

# Franklin Square Hospital Center

Baltimore, MD



## Technical Report 1 | Lighting Existing Conditions + Design Criteria

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## Executive Summary

The Franklin Square Hospital Center 356,000 square feet addition has been designed to provide healthcare to the people of the Baltimore area as well as additional visiting patients. This institution focuses on the patients more than pondering on the smaller details of this major project.

The existing lighting conditions have been evaluated for three specified area within the space; a team station, the gift shop, the emergency department lobby and the main entry and parking lot. The overall lighting design of the building will provide ambient lighting but it can be changed slightly to create a more appealing place to be

The IESNA has recommendations that are being tracked throughout the critique process which include certain design criteria for specific areas of a building. Illuminance values and luminance ratios should be closely follow as well. ASHRAE Standard 90.1 – 2007 is used to calculate the allowable power densities of each designated area. These codes as well as aesthetics are all incorporated into the design of the building and will be further discussed below.



Fig 1: Main entry lobby (LWA)

## Table of Contents

<b>Large Work Space: Team Station</b> .....	<b>4</b>
Existing Lighting Conditions .....	4
Lighting Design Criteria .....	7
Evaluation and Critique of Existing Conditions .....	9
<b>Special Purpose Space: Gift Shop</b> .....	<b>14</b>
Existing Lighting Conditions .....	14
Lighting Design Criteria .....	17
Evaluation and Critique of Existing Conditions .....	19
<b>Circulation Space: Emergency Department Lobby</b> .....	<b>24</b>
Existing Lighting Conditions .....	24
Lighting Design Criteria .....	31
Evaluation and Critique of Existing Conditions .....	34
<b>Circulation Space: Emergency Department Lobby</b> .....	<b>35</b>
Existing Lighting Conditions .....	35
Lighting Design Criteria .....	38
Evaluation and Critique of Existing Conditions .....	40

## Large Work Space: Team Station

### Existing Lighting Conditions

#### Spatial Environment Description

The team station is a place for nurses and doctors to organize and file patient information and documents. They have ample desk space to perform clinical and administrative paper work. It is a private area for the employees of the hospital. Visitors and patients are able to speak with the employees as well to have their questions answered quickly.

Team stations are located throughout the entire hospital with many on each floor, depending on the number of patient rooms. This particular team station is located on the ground floor of the emergency department on the south west side of the hospital. It is rectangular in shape and is approximately 847 square feet.

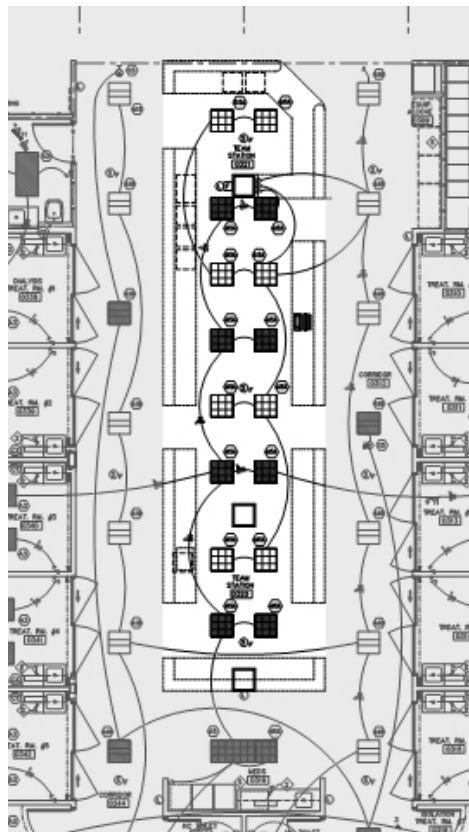


Fig. 2: Team station lighting plan, not to scale (dwg. E04.0H)

## Materials

Ceiling – The ceiling consists of 2x2 acoustical ceiling tiles by Armstrong with angled tegular edges. (ACT-1)

Walls – The walls are painted the color Softer Tan by Sherman Williams (IPS2-A).

Floor – The floor is covered with 12”x12” vinyl composition tiles, by Imperial Texture, that are placed in a specified pattern using four different colors (VCT-1, -2,- 3, -7).

Bulkhead – The bulkheads are painted the color Ruskin Room Green (green) by Sherman Williams (IPS2-E).

Base – The base is a 6” high black colored rubber base by Roppe (RE6-B).

MATERIALS	DESCRIPTION	REFLECTANCE
ACT-1	Fine fissured #1732 2x2 acoustical ceiling tile	0.74
IPS2-A	SW 6141 Softer tan paint	0.81
IPS2-E	SW 0042 Ruskin room green paint	0.50
RB6-B	P100 Black rubber base	0.18
VCT-1	51873 Brushed sand vinyl composition tile	0.83
VCT-2	51916 Dutch delft vinyl composition tile	0.65
VCT-3	51867 Cantaloupe vinyl composition tile	0.63
VCT-7	51885 Granny smith vinyl composition tile	0.82

Fig. 3: Team station material reflectance properties

## Furnishings

Herman Miller Systems:

The reflectance for the Herman Miller Furniture System is approximated by an average horizontal of and average vertical reflectance value of 0.30.

Frame base and vertical connectors – black umber (BU)

Exterior tiles – cherry (V3)

Interior tiles below work surface – painted black umber (BU)

Interior tiles above work surface – Painted just tan (JT)

Work surface – Laminate 2x wheat (LW)

Trans. Counters – Corian with Mojave/ black umber supports (BU)

Crash rail (2 heights) – C/S Acrovyn #103 Beige (BG)

MATERIALS	DESCRIPTION	REFLECTANCE
BU	Black umber paint	0.18
BG	#103 Beige paint	0.77
JT	Just tan paint	0.71
LW	Wheat work surface laminate	0.48
V3	Cherry exterior tiles	0.14

Fig. 4: Herman Miller System material reflectance properties

## Lighting System

The lighting system consists of an ambient arrangement. Fluorescent 2x2 fixtures house 2-40 watt twin tube compact fluorescent lamps to provide ambient lighting within the team station.

TEAM STATION LUMINAIRE SCHEDULE						
TYPE	QTY.	DESCRIPTION	MANUFACTURER/ CATALOG NO.	LAMPS	VOLTAGE	INPUT WATTS
A5	1	2x4, RECESSED, 3" NOMINAL PARABOLIC LOUVER, 18 CELL, LOW IRIDESCENT SEMI-SPECULAR LOUVER, GRID CEILING, STATIC	LITHONIA 2PM3N	(4) F32T8/4100K	277	110
A15A	17	2x2, RECESSED, 3" NOMINAL PARABOLIC LOUVER, 9 CELL, LOW IRIDESCENT SEMI-SPECULAR LOUVER, GRID CEILING, STATIC	LITHONIA 2PM3N	(2) F40BX/4100K	277	80
A18	16	2x2 DIRECT/INDIRECT RECESSED, GRID CEILING, CENTER MICRO-PERFORATED ROUND MESH DIFFUSER WITH WHITE ACRYLIC OVERLAY, WHITE FINISH, STATIC	LITHONIA 2AV	(2) F40BX/4100K	277	80

Fig. 5: Team station luminaire schedule

**Tasks/Activities**

The team station is primarily a working environment. The lighting inside the space should be slightly different than the surroundings to allow the patients and visitors to understand that the team station is a private area for the nurses’ only.

**Lighting Design Criteria - Interior, Health Care, Nursing Stations, General/Desk (IESNA Handbook)**

**Appearance of Space and Luminaires (Important/Not Important)**

It is Important for the architectural and lighting layout to be clean and uniform throughout the entire area to reduce “visual clutter”. The luminaires should help guide people around the space for example if cove lighting is only around the team station then the patients and visitors see this as a private area that they are not allowed to enter.

**Color Appearance and Color Contrast (Very Important/Important)**

Color rendering is crucial in healthcare facilities. Patients’ symptoms and certain problems deal with colors that need to be seen under a high CRI lamp. Lamps with a CRI of 70 or better are recommended for a pleasant appearance of skin-tones.

**Daylighting Integration and Control (Very Important/Not Important)**

Daylight integration is very difficult to achieve in the team station since it is not near any windows. The next best thing to simulate the change of time over the course of the day



is to use controls and settings. A daytime and nighttime scene can be set and with just push of a button the Illuminance levels of the space will adapt.

**Direct Glare** (Important/Somewhat Important)

Direct glare can be controlled with the choice of an indirect luminaire that or a lens or parabolic reflector to lessen the glare.

**Flicker and Strobe effect** (Very Important/Somewhat Important)

The use of high frequency electronic ballasts can eliminate the annoyance of flicker and strobe effect.

**Light Distribution on Surfaces** (Very Important/Important)

The surfaces of different objects in the space should not exceed a 3:1 ratio of luminance but the space should not create a lack of interest with exactly one uniform luminance.

**Uniform Light Distribution on Task Plane** (Very Important/Important)

Shadows and patterns of other light sources are distracting and can be reduced by using more luminaires or integrate luminaires that have a wide angle to cover more area of the task plane.

**Luminances of Room Surfaces** (Very Important/Somewhat Important)

Luminance values in the space should be uniform for each surface including the floor, cabinets and bulkheads over the work plane. Dark area towards the top of the bulkheads should be avoided for uniformity.

**Modeling of Faces or Objects** (Very Important/Very Important)

Non-verbal communication of patients is very important in hospital settings therefore the lighting design of the space should incorporate reflected Illuminance as well as direct. Creating more shadows on the face helps to create a more defined and easy to read facial expressions.

**Reflected Glare** (Important/Not Important)

Avoid veiling reflections from cabinet table tops and glossy or metallic hospital equipment. Do not place luminaires directly behind computer terminals.

**Source/Task/Eye geometry** (Important/Not Important)

Avoid placing luminaires behind screens of any sort such as a computer terminal or a nurse call system display.



**Illuminance**

Horizontal Illuminance (Important/Important) – Category D/E – 30/50 fc

Vertical Illuminance (Important/Somewhat Important) – Category B/C – 5/10 fc

**VDT Criteria**

Visual display terminals are used in the team station all hours of the day therefore the lighting design must reduce veiling reflections that cause glare.

**Power Allowance** (ASHRAE /IESNA Std. 90.1-2007)

Nurses’ Station – 1.0 W/ft<sup>2</sup>

**Controls Criteria**

Nurse Stations are usually located in the center of many patient rooms therefore a multilevel control system is necessary. A higher Illuminance would be used during daytime hours while a lower Illuminance level would be used during nighttime hours. The luminaires that are used for the night should not be visible to the patients through their doorways.

