



University of California, San Diego
Cal (IT)²
Technical Assignment #1

Brian Smith

Advisor: Dr. Moeck
05 October 2005

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Lighting/Electrical Option
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Executive Summary

This existing lighting conditions report is an analysis of the existing lighting fixtures, layout, and general illuminance maintained within the Cal (IT)² building on the University of California, San Diego campus. This report includes, but is not limited to, design criteria, lighting layouts, luminaire schedules, power density calculations, and basic renderings of each space showing the existing lighting conditions.

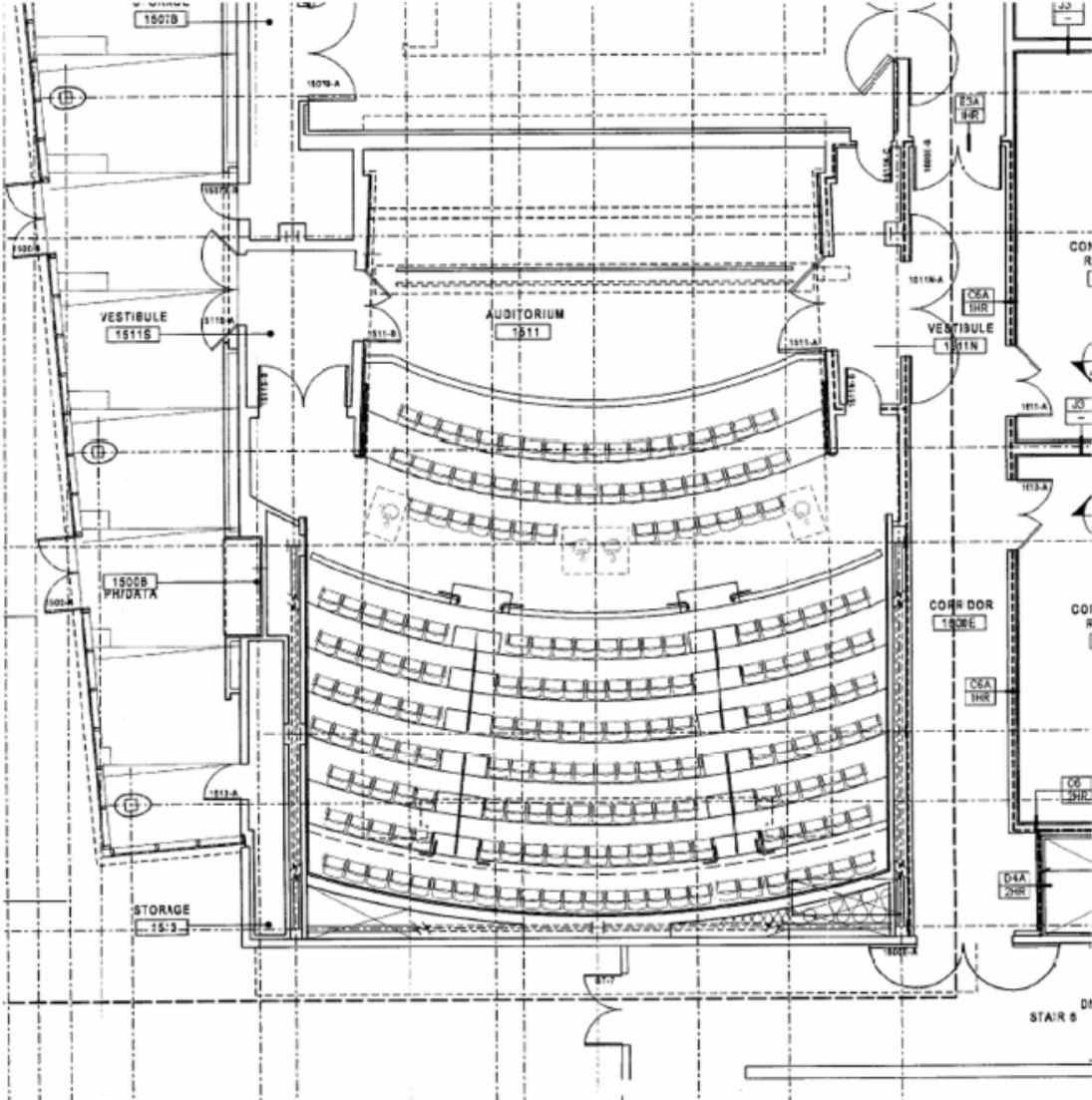
To analyze each space, I first obtained the luminaire information along with light loss factors, lamping, and the general layouts provided by the architect. From here, I used AGI32 software to find the horizontal illuminance values for each space to see if the values met ASHRAE/IESNA and California Title 24 standards. Based on my findings, every space met the criteria with room to spare. Power density calculations were also performed where all spaces met the strict Title 24 standards.

From this report, I learned a great deal about the CAL (IT)² building and all the individual spaces I had chosen. I have already commented on the design criteria and have a great deal of information to work with when I redesign each of the spaces.

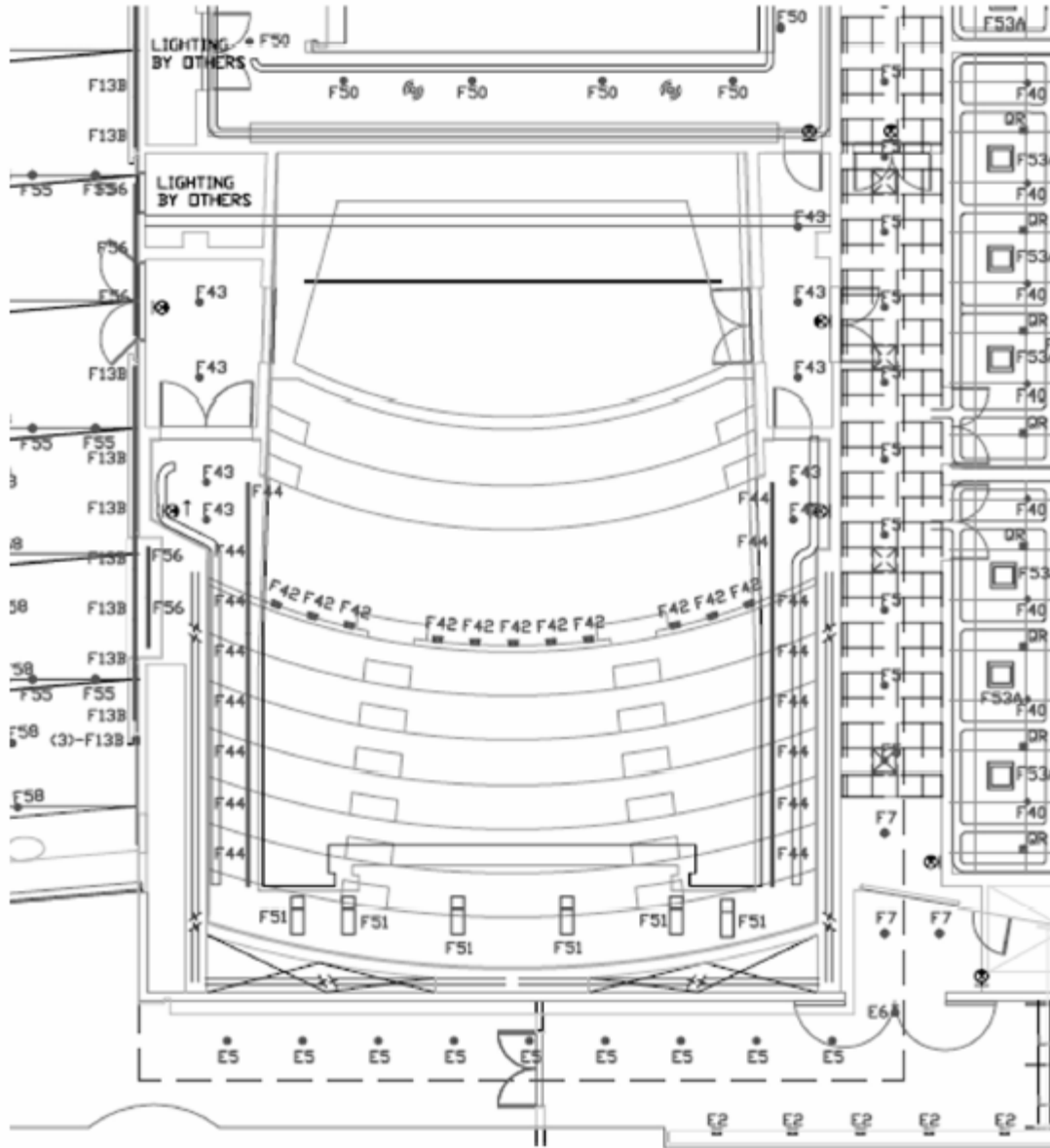
Black-Box Theater

The Black-Box theater of the Cal (IT)² building in UCSD is one of the more unique spaces in this large technological building. This 200 seat theater will be used for guest speakers and audio/visual presentations. A large projection screen can be pulled down on the stage for movies and presentation material as well. The theater is approximately 50 ft x 58 ½ ft. For the most part, everything in the theater is painted or colored black. The walls are covered with acoustic diffuser panels painted black. The front curtains to the stage are a black heavyweight material with the seats upholstered in a dark grey fabric. The ceiling contains acoustically reflective ceiling clouds, also painted black, to reflect the sound effectively within the space. A catwalk also runs around the ceiling for theater lighting equipment, ceiling adjustments, and maintenance.

