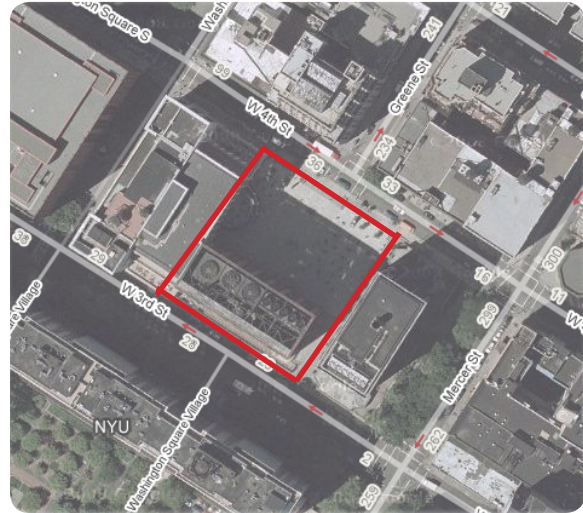
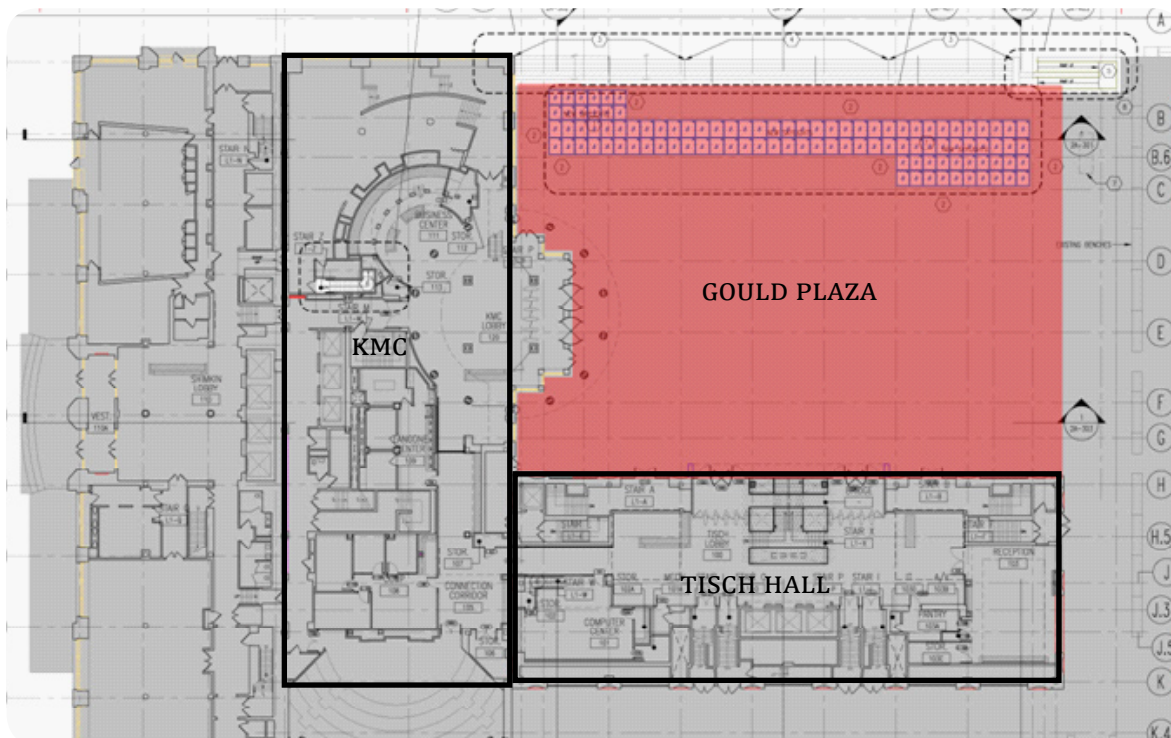


Gould Plaza Background Information

Gould Plaza is surrounded by Kaufman Management Center, Tisch Hall, and Warren Weaver. Located between West 4th Street and West 3rd Street, the plaza is diagonally across from Washington Square Park, where many of the New York University buildings are located. Gould Plaza is at the heart of the Stern School of Business campus. The 27,360 sq.ft plaza is a meeting point in which crowds of students gather.



Satellite view of Gould Plaza



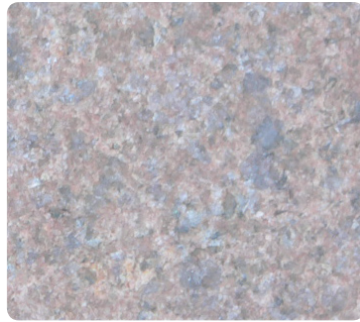
NYU Business School Campus

Materials for Gould Plaza

Finishes for Gould Plaza			
Type	Description	Finish	Reflectance (assumed)
Floor	Concrete Floor	Grey	0.2
Floor	Pattermed Stones on floor	Red	0.2
Skylight	Skylight	Glass	0.1
Artwork	Sculpture	Metal	0.8
Ramp	Stone	Brown	0.4



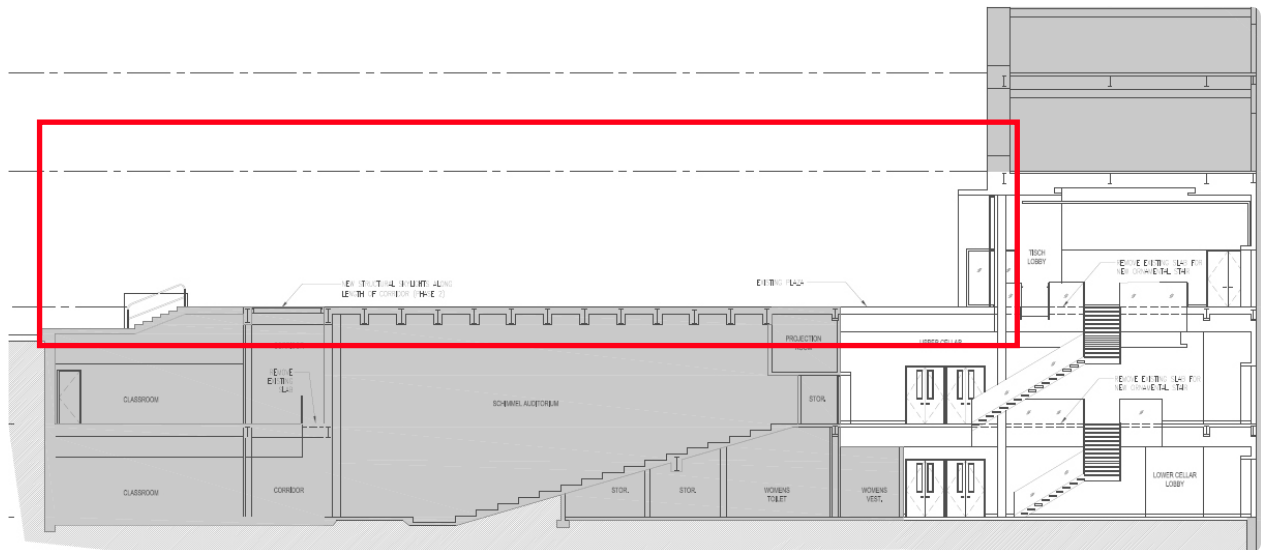
Glass



Red Stone



Concrete Floor



Gould Plaza (red)

Considerations & Criteria

Appearance of Space and Luminaires

- Located in an urban setting, Gould Plaza is an open public square owned by NYU. The surrounding tall buildings provide shade from direct sunlight.
- The plaza is a cozy and relaxing environment for students to interact.
- The space needs to introduce an impression of relaxation, and pleasantness.
- The plaza lighting should be integrated with the architecture of the space.

Color Appearance (and color contrast)

- The gray stone floor of Gould plaza, with the red cement exterior of Tisch Hall, brown bricked Warren Weaver, and gray concrete KMC define the colors of the plaza.

Light Distribution surfaces

- Light distribution near the building entrances and walkways will need to be uniform to provide a well defined walkways.

Light distribution on Task Plane (Uniformity)

- The lighting distribution is at the ground level of the plaza. It is vital to provide enough light levels for people walking at night.

Luminance of Room Surfaces

- Maintain light levels as uniform as possible for main walkways.

Modeling of Faces and Objects

- The facial rendering should also be a critical concern for safety reasons. The art work on the plaza and the ramp will need to be lit.

Points of Interest

- Points of interest to be lighted: Art Statue located at the south west corner of the plaza. Entrances to Tisch Hall, KMC, and Weaver Hall will need to be lit.

Reflected Glare

- Reflected glare is not a concern in this space.

Considerations & Criteria

Shadows

- Shadow is not a concern in this space.

Source/Task/Eye Geometry

- Lighting the perimeter of the plaza will help define the boundaries of the plaza.

Surfaces Characteristics

- Stone floor of Gould Plaza with pattern course strips.
- Concrete columns located at KMC.
- Red cement of Tisch Hall.
- Brown bricks of Warren Weaver.
- Highly reflective glass of Tisch, Warren Weaver, and KMC.

System Control and Flexibility

- None.

Special Considerations

- In-grade daylight windows near the stairs leading to Gould Plaza.

Illuminance (Horizontal)

- 1 fc on walkways - (IESNA Handbook - Figure 22-10. Recommended Average Maintained Illuminance Level for Pedestrian Ways)
- 0.5 fc away from main walkways - (IESNA Handbook - Figure 22-21. Recommended Average Maintained Illuminance Level for Parking Lots - Enhanced Security)

Illuminance (Vertical)

- 0.5 f on vertical surface for walkways
(IESNA Handbook - Figure 22-10. Recommended Average Maintained Illuminance Level for Pedestrian Ways)

Energy

- 0.2 W/sq ft – (IESNA Standard 90.1-2007: Plaza)
- 30W/linear foot of door width - (IESNA Standard 90.1-2007: Building Entrance and Exit)
- 1.25 W/sq ft - (IESNA Standard 90.1-2007: Canopies and Overhangs)
- 0.2 W/sq ft for each illuminated wall or surface or 5.0 W/linear foot for each illuminated wall or surface length - (IESNA Standard 90.1-2007: Building facade)

Gould Plaza Lighting Design

The lighting design of Gould focuses on providing adequate light levels for safety to walk at night. A combination of metal halide, LED, fluorescent, and halogen sources will be used to light the plaza.

Tisch Hall, Weaver Plaza, and KMC Entrance

Luminaires will be mounted on the exterior facade of buildings to provide sufficient light levels for walking. Metal halide lamps will be used since the light levels are higher compared to fluorescent sources and the color rendering index is better compared to halogen sources.

Plaza Center

An NYU logo will be created with frosted glass with LEDs underneath to light it. LEDs were chosen to help with maintenance issues. Since the LEDs underneath the glass logo cannot provide enough vertical illumination, light poles are proposed to provide vertical illumination for safety.

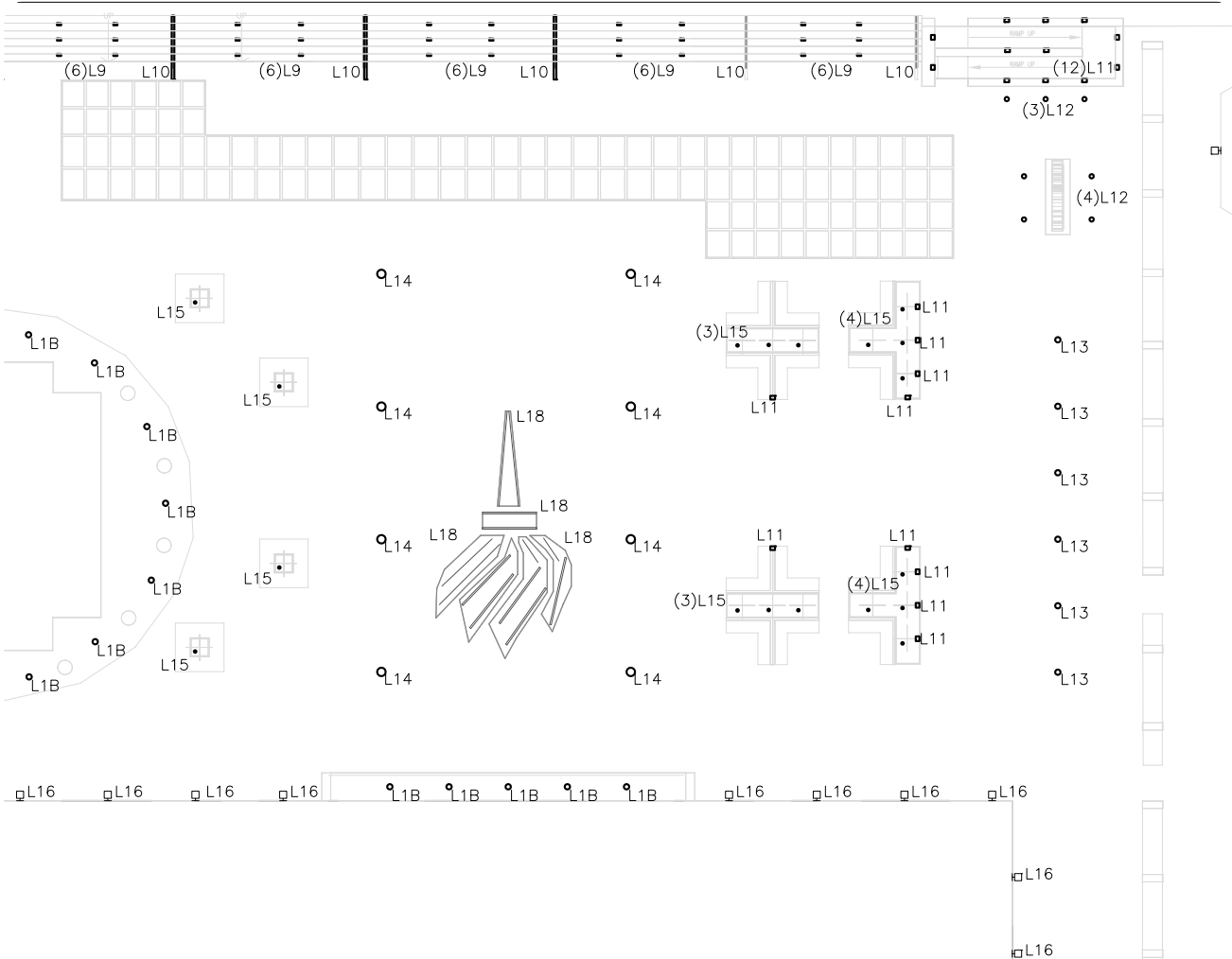
Outdoor Plaza Bench Area

Step lights and halogen sources will be used. The halogen sources will help make the trees look more warm and pleasant. The step lights offer illumination on the ground for people to see where they walk.

Stairs to West 4th Street

Step lights and LEDs mounted under the railing of the stairs provide illumination on the steps.