**Luminance Ratios**

Paper task and adjacent VDT screen - 3:1

**Psychological Aspects**

A private psychological effect within the team station will help visitors and patients understand that they are not supposed to be in that space. This private feeling also plays a role on the nurses that will occupy the space. They will be able to work more efficiently in a more intimate space due to these psychological impressions.

**Evaluation and Critique of Existing Conditions**

TYPE	BF	LLD	LDD	RSDD	TOTAL LLF
A5	0.87	0.95	0.91	0.98	0.737
A15A	1.0	0.95	0.91	0.98	0.847
A18	1.0	0.89	0.91	0.98	0.794

Fig. 6: Light loss factors for the large workspace

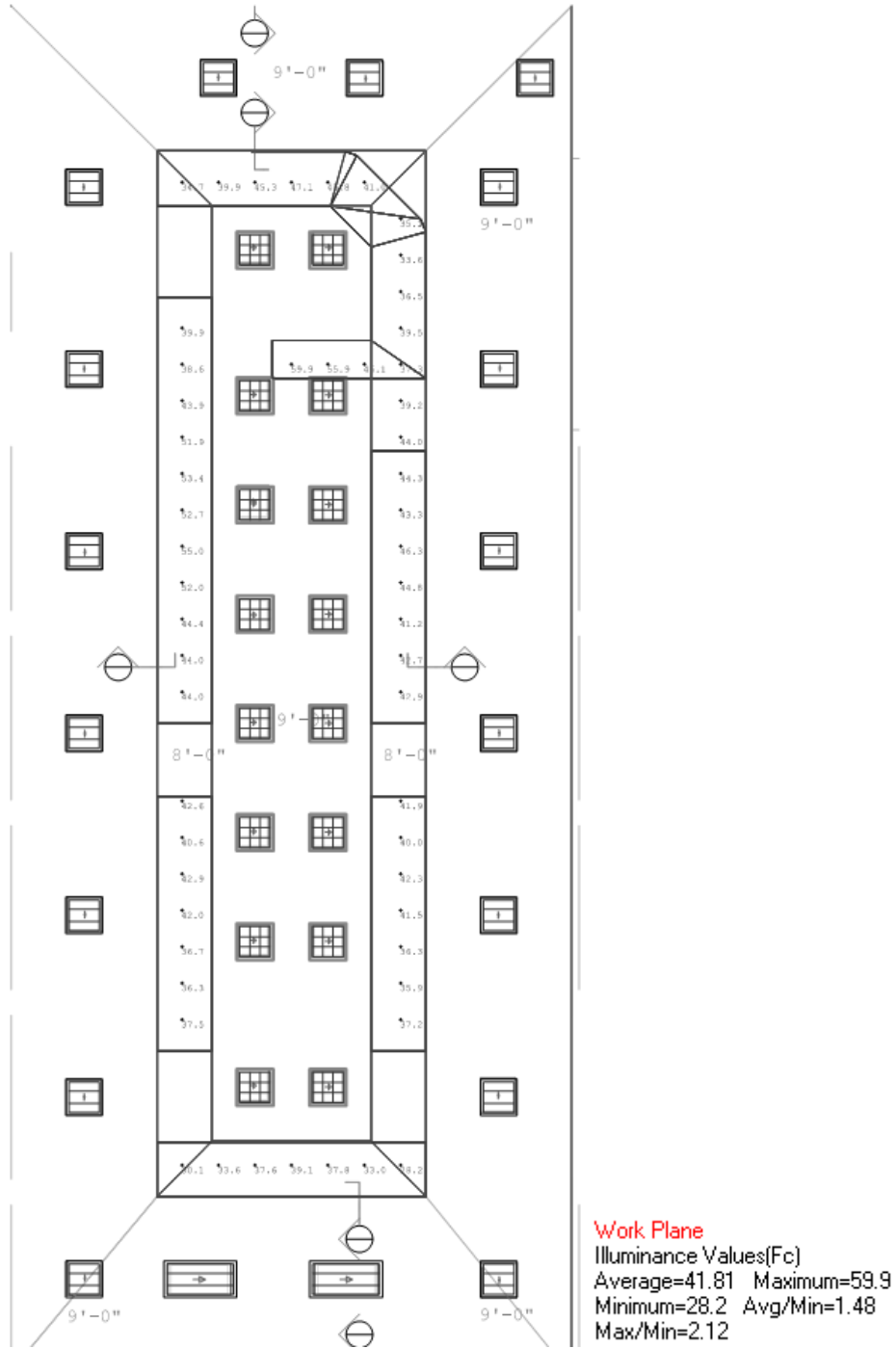


Fig. 7: Illuminance values on the work plane in the team station, not to scale (AGI)

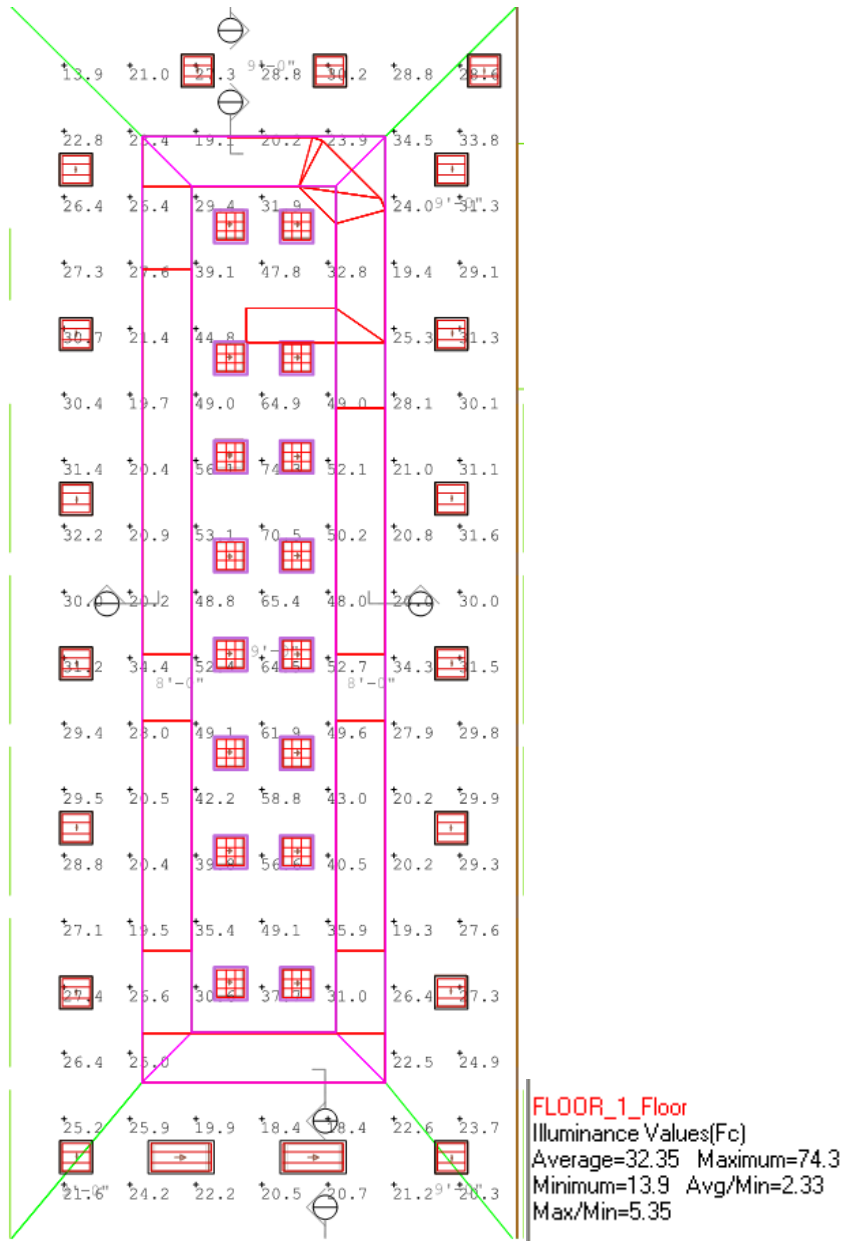


Fig. 8: Illuminance values on the floor in the team station, not to scale (AGI)

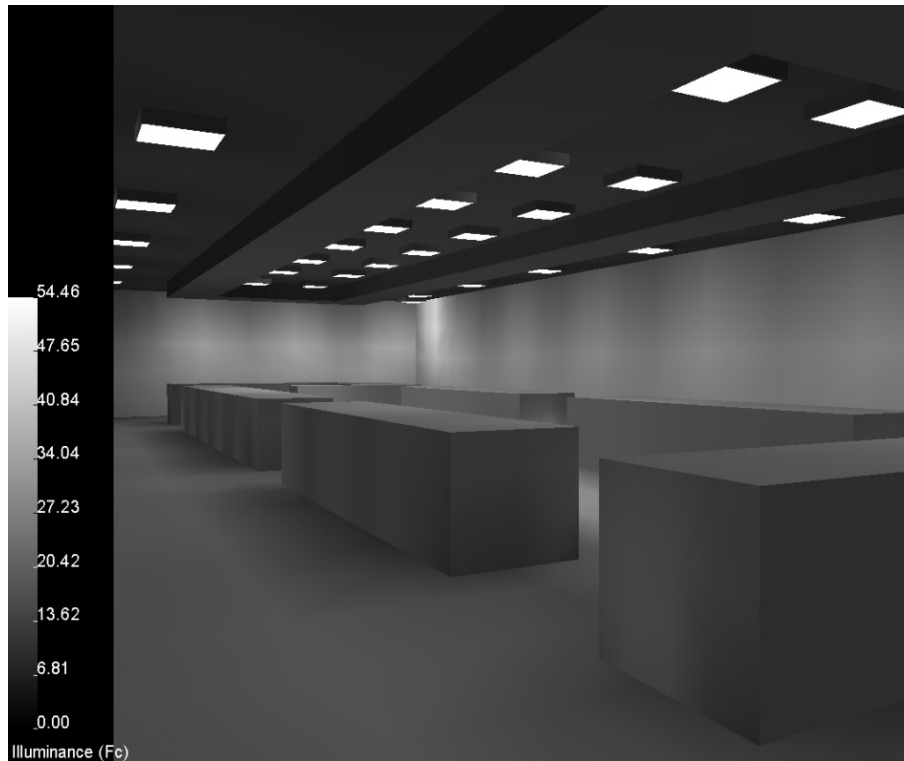


Fig. 9: Grayscale illuminance render of the team station (AGI)

