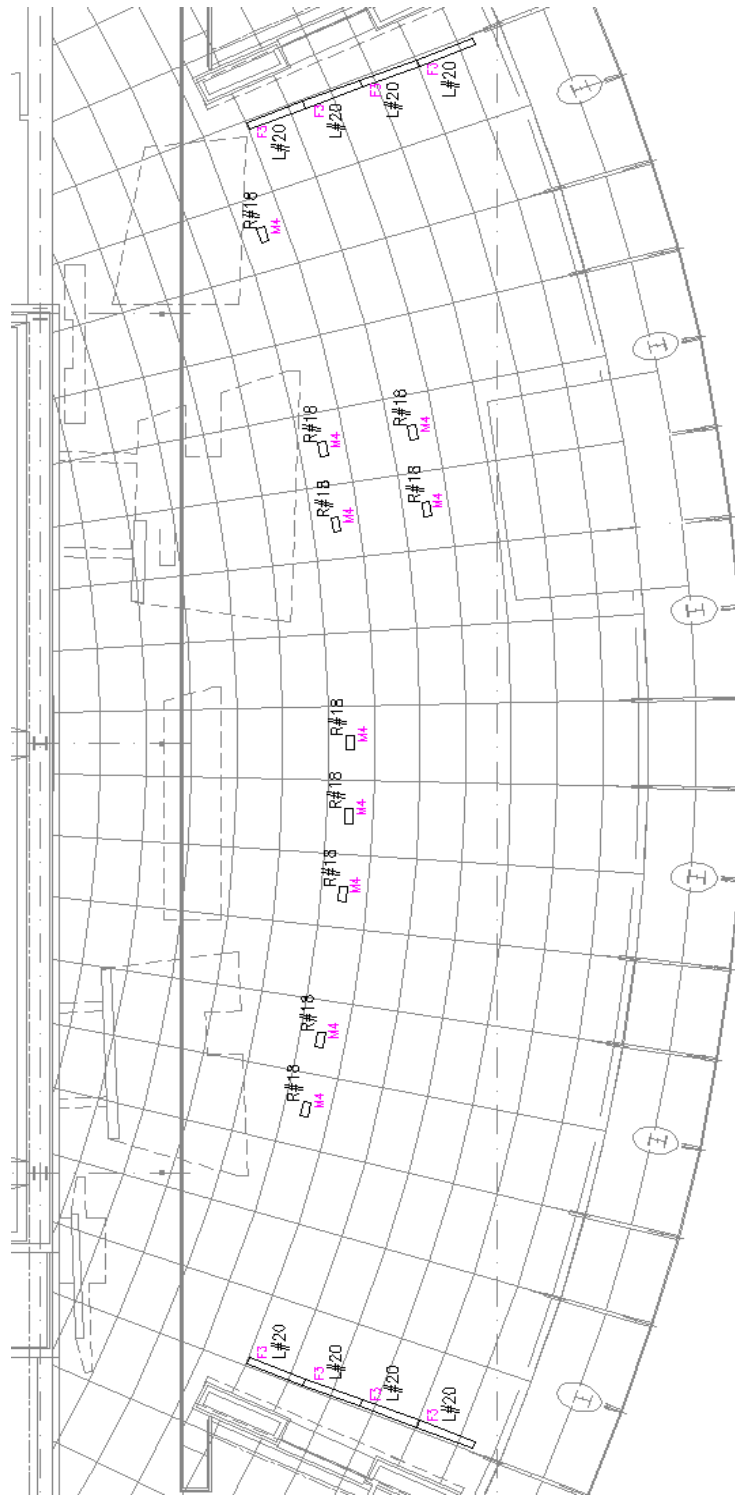
## Reflected Ceiling Plan and Circuiting