Gould Plaza



Lighting Plan

*Larger lighting plan can be found in Appendix : L101

Lighting Fixture Schedule for Gould Plaza								
Image	Type	Manufacture	Fixture Description	Watt	Quantity	Lamp	Ballast	Model
	L9	Bega Step light	Recessed wall luminaire	16	30	CF13DD/835/ECO	Advance H-1B13-TP-BLS	2287P
	L10	iO Luxrail	LED handrail	2.1	48	LED	Driver	06-CAA-1-WM-NR-45-3kHO-80-277v
	L11	Bega Recessed wall luminaire	Recessed wall luminaire with unshielded light	27	22	CF26DT/E/IN/835/ECO Osram Sylvania	Advance RCF-2S26-H1-LD-QS	2850P
	L12	Erco Tesis In-ground luminaire	Lens wallwasher for metal halide lamps	45	7	MC39TC/U/G8.5/830PB Osram Sylvania	Advance RMH-39-K	33715.023
	L13	Louis Poulsen Nimbus LED	Inground accent and marker illumination	9	6	LED	Driver	NIM-PWR-9 LED White - 277V - ST STEEL-ANTI-SLIP-STRAIGHT - W/SLEEVE
	L14	Selux Ritorno Round Symmetrical	Pole top luminaires with for indirect architectural lighting	80	8	MC70T6/U/G12/930PB Osram Sylvania	Advance IMH-70-J	RRS-1-H070T6-SV-277-RP9
	L15	B-K Lighting McKinley Series (PAR20)	Adjustable outdoor lighting system	50	18	50PAR20/HAL/NFL30 Osram Sylvania	-	-
	L16	Erco Cylinder Façade luminaire	Direct/indirect lighting for metal halide lamps	26	21	MC20TC/U/G8.5/830PB	Advance RMH-20-K	85026.023
	L1B	Kurt Versen Downlight	Two reflector optical system for wide distribution	52	12	CF32DT/E/IN/835/ECO Osram Sylvania	Advance ICF-2S42-M2-LD@230	P949
	L18	iLight Technologies Plexineon White 1X Series	Accent lighting solution with LED technology designed to be used straight or bent	100W per 32 ft	104	LED	Driver	T-24-W45-S-1040SC-00

*Light Loss Factor for Outdoor is based on Light Loss Factor from the Roadway Lighting in the IESNA Handbook (Figure 22-25)

Light Loss Factor for Gould Plaza									
	Maintenance Category	Dirt Conditions	Exposure time in years	LDD	Initial Lumens	Mean Lumens	LLD	BF	Total LLF
L9	-	Dirty	1	0.9	780	671	0.86	1	0.90
L10	-	Dirty	1	0.9	34 lms/ft	-	-	1	0.90
L11	-	Dirty	1	0.9	1746	1501	0.86	1	0.77
L12	-	Dirty	1	0.9	3300	-	-	1	0.9
L13	-	Dirty	1	0.9	119	-	-	1	0.9
L14	-	Dirty	1	0.9	6400	5120	0.8	1	0.72
L15	-	Moderate	1	0.92	550	-	-	-	0.92
L16	-	Dirty	1	0.9	1700	1275	0.75	1	0.675
L1B	-	Moderate	1	0.92	2400	2064	0.86	1	0.79
L18	-	Clean	3	0.96	29	-	-	1	0.96

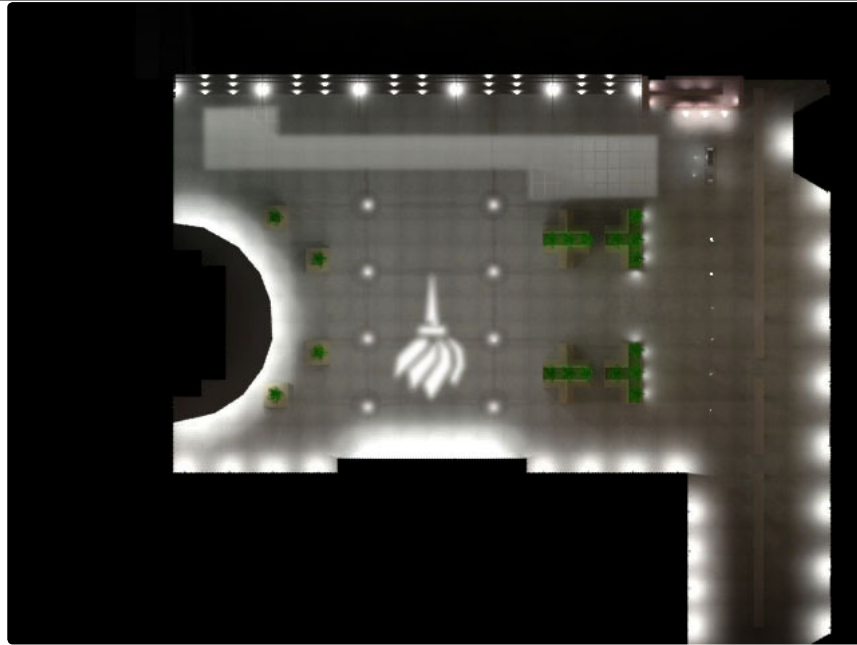
Energy Calculation for Gould Plaza					
Type	Manufacture	Watt	Quantity	Power	Energy Allowed
L9	Bega Step light	16	30	480	27360 sq.ft x 0.2 W/sq.ft
L10	iO Luxrail	2.1	48	100.8	
L11	Bega Recessed wall luminaire	27	22	594	
L12	Erco Tesis In-	45	7	315	
L13	Louis Poulsen Nimbus LED	9	6	54	
L14	Selux Ritorno Round Symmetrical	80	8	640	
L15	B-K Lighting McKinley Series (PAR20)	50	18	900	
L16	Erco Cylinder Façade luminaire	26	21	546	
L17	Kurt Versen Downlight	52	12	624	
L18	iLight Technologies Plexineon White 1X Series	100W per 32 ft	104	325	
Consumed Power				4578.8	5472
Power Density				0.17	0.2
Red - Designed Blue - IESNA recommended					

Energy

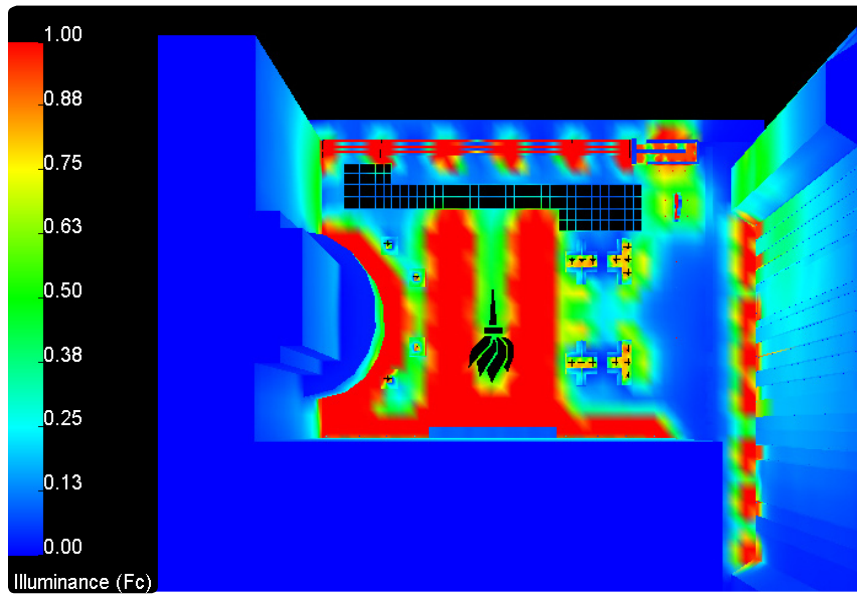
The lighting power density analysis was performed with the space by space method recommended by ASHRAE Standard 90.1-2007. The energy code limits the plaza to 0.2 W/sq.ft. The total energy consumed in the plaza is about 4580W, well below the 5472 W limitation.

Control

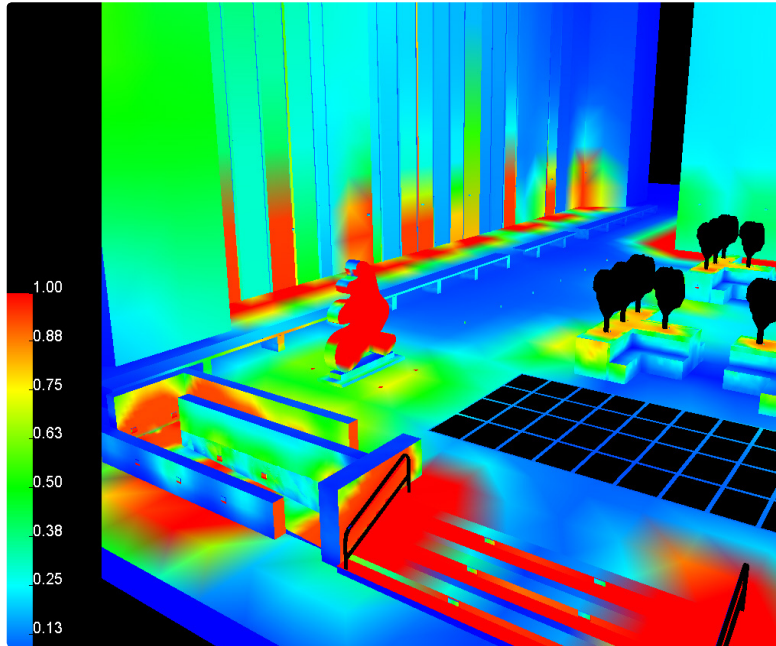
The luminaires in the plaza will be controlled from Tisch Hall. The lighting will be connected to the Lutron Grafik Eye system. All lights in the Gould Plaza zone will either be on/off.



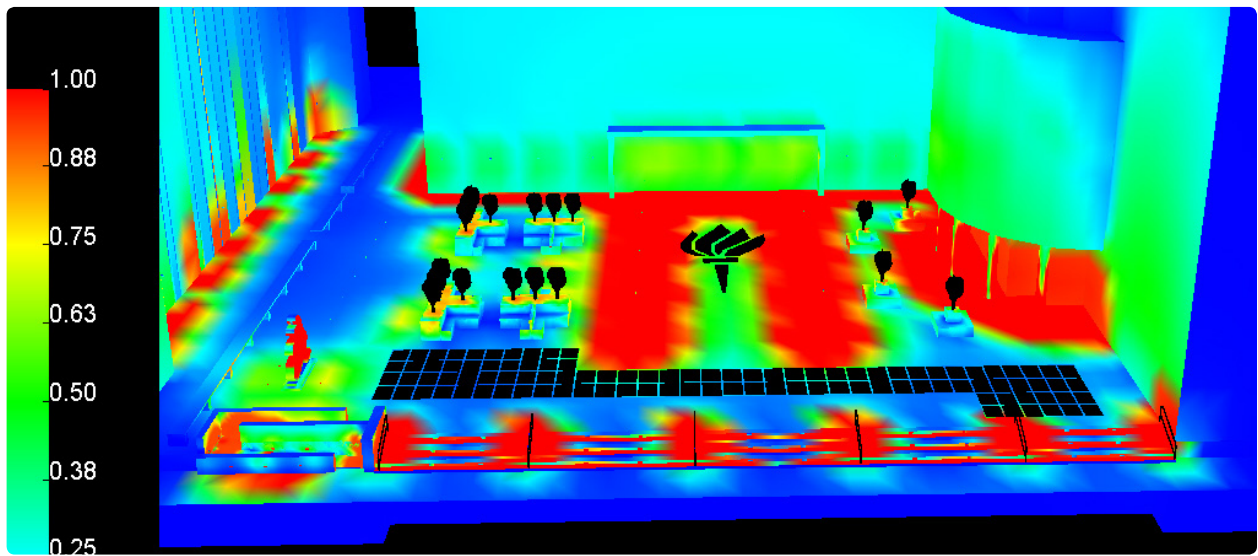
Perspective Rendering



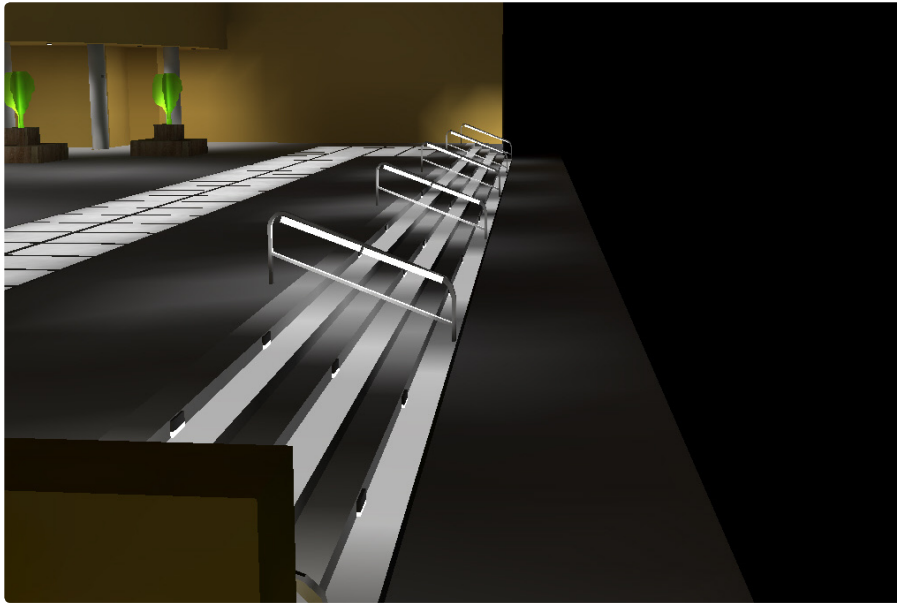
Pseudo Rendering



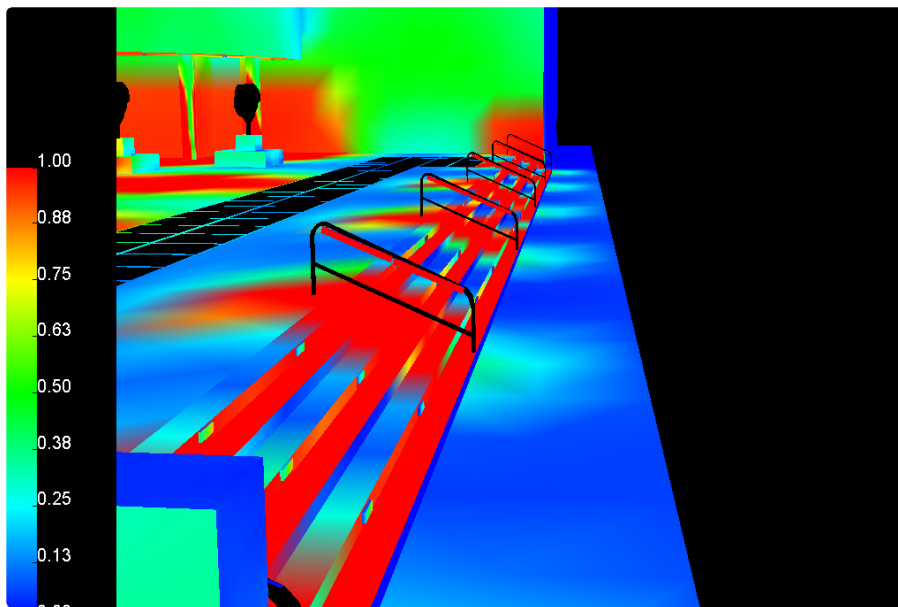
Pseudo Rendering



Pseudo Rendering



Perspective Rendering



Pseudo Rendering

Gould Plaza

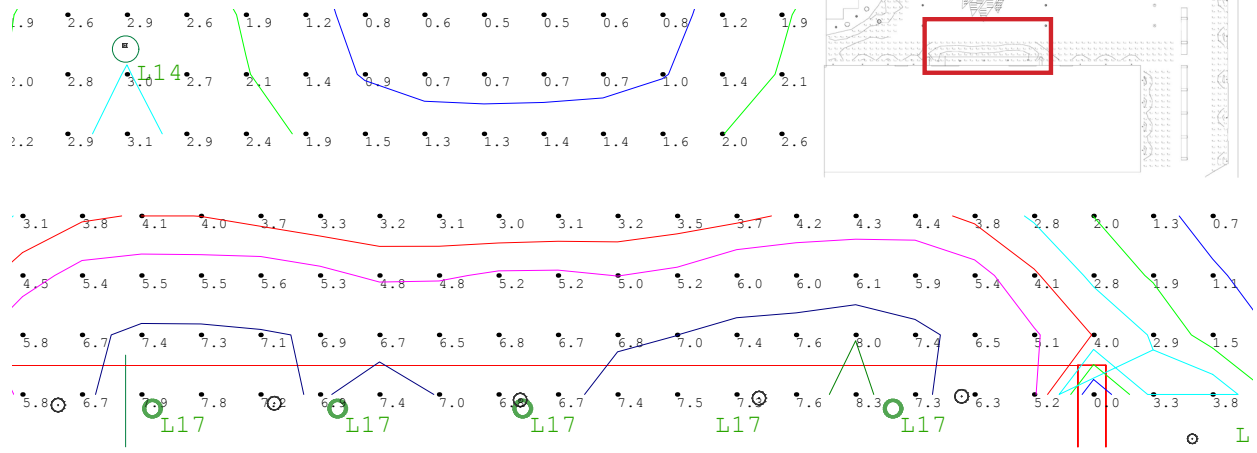
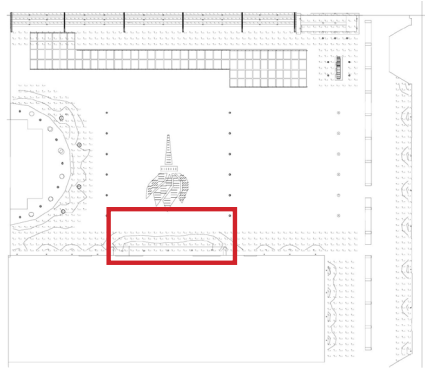
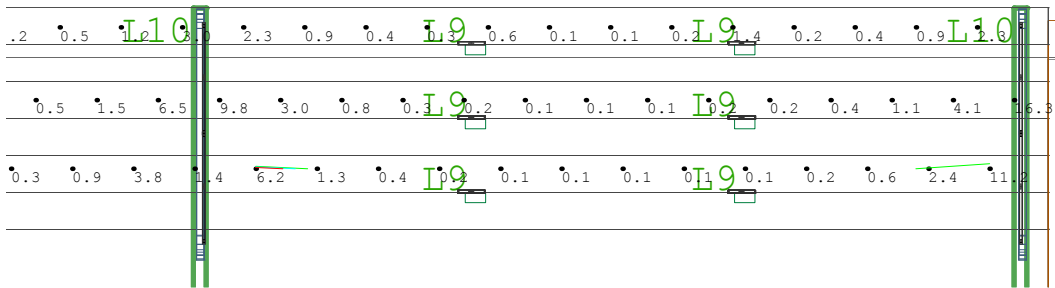
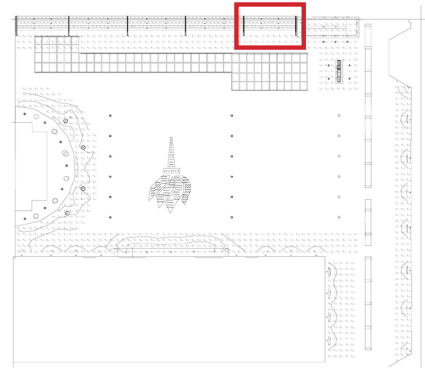