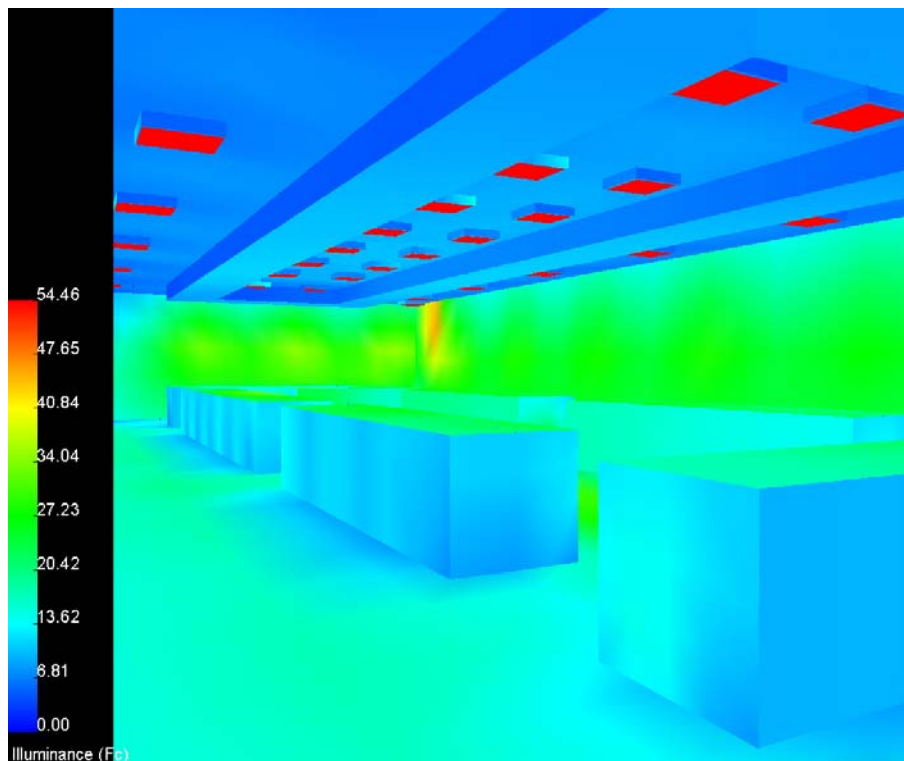


Fig. 10: Pseudo color illuminance render of the team station (AGI)



Fig. 11: Team station render (LWA)

## Discussion

The existing lighting design for the team station utilized two different types of 2x2 fluorescent luminaires. The luminaires provide the space with adequate illumination. The average horizontal illuminance value of 32/41 footcandles does not meet the IESNA recommended levels. When calculated in AGI32, the light loss factors were accounted for but when the luminaires are new they will provide even more uniform illuminance to the space.

Daylight integration was part of the design criteria but was not met because the location of the team station was inadaptable. Slight scalloping occurs on the bottom of the furniture system. The task plane has a uniform illuminance as well as the finished floor. Glare has been avoided with the luminaire choices.

When all of the reflectance values and materials are added to the model, the scalloping close to the floor should fade enough to become unnoticeable. The space appears to be visually clear and clutter free which makes the space enjoyable.

## Special Purpose Space: Gift Shop

### Existing Lighting Conditions

#### Spatial Environment

Visitors and occasionally patients visit the gift shop to shop for a desired item whether it is a needed candy bar or a get well teddy bear and a balloon. Many different types of merchandise are found within this small 1,630 square feet space. It is located on the first level of the hospital adjacent to the main entrance lobby. The occupants circulate around a centralized checkout counter while looking around.

The space resembles a square with notches cut out of the northwest and southwest corners. These notches allow for additional display areas for merchandise. The display tables are fixed in positions as seen on the floor plan. Shelving lines the walls of the gift shop for display of cards, clothes, plants and other items.

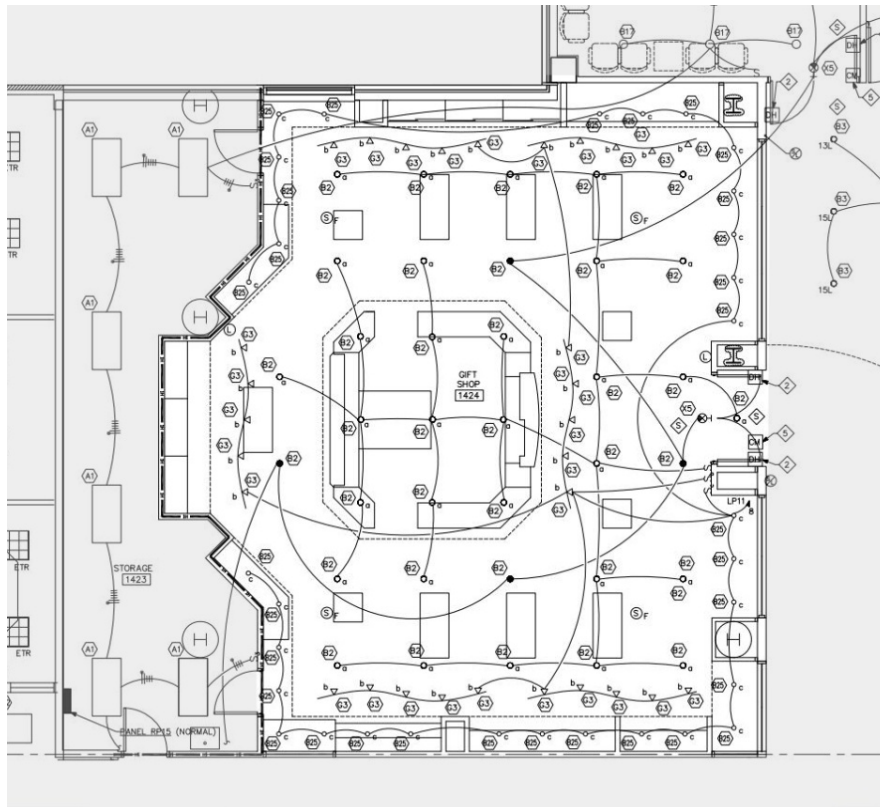


Fig. 12: Gift shop lighting plan, not to scale (dwg. E4.1G)

**Materials**

Ceiling – The ceiling consists of 2x2 acoustical ceiling tiles by Armstrong with angled tegular edges. (ACT-1)

Walls – The walls are painted the color Softer Tan by Sherman Williams (IPS2-A).

Storefront Walls – From the floor, a 7’ tempered clear float glass with 1.5’ of clear float glass above it with a mullion between them (GL-2, -1).

Floor – The floor is covered with 6’ wide condensed cushion with mark 2x backing 02751 Datum Strata isle colored carpet by C&A (CPT-2).

Door Frame - The door frames are painted the color Macadamia by Sherman Williams (IPS7-B).

Bulkhead – The bulkheads are painted the color Softer Tan by Sherman Williams (IPS2-A).

Base – The base is a 4” high almond colored rubber base by Roppe (RB4-A).

MATERIALS	DESCRIPTION	REFLECTANCE
ACT-1	Fine fissured #1732 2x2 acoustical ceiling tile	0.74
CPT-2	15211 Isle datum strata carpet	0.36
IPS2-A	SW 6141 Softer tan paint	0.81
IPS2-B	SW 6142 Macadamia paint	0.97
RB4-A	P184 Almond rubber base	0.72

Fig. 13: Gift shop material reflectance properties

MATERIALS	DESCRIPTION	TRANSMITTANCE
GL-1	1/4" Clear float glass	0.88
GL-2	1/4" Tempered clear float glass	0.88

Fig. 14: Gift shop glass transmittance properties



**Furnishings**

A centralized checkout area is surrounded by the display tables and shelves. Assume all furniture systems are wooden and are located as shown on the plan in a fixed position.

**Lighting System**

The lighting system in the gift shop consists of an ambient system of 36 watt twin compact fluorescent lamped circular downlights. Accent lighting along the walls is provided by 35 watt MR16 lamped downlights. The accent lighting luminaires are smaller than the luminaires covering the entire space. Flexibility is created with track fixtures that house 35 watt MR16 lamps.

GIFT SHOP LUMINAIRE SCHEDULE						
TYPE	QTY.	DESCRIPTION	MANUFACTURER/ CATALOG NO.	LAMPS	VOLTAGE	INPUT WATTS
B2	36	6"/7" DOWNLIGHT, HORIZONTAL LAMP, LOW IRIDESCENT SEMI-SPECULAR ALZAK REFLECTOR AND SELF-FLANGED TRIM	GOTHAM AF-6	(2) F18DBX (4P) /4100K	277	36
B25	32	4" DOWNLIGHT, LOW IRIDESCENT SEMI-SPECULAR ALZAK REFLECTOR AND SELF-FLANGED TRIM	GOTHAM DLV	(1) 35W MR16 /3000K	277	35
G3	30	ADJUSTABLE TRACK FIXTURE, SATIN NICKEL, TILT HEAD WITH AMBER MARTINI GLASS SHIELD, TWO CIRCUIT MONORAIL TRACK	TECH LIGHTING 700 TLT	(1) 35W MR16 SPOT/3000K	277	35

Fig. 15: Gift shop luminaire schedule

**Tasks/Activities**

The major tasks in the area occur in the checkout area with the use of visual display terminals and reading. The shopper’s task is just to look at the merchandise which all needs to be illuminated. The checkout area requires a higher Illuminance value then the circulation and display areas of the gift shop.

**Design Criteria** - Interior, Merchandising Spaces, Sales Transaction Area/General Merchandise Display  
(IESNA Handbook)

**Appearance of Space and Luminaires** (Important/Important)

The arrangement of furnishings and luminaires must be organized in a way that customers will enjoy the space. A uniform layout of downlights creates a pleasant atmosphere in addition to the track fixtures that follow the walls of the space.

**Color Appearance and Color Contrast** (Important/Very Important)

A lamp with CRI of at least 80 would be acceptable for a retail space.

**Daylighting Integration and Control** (Important/Important)

There is no direct daylight into the space. Some daylight will enter from the atrium through the storefront glazing on the east wall.

**Direct Glare** (Very Important/Important)

A greater amount of small downlights are used to avoid direct glare.

**Flicker and Strobe effect** (Somewhat Important/Somewhat Important)

To avoid flicker and strobe effects, compact fluorescent lamps are used in this space.

**Light Distribution on Surfaces** (Somewhat Important/Important)

The illumination of the space should be distributed unevenly due to the fact that there are displays that will have higher Illuminance values than the circulation path.

**Uniform Light Distribution on Surfaces** (Important/Important)

The circulation areas of the space and the work plane at the checkout counter should both be uniform.