### Ground Floor





Second Floor



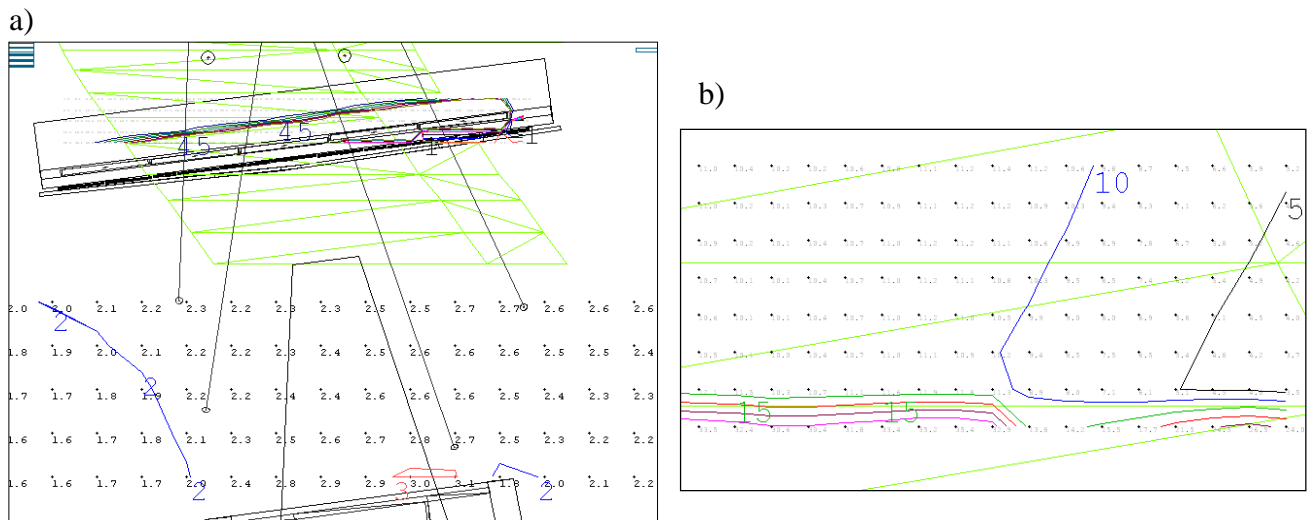
Note: Panelboard and relay schedules are located on the Electrical Depth portion of the report.





## Calculations

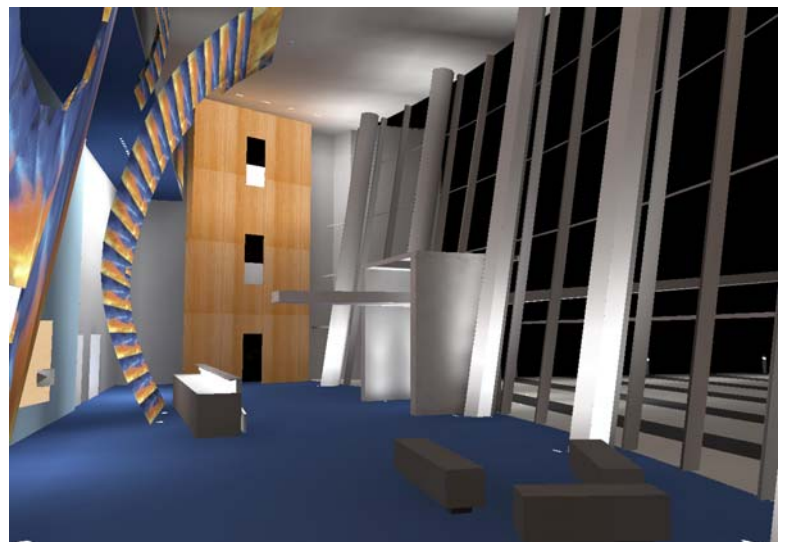
Figure 2.15: a) Horizontal illuminance isometric for lobby floor and security desk. The average horizontal illuminance on the ground is 2 fc from artificial light. There are no area lighting used because of the 3-story glass curtain wall that lets a lot of sunlight during daylight hours. Artificial light is used only to accent the 3-story features of the space, such as the art panels and wood wall. Task lighting is provided for the security desk with an average illuminance of 60 fc. b) Vertical illuminance for security desk. An average of 12 fc is available to highlight the person behind the security desk.



Vertical illuminance was also calculated for the art panels and the wood walls. The 3-story art panels have a range of average vertical illuminance from about 10 fc to 20 fc and much greater for some of the smaller panels hanging higher up in the space. The wood walls have an illuminance gradient of 40 fc at the top to 3 fc two-thirds of the way down.

