Philip Mackey
L/E
Dr. Mistrick

Holy Cross Hospital – North Addition
Silver Spring, MD
10/5/05

Tech Assignment #1

Executive Summary:

The following Lighting and Existing Conditions and Design Criteria Report examines the current general lighting system throughout the entire building and specific lighting system components within the main lobby, multi-purpose room, and registration, while briefly discussing possible exterior considerations.

After analyzing the current lighting conditions and examining photographs taken onsite, the design is adequate for the various tasks needed. But, it was determined there is room for improvements and upgrades to the current design in terms of lighting aesthetics and power consumption.

While the main lobby is lit more than adequately and meets ASHRAE 90.1 standards for power consumption, fixture types and placement could be improved to optimize the architectural features in the space. Although the multi-purpose room is adequately lit, power density was too high for ASHRAE 90.1 standards and could be lowered. Even though lighting controls were flexible and suit the function of the space, a few spot fixtures strategically placed could increase the usability of the space to become more versatile. The registration area was well lit for its task and fixtures were chosen properly for the space. However, power density was too high and fixtures could be located and mounted better to take full advantage of the space geometry.

When considering redesign, all spaces must not only improve lighting aesthetics and controls, but maintain power density levels at or below the ASHRAE 90.1 standards.

Existing System:

The majority of the existing lighting system, including fluorescent downlights, wallwashers, indirect sources; and exit signs, is supplied by 277V line voltage. Recessed compact and linear fluorescents are used to maintain ambient light levels throughout almost all of the project's spaces, while some linear and cylindrical wallwashers are used to highlight various walls and features throughout the spaces.

Track lighting is primarily run at 24V with MR16 and AR111 sources while incandescent downlights and spot PARs are run at 120V line voltage. The track lighting is used throughout the project to highlight artwork, specific architectural features, and

illuminate some signage. The incandescent downlights and sot PARs are used to maintain ambient lighting levels on worktops as well as provide some accent lighting throughout the various spaces.

Being that the North Addition is adding exam rooms on the 2nd and 3rd floors, many rooms are equipped hospital exam grade fixtures. These fixtures are lensed with a gasketed seal to prevent contamination of patients.

Ballasts, as stated in the specifications, are to be electronic "Class P" with sound rating "A" for fluorescent fixtures. Power factor must be 0.95 or greater and shall have a Total Harmonic Distortion of less than 10%. All ballasts shall be covered by a (2) year warranty. Linear and compact fluorescent ballasts shall be rapid start (instant start not accepted). Lamp current crest factor is not to exceed 1.7.

General Lighting Evaluation:

The lighting throughout the North Addition is efficient and very energy conscious. I suspect the power density is slightly high in exam areas, but that is to be expected with the lighting demand being so high in medical facilities. Since the majority of lighting is on 277V, there will be cost savings in terms of wiring, and panel/circuit breaker material costs, as well as decreased installation costs.

Aesthetically, some of the public spaces have some issues with fixtures not complimenting the space as effectively as they could. The lobby has a unique downlight that was apparently part of the overall vision of the project, but seems too large relative to the ceiling height as well as causing awkward scalloping in the reading area of the lobby. Parts of the concourse have uplights washing the pillars that seem to be placed entirely too close to the ceiling element.

Spaces:

Lobby

Architectural Features:

- Blue tiled mosaic art wall bridging the atrium/lobby area needs to be highlighted
- Kiosk in middle of space will need special consideration so visitors are clear where information can be obtained
- Wall behind kiosk is wood paneled with section for hanging artwork
- Reading/Sitting area to west of kiosk will need higher light levels than most of space due to differing task from rest of space
- Columns are spaced throughout space that could be highlighted
- Two walls to exterior are glass curtain walls and controls may help utilize daylight in energy savings

Design Criteria:

- Maximum allowable Power Density = 0.8 - 1.8 W/ft^2
- Target illuminances: 5 fc horizontal, 3 fc vertical
- Color appearance is important for both proper facial recognition and for maintaining correct color characteristics on the numerous paintings, decorative wall finishes, and feature art wall.
- Daylight integration and control needs to be considered since the exterior wall is a glass curtain wall. Controls are important for power savings and proper transitional lighting levels to assist in the eye's need to adjust to different lighting conditions inside. Dimming and zonal controls can be a way to more accurately control the lighting environment to match the exterior conditions most effectively.
- Light distribution on surfaces needs consideration since the lobby is a very multi-functional space. The lobby has people entering/exiting the building, sitting and reading, engaging in conversation, and an information kiosk which all require differing light levels. Therefore, certain zones need to be considered for their specific tasks and should be lit accordingly.
- Luminance of room surfaces is essential in a lobby with glass walls to the exterior. Walls need to be lit so the space does not seem dim and "cave-like" as the sun penetrates into the space. Also, whether night or day, illuminating the walls invites people into the space as well as make it look more spacious.
- Modeling of faces/objects is important since human interaction is very prevalent in this space. People meet and gather in the lobby throughout the day and need to properly recognize others.
- Appearance of space and luminaires should be considered because the lobby is the first impression of a building. The lobby must invite people into the space and make them feel welcome. Improperly lit architectural features and ugly, obtrusive luminaires takes away from the initial impression of the facility. Visitors are probably there to see family and loved ones in the care of the hospital. If the

lobby does not look like it is maintained properly, people may not think as highly of the facility that is caring for their loved ones.

Reading Area:

- Target illuminance: 30 fc horizontal
- Reflected glare needs consideration because veiling reflections can occur on the reading task if the lighting system is improperly designed. The more directional light downward, typically the less reflected glare. However, geometry of fixtures also plays a roll. Avoiding severe hot spots on the ceiling from indirect lighting will decrease glare as well.
- Source/task/eye geometry is important to consider for the same reason, veiling reflectance, as well as creating shadows.

Lighting Fixture Schedule:

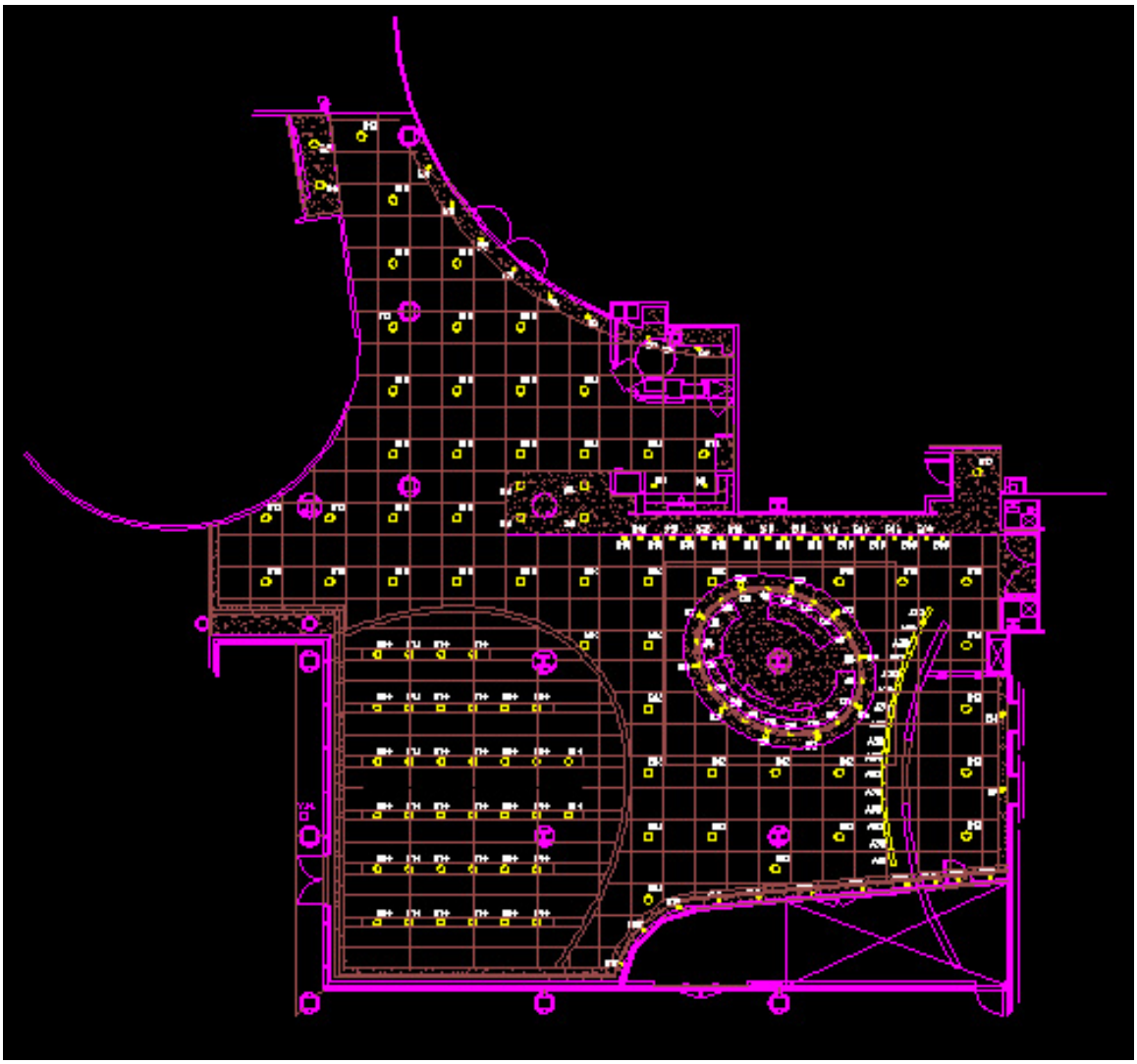
LOBBY LIGHTING FIXTURE SCHEDULE					
TYPE	DESCRIPTION	MANUFACTURER / CATALOG NO.	LAMPS	VOLTAGE	NOTES
A30	2' LINEAR WALLWASH, STEEL HOUSING WITH WHITE FINISH, SEMI-SPECULAR REFLECTOR, GRID CEILING	FORUM LIGHTING PWW SERIES PRUDENTIAL LIGHTING P5900 -	(1) F40BX / 35K	277	NOTE 5
B3	4" OPEN DOWNLIGHT, ALUMINUM REFLECTOR AND SELF-FLANGED TRIM, AIMABLE LAMP, INTERGRAL TRANSFORMER	TARGETTI ARC 50	(1) 50W MR16 40° FL	277	
B6	4" OPEN DOWNLIGHT, ALUMINUM REFLECTOR AND SELF-FLANGED TRIM, AIMABLE LAMP, INTERGRAL TRANSFORMER	TARGETTI VIT	(1) 50W MR16 25° FL	277	NOTE 3
B10	6" OPEN WALLWASH, HORIZONTAL LAMP, SEMI-SPECULAR ALZAK REFLECTOR AND SELF-FLANGED TRIM	DELRAY LIGHTING WH6100 SERIES	(1) 26WTRT / 35K	277	
B13	12" LIGHT-IN-LIGHT, VERTICAL LAMP, ALUMINUM HOUSING, WHITE ENAMEL TRIM	WILA E CONNECT MS-3 E10 OPTICLITES	(1) 42WTRT / 35K	277	
B14	6" GLASS SHADE, VERTICAL LAMP, ALUMINUM HOUSING, WHITE ENAMEL TRIM	WILA E CONNECT MS-3 E10 OPTICLITES	(1) 32WTRT / 35K	277	
B19	4" ADJUSTIBLE SPOTLIGHT, CEILING MOUNTED	BRUCK LIGHTING UNI-LIGHTS WIRE	(1) 35W AR111 SSP	277	NOTE 1
B35	PENDANT MONOPOINT FLOODLIGHT	LIGHTOLIER LYTE SPAN 220OR2AL	(1) 50W PAR 20 25° FL	120	
C6	LINEAR LED LIGHT, COORDINATE FIXTURE LENGTH WITH ARCHITECTURAL DRAWINGS, PROVIDE ALL NECESSARY PLUG-IN POWER SUPPLIES	iLIGHT TECHNOLOGIES PLEXINEON	LED	120	NOTE 2
C8	TWIN RAIL ALUMINUM TRACK, DEMILUMEN LUMINAIRE, TRACK SHALL BE MOUNTED TO CEILING VIA STEM CONNECTORS	TRANSLITE SYSTEMS TWIN RAIL	(1) 50W MR16 40° FL	12	NOTE 4

NOTES:

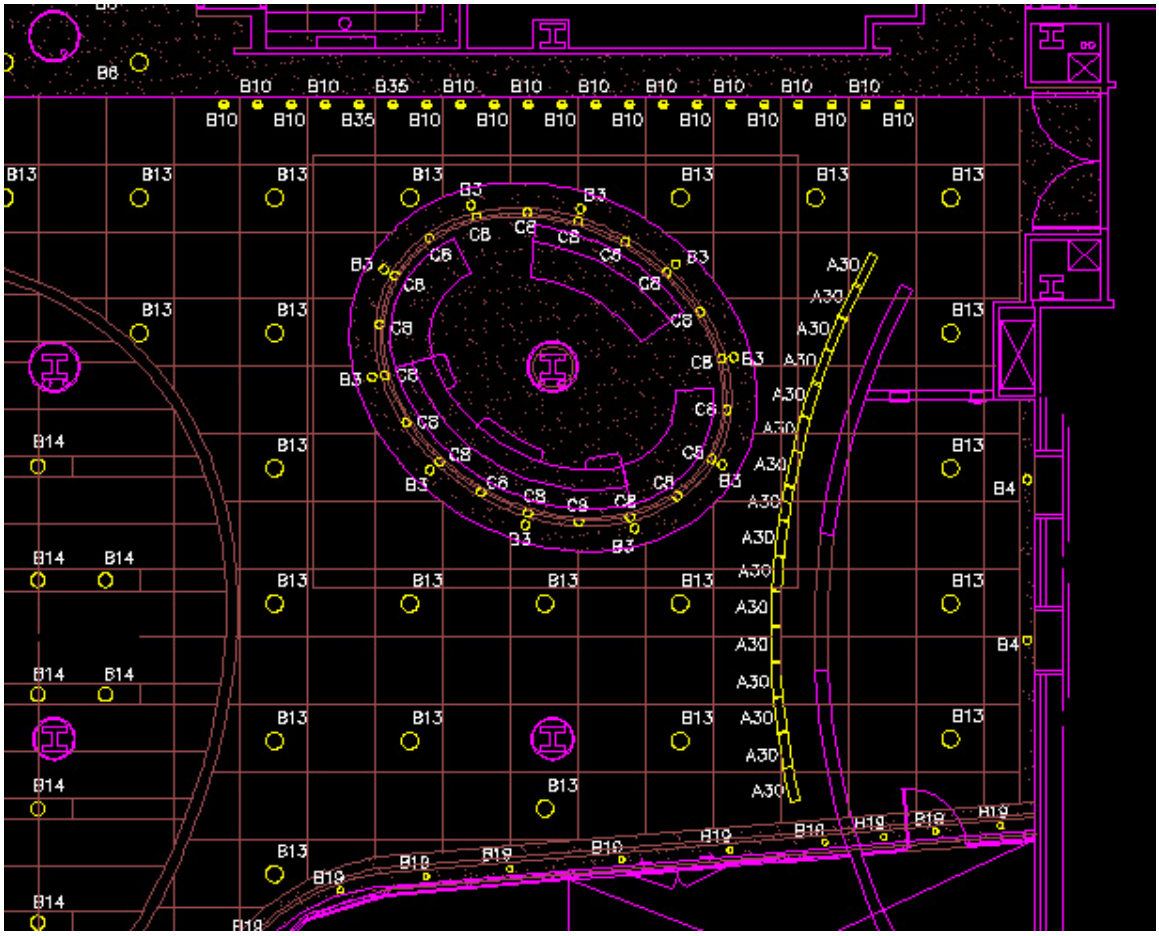
1. PROVIDE FIXTURE WITH CEILING PLUG 10 ADAPTOR. PROVIDE ALL NECESSARY POWER FEED CABLING BETWEEN FIXTURE AND REMOTE
2. POWER SUPPLIES AND ASSOCIATED RECEPTACLE SHALL BE LOCATED WITHIN ACCESSIBLE CEILING SPACE. COORDINATE EXACT LOCATION AND COLOR WITH ARCHITECT. PROVIDE POWER CORD LENGTH AS REQUIRED TO PLUG INTO RECEPTACLE IN ACCESSIBLE CEILING SPACE.
3. COORDINATE TRIM RING COLOR WITH ARCHITECT.
4. PROVIDE TRACK WITH ALL NECESSARY MOUNTING HARDWARE, COUPLERS, POWER FEEDS, AND CABLING FOR A COMPLETE TRACK SYSTEM. COORDINATE EXACT TRACK LENGTH AND MOUNTING HEIGHT WITH ARCHITECTURAL DRAWINGS. PROVIDE TSQ600 POWER SUPPLY TRANSFORMER. COORDINATE EXACT LOCATION OF TRANSFORMER WITH ARCHITECT. TRANSFORMER SHALL BE LOCATED WITHIN ACCESSIBLE CEILING SPACE. COORDINATE FINISH TYPE WITH ARCHITECT.