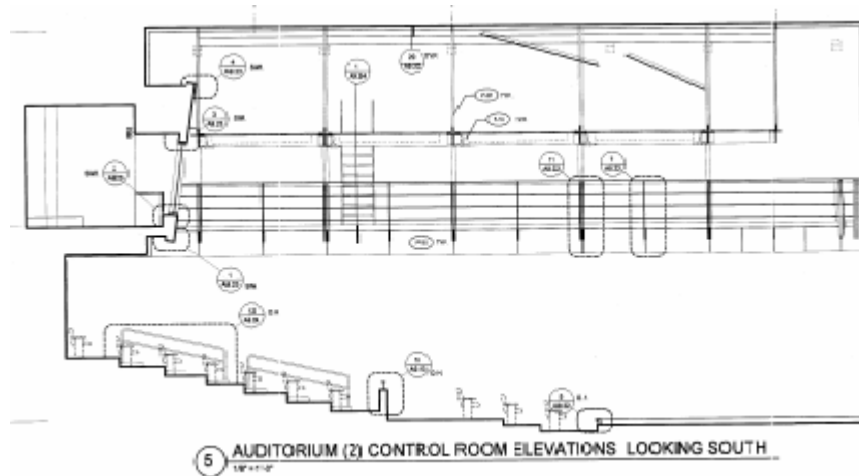
Black-Box Theater Furniture Plan
Scale: 3/16" = 1'0"



Black-Box Theater Lighting Plan
Scale: 3/16" = 1'0"



Section showing catwalk, roof and steps



Not to scale

Existing Lighting System

The lighting system for the black-box theater is mostly small step lights, recessed tungsten-halogen lamps, and wall-washing strip sources. Light levels of around 5 fc for entering and leaving the theater are the main criteria for this dark black-box theater. As seen on the reflected ceiling plan, the main part of the ceiling does not contain any luminaires. Most of the space is used for theatrical lighting for the presenters and performers on the stage area. Starting in the rear of the auditorium, 6 fixtures (F51) with a combination of a 27W compact fluorescent twin tube and small 50W PAR30 tungsten-halogen sources are recessed into the flat ceiling below the projection room. Along the sides of the theater, surface mounted linear wall washers line the wall. A 32W T8 tube is used with a blue colored gel over the lamp. These fixtures give strong light for the paths along the sides as a means of egress and finding your seat. As you walk farther down into the middle of the theater, there is a wide horizontal aisle that lit by small wall-mounted steplights. These horizontally slotted steplights use 1 13W T4 quad tube compact fluorescent bulbs which shine the light down on the aisle. Finally, towards the front of the theater, 2 downlights on each side by the entering and exiting doors exists. They consist of a 6" recessed 60W PAR38 tungsten halogen lamp downlight. The main purpose of these lights is to transition from the brightly lit lobby to the dark black-box theater.

LUMINAIRE SCHEDULE					
TYPE	Description	Lamp Data	Voltage	Manufacturer	Alternate Manufacturer
F42	Wall-mounted compact fluorescent steplight	(1) - 13-watt T4 quad compact fluorescent	120V	Belfer Lighting	Bega or equal.
F43	6" aperture recessed tungsten halogen downlight	(1) - 60-watt PAR38 tungsten halogen	120V	Lightolier	Zumtobel/Staff , Portfolio or equal.
F44	Surface-mounted linear fluorescent wallwasher with blue colored gel	(1) - 32-watt T8 linear fluorescent	120V	CJ Lighting	Metalux, Lightolier or equal.
F51	Recessed tungsten halogen and fluorescent downlight	(1) - 50-watt PAR30 tungsten halogen and fluorescent	120V	RSA	or equal (no known equal)

Light Loss Factors							
TYPE	Cleaning Interval	Category	BF	LLD	LDD	RSDD	LLF
F42	12 Months (Clean)	IV	0.88	0.86	0.88	0.96	0.64
F43	12 Months (Clean)	IV	1.00	0.85	0.88	0.96	0.72
F44	12 Months (Clean)	IV	0.88	0.95	0.88	0.96	0.71
F51	12 Months (Clean)	IV	0.88	0.85	0.88	0.96	0.63

Design Criteria

Reflectances

Side and Back Walls: 22% (Carnegie Xorel Fabric Wall Coverings)

Ceiling: 20% (Dark black paint on mesh acoustical ceiling)

Flooring: Assumed 20% (Collins & Aikman's Sequence ST320 -17 Carpet)

Chairs: 10% (Dark grey upholstered auditorium seating)

System Controls

The theater is currently set up for multiple lighting scenarios with separate switching for every type of light. Dimming is available during presentations as well. Theatrical lighting is also present from the projection room by the catwalk.

Ceiling characteristics

The ceiling is designed as a grid with small steel beams running up and down, left and right. Above the steel grid is a black mesh acoustical system designed to reflect the sound back to the audience with minimal reverberation time. The panels behind the mesh are angled toward the stage and reflecting sound onto the crowd. The ceiling is 16 feet above the catwalk. The catwalk along the sides of the theater also creates a cove like atmosphere around the seating where current lighting is installed. Placing light fixtures in the ceiling is not a good option for this space due to the complex ceiling allowing minimal light through the metal mesh.

Theme

The theater setting is created to be very dark and intimate with only 200 seats available and minimal lighting on the audience. The mood I want to place in this room is one of comfort and technologically advanced. Most of the performances and presentations will be for entertainment purposes, so minimal light needs to cast on the audience for visual tasks. The audience should be very comfortable to be able to sit and listen and gather knowledge from the presentations without a feeling of sleepiness or an overwhelming atmosphere.

Facial appearances

The shadows placed on the presenter or cast of people on the stage is a strong issue for the angles at which the light is aimed at the people. Since theatrical fixtures will be casting all the light on the stage area, this scenario is not in my scope of work.

Horizontal Illuminance

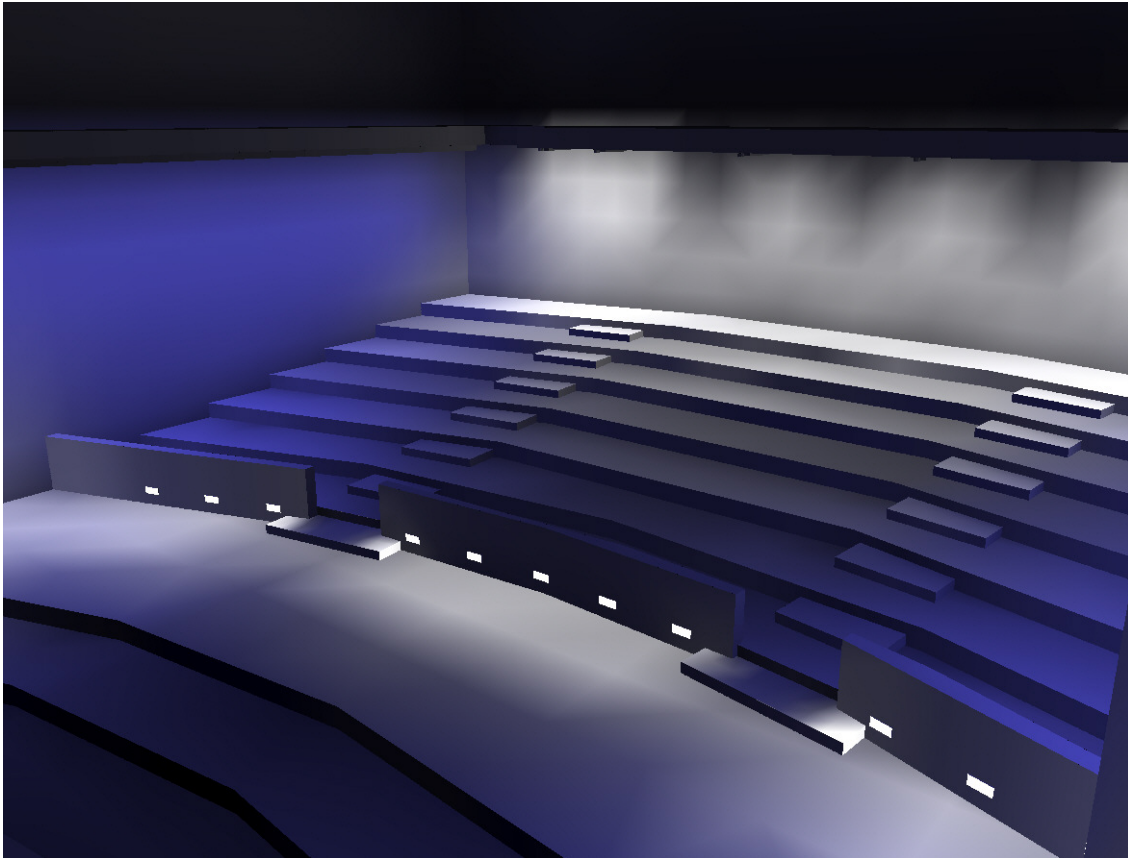
Theater during performances: emergency lighting needed at 0.2 fc

Theater in between performances: 5 fc for circulation

Light levels should be minimal due to the highlighting of the stage area with the theatrical fixtures. Only path-lights and low-voltage ambient lighting should be used for egress.