## Renderings

Figure 2.16: North end of the East Lobby. The height of the space is accentuated by highlighting the 3-story features of the space, such as the art panels, anigure wood walls, and columns, with light. The space is kept relatively dark except for these features and the reception desk to bring attention to the 36' high ceiling height of the space. In turn, accenting these features gives the impression of magnanimity and modern grandness.



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Figure 2.17: South end of the lobby. Again, lighting the 3-story features of the space accentuates its height and brings the focus on the artwork as the primary object when viewing the lobby from the exterior, as well as the contrasting wood wall from all the metals used in the space.



Figure 2.18: West view of the lobby from the exterior entrance. During the daytime, the wall where the studio doors are located, as seen here, will be washed with light to draw emphasis to those doors that could get obstructed by the 3-story panels. This is done to direct visitors' attention to the studio doors. During the night, this will be shut off so that emphasis is drawn to the art panels instead of this part of the wall.



### Conclusion

The biggest improvement in the lobby lighting design is the reduction of the power density. The existing power density for the lobby is 3.1 W/sf for the combined general and decorative lighting. The new power density for the space is 1.2 W/sf, is below the 1.8 W/sf provision on ASHRAE 90.1. Moreover, lighting the space's 3-story element as the main focal point enhances the verticality of the space. With the focus on the space's height, an impression of a grand, massive space is evoked which reflects CNBC's reputation as one of the broadcasting industry's giants. The wall where the studio doors are located is also highlighted so that they can be emphasized for visiting guests.



## **EAST PLAZA**

### **Introduction**

The East Façade serves as the main point of entry into the building drawing visitors through the plaza. The plaza has an alternating pattern of white and black terrazzo tiles. A pre-formed metal canopy supported by the CNBC signage leads guides occupants to the building entrance. On adjacent sides of the curved tinted glass curtain wall that frame the lobby are metal panels, interrupted by tinted glazed ribbon windows.

### **Schematic Design**

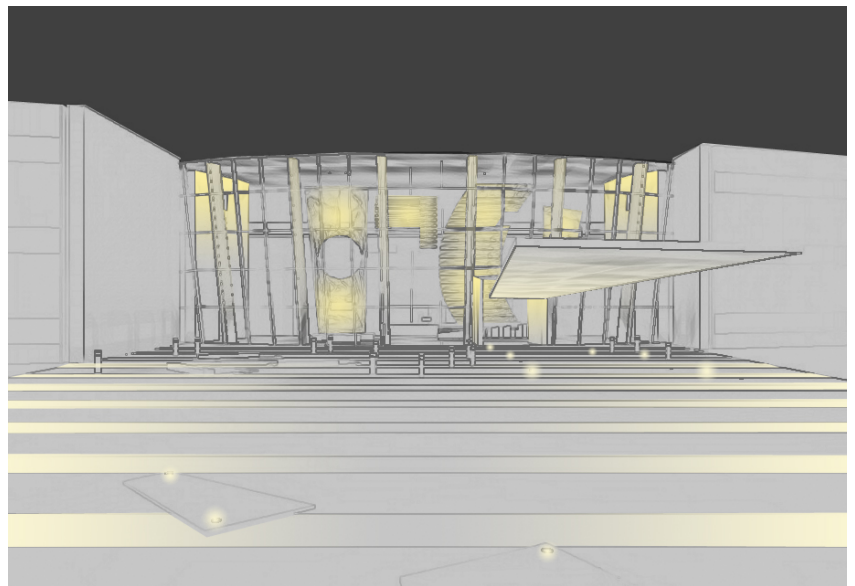
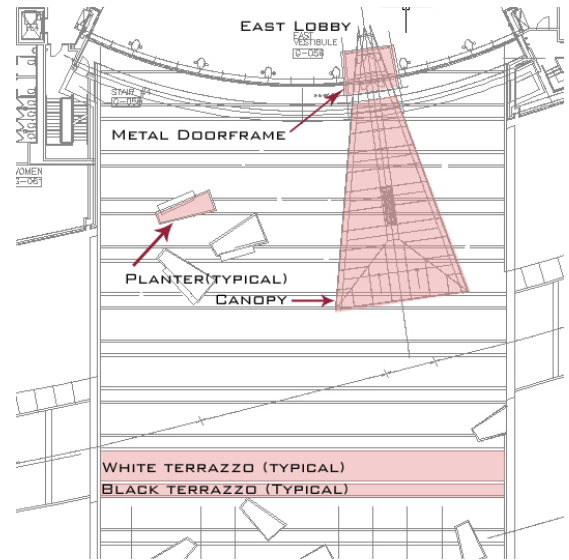
#### **Design Goals**