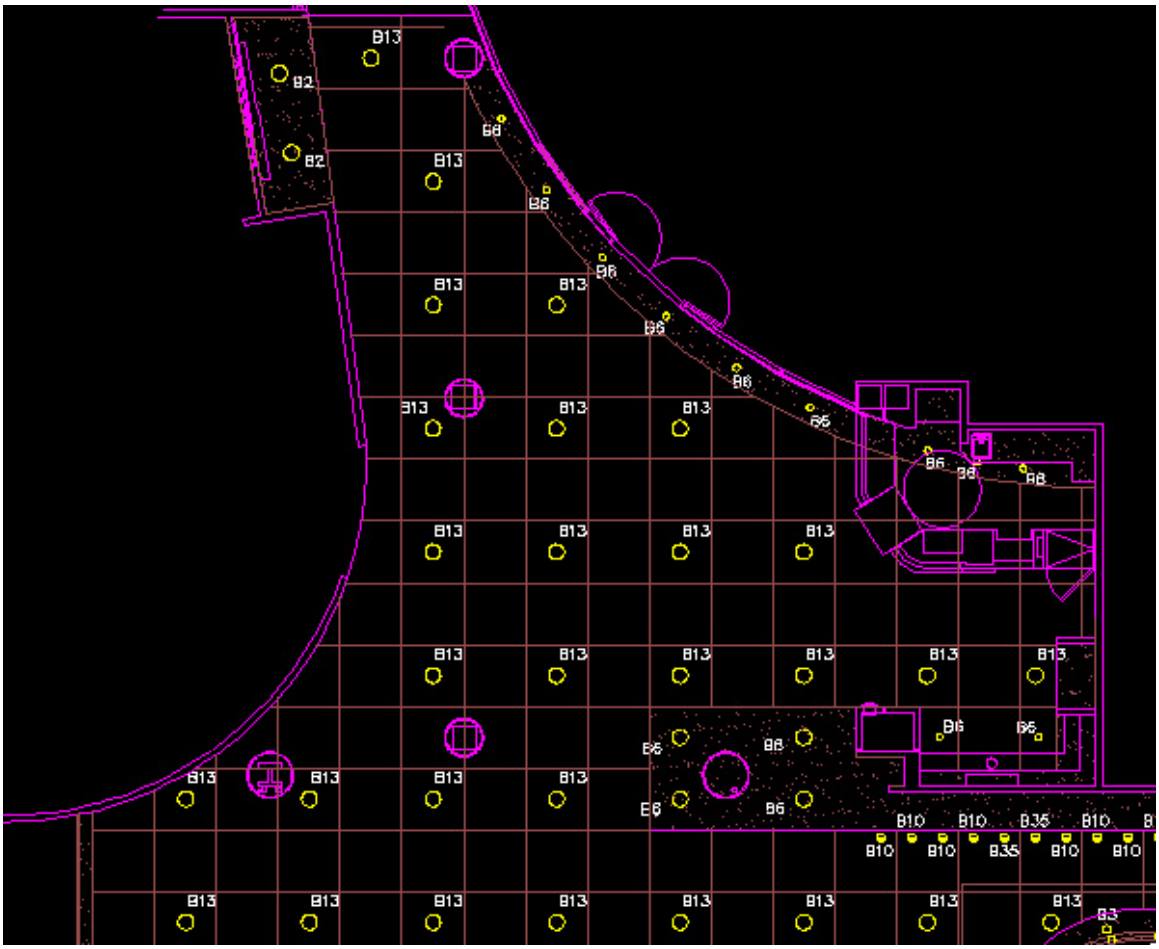
5. PROVIDE INFILL PIECES BETWEEN ALL SECTIONS FOR THE APPEARANCE OF A CONTINUOUS LINEAR FIXTURE. EGDE SHALL BE MODIFIED AS DIRECTED BY THE ARCHITECT.