**Luminances of Room Surfaces** (Somewhat Important/Somewhat Important)

Luminances of the walls should be consistent as well as furnishings. The merchandise will vary therefore the displays are not as important.

**Modeling of Faces or Objects** (Important/Important)

The modeling of the merchandise is very important to sell the items. Point sources are used to create ambient lighting in addition to creating more directions that the light is coming from to illuminate the face.

**Point(s) of Interest** (Somewhat Important/Somewhat Important)

Points of interest are created when using the track fixtures for the displays.

**Reflected Glare (Important/Important)**

Reflected glare causes uncomfortable feelings that are unwanted to customers that are shopping. These are avoided by using matte finished oh displays, walls and floors.

**Shadows (Somewhat Important/Not Important)**

Shadows in the checkout area interfere with the employees but are avoid by having many luminaires in the area behind the counter.

**Source/Task/Eye geometry (Important/Somewhat Important)**

The increased sources with smaller apertures allows for less direct glare. The checkout uses VDT screens hence no large luminaires are located directly behind the counter.

**Sparkle/Desirable Reflected Highlights (Not Important/Important)**

The displays of the merchandise is essential to a retail store so sparkle is obtained by using many point sources from the ceiling as well as the track fixtures to highlight specific objects.

**System Control and Flexibility (Not Important/Somewhat Important)**

The flexibility of the system is found in the adjustable track luminaires.

**Illuminance**

Horizontal Illuminance (Important/Important) – Category D/E – 30/50 fc

Vertical Illuminance (Not Important/Important) – Category N.A./C – N.A./10 fc

**VDT Criteria**

Visual display terminals will only be used at the checkout area and with many luminaires in that area; the veiling reflections will be avoided.

**Power Allowance (ASHRAE /IESNA Std. 90.1-2007)**

Sales Area – 1.7 W/ft<sup>2</sup>

Additional Interior Lighting Power Allowance - [1000 Watts + (Area \* 1.0 W/ft<sup>2</sup>)] = 2630 W

**Controls Criteria**

Switching controls three different zones in the gift shop. The zones include the ambient lighting of the space, the track luminaires and the perimeter lighting.

**Accent Lighting Considerations**

Accent lighting for retail spaces is very important to attract the customer to the merchandise. Point sources are used in these situations to provide focal points to the products. The displays can be up to three times brighter than the surroundings.

**Luminance Ratios (max:min)**

Ambient lighting – 5:1 or less

Accent lighting – 15:1 or less

**Psychological Aspects**

Pleasantness or calmness is aimed to be the psychological impress that customers get when they occupy the gift shop. Since the illumination level is uniform and the illumination level isn't extremely high the space is comforting and inviting.

**Evaluation and Critique of Existing Conditions**

TYPE	BF	LLD	LDD	RSDD	TOTAL LLF
B2	1.0	0.89	0.88	0.95	0.744
B25	1.0	0.89	0.91	0.95	0.769
G3	1.0	0.92	0.85	0.95	0.743

Fig. 16: Light loss factors for the special purpose space

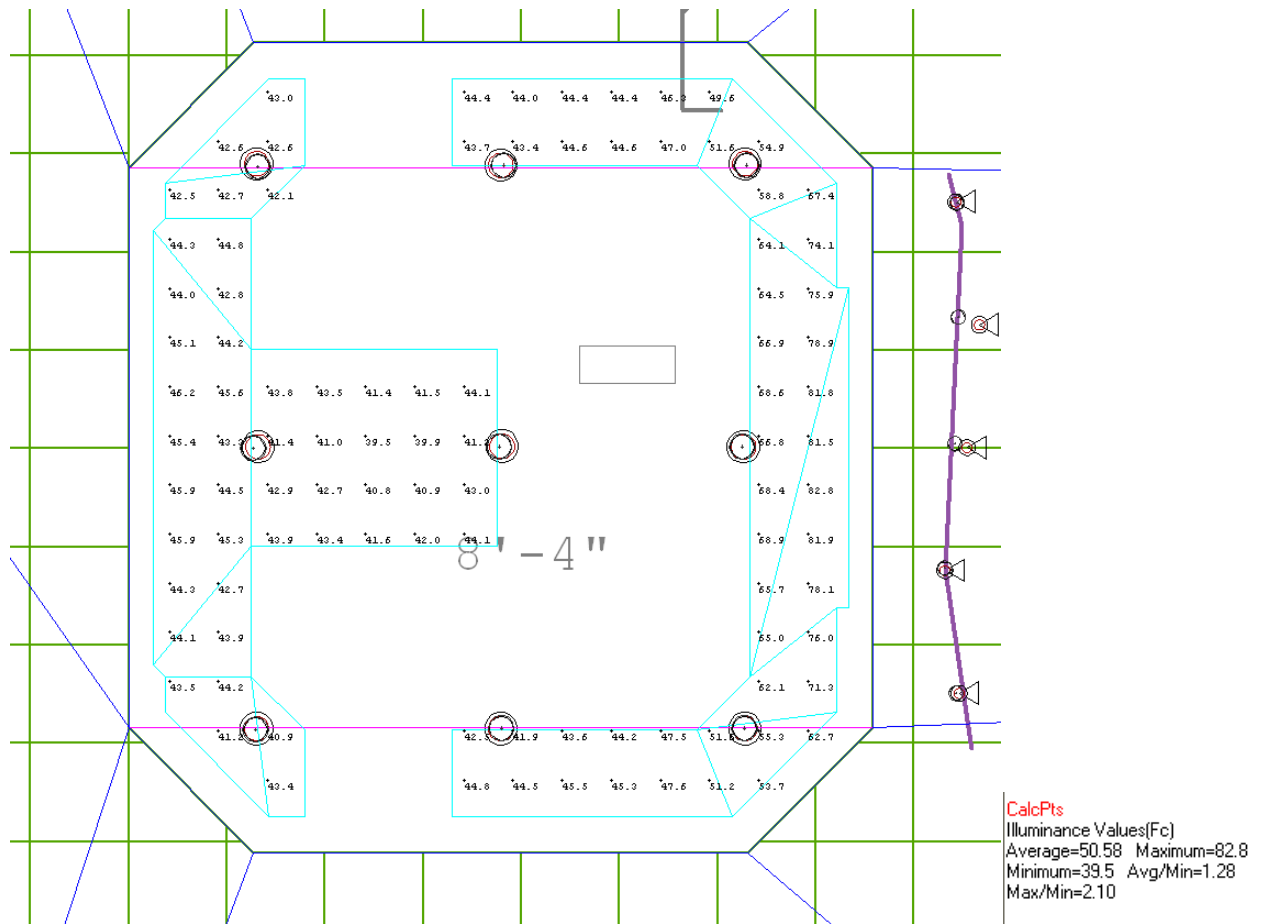


Fig. 17: Illuminance values on the work plane in the gift shop, not to scale (AGI)

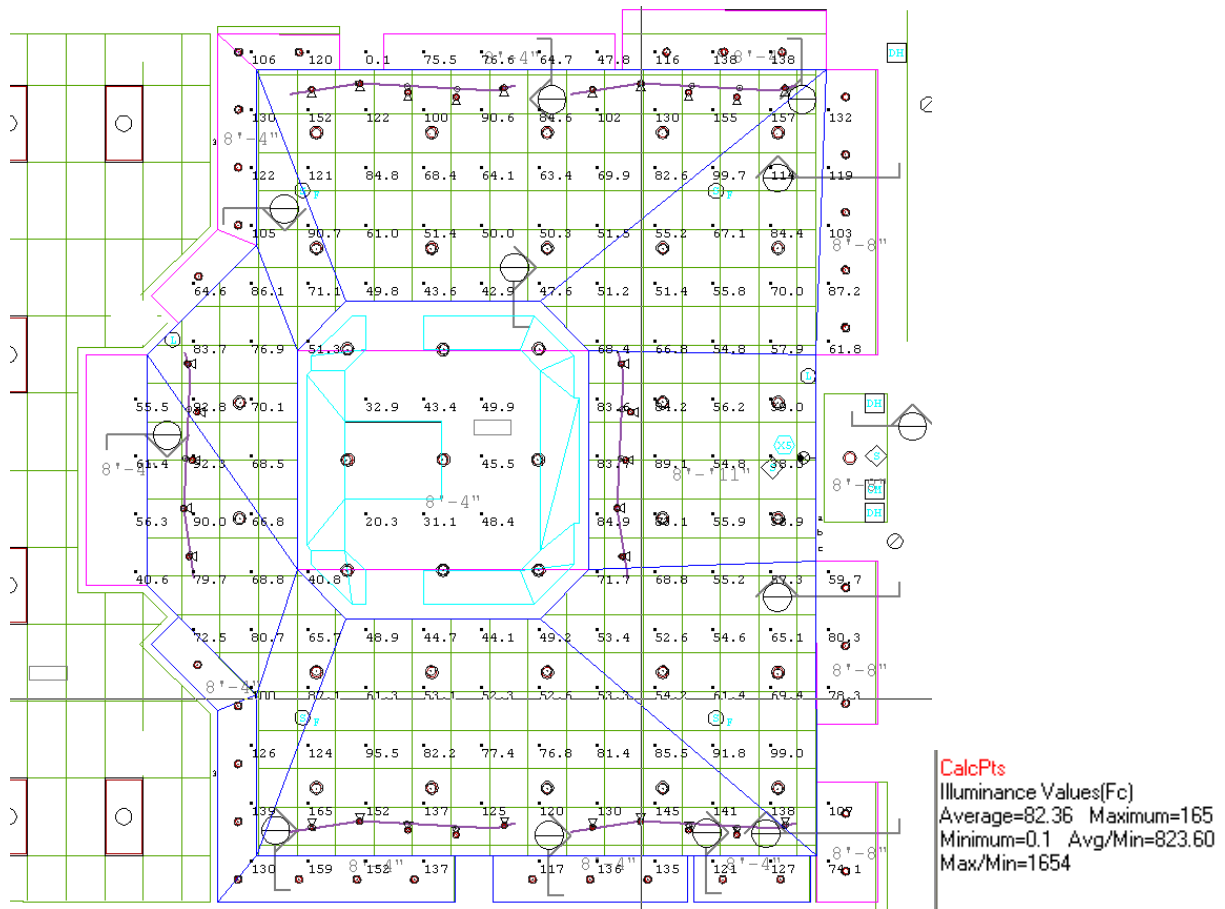


Fig. 18: Illuminance values on the floor in the gift shop, not to scale (AGI)