This space receives a lot of traffic from both the building occupants and guests for the broadcasting shows. The lighting in the space should reflect great aesthetic quality to complement CNBC's reputation as one of the nation's largest networks. Moreover, the lighting in the plaza and façade must not take away from the showcased art/banners seen from within the lobby. Instead, the focal point will be the 3-story panel display inside the lobby, where surfaces become brighter as they are closer to the interior. This way, the light draws attention to the interior of the space and the point of entry.

#### **Photoshop Sketches**

Figure 2.19:

This view shows the plaza as the main entry point to the east lobby. The soft gradient of light that becomes brighter as it approaches the entry of the building helps draw attention to the entrance, but most of all does not take attention away from the three story panels. Instead, it helps draw attention to them.





### **Design Criteria**

(Per IESNA Lighting Handbook)

- ❑ Horizontal Illuminance – The recommended light level on the work plane is 5 fc. Proper illuminance level is needed for safety when walking in the plaza.
- ❑ Vertical Illuminance – The recommended vertical illuminance is 3 fc.
- ❑ Direct Glare – Direct glare can cause visual discomfort to occupants approaching the building. This is an active pedestrian entrance, and direct glare should not take away attention from the entrance.
- ❑ Reflected Glare – Reflected glare from the canopy, which is a current issue, can cause visual discomfort to those approaching the building.
- ❑ Source/Eye/Task Geometry – To avoid uncomfortable direct and reflected glare to those approaching the building, it is necessary to consider this geometry.
- ❑ Appearance of Space and Luminaires – This space receives a lot of traffic from both the building occupants and guests for the broadcasting shows. The lighting in the space should reflect great aesthetic quality to complement CNBC's reputation as one of the nation's largest networks. Moreover, the lighting in the plaza and façade must not take away from the showcased art/banners seen from within the lobby.
- ❑ Color Appearance – Once again, this space receives high profile traffic, and material used should appear rich and vibrant for aesthetic reasons. However, it must not take away from the main focus, which are the 3-story panels inside the lobby.
- ❑ Modeling of faces and objects – For the safety of pedestrians, faces must be properly lit properly to create a sense of security.
- ❑ Shadows – For the same reason above, it is important to eliminate shadows for the safety and security of building occupants.
- ❑ Peripheral Detection – Proper illuminance should be given so that occupants entering or leaving the building has enough light to be aware of activities occurring in their peripheral vision. This, in turn, provides a sense of security.



- Points of Interest – The entrance to the building should be the brightest to direct occupants to the proper areas.
- Light Pollution/Trespass – Light pollution has increasingly been becoming a problem. Luminaires that do not emit light above the horizontal plane should be used to minimize this problem.

(Per ASHRAE Standard 90.1)

- Power Allowance – ASHRAE Standard 90.1 allows 3 W/sf for canopied area or building entrances with canopy, and 0.25 W/sf for plazas.
- Control Requirements – The standard mandates controls through photosensor or astronomical time switch capable of automatically turning off the lights once daylight is available.

**Equipments**

**Luminaire Schedule**

Fixture Designation	Description	Mounting	Lamp Qty	Lamp Type	Voltage	Ballast Type	Ballast Watts
M6	Metal Halide Directional Uplight	Recessed Floor	1	CDM39/PAR20/830FL	120	HX-HPF	53
M7	Metal Halide Pole Mounted Flood Light	Surface Floor	1	CDM70/T6/830	120	HX-HPF	94
Notes: 1. See Appendix A for luminaire cutsheets						Total Power:	2304 W
						Power Density:	0.17 W/sf

**Light Loss Factors**

Fixture Designation	Maintenance Category	Cleaning Interval	RCR	RSDD	LDD	LLD	BF	Total LLF
M6	IV	Dirty, 12 mos.	N/A	0.8	0.78	0.80	1.00	0.50
M7	VI	Dirty, 12 mos.	N/A	0.8	0.76	0.75	1.00	0.46