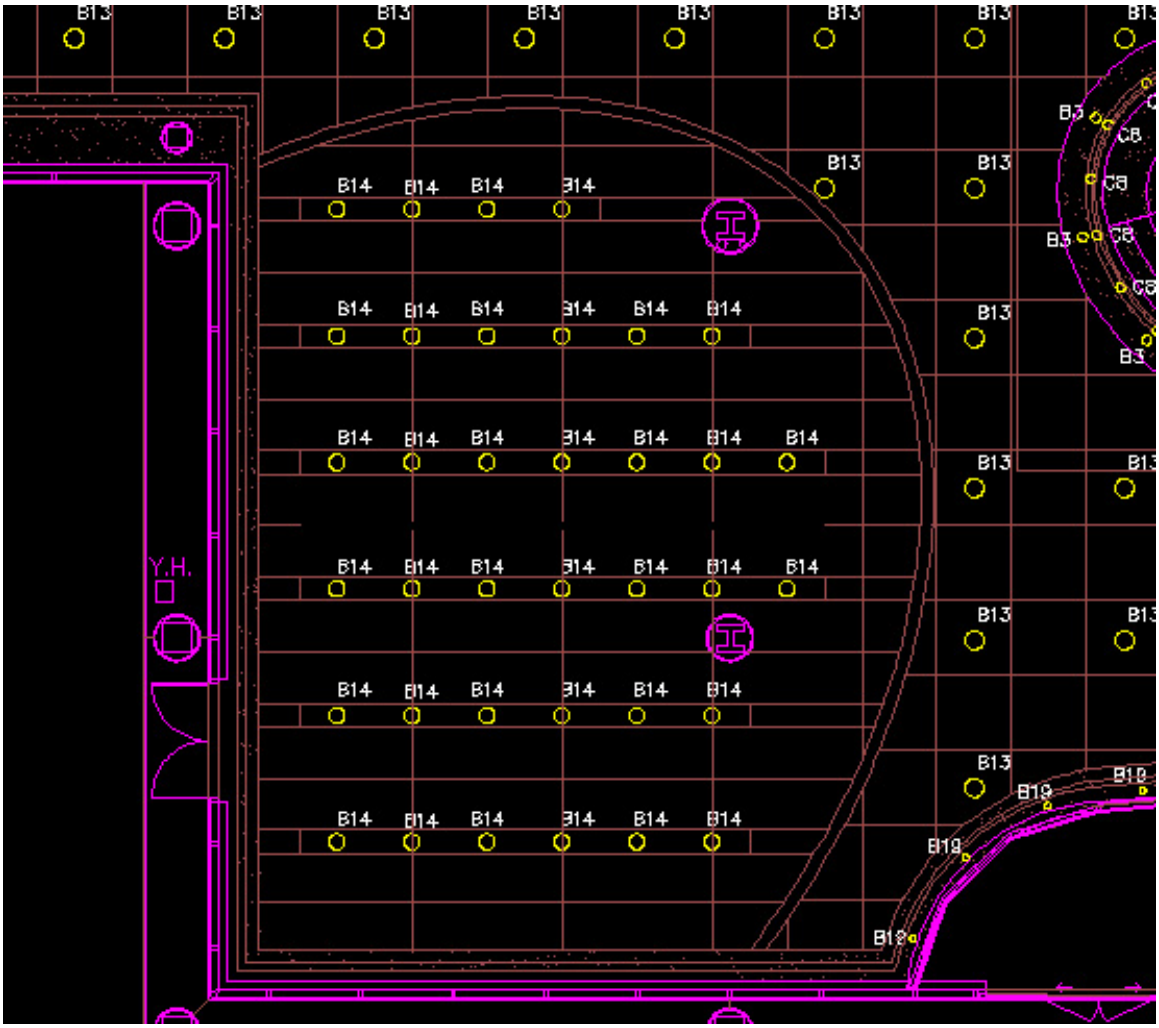
Master Plan: (did not include sections because existing site photographs were available)



Partial Plans:




B13
B2
B8
B6
B5
B10
B35



Assumptions:

Reflectance: Values and colors of materials determined by analyzing current conditions from site visit pictures obtained in August and reflectance information from AGI32 (grid ceiling reflectance taken from Armstrong product website).

Flooring –	0.42
Pillars -	0.65
Art Wall -	0.40
Wood Wall -	0.24
Gypsum Wall -	0.70
Windows -	0.10
Doors -	0.30
Gypsum Ceiling -	0.85
Grid Ceiling -	0.83
Countertops -	0.20

Counters - 0.24

*Openings to other spaces were treated as a reflectance of 0 since lighting contribution from those spaces cannot be determined.

Light Loss Factors/Room Geometry:

RCR = 1.1
RSDD = 0.98
LDD = 0.88 (Fixture type IV)
LLD = 0.95 (Tungsten Halogen)
LLD = 0.93 (Fluorescent)

*Assumed 12 month cleaning cycle and clean room

Results:

Power Density = 1.25 W/ft^2 (allowable: 0.8-1.8 W/ft^2)

Calc Planes:

Reading Area: (2.5' calc plane)

Avg = 38 fc
Max = 50 fc
Min = 10 fc
Max/Min = 5.0

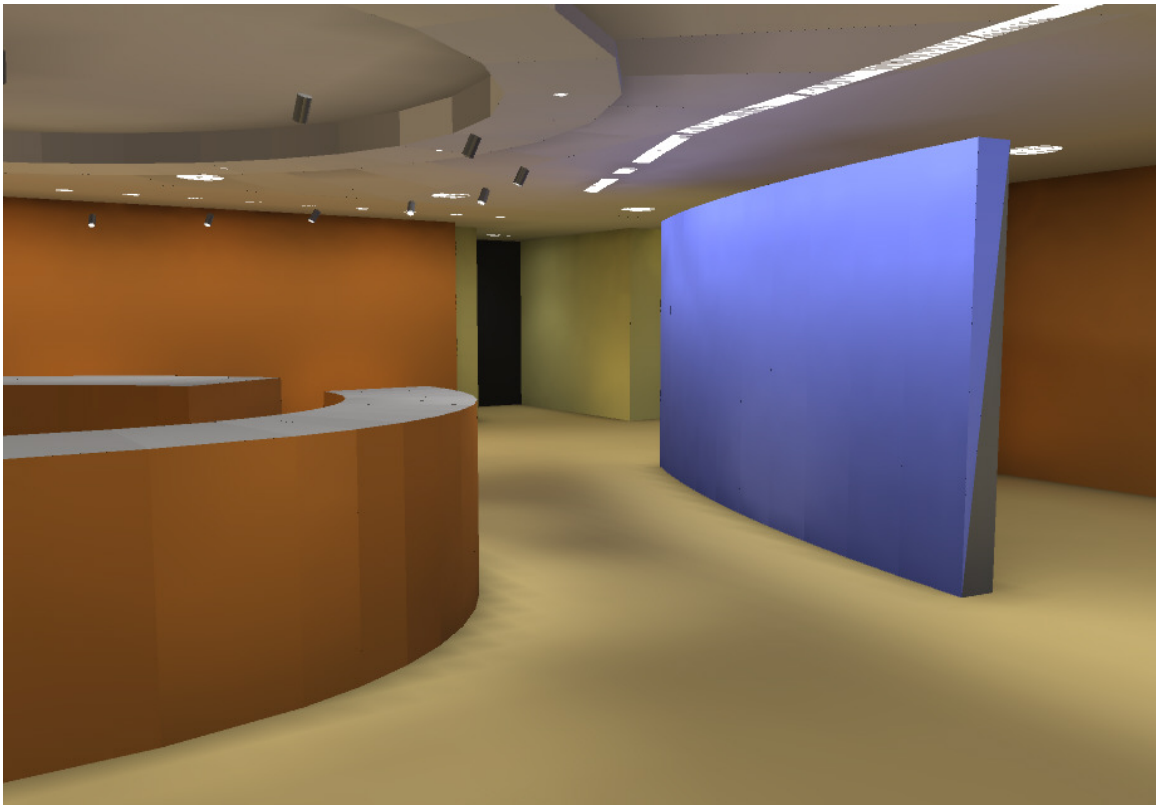
Kiosk Desk: (42" calc plane)

Avg = 93 fc
Max = 132 fc
Min = 51 fc
Max/Min = 2.6

Heavy Traffic Area: (0' calc plane)

Avg = 30 fc
Max = 55 fc
Min = 14 fc
Max/Min = 3.9

Renderings: (I have included some site pictures as some rough comparison between renderings and site conditions)



Results Summary:

Lighting levels seem more than adequate compared to the desired levels stated in the design criteria. Power density was well within the range of acceptable values determined by ASHRAE 90.1. However, power density could probably be decreased even further if some of the fixtures were replaced by more efficient standard downlights. I think fixture selection could be improved in the reading area. There are too many hot spots on the ceiling in both the rendering and actual conditions that I believe could be improved. The wood paneling above that reading area could also be highlighted, but in a more flattering technique that would not create as many harsh hot spots.