Perspective Rendering

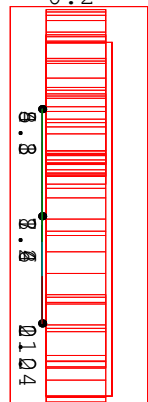
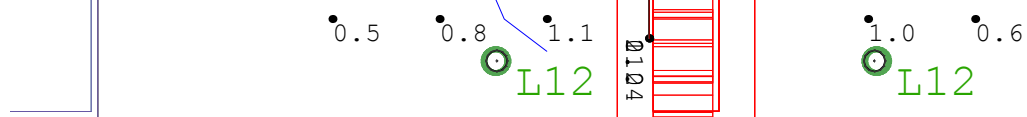
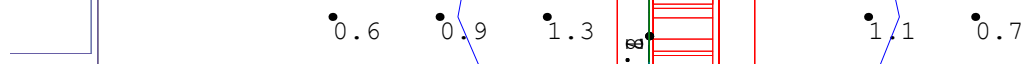
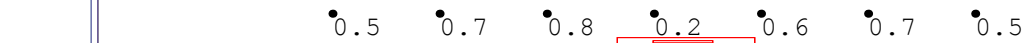
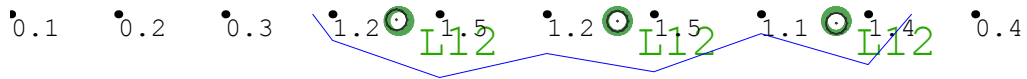
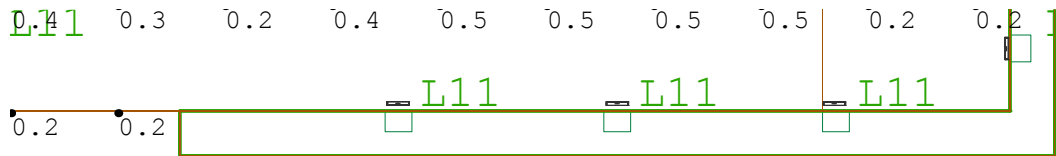
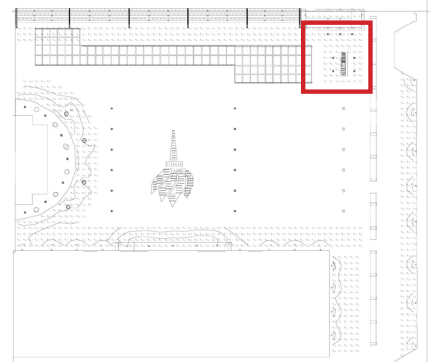


Perspective Rendering

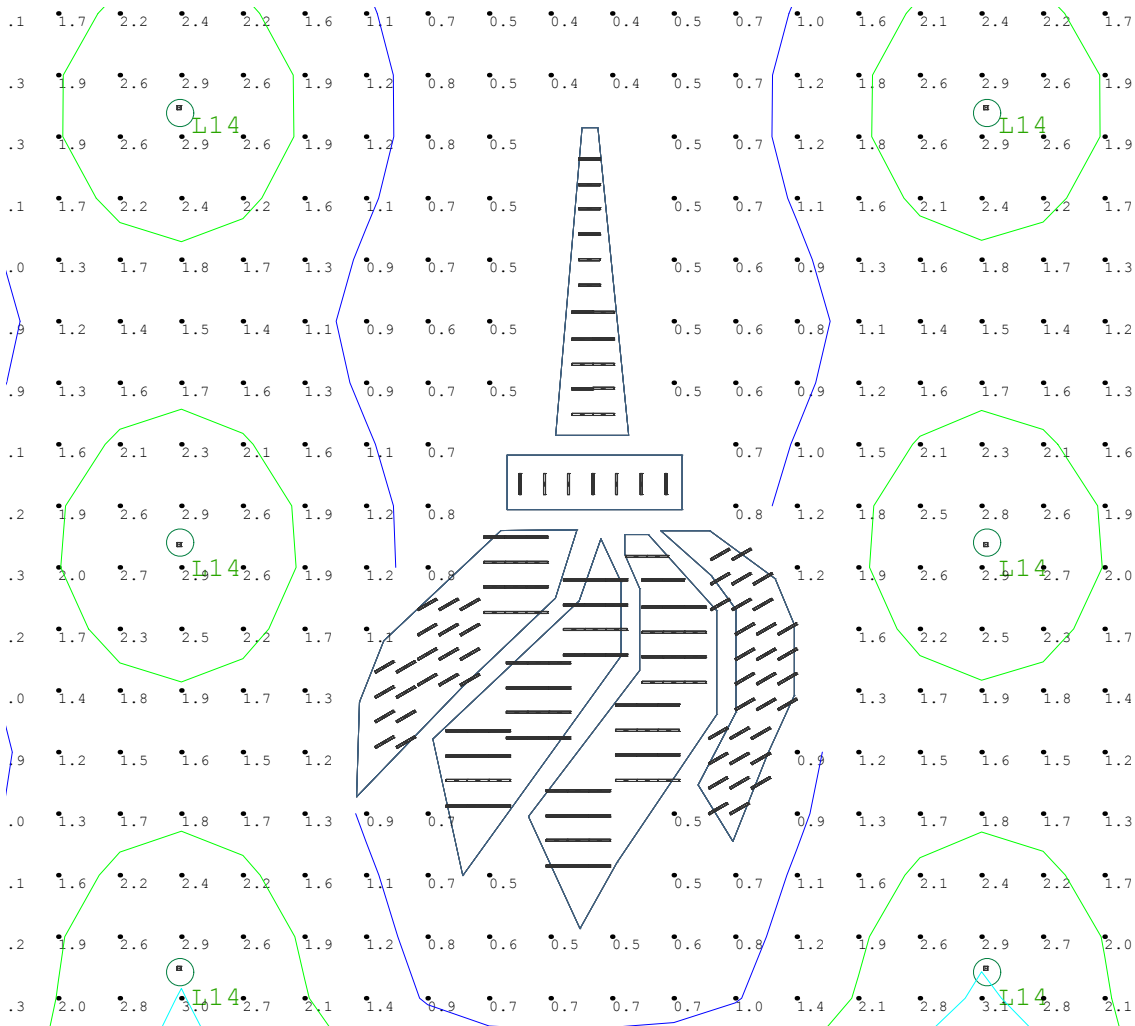
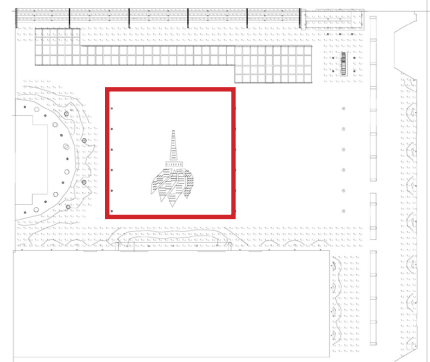
Calculations



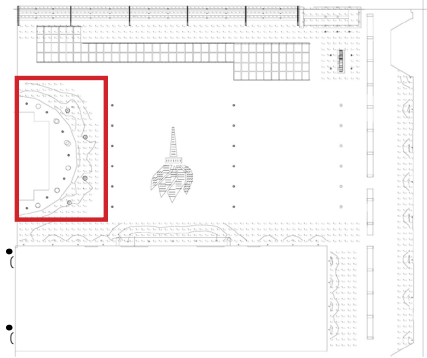
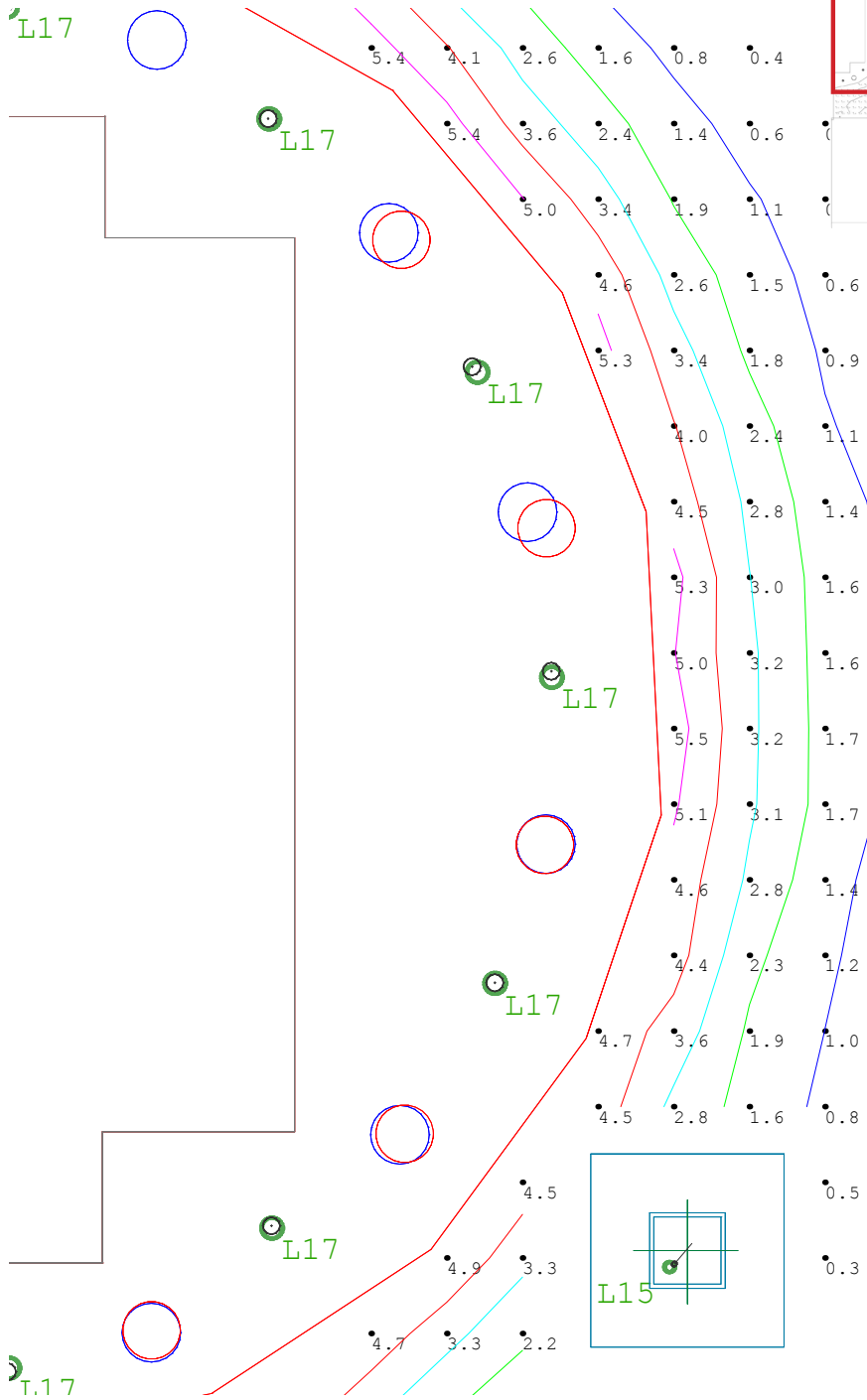
Calculations



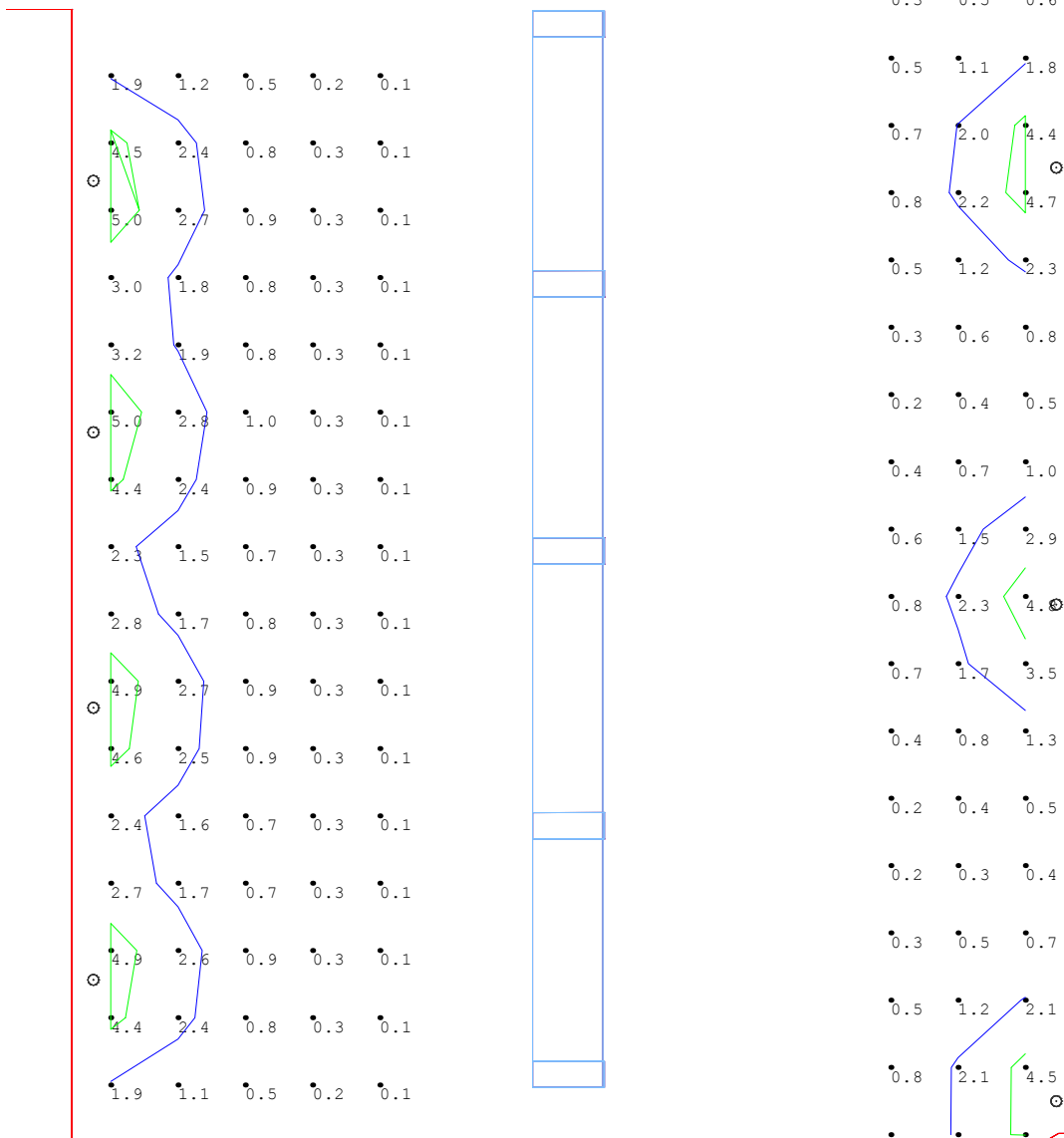
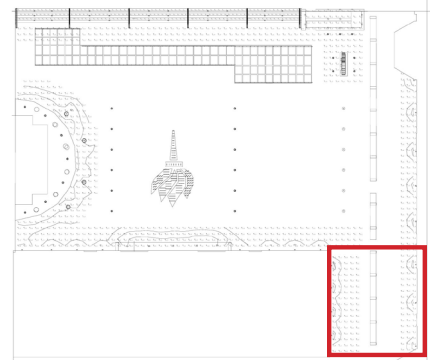
Calculations



Calculations



Calculations



Gould Plaza Design Summary

The lighting design of Gould focuses on providing adequate light levels for safety to walk at night. The design philosophy is to reinforce the light levels at the main pathways and entrances. A custom lighted NYU logo is also created at the heart of the plaza to reinforce the NYU school spirit. The lighting design consists of metal halide downlights mounted on the outer walls of Tisch and Weaver Hall. A number of light poles are also proposed at the heart of the plaza to provide illumination for the benches and the walkway to west 4th street. At the steps on the north side of the plaza, step lights and light rails are proposed. Next to the stair steps recessed wall luminaires are used to light the ramp. At the center of the plaza, outdoor bench areas are proposed with landscape lighting.