Existing Conditions Analysis with AGI32 1.8

Renderings based on existing conditions within the theater using AGI32



Horizontal Illuminance

I placed two different calculation grids on the space. One is placed on the middle circulation area with the step-lights installed. The other calculation grid is placed on the upper-most tier of seating under the catwalk and project room. I wanted to make sure enough light was in place to circulate the space to and from the exits. My results are as follows:

Middle floor separating lower seating and upper seating

Avg: 9.32 fc

Max: 72.7 fc

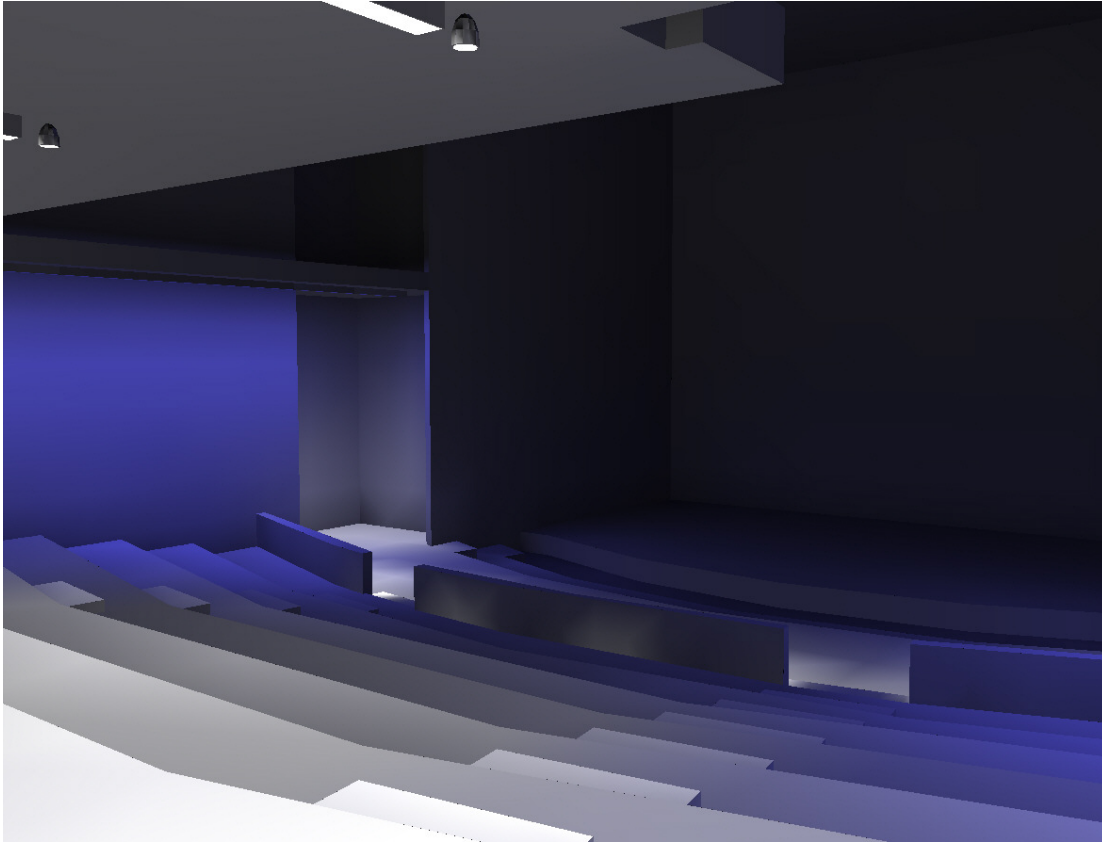
Min: 0.5 fc

Top Row under white wall washing lights

Avg: 19.13 fc

Max: 25.7 fc

Min: 8.3 fc



I used the reflectances and light loss factors as I had stated above. For the step-lights and integrated fluorescent and halogen fixtures, IES files were not available, so I used a similar product line from another manufacturer inputting the lamp and angle values as specified.

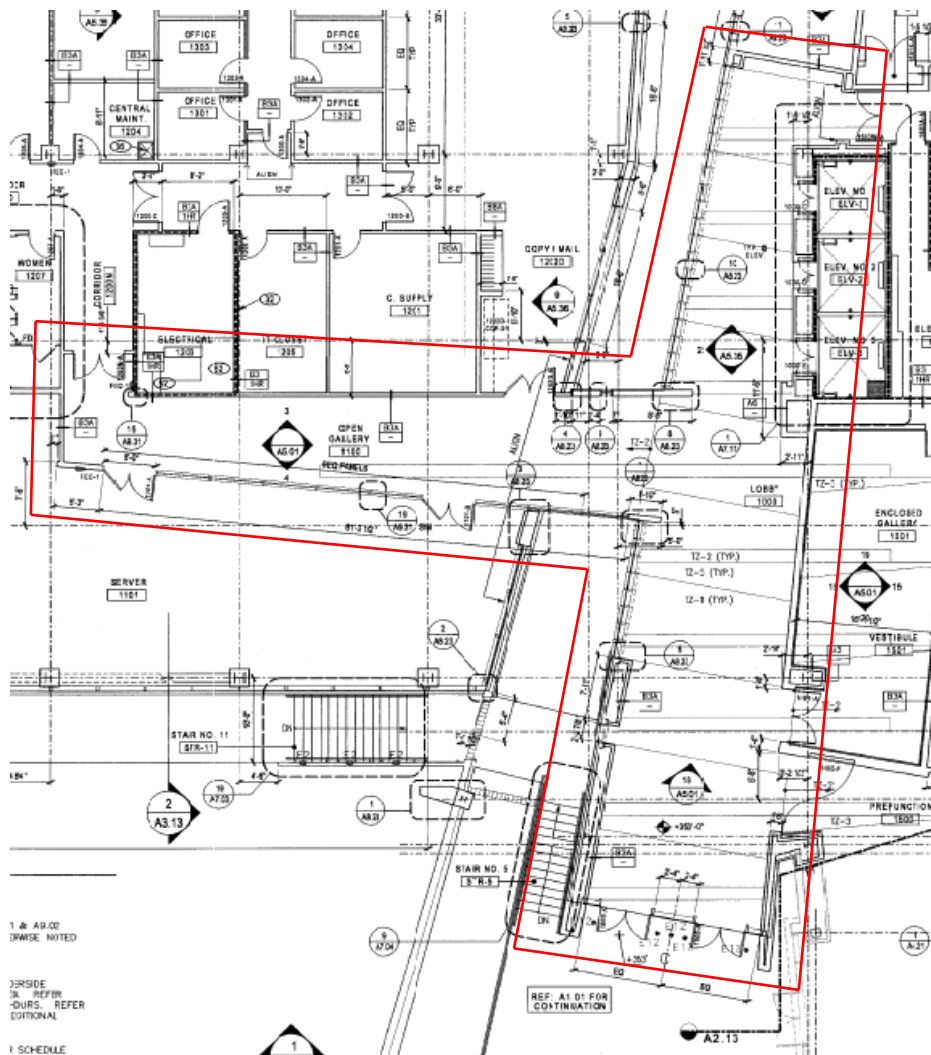
***Power Density** = 0.49 W/sf which is under the 1.3 W/sf requirement by California Title 24 Energy standards and ASHRAE/IESNA standards*

Based on my findings, I feel the theater meets all the criteria and sets a comfortable mood for the people to watch performances. One note I might make for my redesign is more light added to the center aisles for exiting and entering purposes. Small low-voltage rope lights might be a good addition for the steps leading to the chairs. I liked the effect the blue wall washers had on the fabric walls of the theater.

Main Lobby

The main lobby of Cal (IT)² enters on the courtyard side of the building and leads to the main elevators and corridors that lead to the main laboratories and upper floor offices and research areas. The main lobby offers a large 2 story space with a covered ceiling on top. Adjacent to the lobby is a bridge that crosses the “worm-hole” tunnel going under the building to the other side. This then connects to the corridors on the other side. The lobby is about 98 ft long from the front doors to the elevators. It starts at about 25 ft at the entrance and slowly converges. The walls are painted grey with a white covered ceiling and other light green walls by the elevators. Glass panels overlook the “worm-hole” and the outside towards the front of the lobby.