The current illumination of the blue art wall seems to nicely accent the wall and call it out as a prominent architectural feature in the space. The wood paneled back wall is nicely and evenly wallwashed, but I would like to see slightly more powerful spots on the art feature which would allow the art to stand out a little more. The kiosk desk countertop lighting levels were exceptional with an average close to 100 fc. However, there may be some glare issues if that countertop is glossy with all the MR16 point sources aimed at it. I think the underside of the counter should be lit on the exterior perimeter. This would highlight the information desk a little more and help visitors immediately recognize where assistance can be found. There are also blue LED highlights in the cove above the kiosk; however, to keep things simplistic, I did not include the LED's in my renderings. So, the underside of that ceiling is not quite as dark as it is shown in the renderings.

Multi-Purpose

Architectural Features:

- SE corner of space has floor to ceiling windows as well as a column in the same location
- Electric partitions can split the room into 4 equal spaces for smaller functions
- Ceiling is combination gypsum and 2'x2' grid
- Walls are an orange/tan paint, ceiling is white, and carpet is a multi-color pattern
- Stage/podium capabilities are possible and will probably be flexibly located depending on function of activity

Design Criteria:

- Maximum allowable Power Density = 1.5 W/ft^2
- Target illuminances: 10 fc horizontal, 3 fc vertical
- Color appearance is important for both proper facial recognition and for maintaining correct color characteristics on any visual aids used in a presentation
- Daylight integration and control needs to be considered since entire SW corner of the space is floor to ceiling windows. Controls are important for power savings, especially if some portions of the space are sectioned off and not being used. Dimming and zonal controls can be a way to more accurately control the lighting environment since room dimensions and functions are so flexible.
- System control and flexibility needs to be considered since the room could have so many different uses. Not only does the lighting need to be broken up into zones, but there will need to be varying lighting levels throughout the space to properly accommodate different types of presentations.
- Modeling of faces/objects is important since human interaction is very prevalent in this space. This space may hold gatherings and social events for the hospital as well as conferences. All these various functions will have significant human interaction.

Reading Area:

- Target illuminance: 30 fc horizontal
- Reflected glare needs consideration because veiling reflections can occur on the reading task if the lighting system is improperly designed. The more directional light downward, typically the less reflected glare. This space should not have too much trouble with veiling reflections since the ceiling height is so high relative to the length and width of the space. However, it can not be ignored.
- Source/task/eye geometry is important to consider for the same reason, veiling reflectance, as well as creating shadows.

Demonstration:

- Target illuminance: 100 fc horizontal, 50 fc vertical
- Light distribution on task plane is important when presenting in front of a large group. Everyone in the room needs to see the presenter and what is happening up front. Even lighting on the task with minimal shadows can be seen well.
- Direct glare needs to be considered when concerning the presenter. Spotlights cannot be in the presenter's line of site because it causes severe glare and may

hinder the presenter's ability to deliver a presentation. Typically, lighting a speaker should come from 40 to 60 degrees above horizontal to avoid hindering the speaker's site line.

- Similarly, the audience wants to see the speaker properly and not have the speaker's face washed out or in heavy shadows. The spots being place properly (usually 45 degrees from horizontal and 45 degrees from vertical as a rule of thumb) will render the facial features of the speaker quite well.

Lighting Fixture Schedule:

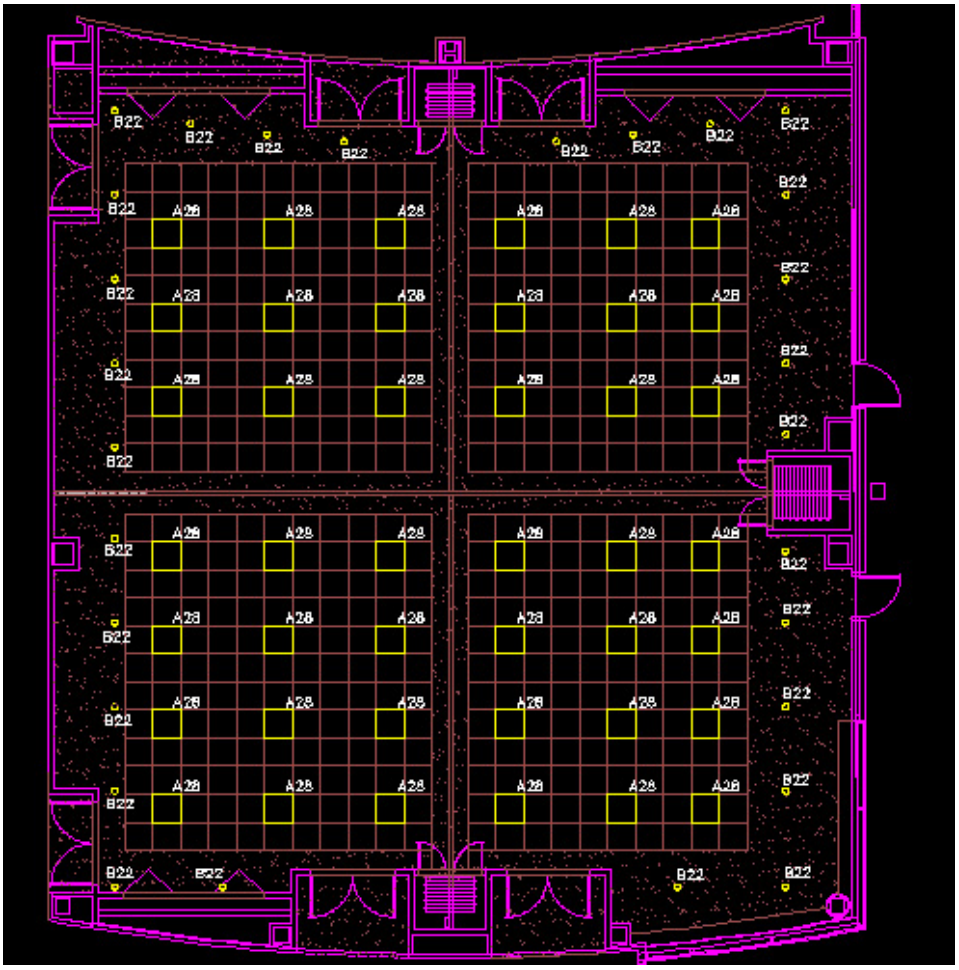
MULTI-PURPOSE LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER / CATALOG NO.	LAMPS	VOLTAGE	NOTES
A28	2x2 DIRECT/INDIRECT SEMI-RECESSED, MICRO-PERFORATED MESH DIFFUSER, WHITE FINISH, GRID CEILING	DAY-BRITE 2AVL LIGHTOLIER ALTER QVH2G MARK LTG PORTICO SERIES	(3) F40BX / 35K	277	NOTE 1
B22	8" CROSS-BAFFLE DOWNLIGHT, HORIZONTAL LAMPS, SEMI-SPECULAR ALZAK REFLECTOR AND SELF-FLANGED TRIM	SPECTRUM SPX8HF LITHONIA AFZ-8 PRESCOLITE CFCB8 SERIES	(2) F26DBX (4P) / 35K	277	NOTE 1