The lighting provides a guide to help direct people at night. The average illumination in the plaza meets the recommended 1 fc. Even at areas with light levels lower than 1fc, the illumination levels meets the 0.5fc suggestion for outdoor parking - enhance security.

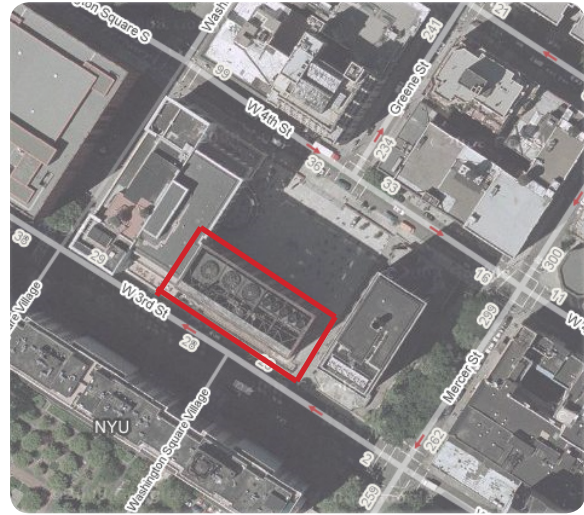
The boundaries of the plaza are lit so that people can see where they will walk to. The lighting also creates an interesting walking experience with the proposed NYU logo and lit art piece at the corner of the plaza. The lighting design consumes 4580W, well below the 5472 W limitation.

Calculation Summary: Gould Plaza							
Label	Calculation Type	Units	Avg	Max	Min	Avg/Min	Max/Min
Artwork	Illuminance	Fc	5.44	11.40	0.20	27.20	39.33
stairs step 5	Illuminance	Fc	1.19	11.20	0.00	NA	NA
stairs step 3	Illuminance	Fc	1.83	16.30	0.10	18.30	NA
stairs step 1	Illuminance	Fc	1.39	19.20	0.00	NA	NA
Weaver Hall Entrance	Illuminance	Fc	1.40	4.50	0.20	7.00	22.50
Tisch Hall entrance	Illuminance	Fc	1.74	8.30	0.00	NA	NA
backpath (between Tisch & Weaver)	Illuminance	Fc	1.18	3.30	0.30	4.90	NA

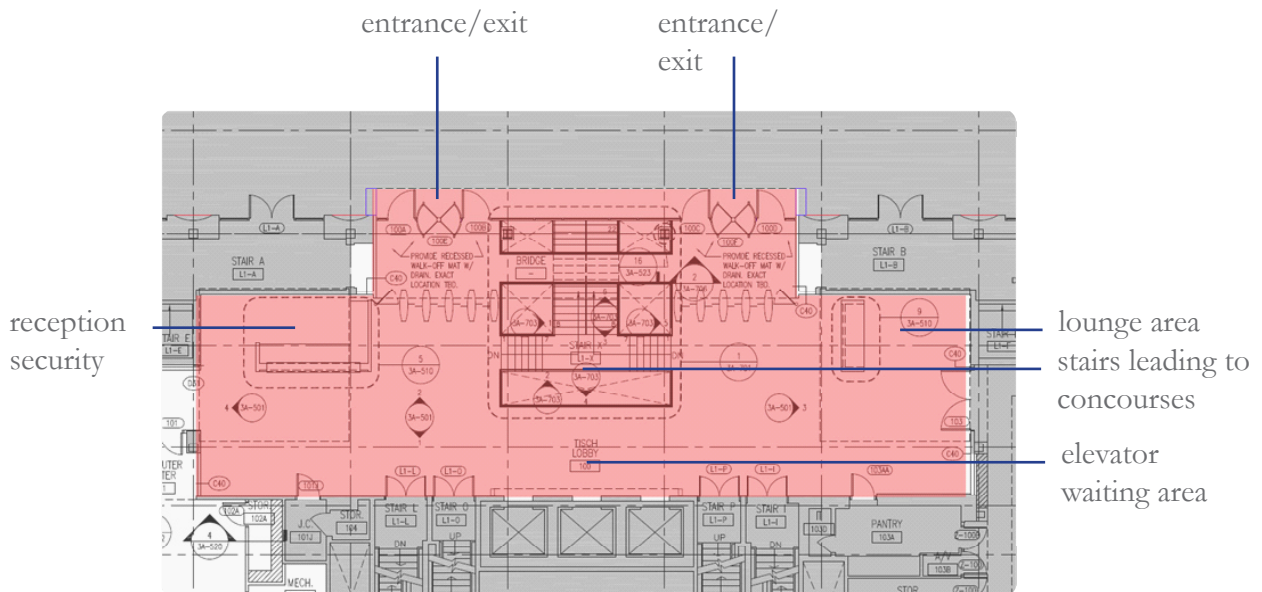
Tisch Hall Background Information

Tisch Hall is located at the south center of Gould Plaza. Situated between Kaufman Management Center and Warren Weaver, the building hosts a number of classrooms for the New York University's Stern School of Business.

There are two entrances (revolving doors) that lead into Tisch Hall. The atrium space has a glass bridge that sits close to the curtain wall. There are two sets of stairs that lead to the bottom levels (upper and lower concourses) of Tisch Hall. In the lobby there are three elevator doors, sofa, reception desk, and hallways that connect to the other buildings. The new design will help introduce daylight into the space.



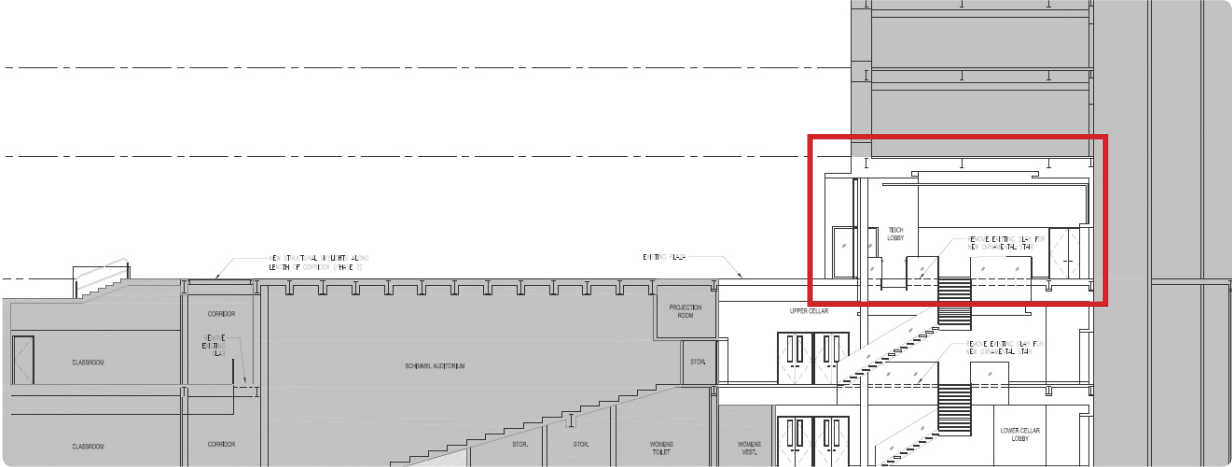
Tisch Hall, between West 4th and West 3rd St



Tisch Hall Lobby, ground level

Materials for Tisch Lobby

Finishes for Tisch Lobby			
Type	Description	Finish	Reflectance (assumed)
Wall			
ST-2	Batek Diamante Limestone (smooth)	Grey	0.5
WD-2	Bamboo Patina panel	Light Brown	0.3
P-1	White finish	Eggshell	0.9
Wall Base Finish			
ST-2	Batek Diamante Limestone	Grey	0.5
CT-5B	Gateway Ceramic Flooring	Sterling Grey	0.3
Flooring			
CT-5A	Gateway Ceramic Flooring	Sterling Grey	0.3
Ceiling			
ST-2	Batek Diamante Limestone	Grey	
ACT-5	Bamboo Patina panel	Light Brown	0.9
P-1	White finish	Eggshell	0.9



Tisch Lobby (in red)

Considerations & Criteria

Appearance of Space and Luminaires

- Tisch Lobby intends to create a spacious and pleasant environment for people traveling to the various compartments of the building. The appearance of the lobby consists of both cool (metal and stone) and warm surfaces (bamboo).
- The luminaire for this space would need to incorporate well with the modern look of the lobby.
- The luminaires can also highlight the aesthetics of the architectural space (wall, cove, metal overhang)

Color Appearance (and color contrast)

- The space is filled with both cool and warm surfaces with high reflectivity. The wall finishes are grey limestone and bamboo panels. The wall base finishes are limestone and ceramic grey. The same limestone is also used on the floor. The ceiling consist of white finish panel boards.

Daylight integration and control

- The large glass panels will provide daylight into the space. Daylighting integration and controls can be utilized to help conserve energy. Automatic photoelectric controls as well as manual dimming can be integrated into the design.
- Building is north east facing with a good amount of northern light coming into the space which can be incorporated with the electric lighting of the lobby.

Direct Glare

- Direct glare will not be a concern.

Light Distribution surfaces

- Light distribution will need to be uniform on the floor.
- The limestone, resin panels, and wood panels on the walls can be grazed or highlighted to bring out the rich details and textures of the space.
- Non-uniform lighting in the space can help create visual interest.

Considerations & Criteria

Light distribution on Task Plane (Uniformity)

- The lighting distribution on the floor will be crucial for people to see where they walk. In general, the lighting level in the lobby will need to be bright enough for security purposes to see the people entering/leaving the building.

Luminance of Room Surfaces

- Since the lobby is a converging point of various spaces, the lighting will need to address the paths to the other compartments of the building. The focus should be lighting the elevator waiting area, stairs leading down into the upper and lower concourses, and the path leading to the Tisch hallways. The lighting brightness level can help define various traffic pattern.

Modeling of Faces and Objects

- Modeling of faces will be crucial in this space. Security guards will need to see the people entering/leaving the building. The stairs will also need to be bright enough for people to not fall. An important object to be lit is the security desk. The architectural glass bridge at the front of the entrance can also be lighted to showcase the modern aspect of the space.

Points of Interest

- Points of interest to be lighted are the security desk, elevator waiting area, paths leading to other compartments of the building (stairs leading down to the upper and lower concourses of the building), paintings, and Stern School of Business logo.

Reflected Glare

- The reflected glare will be a concern for the atrium glass and the glass around the stairs.

Shadows

- Shadows will not be a big concern in this space.

Considerations & Criteria

Source/Task/Eye Geometry

- Light sources can also be positioned in a creative way to help lead people into various spaces in the building.

Sparkle/Desirable Reflected Highlights

- Not an issue.

Surfaces Characteristics

- Stainless steel doors, painted doors, glass doors, and fire rated wood doors.
- Walls are smooth limestone, resin panels, wood panels, and painted gypsum wall board.
- The floor is concrete with a high gloss.
- The curtain wall is glass fin wall system with glass wall insulated glazing unit.
- The revolving doors are glass.
- The stairs are steel.

System Control and Flexibility

- The lighting system will always be on for security issues. The lighting system should be grouped into various regions. During nighttime, when there are not many people in the building, lighting in certain areas of the lobby can be dimmed or turned off.

Special Considerations

- Daylight integration system with designed lighting system.

Illuminance (Horizontal)

- 10 fc –(IESNA Handbook: hotel lobby general lighting) on floor
- 30 fc on security desk –(IESNA Handbook: Reading Handwriting tasks- #2 pencil and softer leads)

Illuminance (Vertical)

- 10 fc –(IESNA Handbook: hotel lobby general lighting) on walls

Energy

- 1.3 W/sq ft, additional 1.0 W/sq ft for decorative lighting (IESNA Standard 90.1-2007: Lobby)

Tisch Hall Lighting Design

The light design consist a mixture of downlights, recessed fluorescents, LED cove system, and pendants. The main issue is to solve the traffic congestion in the lobby. Proposed 'light guides' (recessed linear fluorescents, lighted glass box, and custom pendants) will be used to solve this problem.

Security Desk

At the security desk, suspended decorative pendants provides illumination and visual interest. The use of the pendants also helps bring down the scale of the lobby to the security desk (in large spaces, occupants can often feel out of place due to the high ceiling height).

Elevator Waiting Area

Above the elevator waiting area, recessed LEDs are used to light the school logo. General illumination at the elevator waiting area will be provided by the downlights and recessed 'light guides' on the sides of the elevator doors.

Stairs to Upper and Lower Concourse

The decorative custom pendant and downlights will provide illumination to the stairs.