Lobby Floor Plan Scale: 5/16" = 1'0"



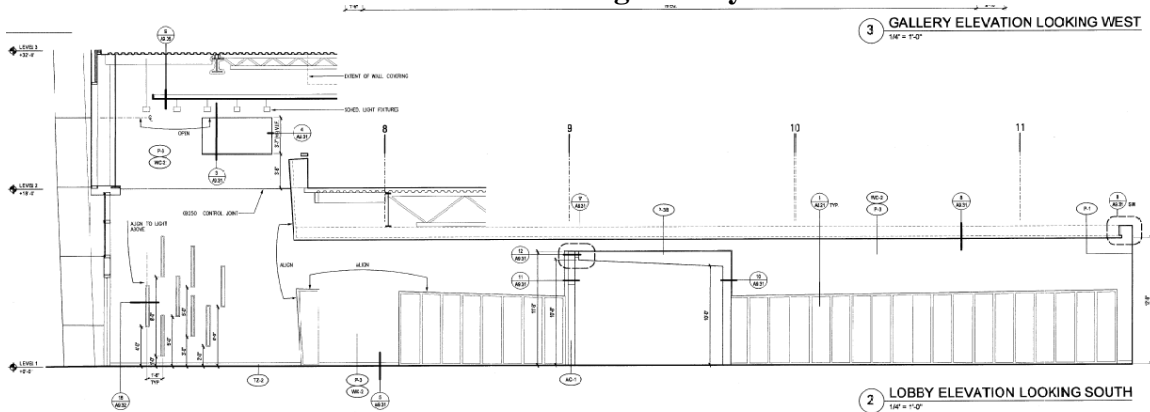
Existing Lighting Conditions

As you enter the lobby from the academic court, there exists an overhang with exterior fixtures highlighting the entrance to the main lobby. Upon entering the lobby, two large decorative pendants are suspended highlighting the doors. They are large vertical cylindrical tubes with 1 100W PAR38 metal halide bulbs. As you continue walking towards the elevators and bridge over the underground tunnel, the two-story space ends and becomes an 18 ft ceiling with a large cove on all sides. A long line of blue strip lights line the edges of the ceiling with 32W T8 lamps. Near the elevators, four large pendants are hung from the ceiling as decorative fixtures to shine more light on the entrance and exit of the elevators. These fixtures have 32W T4 triple tube compact fluorescent lamps. Along the bridge, a smaller 10 ft sloped ceiling is used with recessed 32W T4 triple tube compact fluorescent in a 6 inch apertures downlight. Recessed in the slab along the side are 7 inch adjustable accent up-light with blue lens of a 50W MR16 tungsten halogen. Along the center of the ceiling are pipe mounted 50W MR16 tungsten halogen accent lights as well. These lights also shine onto the underground path below through the clear windows looking down.

LUMINAIRE SCHEDULE					
TYPE	Description	Lamp Data	Voltage	Manufacturer	Alternate Manufacturer
F12	7" aperture recessed slab tungsten halogen adjustable accent uplight	(1) - 50-watt MR16 tungsten halogen	120V	BK Lighting	or equal (no known equal)
F13A	4' long surface-mounted linear fluorescent wall wash cove light with blue lens	(1) - 32-watt T8 linear fluorescent	277V	Peerless Lighting	Lightolier, LiteControl, Ledalite, or equal
F21C	11 inch diameter compact fluorescent pendant with blue colored accent lens	(1) - 32-watt T4 triple tube compact fluorescent	277V	D'AC	or equal (no known equal)
F23	Recessed linear fluorescent wall wash light fixture in architectural slot	(1) - 32-watt T8 linear fluorescent	277V	Linear Lighting	Se'lux or equal.
F38A	Pipe-mounted tungsten halogen accent light	(1) - 50-watt MR16 tungsten halogen	120V	Lightolier	Halo, RSA or equal
F39	6" aperture pendant-mounted compact fluorescent downlight	(1) - 32-watt T4 triple tube compact fluorescent	277V	Lightolier	Zumtobel/Staff , Portfolio or equal.
F49	6" aperture pendant-mounted compact metal halide downlight	(1) - 100-watt PAR38 compact metal halide	277V	Kurt Versen	Zumtobel/Staff, Portfolio or equal.

Light Loss Factors							
Type	Cleaning Interval	Category	BF	LLD	LDD	RSDD	LLF
F12	12 Months (Clean)	VI	0.88	0.95	0.85	0.96	0.68
F13A	12 Months (Clean)	VI	1.00	0.95	0.85	0.96	0.78
F21C	12 Months (Clean)	IV	0.88	0.86	0.88	0.96	0.64
F23	12 Months (Clean)	IV	0.88	0.95	0.88	0.96	0.71
F38A	12 Months (Clean)	IV	0.88	0.95	0.88	0.96	0.71
F39	12 Months (Clean)	V	0.88	0.86	0.88	0.96	0.64
F49	12 Months (Clean)	IV	0.88	0.86	0.88	0.96	0.64

Section Through Lobby



Note: Not To Scale

Design Criteria

Reflectances

Walls: 50% (White and Light green paint from Sherwin Williams)

Ceiling: 80% (White coved ceiling)

Floor: 30% (Terrazzo glass and stone pour in place flooring)

Ceiling Characteristics

The ceiling in the lobby is multistoried. When first entering, the ceiling expands up to the exposed truss system 32 ft high. As you continue on, the second floor creates a cove ceiling the rest of the way at 12'-9" high. The bridge over the tunnel had another ceiling that is sloped at only 10 ft high. Because of the differing ceilings, many different lights can be used to emphasize the size of the space, the length of the space and the jagged edges that all the ceilings create when put together.

Theme

As you enter the space, the lobby is meant to invite you into the building and give a sense of what it is hiding inside. In Cal (IT)², the blue cove lights, modern hanging pendants, and misshaped ceilings give a sense of modern improvement and the advancement of building technology. This is the sense that I am going to highlight in my redesign.

Horizontal Illuminance

In the lobby, a horizontal illuminance of 5-10 fc is sufficient for circulation and entering. It is a simple orientation to the building with only a short visit.

Vertical Illuminance

In the lobby, a vertical illuminance of 3 fc is needed.

Daylight Integration

This space has large glazing windows when you first enter the space from the courtyard in the East. Daylight can help generate much of the light needed during the daytime hours to illuminate the immediate two story space upon entering; however, glare must be considered for people walking through the space.

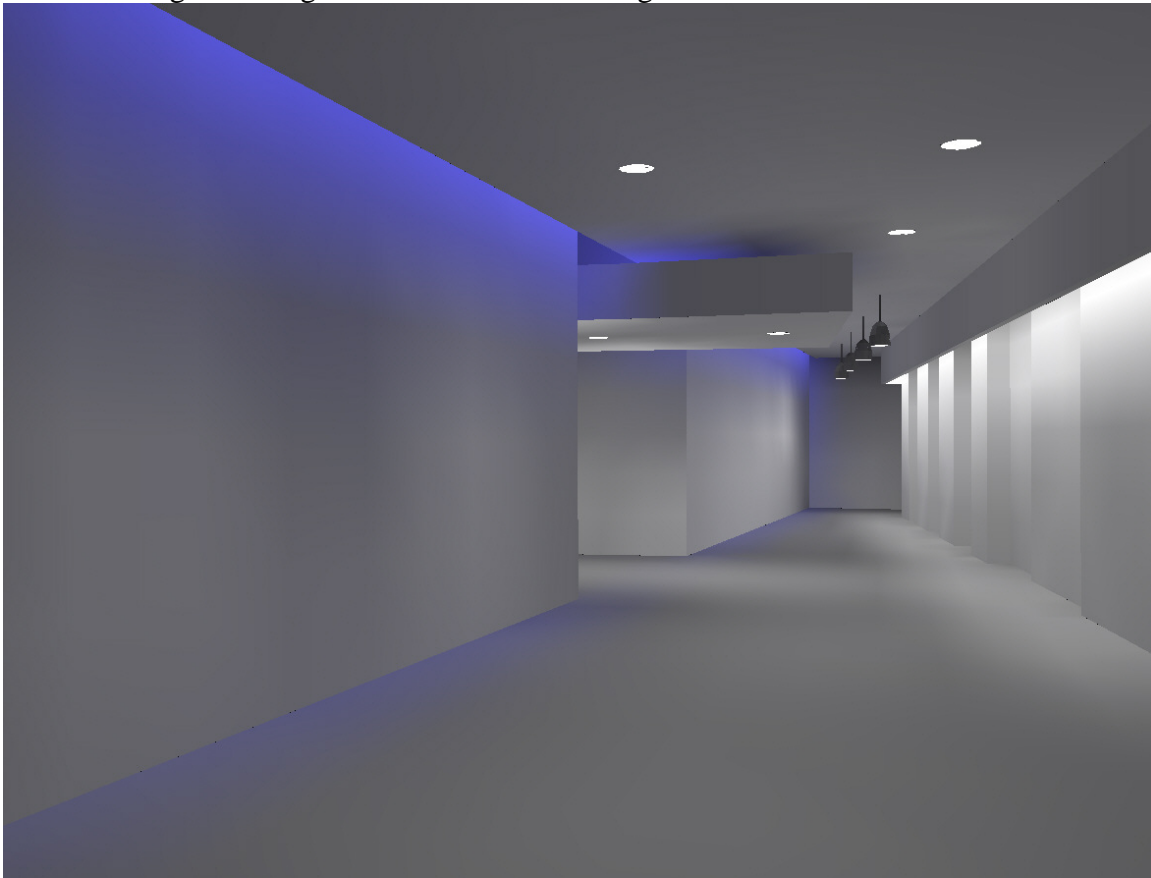
Color and Texture

For this technological building, all of the walls are painted grey, white and a lightened green. The choice of these colors really emphasizes its use as an educational facility while also showing a form of design. Accenting these colors well can create an

atmosphere pleasant and suitable for the growing technology that is being designed within its walls.