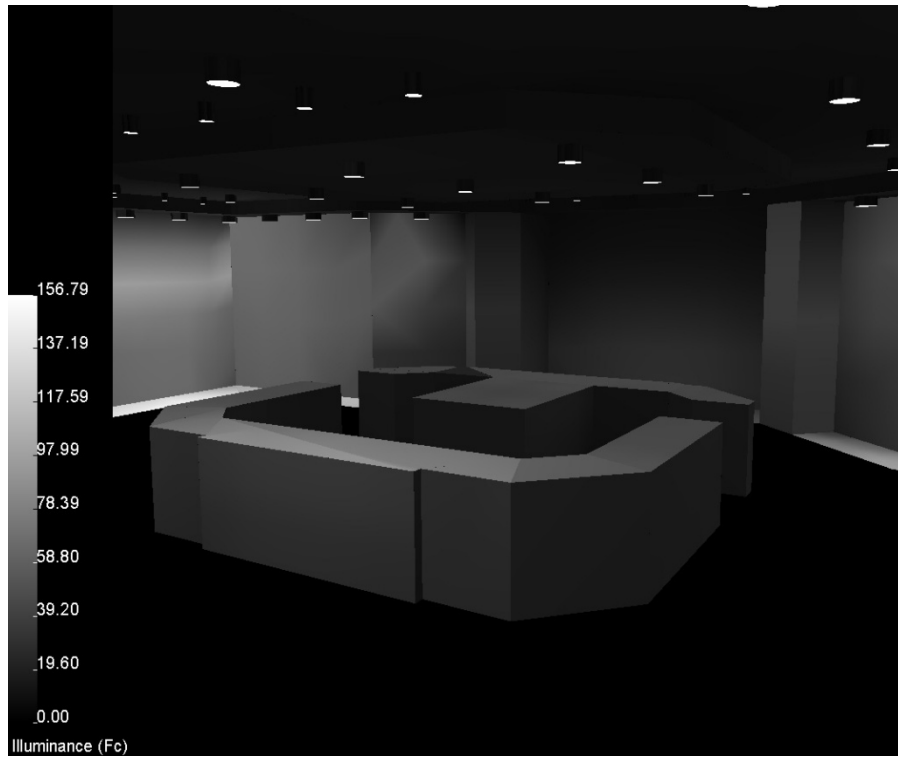


Fig. 19: Grayscale illuminance render of the team station (AGI)

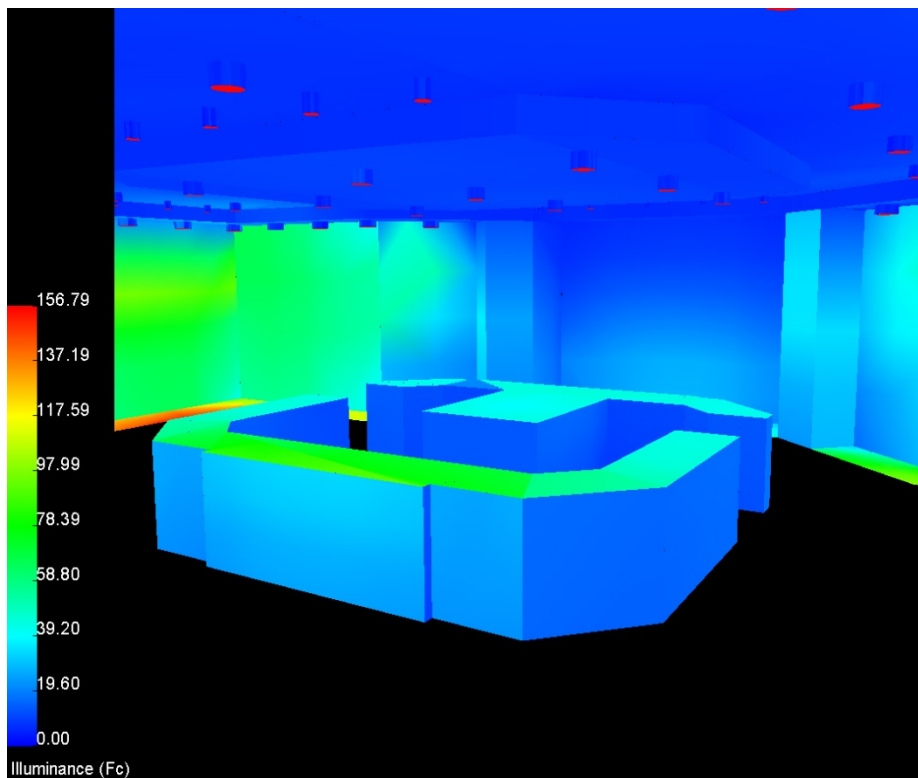


Fig. 20: Pseudo color illuminance render of the gift shop (AGI)



## Discussion

The gift shop has a unique shape therefore it needs a specific lighting design to express the intricate shape it portrays. The number of downlights in the space helps to elevate the problem of shadows on the merchandise and also decreases glare in the space. Different luminance values can be seen easily in the pseudo color rendering above which makes the space very interesting for the visitors.

The illuminance on the work plane looks very low compares to the surroundings in the grayscale render. The average illuminance on the checkout counter is 51 footcandles which is actually more than the IESNA recommended value of 30 footcandles.

Daylighting from the atrium was not accounted for in the model but can be further studied to see how the space changes throughout the day and year. The furniture schedule and layout of merchandise has not been attained at this time but will be incorporated in the future. The merchandise can strongly affect the space depending on its reflective properties as well as colors. The flexibility of the space makes it seem a slightly cluttered but once the space is seen with merchandise stocked on the displays the cluttered ceiling will not be as noticeable.

## Circulation Space: Emergency Department Lobby

### Existing Lighting Conditions

#### Spatial Environment

This essential circulation space brings visitors and patients into the hospital for the first time. It needs to have an inviting and welcoming impression but also be organized and easy to navigate. It is located on the ground floor of the hospital. The 2,447 square foot area encompasses a lobby with a reception/security desk, two emergency department waiting rooms and a pediatric emergency department waiting room.

The spaces are very geometric and are each rectangular in shape. The reception/security desk has a aesthetically pleasing curve on the side which breaks up the rough box shape of the rest of the space.

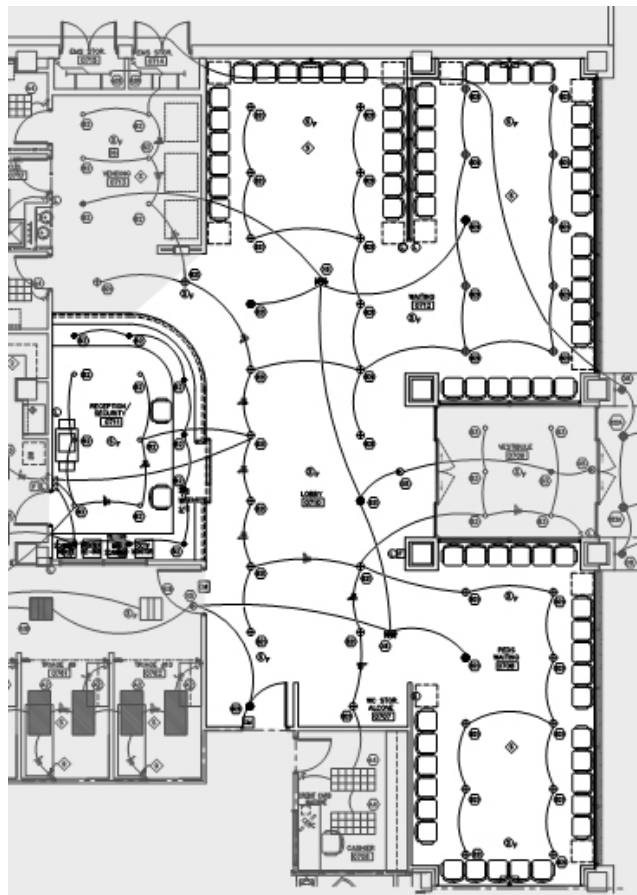


Fig. 21: Emergency department lobby area lighting plan, not to scale (dwg. E04.0A)

## Materials

### Lobby

Ceiling – The ceiling consists of 2x2 acoustical ceiling tiles by Armstrong with angled tegular edges (ACT-1).

Walls – The walls are painted the color Softer Tan by Sherman Williams (IPS2-A).

Floor – The floor is covered with linoleum of different colors including Shell, Indian Summer and Arabesque by Forbo (LIN-1, -4, -5).

Door Frame - The door frames are painted the color Macadamia by Sherman Williams (IPS7-B).

Bulkhead – The bulkheads are painted the color Softer Tan by Sherman Williams (IPS2-A).

Base – The base is a 6” high black colored rubber base by Roppe (RE6-B).

### Reception/Security

Ceiling – The ceiling consists of 2x2 acoustical ceiling tiles by Armstrong with angled tegular edges (ACT-1).

Walls – The walls are painted the color Softer Tan by Sherman Williams (IPS2-A).

Floor – The floor is covered with linoleum of color Shell by Forbo (LIN-1).

Door Frame - The door frames are painted the color Macadamia by Sherman Williams (IPS7-B).

Bulkhead – The bulkheads are painted the color Decorous Amber (orange) by Sherman Williams (IPS2-D).

Base – The base is a 6” high black colored rubber base by Roppe (RE6-B).

### Waiting

Ceiling – The ceiling consists of 2x2 acoustical ceiling tiles by Armstrong with angled tegular edges (ACT-1).

Walls – The walls are painted the color Softer Tan and Ruskin Room Green (green) by Sherman Williams (IPS2-A, -E).

Storefront Walls – From the floor, a 2.75’ Solarban tempered glass with 5.25’ of Solarban tempered glass above and 2’ Solarban glass at the top all with mullions between them (GL-6T, -6).

Floor – The floor is covered with linoleum of different colors including Shell, Indian Summer and Arabesque by Forbo (LIN-1, -4, -5).

Door Frame - The door frames are painted the color Macadamia by Sherman Williams (IPS7-B).

Bulkhead – The bulkheads are painted the color Soulmate (purple) by Sherman Williams (IPS2-H).

Base – The base is a 6” high black colored rubber base by Roppe (RE6-B).

#### Pediatrics Waiting

Ceiling – The ceiling consists of 2x2 acoustical ceiling tiles by Armstrong with angled tegular edges (ACT-1).

Walls – The walls are painted the color Softer Tan and Ruskin Room Green (green) by Sherman Williams or the walls have a vinyl wall covering of a watercolor mural “ journey” that is 68”h x 252”w by Genesys/4walls.com (IPS2-A, -E, VWC-1).