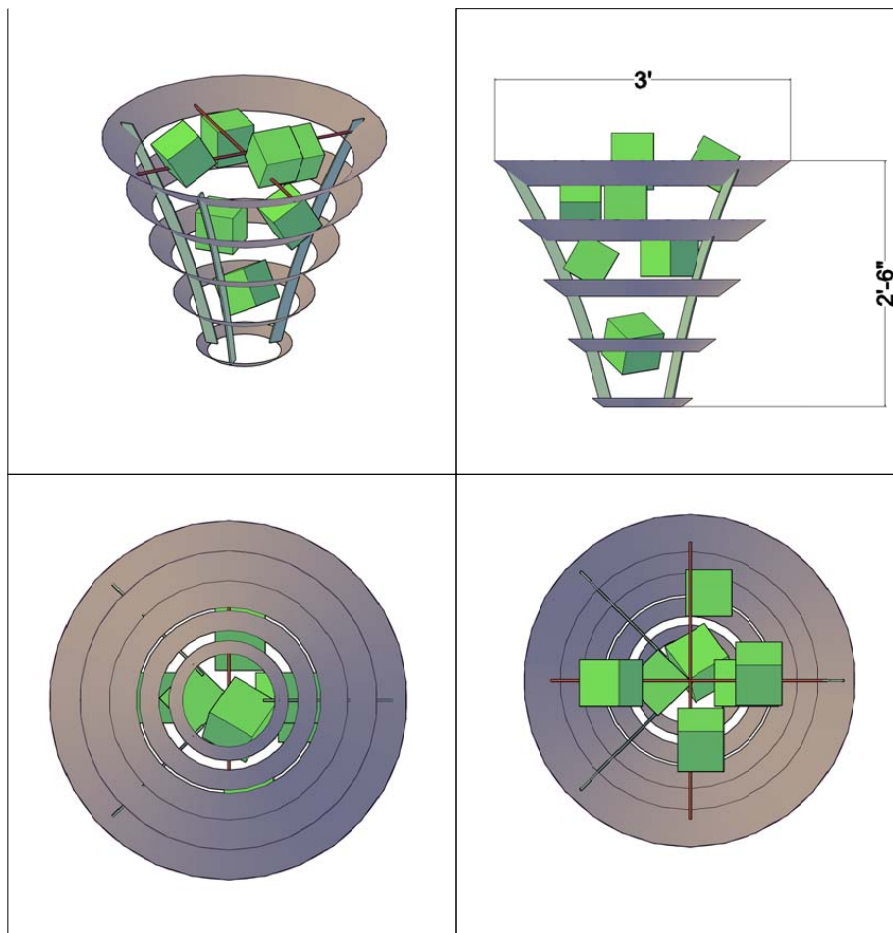
Hallways and Doors to Stairs

A combination of linear recessed fluorescents and glass boxes will be used as 'light guides'.

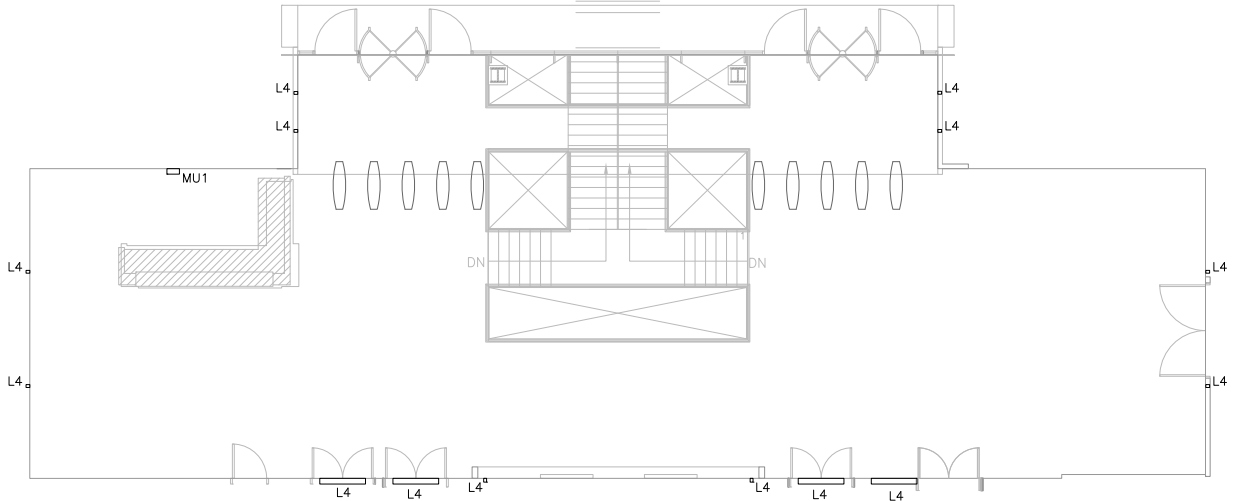
Custom Luminaire

The custom luminaire consist of curved metal rings with support metal pieces on the inner corners of the luminaire. A number of thin metal rods are placed at various levels of the luminaire to help support the acrylic blocks. A 24W T5 linear strip is inserted at the center of the luminaire, with a plastic housing over it.

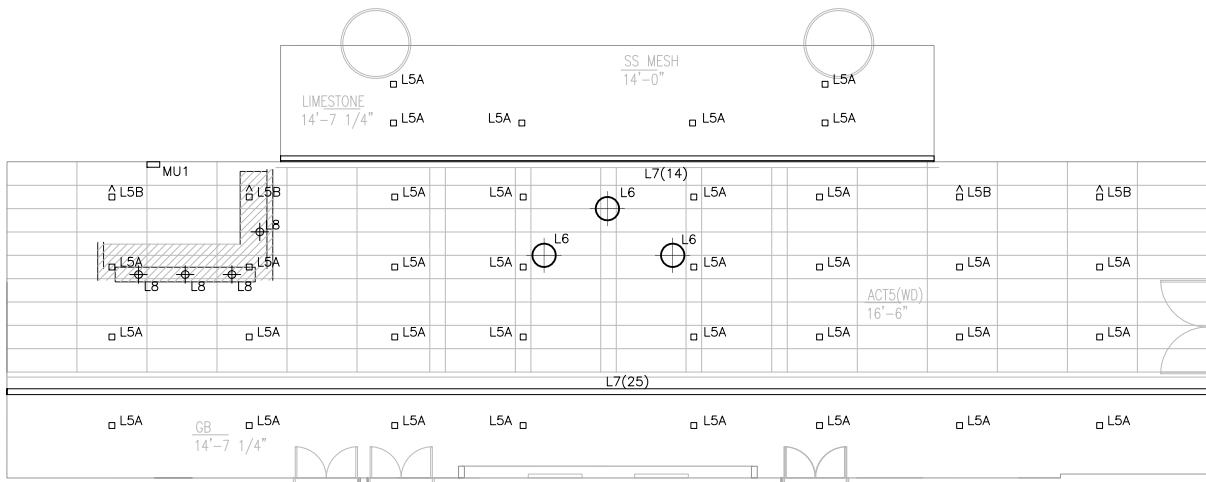
The meaning behind this luminaire symbolizes the buildings blocks of knowledge. The mixture of all the knowledge is funneled. The funneling represents education being provided to the students.



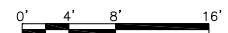
Tisch Lobby



Lighting Floor Plan









Reflected Ceiling Plan



*Larger lighting plan can be found in Appendix I : L201, L202


Tisch Lobby

Lighting Fixture Schedule for Tisch Lobby								
Image	Type	Manufacture	Fixture Description	Watt	Quantity	Lamp	Ballast	Model
	L4	Selux M60	Recessed linear fluorescent	39	14	FP28/835/ECO Osram Sylvania	Lutron Eco-10	M6R1-1T5-MA-PM-004-SV-277
	L5A	Kurt Versen H8632	Recessed compact fluorescent downlight	36	34	CF32DT/E/IN/835/ECO Osram Sylvania	Advance IDL-2S26-M5-BS	H8632
	L5B	Kurt Versen H8653	Recessed compact fluorescent wallwasher	36	4	CF32DT/E/IN/835/ECO Osram Sylvania	Advance IDL-2S26-M5-BS	H8653
CUSTOM	L6	Custom Luminaire	Decorative Pendant	27	3	FP24/835/HO/ECO Osram Sylvania	Advance ICN-2S24@120V	Custom
	L7	Electrix Adjustable Linear Fluorescent	Linear Cove System	39	39	FP28/835/ECO Osram Sylvania	Lutron Eco-10	AX-28-S1-U-D3-156
	L8	Schmitz Public	Surface compact fluorescent sconce	46	4	CF42DT/E/IN/835/ECO Osram Sylvania	Advance ICF-2S26-H1-LD@120	16991.06/2830
	L19	Color Kinetics eW Cove Powercore	Linear cove System	4.5	19	LED	Driver	523-000004-00-910403600103

Light Loss Factor for Tisch Hall									
Type	Maintenance Category	Dirt Conditions	Cleaning Period	LDD	Initial Lumens	Mean Lumens	LLD	BF	Total LLF
L4	IV	Clean	12 months	0.88	2900	2697	0.93	1	0.82
L5A	IV	Clean	12 months	0.88	2400	2064	0.86	1	0.76
L5B	IV	Clean	12 months	0.88	2400	2064	0.86	1	0.76
L6	I	Clean	12 months	0.94	1750	1627	0.93	1.02	0.89
L7	VI	Clean	12 months	0.86	2900	2697	0.93	1	0.80
L8	IV	Clean	12 months	0.88	3200	2752	0.86	0.98	0.74
L19	VI	Clean	12 months	0.86	135	-	-	1	0.86

Tisch Lobby Control

All luminaires will be connected to the Lutron Grafik Eye 3000 System. The Grafik Eye system will use a daylighting sensor to dim the lightings according to the daylight condition in the space.

Control Schedule for Tisch Lobby			
Image	Manufacture	Prdouct Description	Model
	GRAFIK Eye 3000 Series	Automatic Preset scenes in response to ambient daylight.	GRX-DACPI-MW-PS-WH

Energy

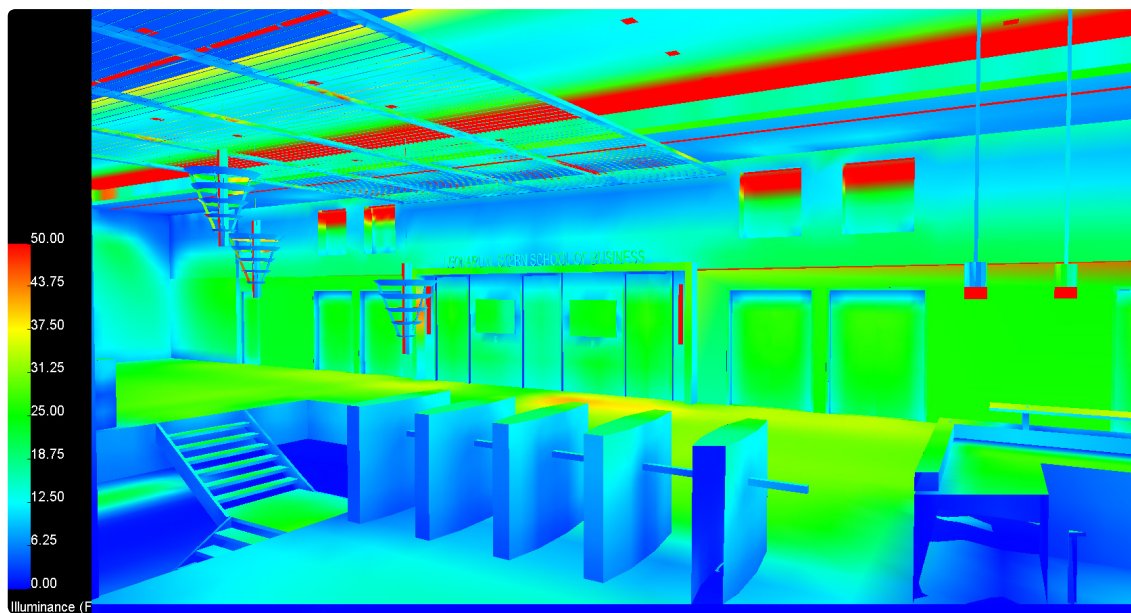
The lighting power density analysis was performed with the space by space method recommended by ASHRAE Standard 90.1-2007. The energy code limits the plaza to 1.3 W/sq.ft. The total energy consumed in the plaza is about 3705W, well below the 4596 W limitation.

Energy Calculation for Tisch Hall					
Type	Manufacture	Watt	Quantity	Watt	Energy Allowed
L4	Selux M60	39	14	546	
L5A	Kurt Versen H8632	36	34	1224	
L5B	Kurt Versen H8653	36	4	144	
L6	Custom Luminaire	27	3	-	
L7	Electrix Adjustsable Linear Fluorescent	39	39	1521	
L8	Schmitz Public	46	4	184	
L19	Color Kinetics eW Cove Powercore	4.5	19	85.5	
Consumed Power				3704.5	4595.5
Power Density				1.05	1.3
<p>Red - Designed Blue - IESNA recommended</p>					