Existing Conditions Analysis with AGI32 1.8

The following renderings are based on the existing conditions described above:



Horizontal Illuminance

Using all the conditions listed above including light loss factors, fixtures, and reflectances, a calculation grid on the floor produced the following results:

Floor calc grid

Avg: 10.69 fc

Max: 21.4 fc

Min: 1.9 fc



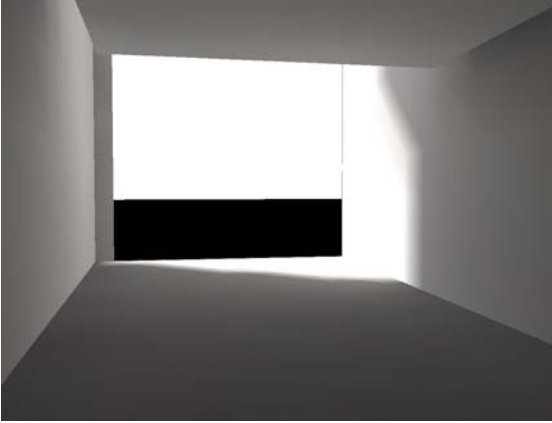
Power Density = 1.35 W/sf which is under the 1.5 W/sf requirement by California Title 24 Energy standards and the ASHRAE/IESNA standards.

For this space, all the criteria are met as expected. I liked the effect the blue cove lights had on the space, and hope to incorporate a similar idea into my redesign. Another aspect I hope to incorporate is light from the tunnel and light onto the tunnel from the lobby for energy savings and a new effect. Possible new architectural features may be added to incorporate this new lighting scheme.

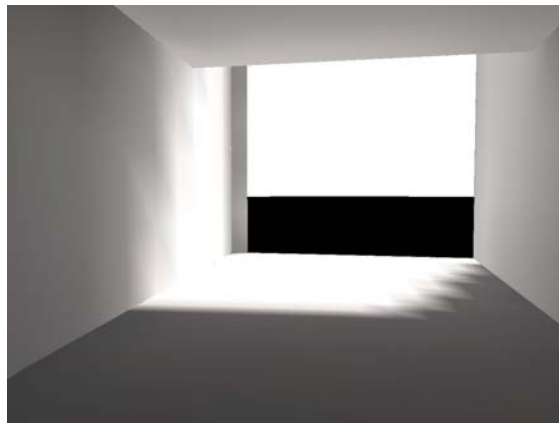
Daylighting Study

For this study, daylight patterns on the floor were studied to see if possible glare issues would result. Daylight was studied for March 21st, June 21st, and December 21st all at 10:00 am and 1:00 pm in San Diego, CA. The following are renderings using AGI32 showing the patterns of light entering the space. All these renderings are showing the window facing east in the courtyard where the entrance exists.