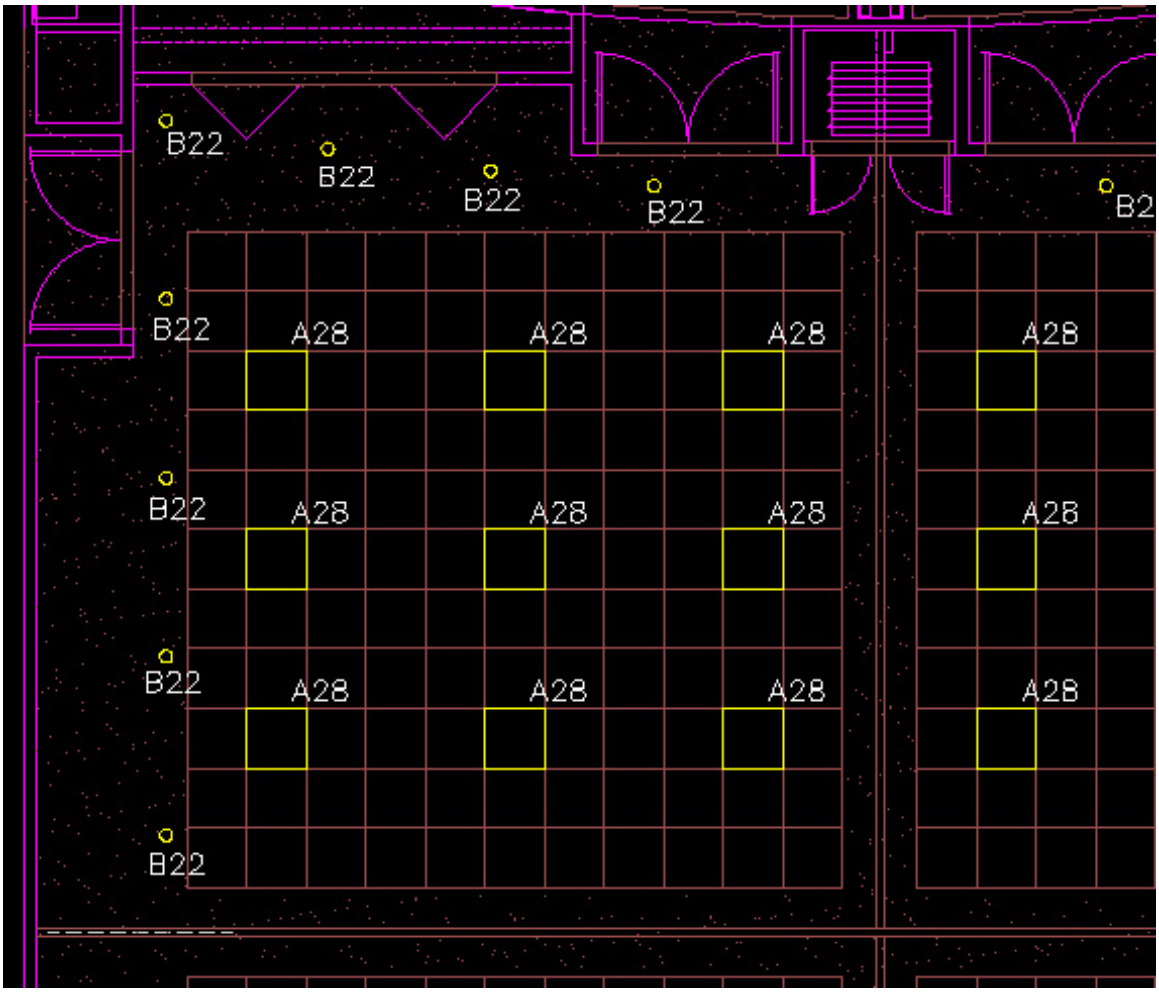
NOTES:

1. PROVIDE LIGHTING FIXTURE WITH LUTRON "HI-LUME" DIMMING BALLAST.

Master Plan: (did not include sections because existing site photographs were available)



Partial Plan:



Assumptions:

Reflectance: Values and colors of materials determined by analyzing current conditions from site visit pictures obtained in August and reflectance information from AGI32 (grid ceiling reflectance taken from Armstrong product website).

Flooring –	0.30
Pillars -	0.55
Gypsum Wall -	0.55
Partitions -	0.55
Windows -	0.10
Doors -	0.36
Gypsum Ceiling -	0.85
Grid Ceiling -	0.83

Light Loss Factors/Room Geometry:

RCR = 2.5
RSDD = 0.97
LDD = 0.88 (Fixture type IV)
LLD = 0.93 (Fluorescent)

*Assumed 12 month cleaning cycle and clean room

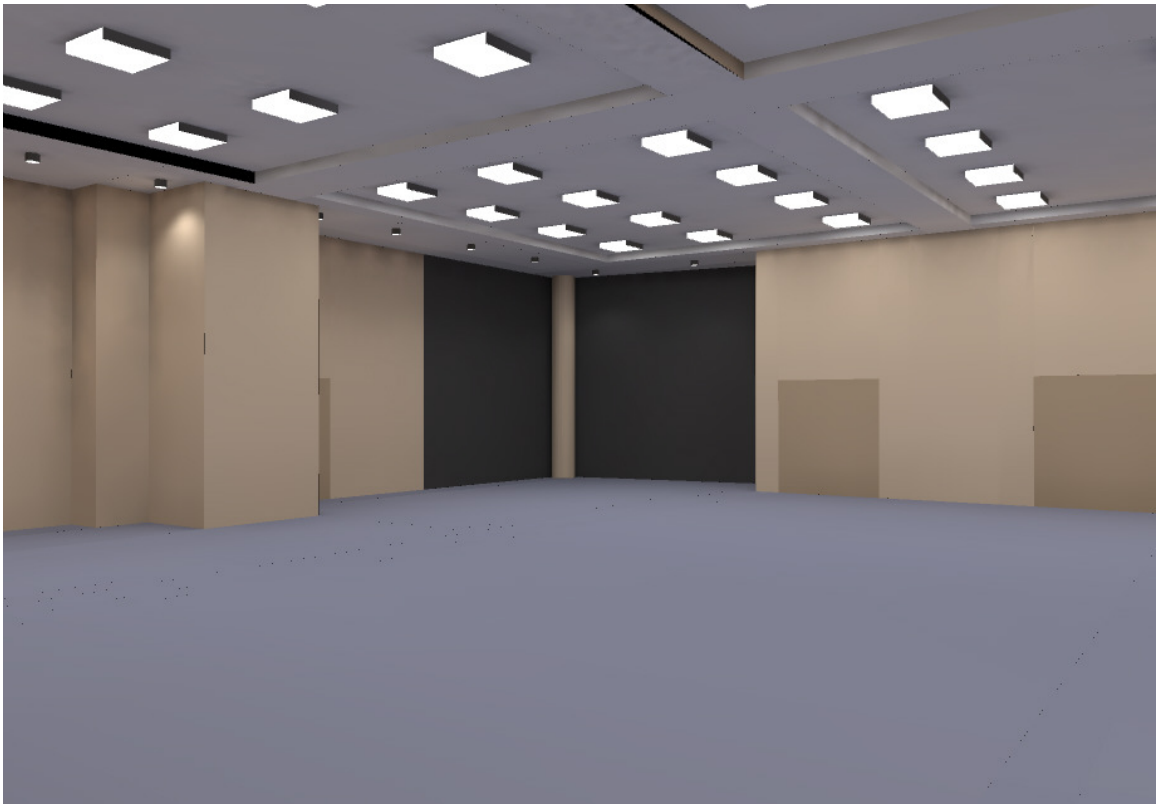
Results:

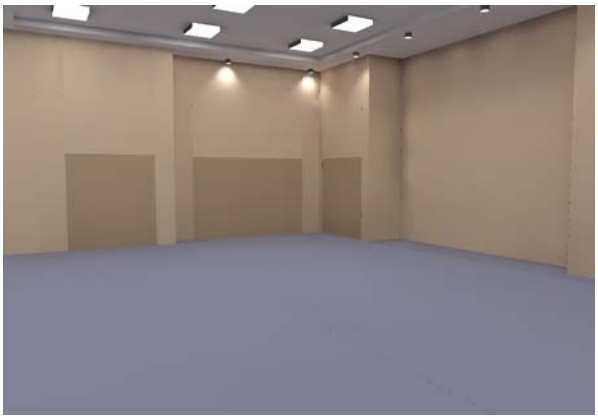
Power Density = 2.11 W/ft^2 (allowable: 1.5 W/ft^2)

Calc Plane: (2.5')
Avg = 69 fc
Max = 82 fc
Min = 30 fc
Max/Min = 2.7

Renderings:

(I have included some site pictures as some rough comparison between renderings and site conditions)





Results Summary:

General lighting levels seem more than adequate for gatherings and social functions. However, if the client wants to have this room capable of using a stage or any large presentation, I feel like there needs to be a more flexible lighting component. If some adjustable spots were placed somewhere centrally located in the ceiling where they could be aimed wherever the stage or presentation may be, the lighting solution would be much more effective. The downlights around the exterior seem to be too close to the wall in some locations. As you can see above, there are pretty distinct, harsh scallops due to the fixture being almost directly against the far wall. If the fixtures were rearranged slightly, I think this would solve that problem.

Power density is going to be an issue in this space. It is currently at 2.1 W/ft^2 when the allowable is 1.5 W/ft^2. The power density could possibly be dropped to below the allowable with a more efficient fixture selection and better wall reflections. The space currently has a multi-scene, multi-zone dimmable switching system which I believe will adequately control the space. Overall, the space has a simple, straight forward design approach that lights the space pretty adequately, but I believe some spots will be needed if this space becomes a true multi-purpose conference/convention room.

Registration

Architectural Features:

- Wood-paneled, curved wall behind registration desks
- Frosted glass wall separating private offices from registration area
- Metal partitions separating each individual registration desk
- Curved countertop flush with curved wall behind registration area

Design Criteria:

- Maximum allowable Power Density = 1.3 W/ft^2 (open office)
- Target illuminances: 30 fc horizontal, 3 fc vertical
- Color appearance is important for both proper facial recognition and for maintaining correct color recognition on the wood wall.
- Direct glare issues are essential to the operation of this space. Both registration personnel and patients need to use the same desk space from opposite sides of the desk to fill out paper work. Glare would hinder their ability to read things properly and may result in registration inaccuracies, which are important concerning healthcare procedures.
- VDT ratios and source/eye/VDT geometry and important in this space. The registration personnel will most likely be entering relatively important healthcare information into computers and need proper task to background ratios (3:1) and avoid veiling reflections from light sources behind them.
- Light distribution on surfaces needs consideration since the majority of the tasks taking place in this area will be done on a desk or counter. Registration has young and old, healthy and sick people that need to use this space efficiently before they can be cared for. Therefore, the registration desks should be lit evenly and adequately.
- Modeling of faces/objects is important since human interaction is very prevalent in this space. People are constantly being registered and sit across from registration personnel while doing so. To ensure conversation is not distracted, proper facial modeling needs to be achieved.
- Appearance of space and luminaires should be considered because the registration area is directly adjacent to both the lobby and main concourse. It is not even entirely closed off from either space. Registration is one of the first areas a visitor sees when entering the hospital, and it must look pleasing to the eye. The hospital wants to make a good impression upon visitors, and need functioning parts of the hospital to portray a sense of technology and care that is associated with medical treatment.

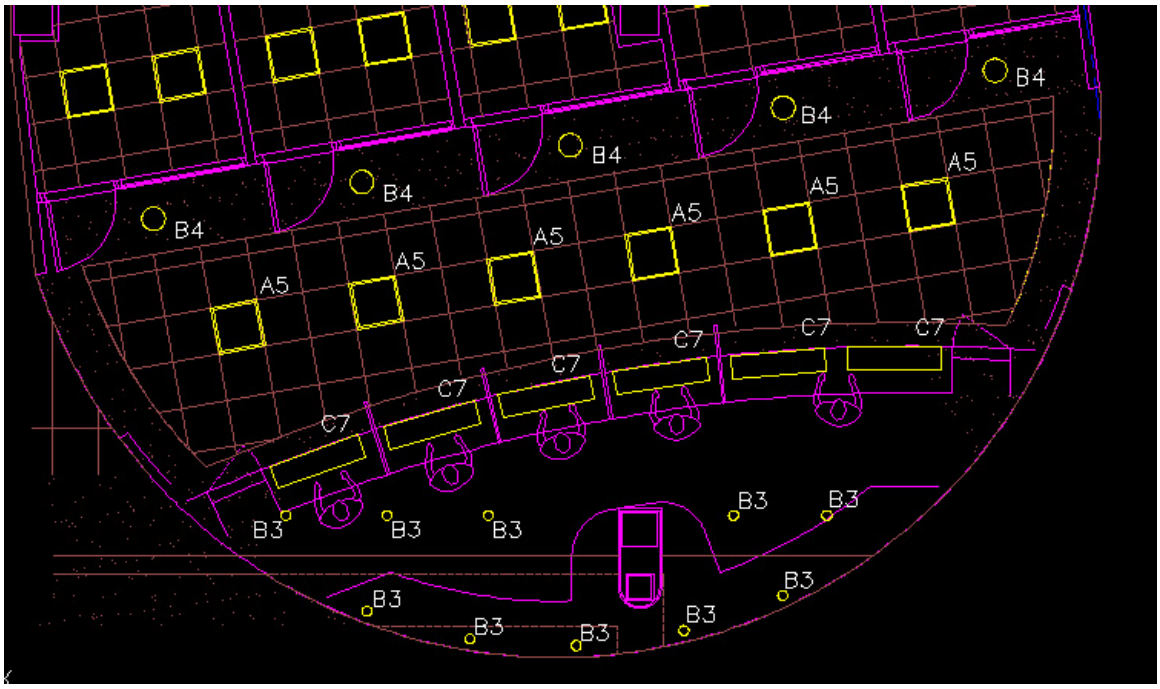
Lighting Fixture Schedule:

REGISTRATION LIGHTING FIXTURE SCHEDULE					
TYPE	DESCRIPTION	MANUFACTURER / CATALOG NO.	LAMPS	VOLTAGE	NOTES
A5	2x2 DIRECT/INDIRECT SEMI-RECESSED, MICRO-PERFORATED MESH DIFFUSER, WHITE FINISH, GRID CEILING	DAY-BRITE 2AVL LIGHTOLIER ALTER QVH2G MARK LTG PORTICO SERIES	(2) F40BX / 35K	277	
A6	2x2, RECESSED, 3" DEEP PARABOLIC, 16 CELL, LOW IRIDESCENT SEMI-SPECULAR LOUVER, GRID CEILING, STATIC, PAINT AFTER FABRICATION	DAY-BRITE 2P3 LITHONIA 2PM3 COLUMBIA P4D22 SERIES	(4) F17T8 / 41K	277	
B3	4" OPEN DOWNLIGHT, ALUMINUM REFLECTOR AND SELF-FLANGED TRIM, AIMABLE LAMP, INTERGRAL TRANSFORMER	TARGETTI ARC 50	(1) 50W MR16 40° FL	277	
B4	6"/7" OPEN DOWNLIGHT, HORIZONTAL LAMP, SEMI-SPECULAR ALZAK REFLECTOR AND SELF-FLANGED TRIM	CAPRI PL17 LITHONIA LGF-7 PRESCOLITE CFR613UQEB SERIES	(2) F13DBX (4P) / 35K	277	
C7	4' LINEAR FLUORESCENT FIXTURE, ALUMINUM FINISH, PARABOLIC CENTER LOUVER, PERFORATED SIDE PERFORATIONS, CABLE SUPPORT	AXIS LIGHTING FLOW LINEAR LIGHTING CRESCENT SERIES -	(3) F32T8 / 41K	277	NOTE 1

NOTES:

1. MOUNT FIXTURE 7'-6" AFF TO BOTTOM OF FIXTURE. CABLE SUPPORT SHALL BE HUNG FROM DRYWALL CEILING. PROVIDE ALL NECESSARY MOUNTING SUPPORTS AND HARDWARE FOR A COMPLETE INSTALLATION. PROVIDE INFILL PIECES BETWEEN ALL SECTIONS FOR THE APPEARANCE OF A CONTINUOUS LINEAR FIXTURE.