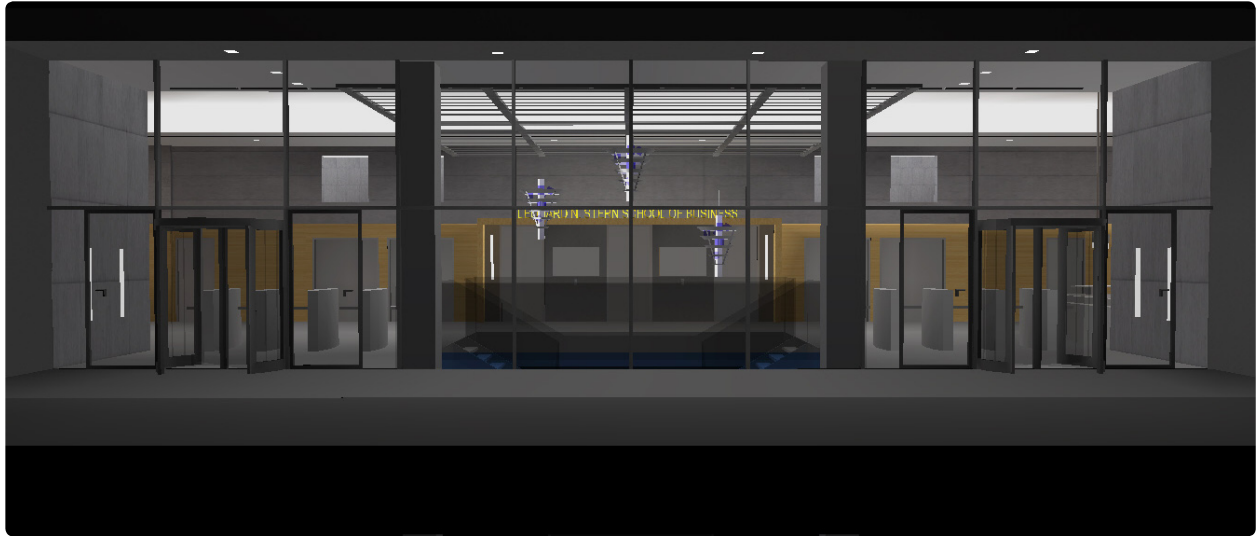
Tisch Lobby



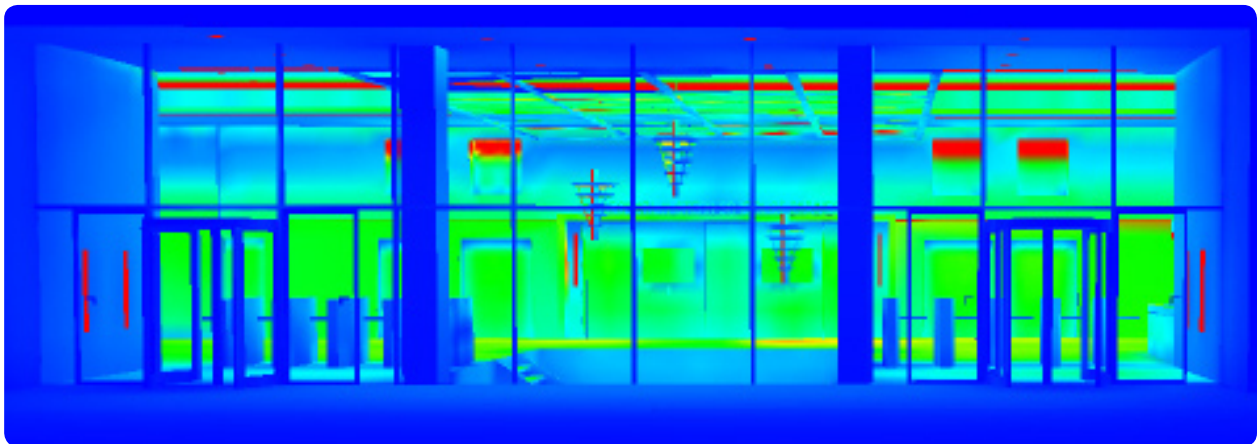
Perspective Rendering at security gate



Pseudo Rendering



Perspective Rendering at front



Pseudo Rendering

Tisch Lobby

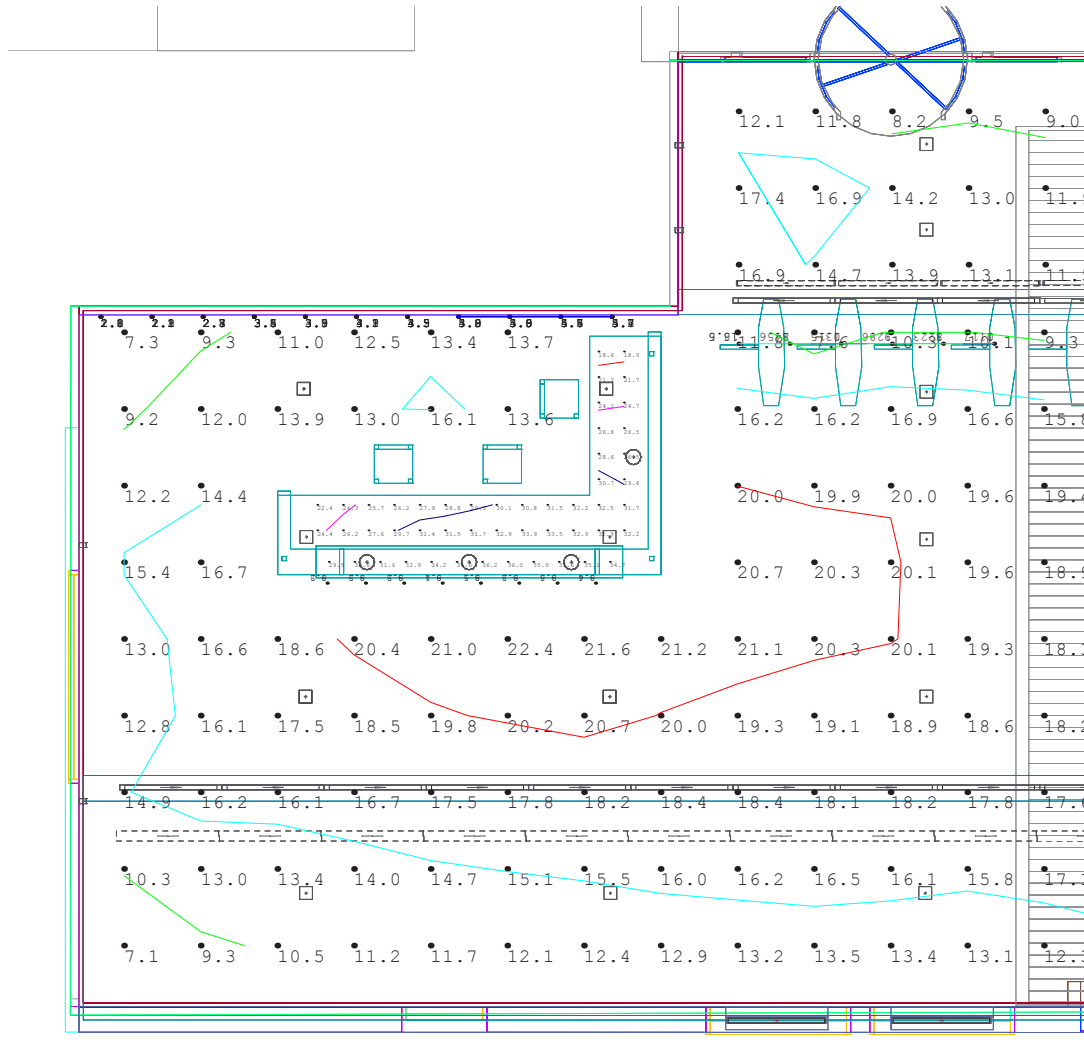
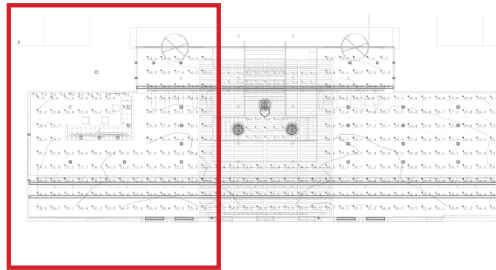


Perspective Rendering

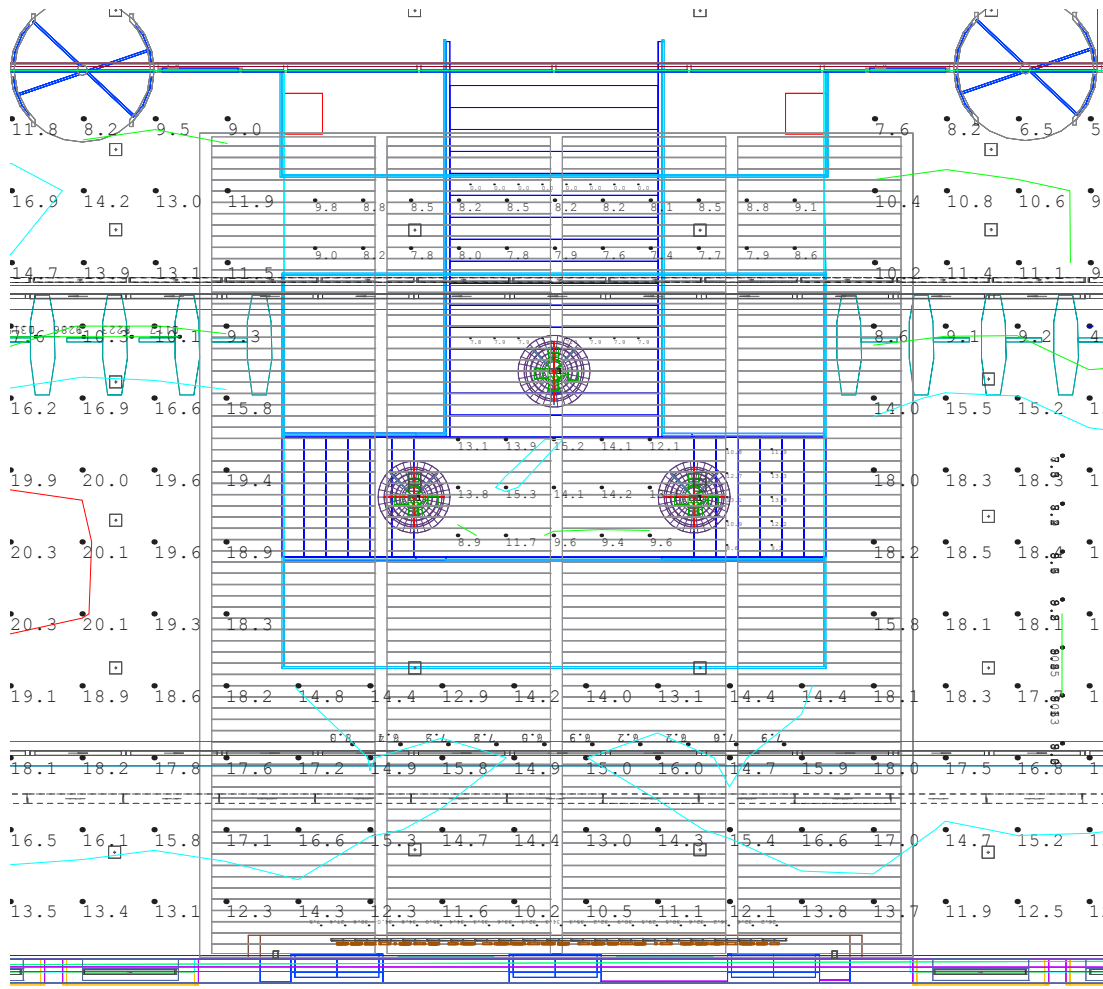
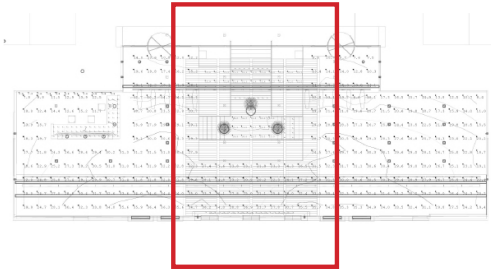


Elevator Lobby

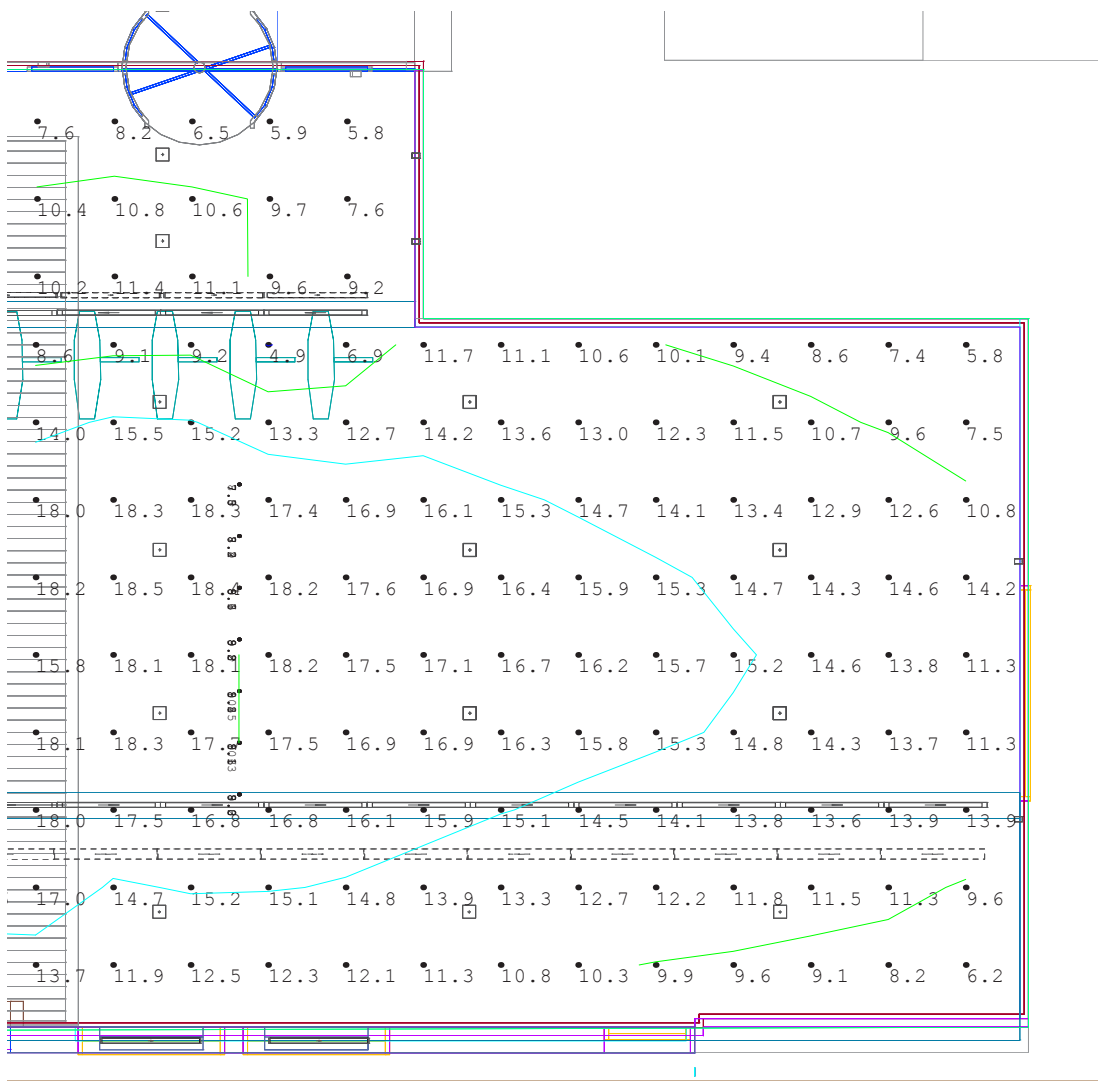
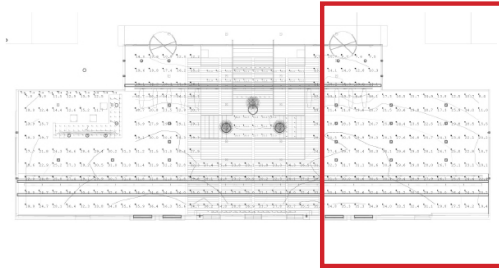
Tisch Lobby



Tisch Lobby



Tisch Lobby



Tisch Hall Design Summary

The lighting of design Tisch Lobby strives to simplify the traffic congestion in Tisch Hall. Tisch Lobby is connected to the various compartments in the building (two hallways, stairs to the lower concourses, elevator lobby, four sets of stairway, and the entrance/exit). The design solution uses light to create guides in which people can be directed to their destination. The lighting guides consist of wall recessed linear fluorescents, custom pendants, and lighting glass blocks. The average illuminance level on the floor is 15 fc, over the recommended 10 fc. With a brighter floor, the physiological feel of the space will be perceived to be larger, cleaner, and safer.

For the hallways and elevator lobby, recessed linear fluorescents are mounted on the sides of the entrance to help guide the occupants. As for the four sets of stairs, above each stairway a glass block is backlit. The glass block consists of student faces mounted on the frosted glass that can create a point of visual interest. In terms of the stairs leading down to the lower concourse, custom pendants are created to make occupants aware of the space below. The rest of the lighting design enhances the overall architecture of the space. The pendants over the security desk are suspended to help bring the physiological feel of the large space down. Fluorescent wallwashers and downlights are used to provide uniform illumination in the space.

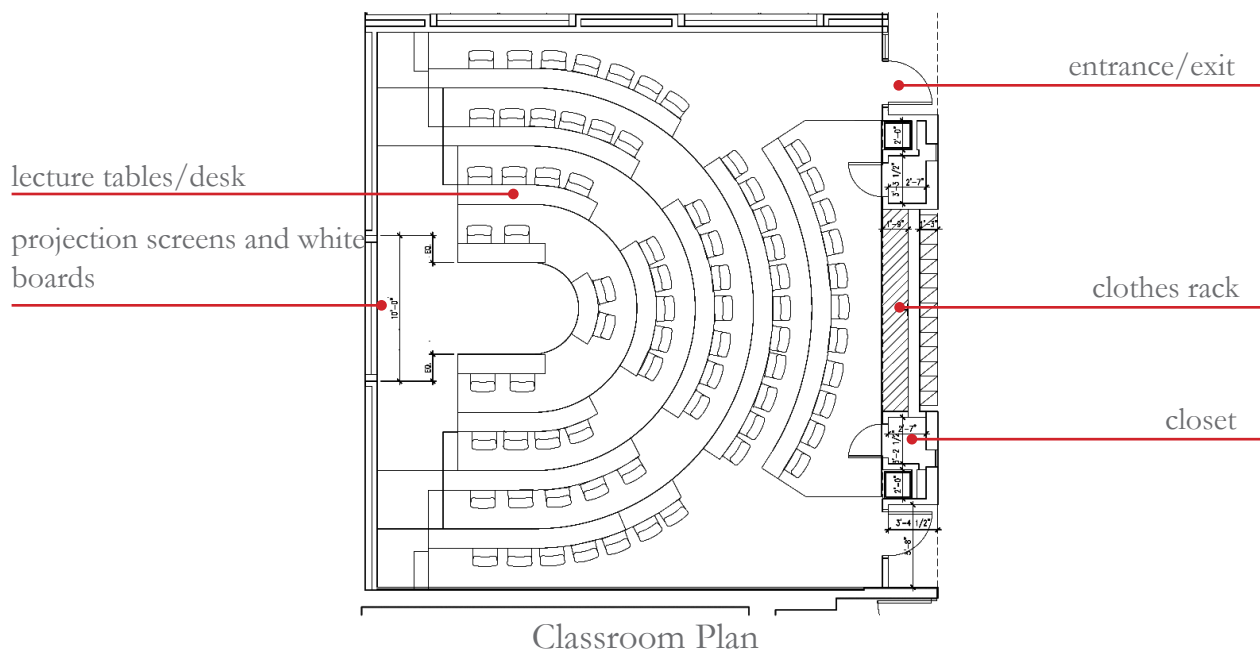
The lighting design meets the design criteria. For the illuminance level of the ground floor, there is an average illuminance value of 14.67 fc, which meets the 15 fc design criteria (IESNA suggests 10 fc). The stairs area are also able to provide between 11-12 fc, again over the 10 fc requirement. Overall, the lighting design meets the ASHRAE/IESNA Standard 90.1. The lighting design consumes 3705 watts which is below the maximum of 4596 watts.