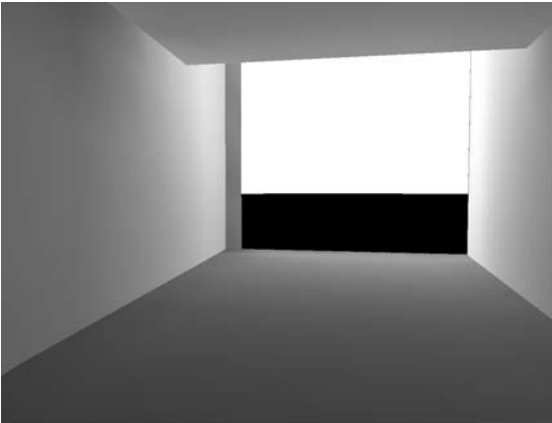
March 21st 10:00 am



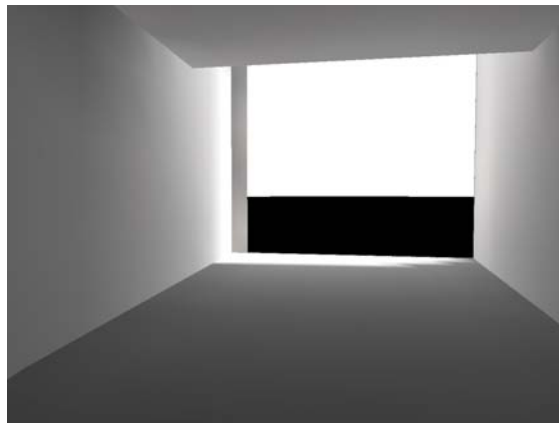
March 21st 1:00 pm



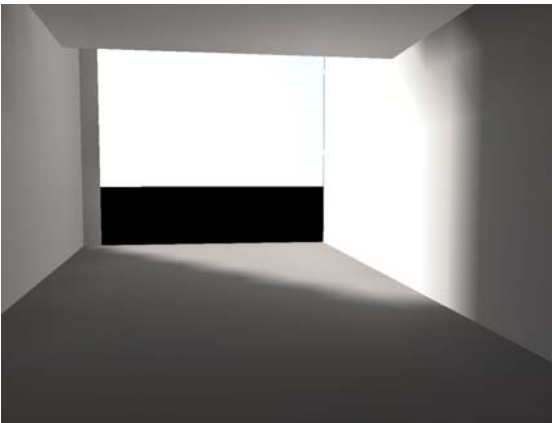
June 21st 10:00 am



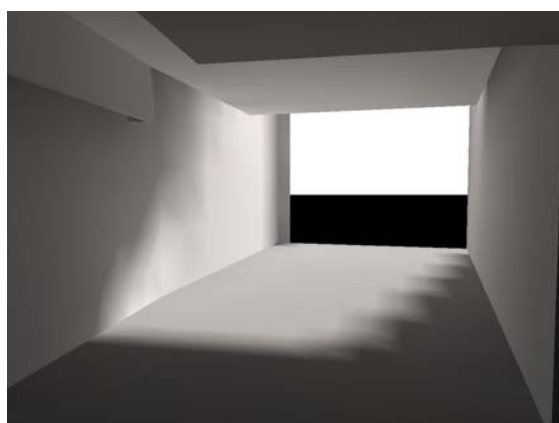
June 21st 1:00 pm



December 21st 10:00 am



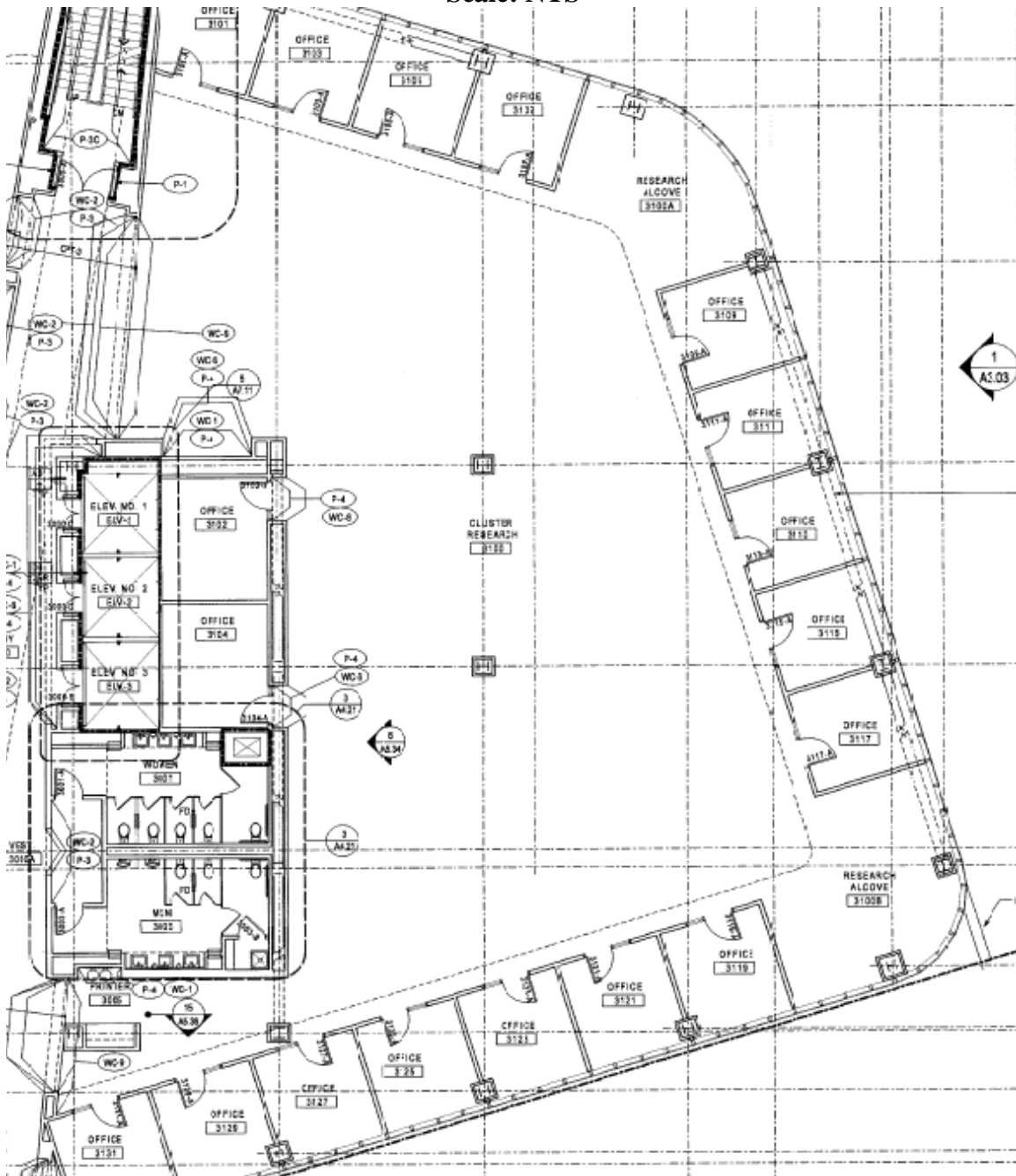
December 21st 1:00 pm



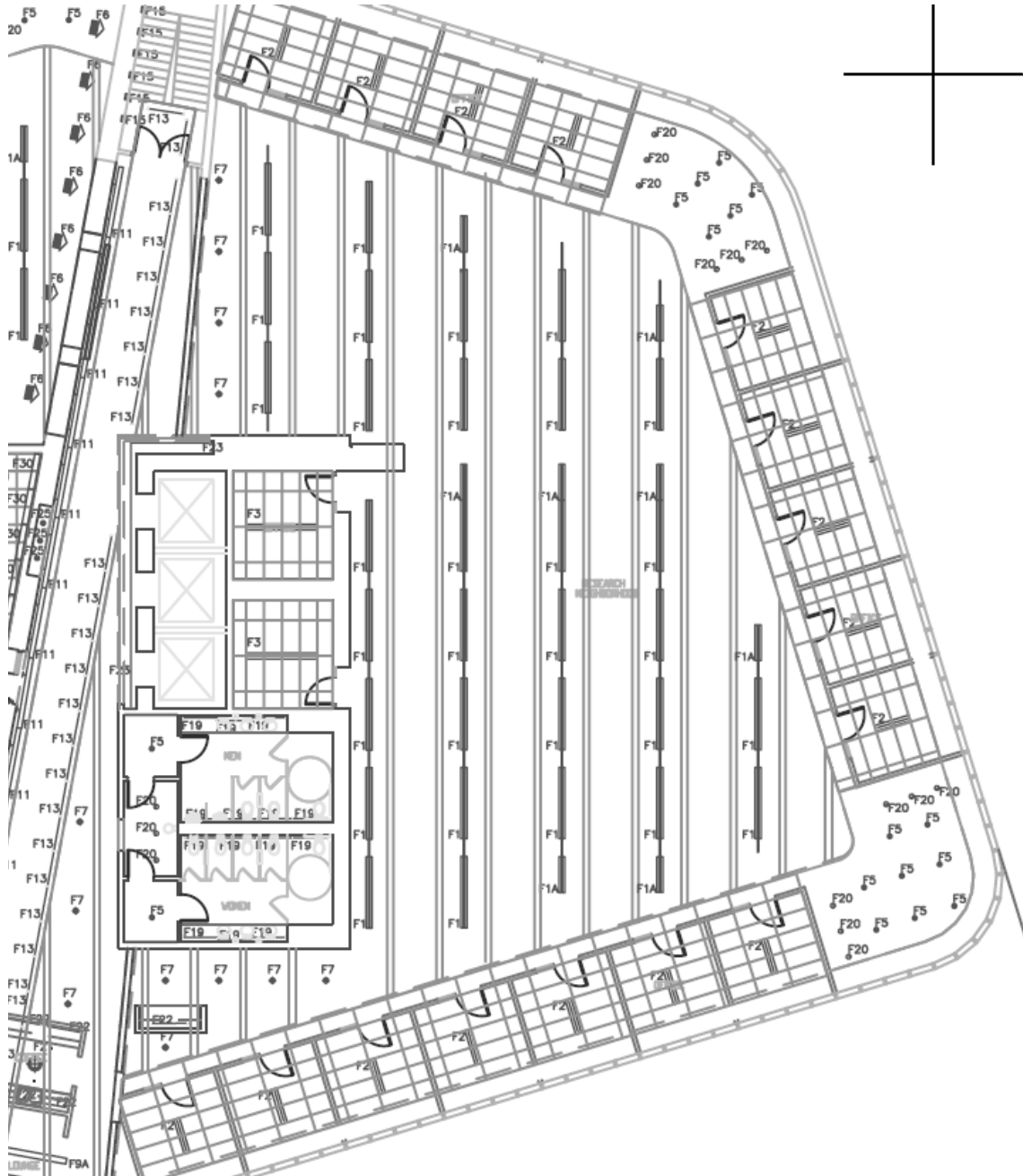
Open Cluster Research Area 3100

The open cluster research area (3100) is located on the 3rd floor in the main tower (section B). This space will eventually contain many cubicles, tables, and open areas for research space and experimentation. The space has rough dimensions of about 101 ft x 68 ft. The area is surrounded by private offices with windows next to and above the doors allowing minimal daylight into the space. The walls are all painted a light green color with the ceiling exposing dark grey ductwork and trusses. A 4 ½ ft height on the cubicles is assumed with a workplane height of 2 ½ ft. Large rectangular columns painted white are also placed throughout the open area.

3100 Research Area Floor Plan Scale: NTS



3100 Research Area Lighting Plan Scale: NTS



LUMINAIRE SCHEDULE

Type	Description	Lamp Data	Voltage	Manufacturer	Alternate Manufacturer
F1	8' long track-mounted linear fluorescent bivergent parabolic downlight	(4) - 32-watt T8 linear fluorescent	277V	Zumtobel/Staff	or equal (no known equal)
F1A	4' long track-mounted linear fluorescent bivergent parabolic downlight	(2) - 32-watt T8 linear fluorescent	277V	Zumtobel/Staff	or equal (no known equal)
F5	6" aperture recessed compact fluorescent downlight	(1) - 32-watt T4 triple tube compact fluorescent	277V	Lightolier	Zumtobel/Staff, Portfolio or equal.
F7	9" aperture pendant-mounted compact fluorescent downlight	(2) - 32-watt T4 triple tube compact fluorescent	277V	Lightolier	Zumtobel/Staff, Portfolio or equal.
F20	6" aperture recessed compact fluorescent wallwasher	(1) - 32-watt T4 triple tube compact fluorescent	277V	Lightolier	Zumtobel/Staff, Portfolio or equal.

Light Loss Factors							
Type	Cleaning Interval	Category	BF	LLD	LDD	RSDD	LLF
F1	12 Months (Clean)	IV	0.88	0.95	0.88	0.96	0.71
F1A	12 Months (Clean)	IV	0.88	0.95	0.88	0.96	0.71
F5	12 Months (Clean)	VI	0.88	0.86	0.85	0.96	0.62
F7	12 Months (Clean)	VI	0.88	0.86	0.85	0.96	0.62
F20	12 Months (Clean)	VI	0.88	0.86	0.85	0.96	0.62

Existing Lighting Conditions

This entire space involves pendant mounted fluorescent striplights. They come in 4 ft and 8 ft sections and run horizontally in line with the trusses. They all contain 32W T8 lamps with 4 lamps in the 8 ft section and 2 lamps in the 4 ft section. By the entrances, a few 9 inch pendant mounted downlights are shown to shine more light in the smaller space near the elevators. These contain 2 32W T4 triple tube compact fluorescents each.