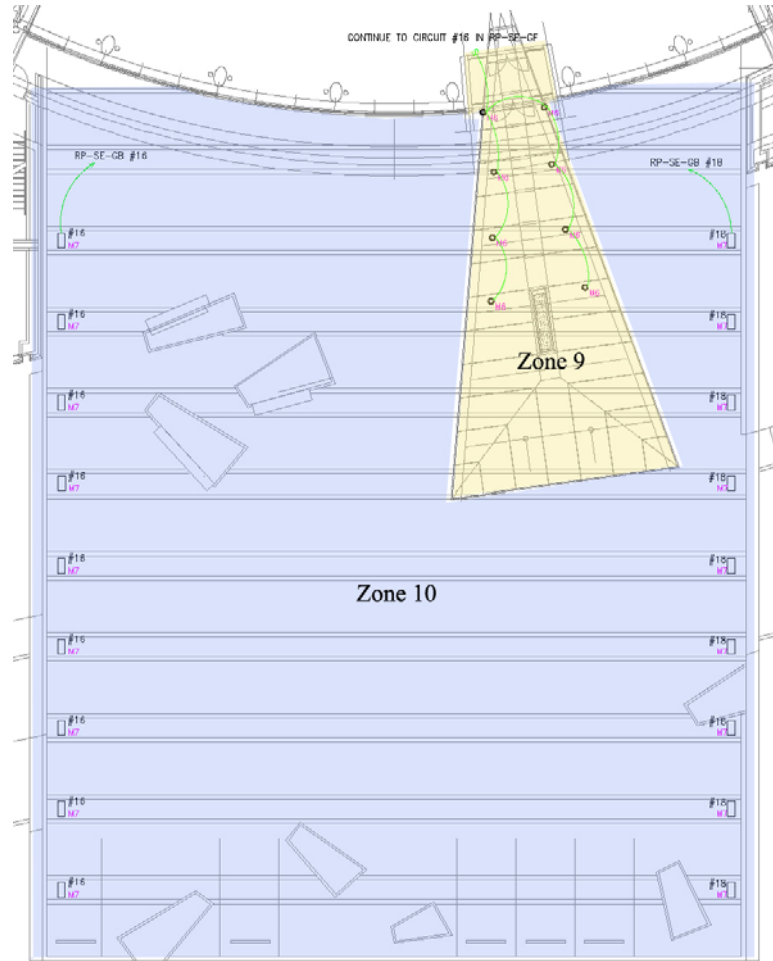


**Controls**

The exterior lighting will be tied in to the building's existing time clock for automatic on at dawn and automatic shut off at dusk.

Figure 2.20:

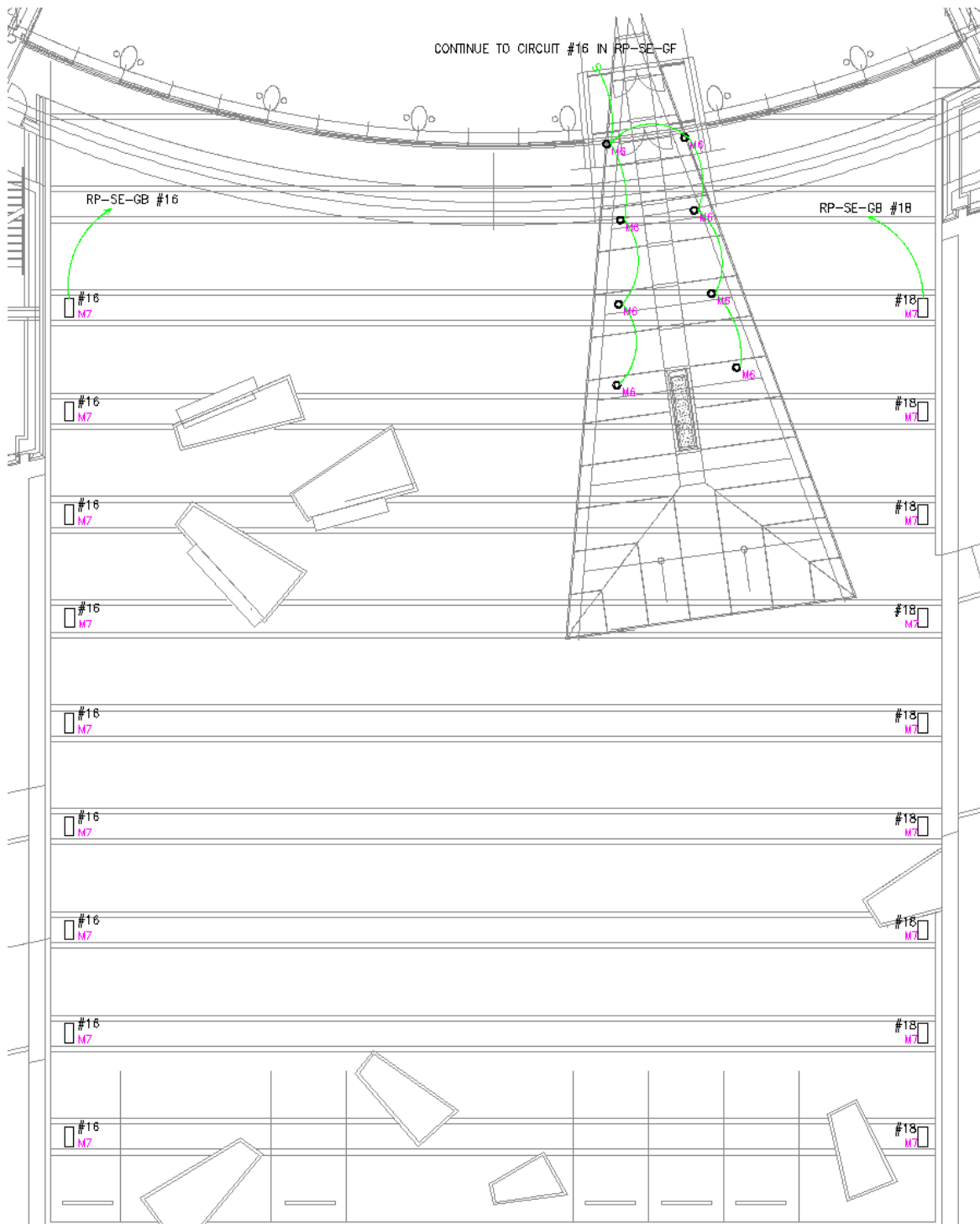
Zoning structure for the east plaza. Each zone to be controlled by the building automated time clock system.