Storefront Walls – From the floor, a 2.75’ Solarban tempered glass with 5.25’ of Solarban tempered glass above and 2’ Solarban glass at the top all with mullions between them (GL-6T, -6).

Floor – The floor is covered with linoleum of different colors including Shell, Indian Summer, Water Melon and Red Violet by Forbo (LIN-1, -4, -8, -11).

Door Frame - The door frames are painted the color Macadamia by Sherman Williams (IPS7-B).

Bulkhead – The bulkheads are painted the color Soulmate (purple) by Sherman Williams (IPS2-H).

Base – The base is a 6” high black colored rubber base by Roppe (RE6-B).

MATERIALS	DESCRIPTION	REFLECTANCE
ACT-1	Fine fissured #1732 2x2 acoustical ceiling tile	0.74
IPS2-A	SW 6141 Softer tan paint	0.81
IPS2-D	SW 0007 Decorous amber paint	0.50
IPS2-E	SW 0042 Ruskin room green paint	0.50
IPS2-H	SW 6270 Soulmate paint	0.49
IPS7-B	SW 6142 Macadamia paint	0.97
LIN-1	ME-3075 Shell linoleum	0.45
LIN-4	ME-3164 Indian summer linoleum	0.17
LIN-5	ME-3123 Arabesque linoleum	0.23
LIN-8	ME-3133 Water melon linoleum	0.41
LIN-11	345 Red violet linoleum	0.31
RB6-B	P100 Black rubber base	0.18
VWC-1	M 5370 1 Mural vinyl wall covering	0.23

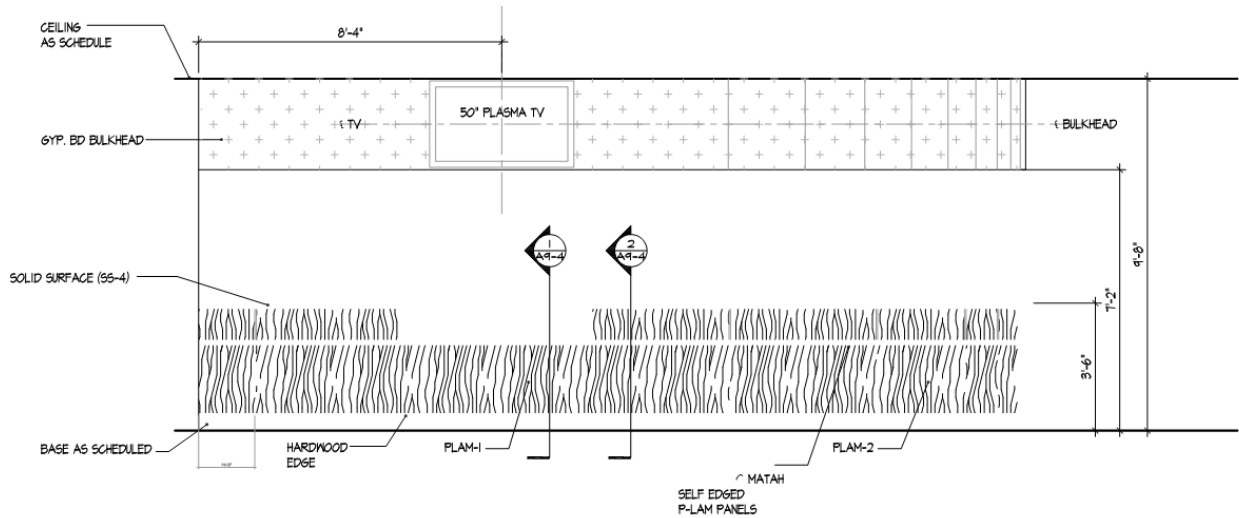
Fig. 22: Emergency department lobby material reflectance properties

MATERIALS	DESCRIPTION	TRANSMITTANCE
GL-6	1" Insulated solarban glass	0.68
GL-6T	1" Insulated solarban tempered glass	0.68

Fig. 23: Emergency department lobby glass transmittance properties

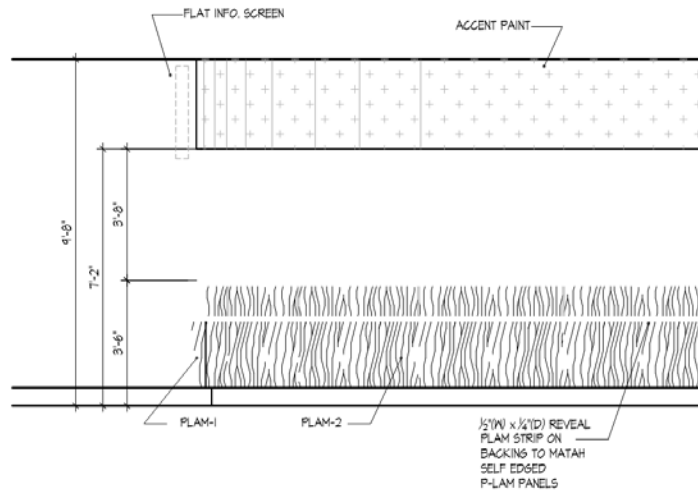
## Furnishings

The reception/security desk is fixed in location as well as the chairs provided for visitors and patients in the waiting areas. The desk is covered in a natural wood laminate with wood edging.



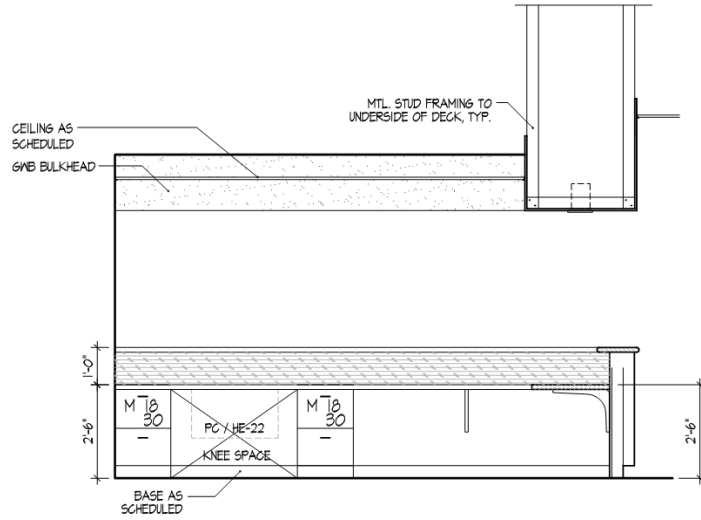
9A RECEPTION / SECURITY AT LOBBY  
 A5-0Be RM. 0710 SCALE: 3/8"=1'-0"

Fig. 24: Elevation of the reception/security desk from the east lobby, not to scale (dwg. A5-0Be)



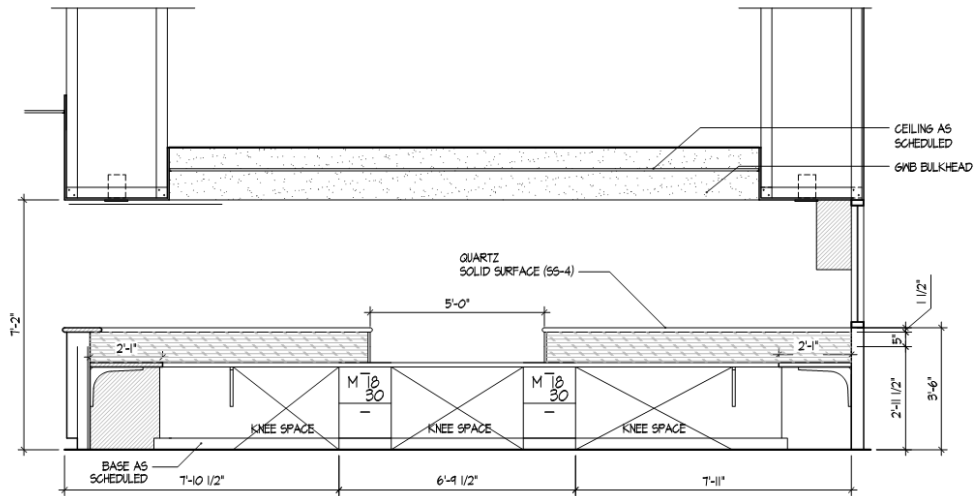
9B RECEPTION / SECURITY AT LOBBY  
 A5-0Be RM. 0710 SCALE: 3/8"=1'-0"

Fig. 25: Elevation of the reception/security desk from the north lobby, not to scale (dwg. A5-0Be)



10A RECEPTION / SECURITY  
 A5-0Be RM. 0711 SCALE: 3/8"=1'-0"

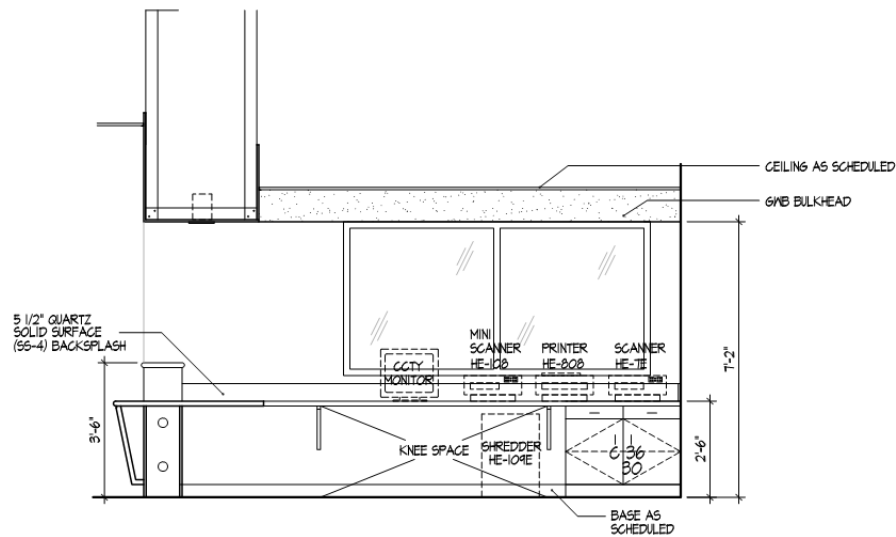
Fig. 26: North elevation of the reception/security, not to scale (dwg. A5-0Be)



10B RECEPTION / SECURITY  
 A5-0Be RM. 0711 SCALE: 3/8"=1'-0"

Fig. 27: East elevation of the reception/security, not to scale (dwg. A5-0Be)





100 RECEPTION / SECURITY  
 A5-0Be RM. 0711 SCALE: 3/8"=1'-0"

Fig. 28: South elevation of the reception/security, not to scale (dwg. A5-0Be)

### Lighting System

The lighting layout throughout the waiting areas and lobby consist of ambient light provided by 64 watt cross baffle downlights, in a uniform arrangement. Smaller downlights at 36 watts create ambient and task light for the reception area. Both luminaire types use compact fluorescent lamps, triple tube and twin tube respectively. Kinetic lighting is provided by the storefront and vestibule.