Label	Calculation Type	Units	Avg	Max	Min	Avg/Min	Max/Min
Lobby ground floor	Illuminance	Fc	14.67	22.4	4.9	2.99	4.57
Entrance	Illuminance	Fc	10.96	17.4	5.8	1.89	3
Security Desk	Illuminance	Fc	28.22	33.9	18.6	1.52	1.82
NYU Logo	Illuminance	Fc	31.06	36.2	7.5	4.14	4.83
Glass Bridge	Illuminance	Fc	8.3	9.8	7.4	1.12	1.32
Stairs platform	Illuminance	Fc	12.54	15.3	8.9	1.41	1.72
Stairs platform 1	Illuminance	Fc	12.1	13.9	9.2	1.32	1.51
Stairs platform2	Illuminance	Fc	11.22	13.1	8.6	1.3	1.52

Classroom Background Information

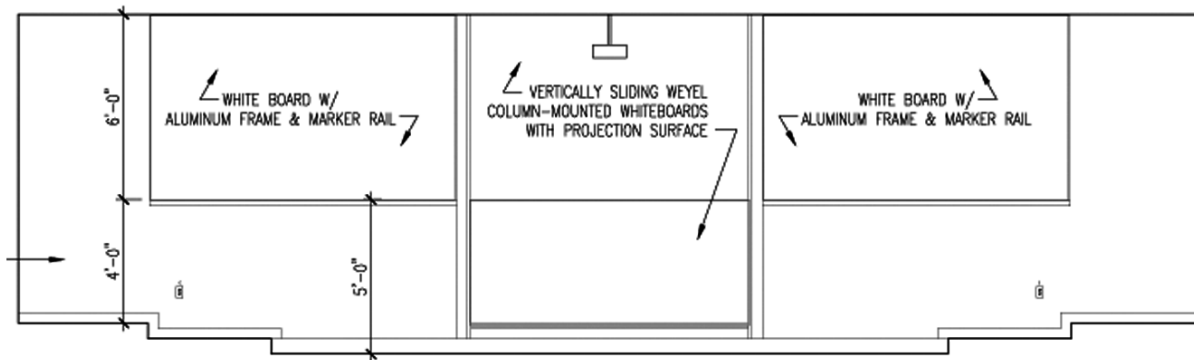
One of the objectives of the NYU Concourse Project is to connect the three existing buildings. In the concourse project, new classrooms are constructed for the Stern School of Business. The classroom sizes range from a capacity of 20-73 occupants.

The classroom (U18) is rectangular. The seating arrangement is semi circular with a total of 73 seats. There are three white boards at the front, with the center white board having a vertical sliding component that can be adjusted into a projection surface. The projection screen at the front is attached to the ceiling of the classroom. The seating arrangement is divided into various elevation heights.



Materials for Tisch Lobby

Finishes for Classroom			
Type	Description	Finish	Reflectance (assumed)
Wall			
P-5	Eggshell Finish	Concord Ivory	0.6
P-6	Eggshell Finish	Swiss Coffee	0.6
Wall Base Finish			
RB-5	Rubber Thermoplastic	Bright Orange	0.5
RB-6	Rubber Thermoplastic	Bright Orange	0.5
Floor			
CPT-3	Broadloom carpet	Navy Blue (assumed)	0.3
Ceiling			
ACT-2	Ceiling Material	White	0.9
Furniture			
Chalkboard	White	Plastic	0.6
Chairs	Red	Leather	0.5



Classroom West Elevation

Considerations & Criteria

Appearance of Space and Luminaires

- The typical classroom is intended to create a comfortable learning environment in which students can enhance their learning experience. The focus point is the three white boards and projection surface at the front of the classroom. Lighting levels on the vertical surface would need to be bright enough for people to read.
- The desks will be arranged in a semi-circular format which can help contribute to the newly designed luminaires to be arranged in a playful manner with the orientation of the desks.
- The space needs to introduce an impression of visual clarity and pleasantness to provide students with the best learning environment.
- The projector located on the surface of the ceiling would be an obstacle for any suspended luminaires (block projector view).

Color Appearance (and color contrast)

- The color surfaces of the classroom are bright. The wall finishes are ivory and light coffee toned with a white ceiling panel boards with a navy blue carpet.
- The lighting from the luminaires needs to accompany the cool tones of the classroom to make the space feel clean and efficient. In a brighter and cool toned environment, work efficiency is higher in comparison to a relaxed warm tone environment. The cool tone will also help enhance the reading visibility of the white boards at the front of the room.

Daylight integration and control

- Daylight integration will not be a concern since there are no windows.

Light Distribution surfaces

- Light distribution on the tables will need to be uniform to provide an pleasant learning environment for every student in the classroom. The light distribution on the three white boards at the front of the room will need to be uniform so that the visibility conditions will be the same.

Considerations & Criteria

Light Distribution on Task Plane (Uniformity)

- The lighting distribution at the desk plane (2.5 feet for table height) will need to provide enough light for writing and reading.
- Since the floor will not all be on the same plane (various seating heights), the light level on the floor would need to be maintained as uniform as possible.

Luminances of Room Surfaces

- The front of the classroom (whiteboard and podium) should have higher luminance levels in the space followed by the desks (student sitting area). The back and side of the space will have lower light levels on the walls. The floor should have the least amount of light level in comparison with the rest of the surfaces.

Modeling of Faces and Objects

- A healthy learning environment would provide sufficient light levels for the professor and students to communicate. Facial recognition will be a critical concern for the professor at the front of the room and the students sitting.
- The three white boards in the front of the board also need to have enough brightness for reading.

Points of Interest

- Points of interest to be lighted: Three white boards and podium at the front of the room.

Reflected Glare

- The reflected glare on the projection screen will be a concern for students looking. It would be hard to read if the board is too bright. This can be prevented by using luminaires with a narrow beam angle or adjustable luminaire to prevent light from spilling onto the projection screen.

Considerations & Criteria

Shadows

- Sufficient light levels should be provided so that shadows do not interfere with writing and reading visibility (desk and white boards at front of room).

Source/Task/Eye Geometry

- Light sources need to be positioned right above the table height for writing, reading, facial rendering purposes.
- Light source will also need to be positioned correctly to provide enough light levels on the white boards.

Surfaces Characteristics

- Vertical sliding white boards with rear projection screen.
- Painted gypsum wall board.
- Resin panels.
- Wood credenza with locker cabinets, resin counter top, and adjustable shelves.
- Doors are coated metal.

System Control and Flexibility

- Since the classroom would have a variety of different learning conditions (lecture, presentation with projector screen), the classroom must have a flexible lighting control tailored towards the different activities.
[Lecture mode] – light levels can be adjusted to have a better writing/reading.
[Presentation mode] - lighting levels will need to dim

Illuminance (Horizontal)

- [Study Mode] 30 fc –(IESNA Handbook: Reading Handwriting tasks- #2 pencil and softer leads)

Illuminance (Vertical)

- [Presentation Mode] Less than 5 fc on front screen project systems – (IESNA DG17-05)

Energy

- 1.4 W/sq ft – (IESNA Standard 90.1-2007: Classroom/lecture/training)
1.0 W/sq ft for accent

Design Objective

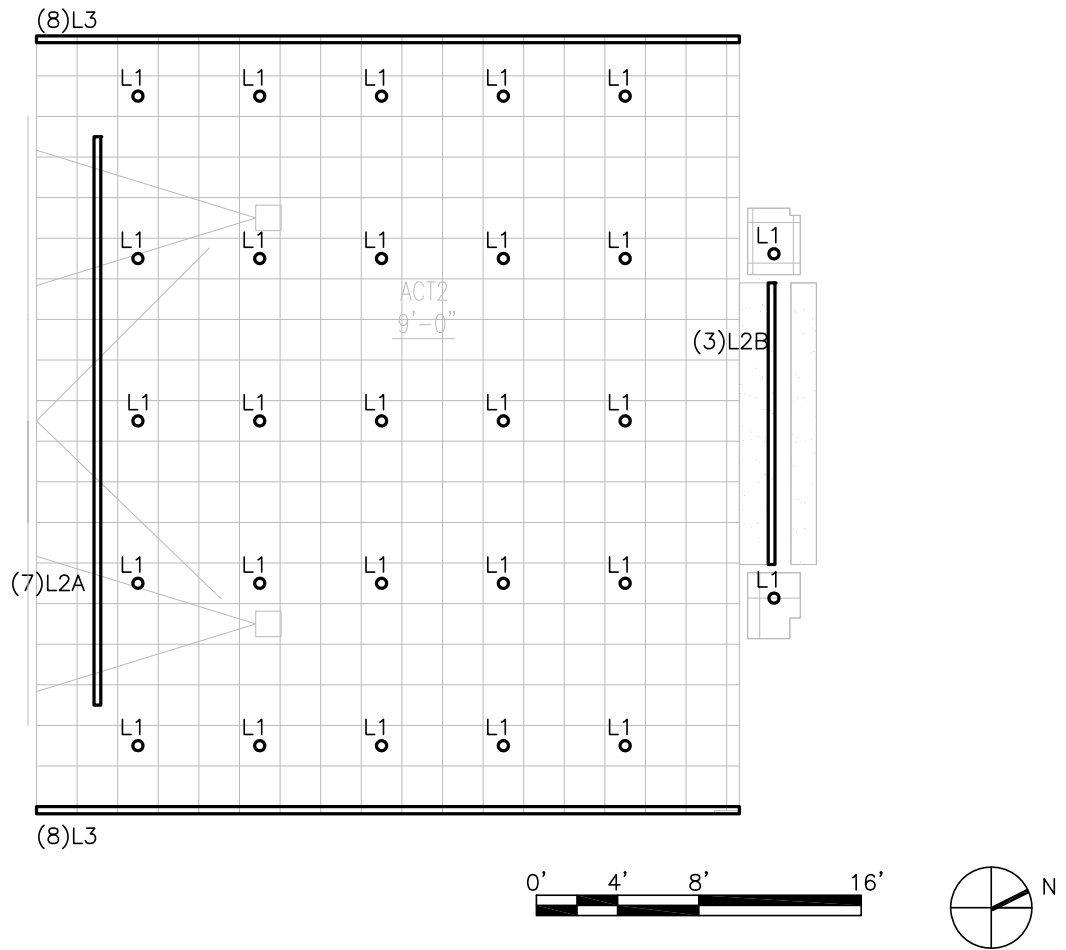
Going along with the overall lighting design concept of the New York University Concourse Project, the lighting system for the classroom will strive to enhance the learning experience of students at New York University. Lighting will be addressed on the surfaces that are the most important in the space. In the case for the classroom, the important surfaces are the white boards at the front of the room and the student desks.

Lighting Design

The lighting design consist a mixture of downlights, wallwashers, and recessed linear fluorescents. The downlights are used to provide general ambient lighting and specifically, sufficient light levels on the student desks. For the wallwashers at the front of the classroom, they are used to light up the white board/projection screen. The cove lighting on the sides of the room help graze the wall to make the classroom feel spacious.





General Classroom


*Larger lighting plan can be found in Appendix : L301



Lighting Reflected Ceiling Plan

General Classroom

Lighting Fixture Schedule for General Classroom								
Image	Type	Manufacture	Fixture Description	Watt	Quantity	Lamp	Ballast	Model
	L1A	Kurt Versen P921	Recessed compact fluorescent wallwasher	36	27	CF32DT/E/IN/835/ECO Osram Sylvania	Advance IDL-2S26-M5-BS	P921
	L2A	Selux M100	Recessed linear fluorescent wall washer	39	7	FP28/835/ECO Osram Sylvania	LUTRON ECO-T528-277-1	M1A-1T5-AMP-PM-004-SV-277-X
	L2B	Selux M100 Super Recessed	Recessed linear fluorescent wall washer	31	3	FP28/835/ECO Osram Sylvania	Advance ICN-2S28-N@120	M1B1S-1T5-SD-PM-68-SV-277
	L3	Litecontrol Wall/Slot-2000	Recessed perimeter fixture	36	16	FP28/835/ECO Osram Sylvania	LUTRON ECO-T528-277-1	#14716000

Control Schedule for General Classroom			
Image	Manufacture	Prdouct Description	Model
	GRAFIK Eye 3000 Series	Pushbutton to recall 2 preset lighting scenes	GRX-3502-T-AU-WH

Light Loss Factor for General Classroom									
Type	Mainenace Category	Dirt Conditions	Cleaning Period	LDD	Initial Lumens	Mean Lumens	LLD	BF	Total LLF
L1	IV	Clean	12 months	0.88	2400	2064	0.86	1	0.76
L2	IV	Clean	12 months	0.88	2900	2697	0.93	1	0.82
0.88	IV	Clean	12 months	0.88	2900	2697	0.93	1	0.82
L3	II	Clean	12 months	0.88	2900	2697	0.93	1	0.82

Energy

The lighting power density analysis was performed with the space by space method recommended by ASHRAE Standard 90.1-2007. The energy code limits the plaza to 1.4 W/sq.ft. The total energy consumed in the plaza is about 1914W, right under the 1946 W limitation.

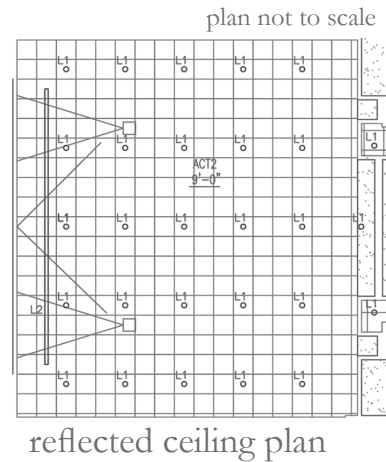
Energy Calculation for General Classroom					
Type	Manufacture	Watt	Quantity	Power	Energy Allowed
L1A	Kurt Versen P921	36	27	972	1390 sq. ft x 1.4 wt/sq. ft
L2A	Selux M100	39	7	273	
L2B	Selux M100 Super Recessed	31	3	93	
L3	Litecontrol Wall/Slot-2000	36	16	576	
Consumed Power				1914	1946
Power Density				1.38	1.4
Red - Designed Blue - IESNA recommended					

Classroom Control Modes




The luminaires in the classroom will be connected to the Lutron Grafik Eye 3000 System. A total of two preset light modes will be used: general mode and presentation mode. During the presentation mode, the downlights will be divided into three different zones and dim accordingly. The main control unit will be at the front of the classroom. Additional wall stations will be located at the entrance to the classroom.

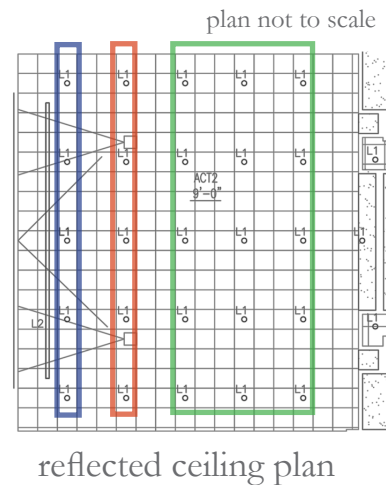
General Mode

No Dimming for any of the luminaires in the space.