Design Criteria

Reflectances

Walls: 50% (Light green and white paint)

Ceiling: 20% (exposed ceiling painted black)

Floor Covering: 20% (tan/taupe bur bur carpeting)

Furniture: 40% (assumed value for future furniture/partitions installation)

Ceiling Characteristics

The ceiling of 3100 (the research area on the third floor) is an exposed ceiling of trusses, ductwork, and hanging light fixtures. The mechanical and structural work is painted black to have a low reflectance with suspended direct fluorescent louvered striplights.

The room shows its design elements to enhance the function of the room (being a research area of technology).

Theme

The research area should exhibit a feeling of creativeness, adaptive ability, and convenience. It is surrounded by private offices with windows overshadowing the space providing some minimal daylight to the space. This space needs to show sleek modern design with economical and energy efficient ideas.

Horizontal Illuminance

According to IES criteria, a research area room which will most likely contain intensive VDT use and paper tasks should have an illuminance level of 30 to 50 fc. Workstations are required to have 30 fc while laboratories with experimentation and intensive VDT use should provide 50 fc.

Glare Consideration

Glare should be considered in this space because of the work-like environment. The suspended fluorescent striplights will most likely not cause a problem, but must be taken into account during my redesign.

Vertical Illumination

A vertical illumination of 5 fc is required for this open office research area.

Daylight Consideration

As will be mentioned later, daylight will be entering the space through the windows in the corners and through the upper windows above the private offices. Even though the light is minimal, system controls may be able to regulate energy usage and turn off many luminaries during daylight hours to save on energy consumption. In my redesign, a study of the windows above and next to the offices will be done to see if light may be redirected to provide light onto the working planes in the open area. This will save on energy costs which is a major issue for California at the moment.

Existing Conditions Analysis Using AGI32 1.8

The following renderings are based on the existing conditions described above using AGI32.



Horizontal Illuminance

Using all the conditions listed above including light loss factors, fixtures, and reflectances, a calculation grid on the workplane (2.5 ft above the floor) produced the following results:

Workplane calc grid

Avg: 39.53 fc

Max: 67.6 fc

Min: 2.6 fc



The results I got from AGI32 were as expected for an open office/research area. The private offices surrounding the space will also add a little more light on the edges of the space with their glass window panes next to each door.

Power Density = 1.026 W/sf which is under the 1.3 W/sf requirement by California Title 24 Energy standards and the ASHRAE/IESNA standards.

Based on my findings, all the criteria were met as expected. The low power density proved very economical for the large office space that will be placed there in the future. In my redesign, I may try to use more daylight into the space as described earlier and choose a different photometry for the fixtures. I feel a fluorescent pendant is a good choice for the open area, but the ceiling may somehow be used to save on the number of fixtures and cost.

Daylighting Study

For this study, daylight patterns on the floor were studied to see if possible glare issues would result. Daylight was studied for March 21st, June 21st, and December 21st all at 10:00 am and 1:00 pm in San Diego, CA. The following are renderings using AGI32 showing the patterns of light entering the space. All these renderings are showing the South facing corner window with the line of windows above the offices.

March 21st 10:00 am



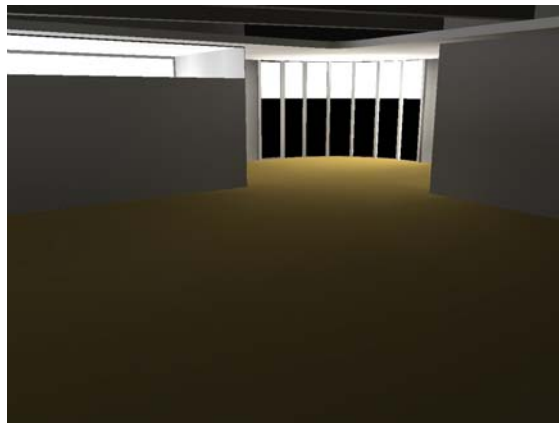
March 21st 1:00 pm



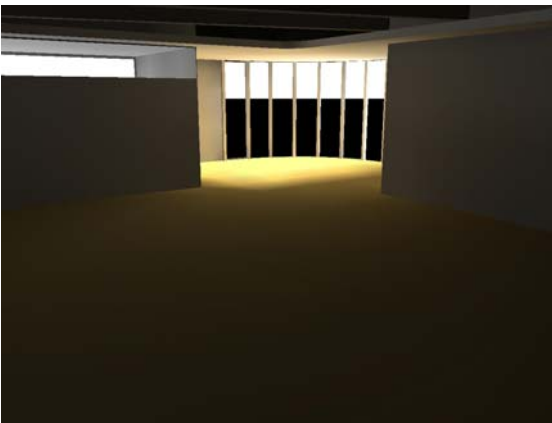
June 21st 10:00 am



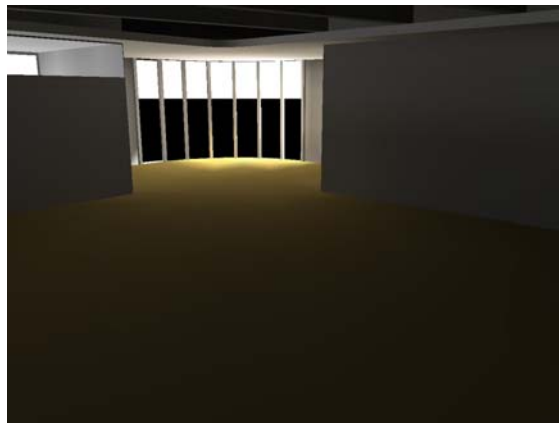
June 21st 1:00 pm



December 21st 10:00 am



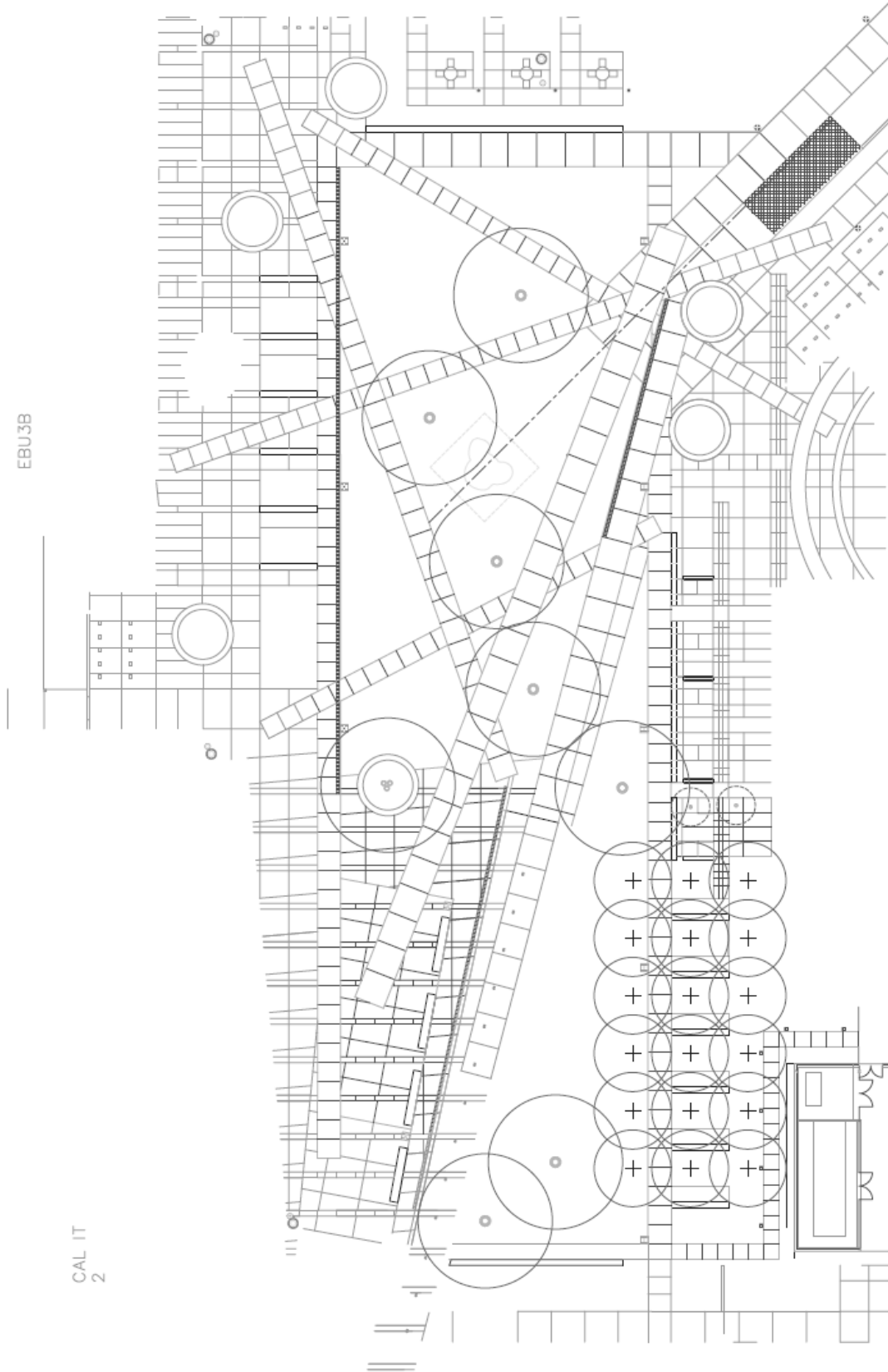
December 21st 1:00 pm



Academic Courtyard

The academic courtyard is the area just outside the eastern entrance facing the campus. It contains concrete paths leading from one building to the other and across the campus. A large teddy bear sculpture is also displayed in the courtyard along with a variety of trees and shrubbery. One main feature of the courtyard is the entrance to the underground tunnel or “worm-hole” under the CAL (IT)² building. A canopy leads the path under the building to the other side by the road. The whole courtyard is approximately 280 ft x 95 ft.