EMERGENCY DEPARTMENT LOBBY LUMINAIRE SCHEDULE						
TYPE	QTY.	DESCRIPTION	MANUFACTURER/ CATALOG NO.	LAMPS	VOLTAGE	INPUT WATTS
B2	14	6"/7" DOWNLIGHT, HORIZONTAL LAMP, LOW IRIDESCENT SEMI-SPECULAR ALZAK REFLECTOR AND SELF-FLANGED TRIM	GOTHAM AF-6	(2) F18DBX (4P) /4100K	277	36
B21	32	8" CROSS-BAFFLE DOWNLIGHT, HORIZONTAL LAMPS, LOW IRIDESCENT SEMI-SPECULAR ALZAK REFLECTOR AND SELF-FLANGED TRIM	GOTHAM AF	(2) F32TRT (4P) /4100K	277	64

Fig. 29: Emergency department lobby luminaire schedule

## **Tasks/Activities**

The main tasks in this space occur at the reception/security desk which are reading, writing and conversing with patients and visitors. Within the waiting areas, the main tasks include reading and writing. Once the visitors and patients enter into the lobby they should be guided to the reception/security desk and to the respective waiting areas from there.

## **Design Criteria - Interior, Health Care Facilities, Waiting Areas, Local for Reading (IESNA Handbook)**

### **Appearance of Space and Luminaires (Important)**

The appearance of the space should be comforting with one or two luminaire types at most to avoid causing visual clutter. The luminaires should be organized in a manner that would not distract the visitors or patients from what they are doing.

### **Color Appearance and Color Contrast (Very Important)**

The CRI should be no less than 70 with a CCT of about 4100K since it is exposed to daylighting.

### **Daylighting Integration and Control (Very Important)**

Daylighting affects the space in a kinetic way throughout the entire day. This creates a more pleasant atmosphere for the patients and visitors as they wait to be attended to. It can be controlled with blinds or shades to allow the occupants to adjust the intensity of the sun as the day progresses.

### **Direct Glare (Important)**

Direct glare is avoided in the space by incorporating smaller luminaires versus less larger apertures.

### **Flicker and Strobe effect (Very Important)**

Using compact fluorescent lamps in the space allows for no flicker or strobe effect.

### **Light Distribution on Surfaces (Very Important)**

The distribution of light on the surfaces in the circulation space should be no more than a 3:1 ratio of luminance.

### **Uniform Light Distribution on Surfaces (Somewhat Important)**

Each surface should be uniformly illuminated, especially the floor, so the visitors and patients can find their way through the space.

**Luminances of Room Surfaces** (Very Important)

The walls of the space should each have a uniform luminance value. Scalloping is avoided since the luminaires are far enough away from the walls.

**Modeling of Faces or Objects** (Very Important)

Modeling of faces in a waiting area is essential to increase comfort level.

**Reflected Glare** (Important)

Televisions are present in the waiting areas therefore the reflected glare from the storefront will be avoided by the use of blinds or shades. The visual display terminals at the reception/security desk will not have luminaires placed directly behind them.

**Source/Task/Eye geometry** (Important)

The ambient lighting throughout the space is consistent to improve visibility for the visitors and patients.

**Illuminance**

Horizontal Illuminance (Important) – Category D – 30 fc

Vertical Illuminance (Important) – Category B – 5 fc

**VDT Criteria**

The televisions located in the waiting rooms on the south façade of the building can be shaded using the blinds or shades to avoid the glare from daylight. The VDT at the reception/security desk do not have luminaires behind them and the ambient light of the space illuminates them without glare.

**Power Allowance** (ASHRAE /IESNA Std. 90.1-2007)

Lobby – 1.3 W/ft<sup>2</sup>

**Controls Criteria**

Photo sensors can be added to the space to reduce the total building load in addition to the existing switches behind the reception/security desk.

**Accent Lighting Considerations**

There are no accent lights within this circulation space.

**Luminance Ratios (max:min)**

Information desk – 3:1 to 5:1

Paper task and adjacent VDT screen - 3:1 or less

## Psychological Aspects

The desired psychological impression a visitor or patient should have when they enter this space is relaxation. In healthcare facilities, especially emergency waiting areas, this is difficult to achieve. To achieve this goal through the lighting system, the light has to take the attention away from the occupants. This can be attained by illuminating the walls or peripheral objects and the uses of indirect lighting or lower levels of direct illumination. The reflectance of the walls should be lower with a rich color or material to enhance the feeling of relaxation.

A main focal point should be created on the wall behind the reception/security desk. This would allow the visitors and patients to see their destination right when they enter the space. A higher illumination on the painted wall behind the desk or on artwork that is hung on the wall is all that is necessary to create this focal point. The difference in the luminance ratios cause's people to become attracted that point in the space.

The counterpart system involves a feeling of tension. This can be created with simple downlights that do not directly provide luminance on the walls or ceiling. In this scenario the light comes straight down on a person, giving them the impression of being under a spot light.

## Evaluation and Critique of Existing Conditions

TYPE	BF	LLD	LDD	RSDD	TOTAL LLF
B2	1.0	0.89	0.88	0.95	0.744
B21	1.0	0.95	0.97	0.95	0.875

Fig. 30: Light loss factors for the circulation space

### Discussion

The lighting design through the lobby, waiting areas and reception/security desk all use the same downlight fixtures to tie all the spaces together which is aesthetically pleasing. Each space still has its uniqueness especially the two waiting area that are next to the storefront. These spaces change constantly with the integration of daylighting within the space.

The issue with this space is the impression it gives off. A relaxed and calm feeling is essential but this particular waiting room has a long way to go with the lighting design to achieve this goal. The downlights cause tension rather than relaxation. The lighting design will need to be adapted to the space. A focal point behind the reception/security desk will be added. Variant luminances on the walls verses the floor will be incorporated. The space can easily be redesigned to create a more comfortable waiting place.

## Outdoor Space: Main Entrance and Parking Lot

### Existing Lighting Conditions

#### Spatial Environment

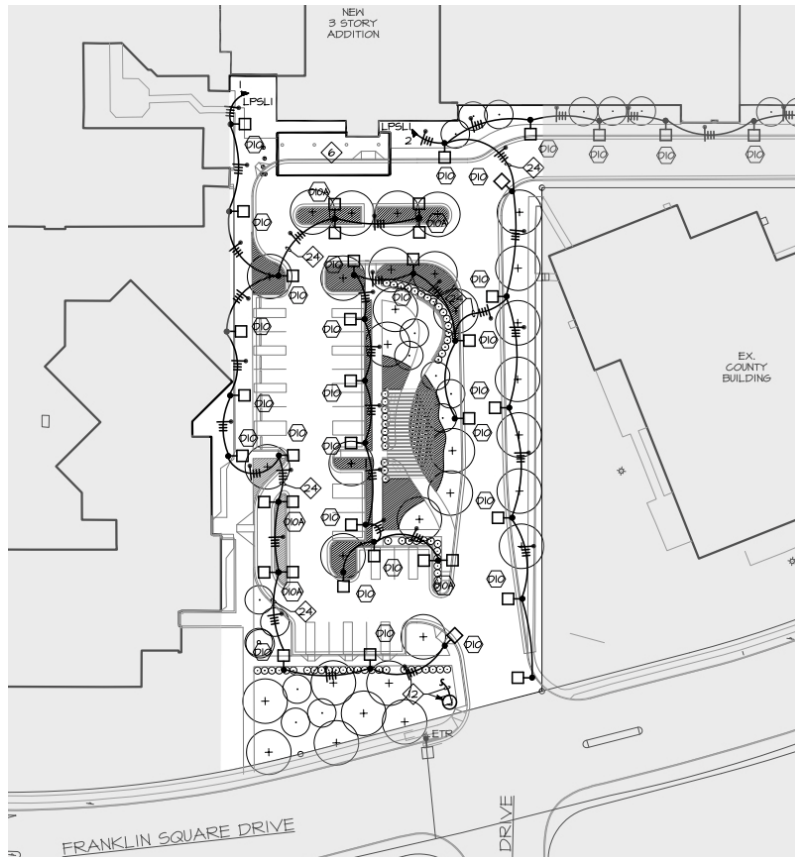


Fig. 31: Main entrance and parking lot site plan, not to scale (dwg. E02.SB)

#### Materials

##### Entrance/Canopy

Roof – Aluminum composite paneling

Walls – Aluminum curtain wall system (GL-6,-6T)

Doors – Aluminum entrance sliding doors (GL-6,-6T)

##### Canopy Area

Canopy – Glass canopy

Columns – metal tube columns

## Paving materials

Roadways – Black asphalt

Walkways - precast concrete pavers and slab on grade concrete

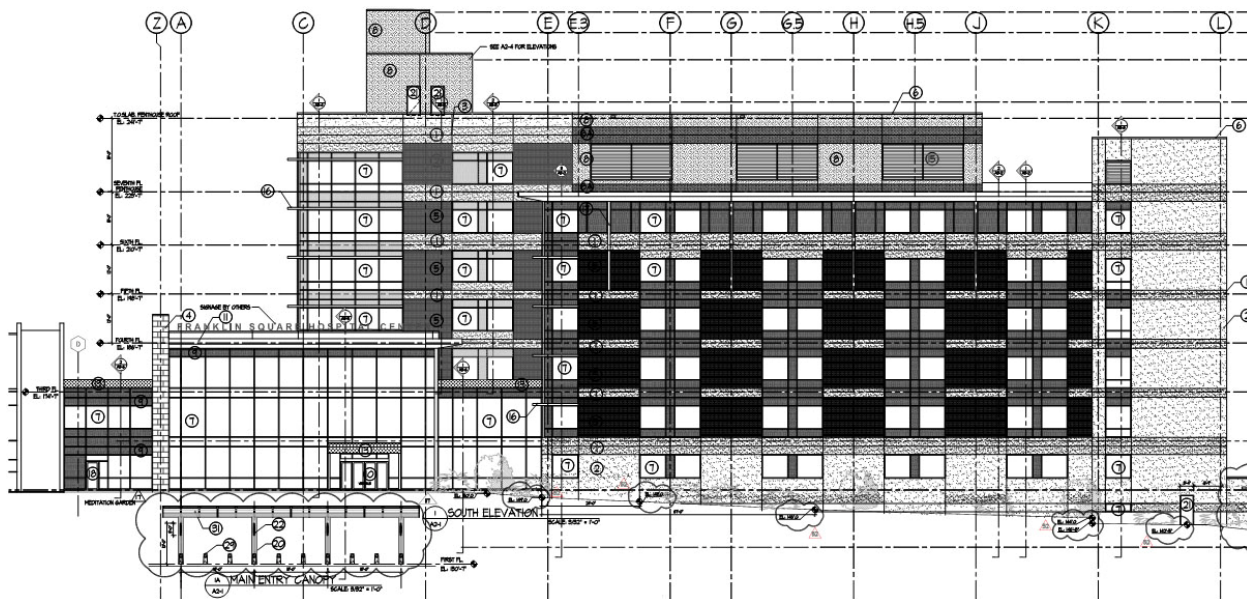


Fig. 32: South Elevation and main entry canopy elevation, not to scale (dwg. A2.1)

## Lighting System

The ambient lighting for the parking lot consists of single and double headed 175 watt metal halide exterior luminaires mounted at 15'-8" on 5" tapered round aluminum poles. The canopy uses wall sconces on the front of the columns that face the parking lot and drop off area. On the ceiling of the canopy strip fixtures line the steel structure to create an ambient light for visitors and patients underneath the canopy.