1. ALL CIRCUITS TO PANEL RP-SE-GB UNLESS OTHERWISE NOTED



### Reflected Ceiling Plan and Circuiting



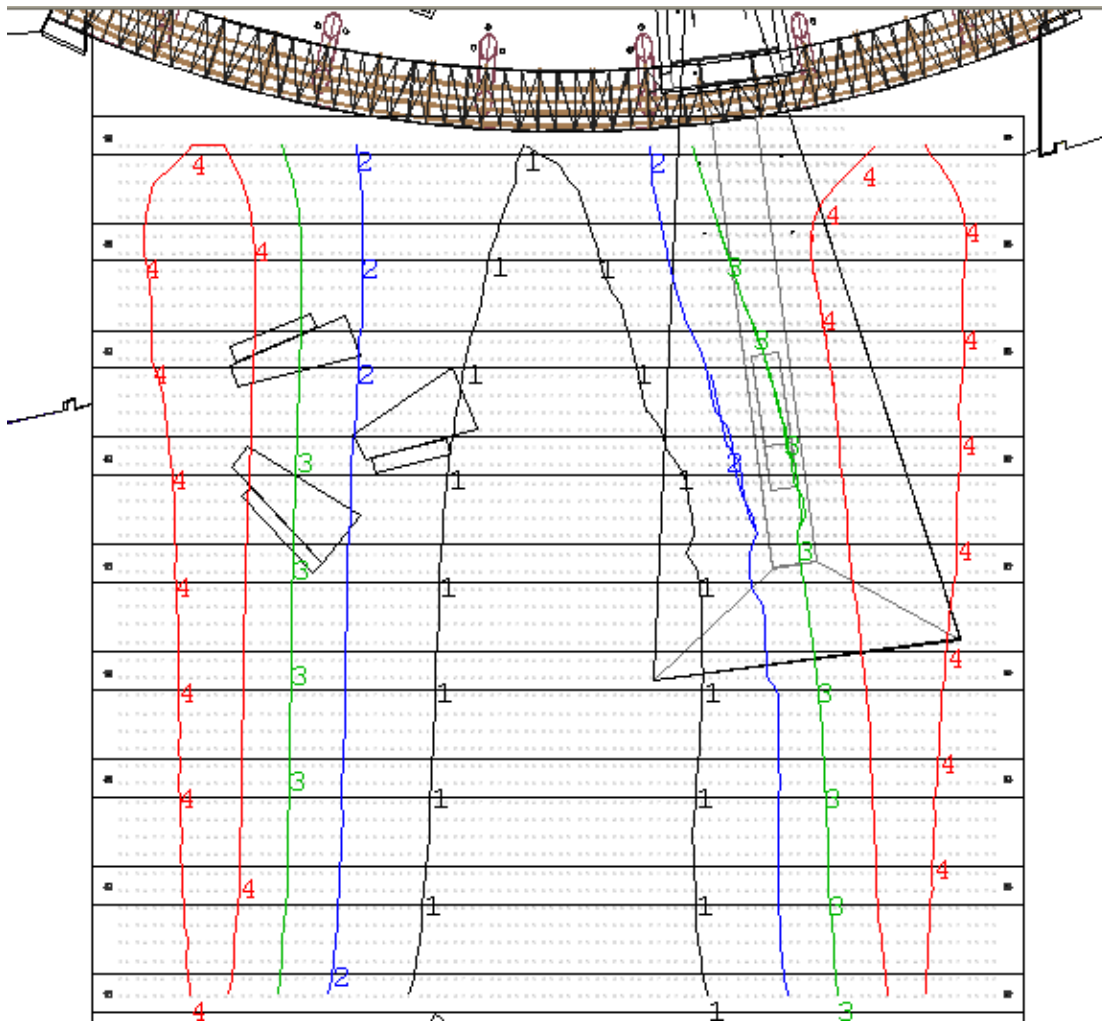
1. ALL CIRCUITS TO PANEL RP-SE-GB UNLESS OTHERWISE NOTED

Note: Panelboard and relay schedules are located on the Electrical Depth portion of the report.



### Calculations

Figure 2.21: The average horizontal illuminance on the plaza grounds is 2.5 fc and 3.2 fc under the canopy awning. The average vertical illuminance in the plaza is 1.5 fc.







### Renderings

Figure 2.22: East Plaza. Unlike the existing design, the new lighting scheme now places the 3-story elements of the space as the focal point, especially the art panels. Furthermore, the lighting in the awning is no the brightest surface that takes focus away from the interior of the lobby. Instead, the gradient of light whose brightest point is the doorway itself pulls the eyes into the building, and attention is not stopped short at the awning.

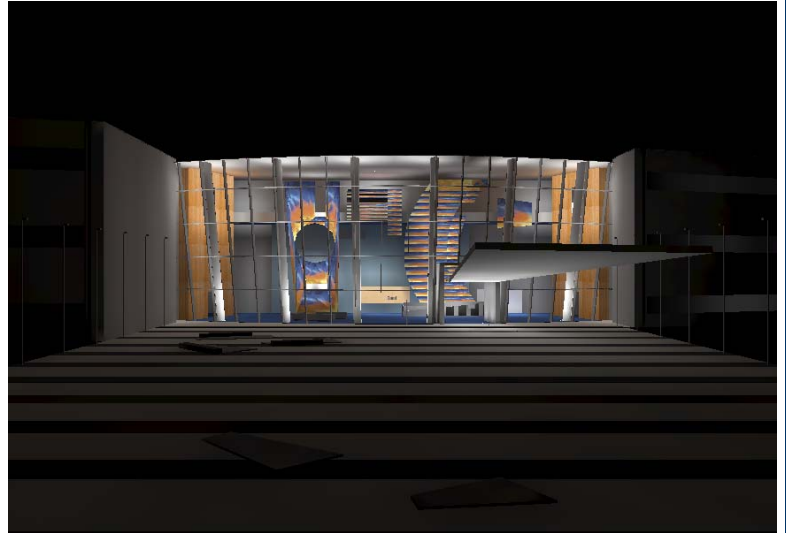


Figure 2.23: East Plaza. This is the view of the plaza when the building is still occupied from 7am to 9pm with its regular occupants. Although the plaza is now also bright, the horizontal illuminance on it averages only 2.5 fc with the maximum illuminance of 4fc under the pole fixtures. However, the vertical illuminance on the 3-story features of the lobby averages at least 15 fc. Therefore, these vertical surfaces inside the lobby have the hierarchy in the lighting and thus remain as the focal point.