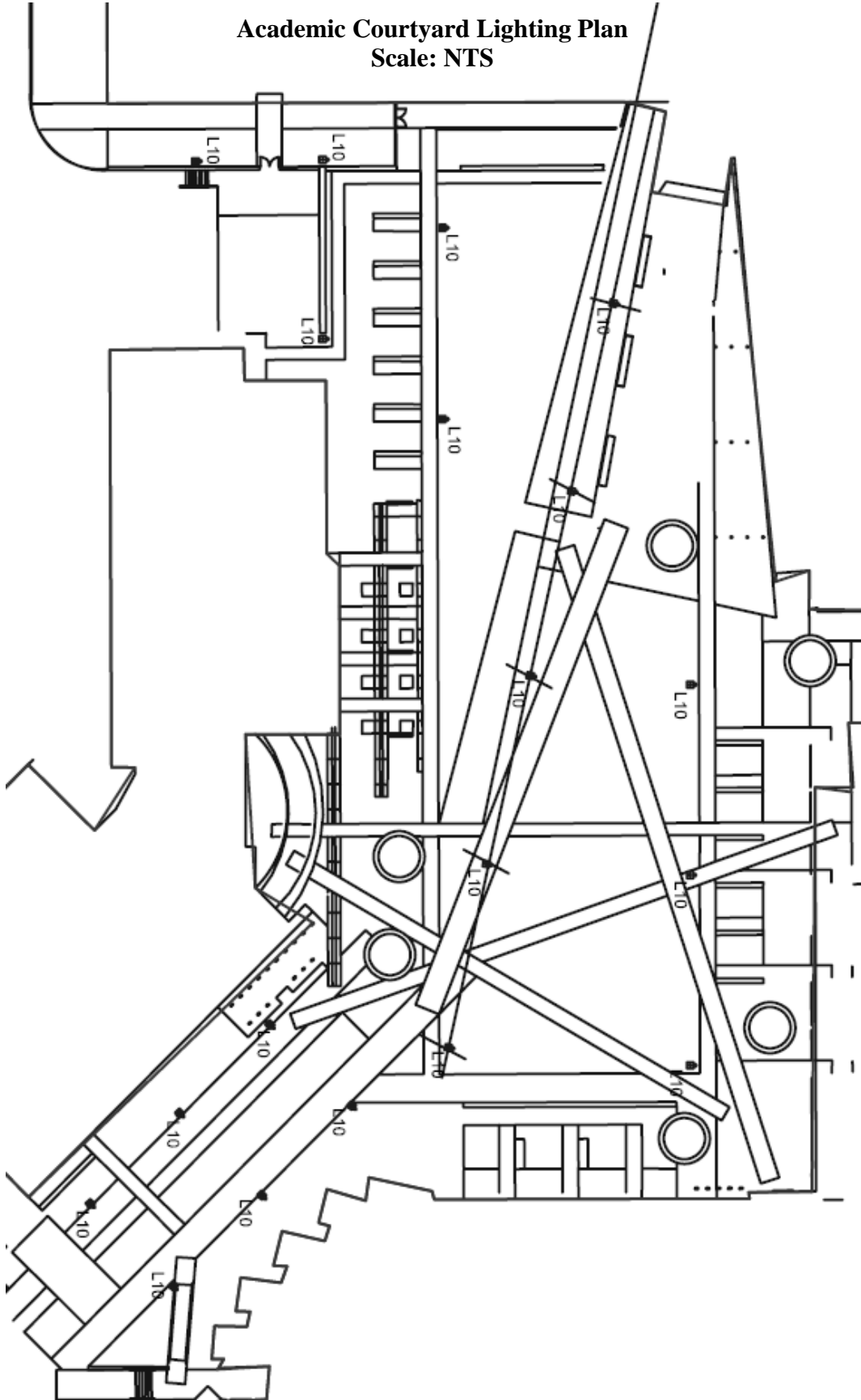
Academic Courtyard Site Plan
Scale: 1/32" = 1'0"



EBU3B

CAL IT
2

Academic Courtyard Lighting Plan
Scale: NTS



Existing Lighting Conditions

The courtyard consists of many different types of lighting applications, sources and type of fixture used. Starting with general safety lighting, 20’ poles were used for a general glow of the space to feel safe walking at night with low-pressure sodium lamps. Other applications include up-lighting on the trees which were not included in my lighting study since they are turned off at 10pm due to UCSD lighting policies, and other exterior fixtures attached to the building near entrances and the tunnel lighting which are also ignored due to my scope of work existing on only the courtyard on not on façade lighting.

LUMINAIRE SCHEDULE					
Type	Description	Lamp Data	Voltage	Manufacturer	Alternate Manufacturer
L10	20' tall pole-mounted low pressure sodium area light type IV distribution	(1) - 90W T-21 Low Pressure Sodium GE SOX90	277V	Spaulding	Gardco or equal
L7	Above-grade mounted compact metal halide landscape up-light	(1) - 70W PAR 38 compact metal halide	277V	Lumiere	Bega, Kim Lighting or equal

Light Loss Factors							
TYPE	Cleaning Interval	Category	BF	LLD	LDD	RSDD	LLF
L10	12 Months (Clean)	V	0.88	0.9	0.88	-	0.70
L7	12 Months (Clean)	VI	0.88	0.86	0.88	0.96	0.64

Design Criteria

Reflectances

A ground reflectance was not considered in this study. Only direct illuminance was studied for safety conditions.

Theme

The general lighting theme for the academic courtyard was to provide a safe walking atmosphere during the nighttime hours while complying with the University of

California, San Diego's lighting policies. Low pressure sodium lamps, which generate a deep orange glow, were chosen due to the existing lighting conditions which already exist on the rest of the campus. The up-lighting on the trees add some depth to the space with a more aesthetic look taking over the deep orange glow of the pole lights.

Horizontal Illuminance

In the courtyard, a horizontal illuminance of 0.5 fc is required for safety and pedestrian identification at night from IES standards.

Building exterior entrances should be highlighted as well as stairs and ramps for safety concerns.

Vertical Illuminance

In the courtyard, a vertical illuminance of 0.5 fc is also required by IES standards.

Glare Considerations

Glare could be an issue when walking down the concrete paths towards the 20' poles and up-lights on the trees. Since they are relatively tall compared to the average person, it shouldn't prove to be a concern, but attention should be paid to it.

Facial Recognition

Facial and body recognition is a major factor in the lighting design for this space. For safety matters, my redesign should pay attention to the vertical illuminance on a person and deleting any major dark spots where a person can hide.

Light Pollution

Light pollution is another concern that should be considered. Since all the poles in this courtyard have a type IV distribution, most of the light should not escape into the atmosphere.

Color Temperature Appearance

For these particular fixtures, the color temperature will be very low. The low pressure sodium lamps create a deep orange glow which won't render certain colors very well.

Existing Conditions Analysis using AGI32 1.8

The following picture is showing the illuminance values on the ground over the entire courtyard. All the poles are 20 ft in height and values are shown in footcandles.

Horizontal Illuminance on ground calc grid:

Avg: 1.5 fc

Max: 5.4 fc

Min: 0.0 fc

Power Density = 0.15 W/sf which is under the 1.0 W/sf requirement for decorative fixtures by California Title 24 Energy standards and the ASHRAE/IESNA standards.

Based on my findings, the light levels and distribution was very good for most of the courtyard. A few dark corners existed near buildings and hidden areas, but were ignored due to the amount of poles in the courtyard. Since the university has strict rules on decorative exterior lights being turned off at 10:00 pm, some of my redesign may incorporate ambient safety lighting through the use of decorative light fixtures. Also, the sculpture in the middle of the courtyard was not accented which I might try to highlight in my redesign.

Academic Court Light Levels

Scale: NTS