## MAIN ENTRANCE AND PARKING LOT LUMINAIRE SCHEDULE

TYPE	QTY.	DESCRIPTION	MANUFACTURER/ CATALOG NO.	LAMPS	VOLTAGE	INPUT WATTS
D8	4	19" WALL SCONCE, VERTICAL MOUNT, ADA COMPLIANT, WHITE ACRYLIC DIFFUSER, BRUSHED ALUMINUM FRAME SIDE RAILS, WET LOCATION	VISA OW1290	(1) F39BX/4100K	277	39
D10	33	SINGLE HEAD ARM-MOUNT EXTERIOR FIXTURE, FLAT TEMPERED GLASS LENS, ALUMINUM HOUSING, SILVER FINISH, TYPE 3 DISTRIBUTION	BEGA 8293MH	(1) 175W MH (ED17)	277	210
D10A	5	DOUBLE HEAD ARM-MOUNT EXTERIOR FIXTURE, FLAT TEMPERED GLASS LENS, ALUMINUM HOUSING, SILVER FINISH, TYPE 3 DISTRIBUTION	BEGA 8294MH	(2) 175W MH (ED17)	277	420
F1	24	EXTERIOR LED STRIP FIXTURE, MOLDED GREY PLASTIC HOUSING, CLEAR TEXTURED PLASTIC DROP LENS	COLOR KINETICS INCORPORATED	10 WHITE LED'S /4000K	277	30

Fig. 33: Main entrance and parking lot luminaire schedule

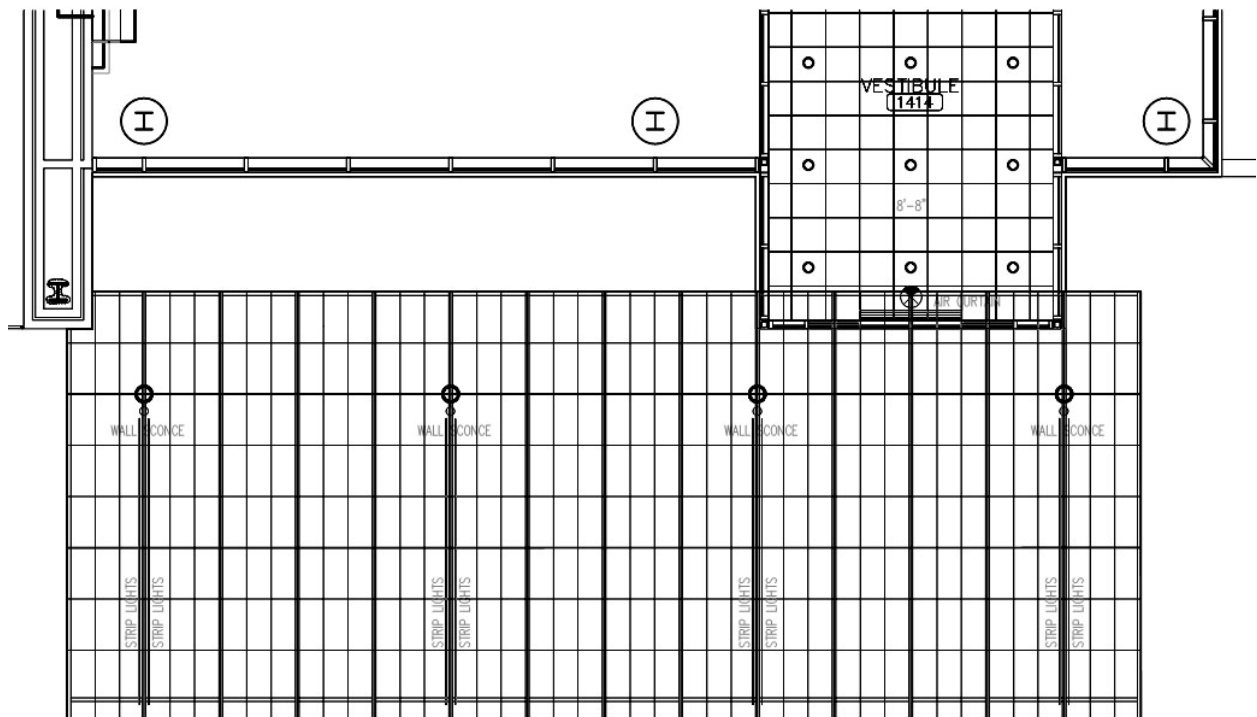


Fig. 34: Main entry canopy reflected ceiling plan, not to scale (dwg. A6-1D)



## **Tasks/Activities**

Walking and driving are the main activities in the parking lot area. Under the canopy, a major task would be loading and unloading patients that may or may not need assistance. Safety is essential especially during the night. Signage and traffic markings on the roads must have adequate illumination in order for people to read them and react to them.

## **Design Criteria – Outdoor, Building Exteriors, Active/Parking Areas (IESNA Handbook)**

### **Appearance of Space and Luminaires (Very Important/Important)**

The appearance of the outdoor space should look clean and organized with poles aligned with each other. If the poles and luminaires were cluttered, the visitors and occupants might get the impression that the hospital is cluttered and unorganized as well. The first impression is the outside of the building so it must appear how the hospital wants to be reflected, remarkable.

### **Color Appearance and Color Contrast (Very Important/Not Important)**

CRI is not critical in the parking area but should be at least 80 under the canopy where the pedestrian traffic is the greatest. The CCT for all the luminaires outside should be within the range of 3500K to 4000K to resemble the sun during the nighttime hours.

### **Direct Glare (Very Important/Very Important)**

Direct glare should be avoided outdoors because it is very distracting for drivers and can be disabling for pedestrians. Both of these issues are a high safety concern.

### **Light Distribution on Surfaces (Important/Important)**

Provide uniformity along the roadways and walkways to enable safety and easy navigation of the circulation of traffic.

### **Light Pollution/Trespass (Very Important/Very Important)**

Full cutoff luminaires can be used to avoid light pollution. Light trespass onto adjacent sites can be reduced by the height of the luminaries and the photometric distribution of the reflector that is chosen.

### **Modeling of Faces or Objects (Very Important/Very Important)**

Modeling of faces in the outdoor space is achieved through the photometric spread of the ambient lighting system.

**Peripheral Detection** (Very Important/Very Important)

The perimeter of the parking area should be illuminated to avoid accidents.

**Point(s) of Interest** (Very Important/Important)

The point of interest of this outdoor space is the main entrance storefront façade during the day. At night it shifts to the canopy outside of the lobby as well as the main lobby/atrium space that will be illuminated inside.

**Reflected Glare** (Very Important/Very Important)

Reflected glare from the curtain wall during the day should be avoided. Also avoid the reflected glare from the cars at nighttime.

**Shadows** (Very Important/Very Important)

Shadows create a visually pleasing area but should be avoided on the walkways and main roadways.

**Source/Task/Eye geometry** (Very Important/Very Important)

Keeping the luminance ratio between the outdoor spaced to a minimum will create a pleasant and more human sized outdoor area.

**Sparkle/Desirable Reflected Highlights** (Important/Not Important)

Sparkle is provided by the interior illumination of the lobby/atrium space at night. The desirable highlights that the space contains are shown to the people outside when the curtain wall façade becomes transparent at night.

**Surface Characteristics** (Very Important/Important)

The walkways have a much higher reflectance value then the roadways therefore the light levels must be adapted for each specific surface that is being illuminated.

**Illuminance**

Horizontal Illuminance (Very Important/Important) – Category B/N.A. – 5/0.2 fc

Vertical Illuminance (Very Important/Very Important) – Category A/N.A. – 3/1 fc

**Power Allowance** (ASHRAE /IESNA Std. 90.1-2007)

Parking Lots and Drives – 0.15 W/ft<sup>2</sup>

Walkways less than 10 ft wide – 1.0 W/linear foot

Main Entries – 30 W/linear foot of door width

Canopies – 1.25 W/ft<sup>2</sup>

**Controls Criteria**

Photo sensors or a timer can be used to switch the outdoor luminaires.

### Luminance Ratios (max:min)

The maintained illuminance uniformity ratio, maximum-to-minimum should not be greater than 20:1 for basic parking lots

### Psychological Aspects

The outdoor area should provide a transitional space for the visitor or patient at night before they reach the main canopy. A feeling of excitement should increase the interest of the occupant to enter the space to actually see the interior features that they got glimpses of from the outside.

## Evaluation and Critique of Existing Conditions

TYPE	BF	LLD	LDD	RSDD	TOTAL LLF
D8	1.0	0.83	0.85	0.90	0.635
D10	1.0	0.83	0.82	0.85	0.579
D10A	1.0	0.83	0.82	0.85	0.579
F1	1.0	0.85	0.88	0.90	0.673

Fig. 35: Light loss factors for the outdoor space



Fig. 36: Interior lobby render (LWA)



Fig. 37: Main entry and parking lot render (LWA)

## Discussion

The outdoor area provides a uniform illumination to ensure safety to all visitors and patients to the healthcare facility. Walkway and roadway lighting come from the same luminaires mounted at 15'-8".

The canopy lighting will not provide enough ambient light for the pedestrians. The atrium will be fully illuminated during the nighttime hours allowing for lighting to penetrate the area underneath the canopy as well. With these two sources, the walkway under the canopy will be illuminated and safe for the pedestrians in the area.