Plan: (did not include sections because existing site photographs were available)



Assumptions:

Reflectance: Values and colors of materials determined by analyzing current conditions from site visit pictures obtained in August and reflectance information from AGI32 (grid ceiling reflectance taken from Armstrong product website).

Flooring –	0.30
Wood Wall -	0.24
Glass Wall -	0.10
Gypsum Wall -	0.60
Gypsum Ceiling -	0.85
Grid Ceiling -	0.83
Countertops -	0.24
Counters -	0.24
Partitions -	0.25

*Openings to other spaces were treated as a reflectance of 0 since lighting contribution from those spaces cannot be determined.

Light Loss Factors/Room Geometry:

RCR = 3.4
RSDD = 0.92
LDD = 0.94 (Fixture type II)
LDD = 0.88 (Fixture type IV)
LLD = 0.98 (Tungsten Halogen)
LLD = 0.93 (Fluorescent)

*Assumed 12 month cleaning cycle and clean room

Results:

Power Density = 2.22 W/ft^2 (allowable: 1.3 W/ft^2)

Calc Planes:

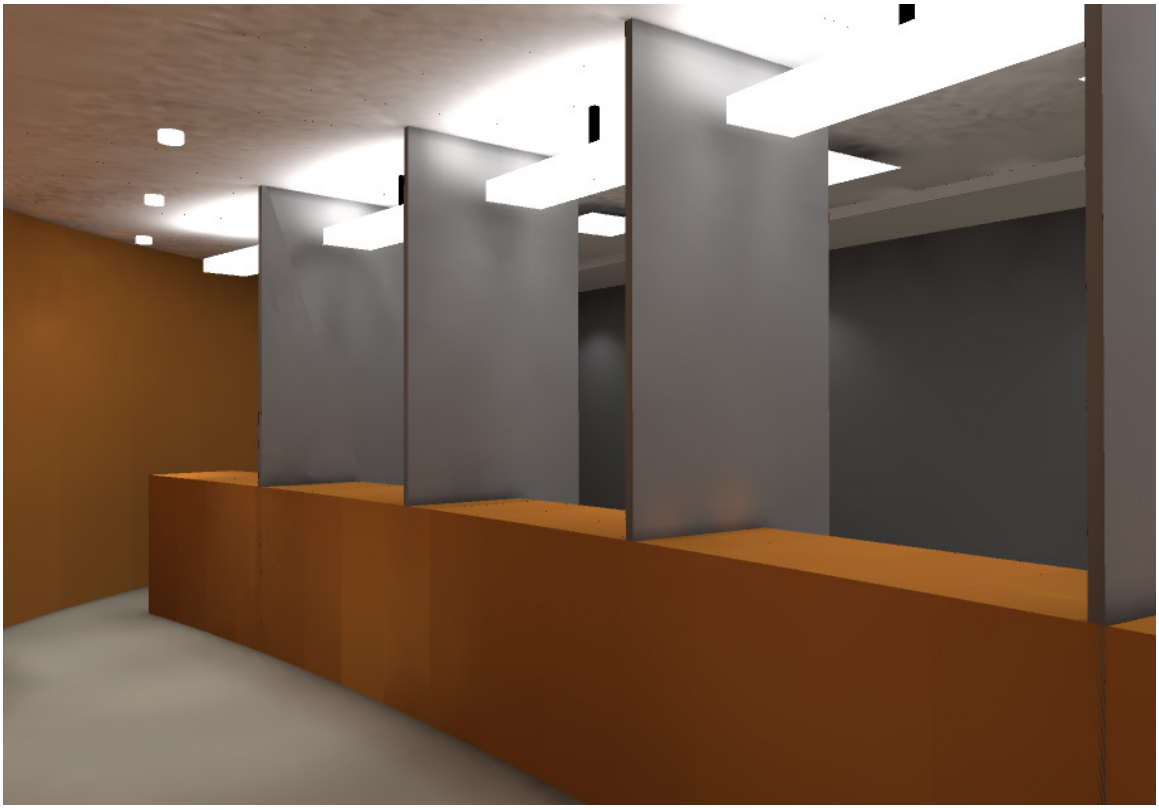
Workplane: (2.5' calc plane)

Avg = 57 fc
Max = 113 fc
Min = 27 fc
Max/Min = 4.2

Corridor: (0' calc plane)

Avg = 39 fc
Max = 56 fc
Min = 15 fc
Max/Min = 3.7

Renderings: (I have included some site pictures as some rough comparison between renderings and site conditions)



Results Summary:

General lighting levels seem adequate for the tasks required in this space. However, fixture placement is a concern because I obtained some pretty harsh scallops on the curved back wall. In reality, the scallops would not be as harsh because the back wall does not continue up to the ceiling. Due to simplicity reasons, I did not model the entire space behind that wall to accurately portray the scalloping. I do think some of the donwlights could be placed in a slightly better location. I would also like to see more of the back wall lit with some wallwashers to accentuate the wooden finish.

The power density was extremely high compared to the allowable and will need to be decreased. I think more efficient selection of fixtures and materials in the space will allow this. The indirect pendant fixtures seem too close to the ceiling and should be dropped lower or replaced by another fixture so the hot spots are not as noticeable for such a public space. Overall, the lighting is adequate for the space, but I think it can be livened up a bit with some accent lighting, and hopefully the power density can be dropped.

Exterior

The exterior façade was not analyzed in this tech report because the current lighting system is not known. The exterior was designed under a separate job package and that information could not be obtained.

However, I envision the interior doing a lot of the lighting for the exterior façade since the entire front is a glass façade. I do want to uplight the entrance canopy. The exposed steel structural elements with glazed glass covering could be illuminated to invite visitors and call out the canopy as the main entrance into the hospital. The efis sides to the main tower could be uplight with floods to balance the lighting levels on the front façade as to not make the sides seem as if they are dark and gloomy. The underneath of the canopy would probably be lit with similar downlights to the ones presently there to light the walkway for pedestrians.

Appendix

All relevant computer files are located on the P-drive under the folder:

P:\pem131\Tech Assign 1

Relevant Computer Files

AGI32:

Lobby.A32
Conference.A32
Registration.A32

AutoCAD:

Lobby 3d.dwg
Conference 3d.dwg
Registration 3d.dwg

Excel:

LTGFIX.XLS

.IES files:

A5.IES
A6 2F40BX.IES
A28 2F40BX.IES
A30.IES
B3.IES
B4.IES
B6.IES
B10 gotham.IES
B13.IES
B14.IES
B19.IES
B22.IES
B35 30deg.IES
C7 3T5.IES
C8 60deg.IES