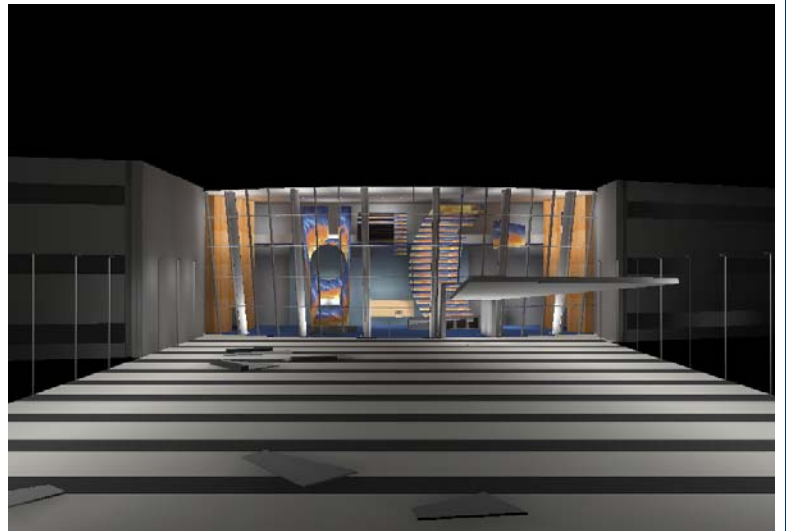
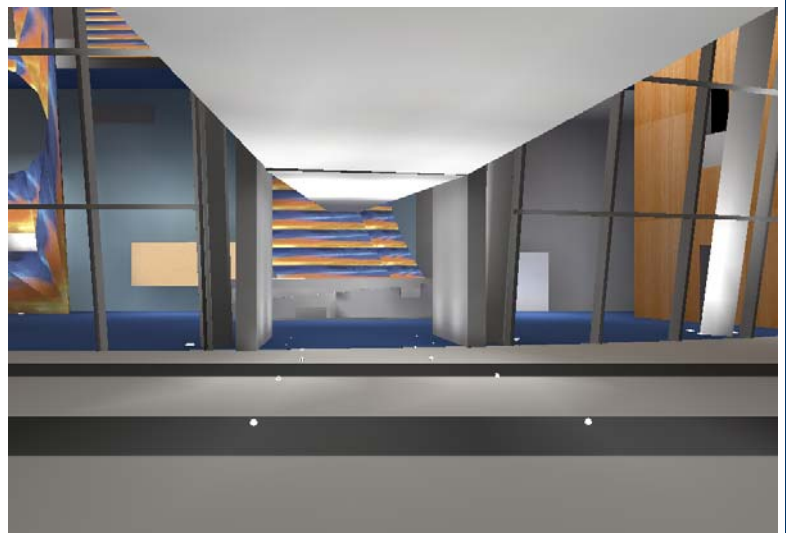


Figure 2.24: Entrance to East Lobby from the plaza. This close up view shows how the light gradually becomes brighter as you approach the doorway, guiding the sight into the space.





## Conclusion

The new lighting design for the plaza really emphasizes the lobby that is highly visible from the outside. The two scenarios where the plaza grounds is flood lit and when it is not, still has the interior of the lobby, specifically the 3-story art panels and the wood walls as the focal point as you draw close to the building. What added to this effect is also the new canopy lighting where there is a gradient of light and surfaces become brighter the closer it is to the entry way. Unlike the existing canopy lighting that stops your attention at the brightly lit canopy, the new design helps draw your attention into the space and in essence, to what is inside the lobby. Finally, the power density for the plaza lighting is 0.17 W/sf. Although it slightly went up from the existing power density of 0.14 W/sf, 0.17 W/sf still falls below the 0.25 W/sf allowed by ASHRAE 90.1.