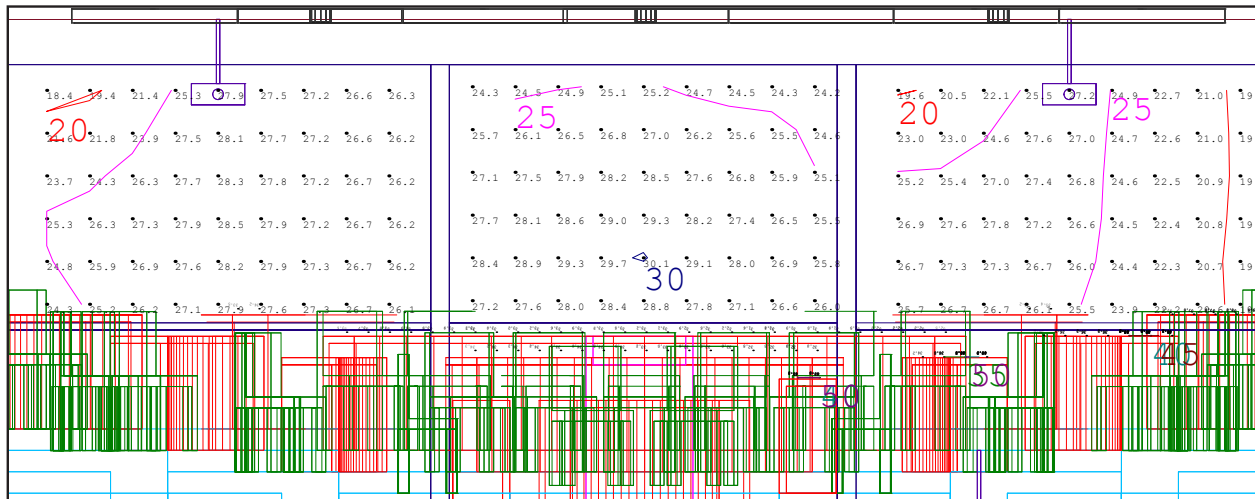
Presentation Mode

-  20% Dimming
-  50% Dimming
-  70% Dimming



Classroom - General Mode

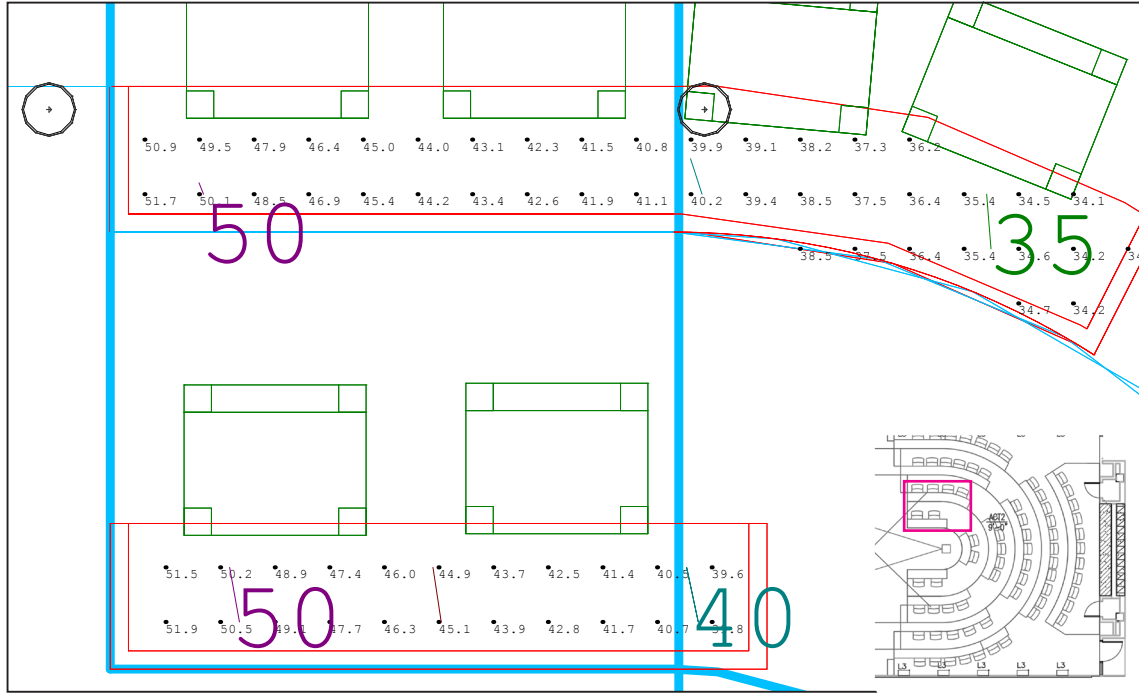
Calculation Summary: Classroom: General Mode							
Label	Calculation Type	Units	Avg	Max	Min	Avg/Min	Max/Min
White Board 5	Illuminance	Fc	26.93	30.10	24.20	1.11	1.24
Projection Screen	Illuminance	Fc	26.15	28.50	18.40	1.42	1.55
Table Level 1	Illuminance	Fc	45.28	52.00	39.60	1.14	1.31
Table Level 2	Illuminance	Fc	40.80	51.70	34.10	1.20	1.52
Table Level 3	Illuminance	Fc	40.10	47.00	35.70	1.12	3.00
Table Level 4	Illuminance	Fc	32.05	35.10	30.00	1.32	3.46
Table Level 5	Illuminance	Fc	27.58	33.50	22.60	1.14	1.39
Back Area Cabinet	Illuminance	Fc	16.52	25.60	21.10	2.90	4.49
Side Wall	Illuminance	Fc	4.80	25.70	0.00	NA	NA
1 ft away from board	Illuminance	Fc	13.12	16.60	1.00	1.32	2.63
3 ft away from board	Illuminance	Fc	13.22	17.00	7.90	1.66	2.15
Table 4 (center)	Illuminance	Fc	32.41	35.40	29.70	1.09	1.19
Table 3 (center)	Illuminance	Fc	32.77	34.00	30.80	1.06	1.10
Table 2 (center)	Illuminance	Fc	33.37	34.40	32.30	1.03	1.07



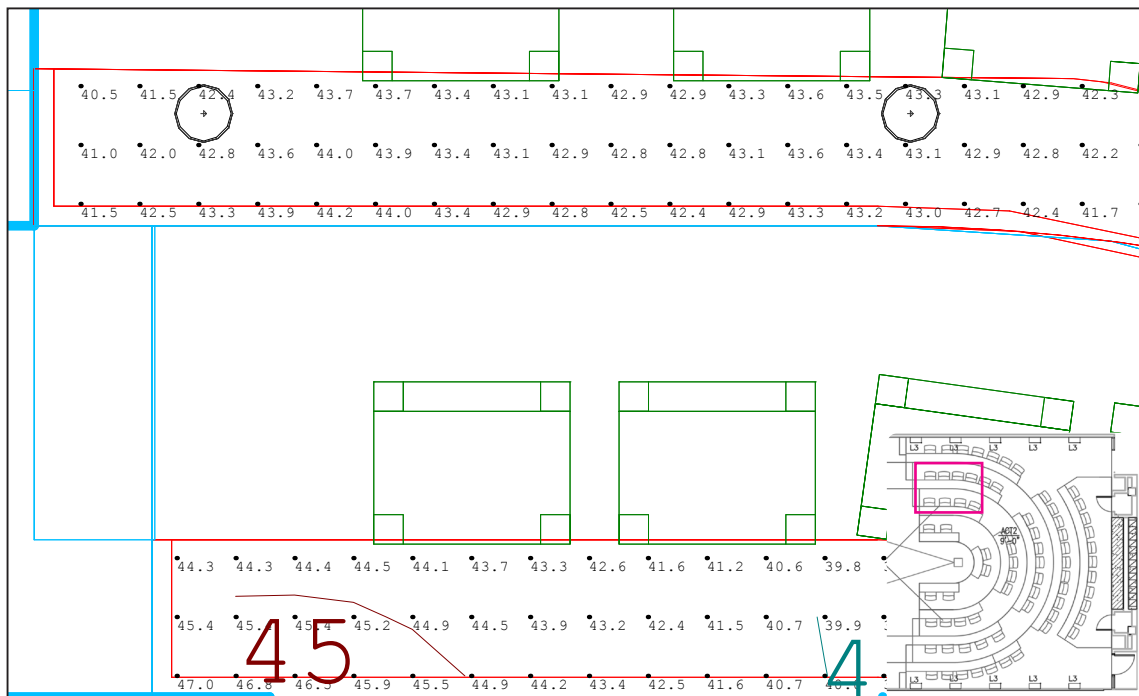
Front of room, white board and presentation screen

General Classroom

Classroom - General Mode



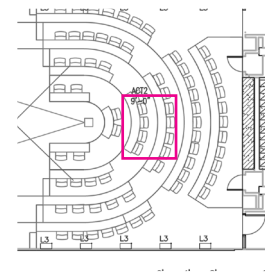
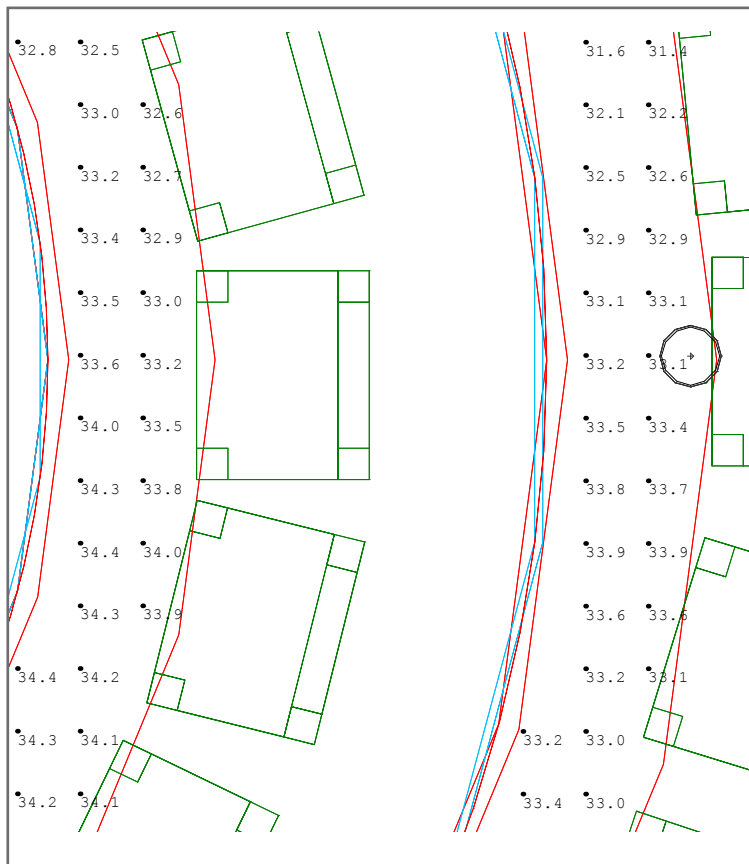
Student desk, row 1 and 2



Student desk, row 3 and 4

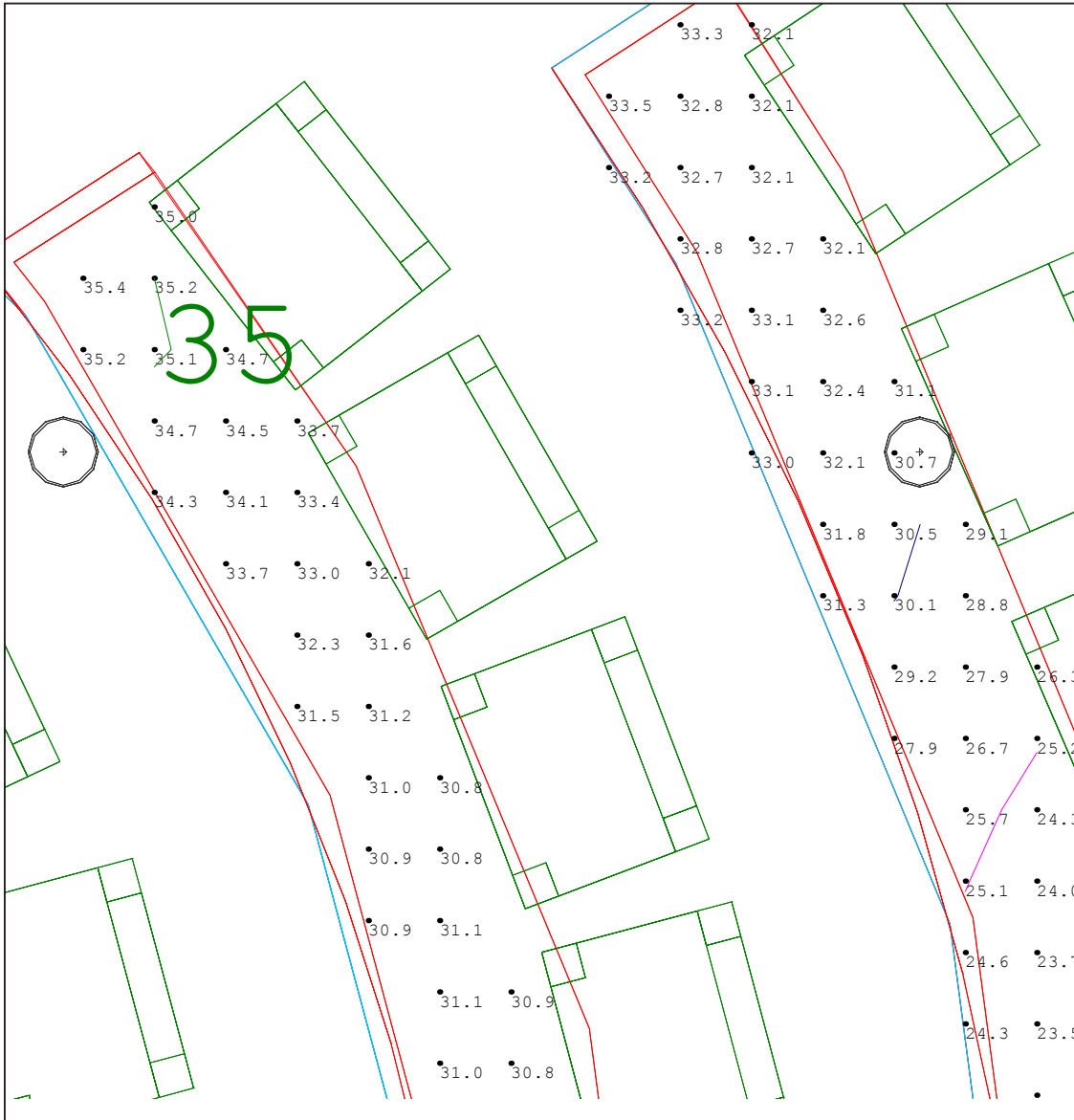
General Classroom

Classroom - General Mode

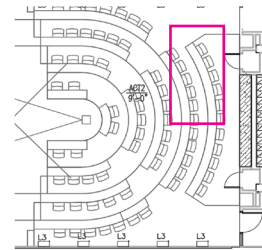


student desk, center row 2 and 3

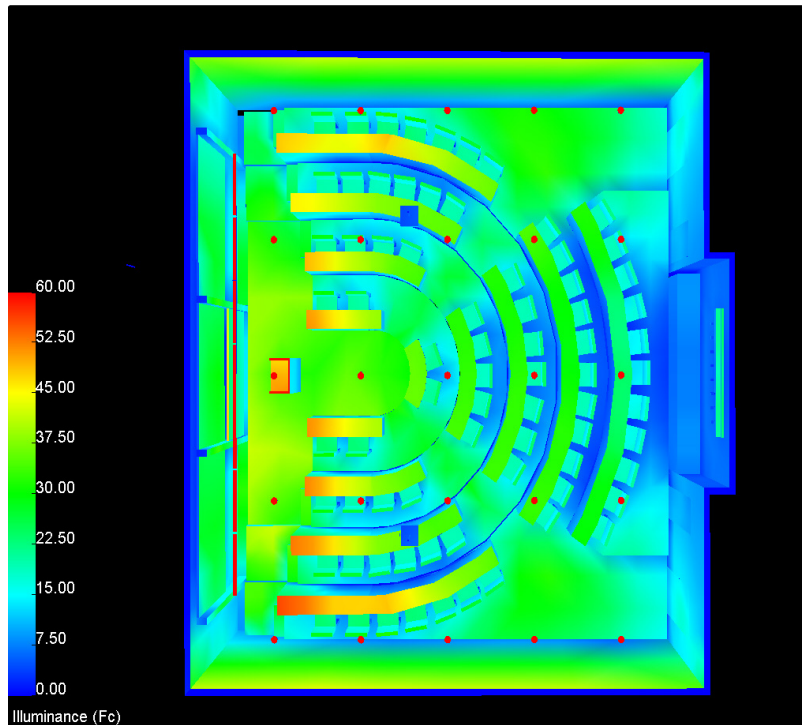
Classroom - General Mode



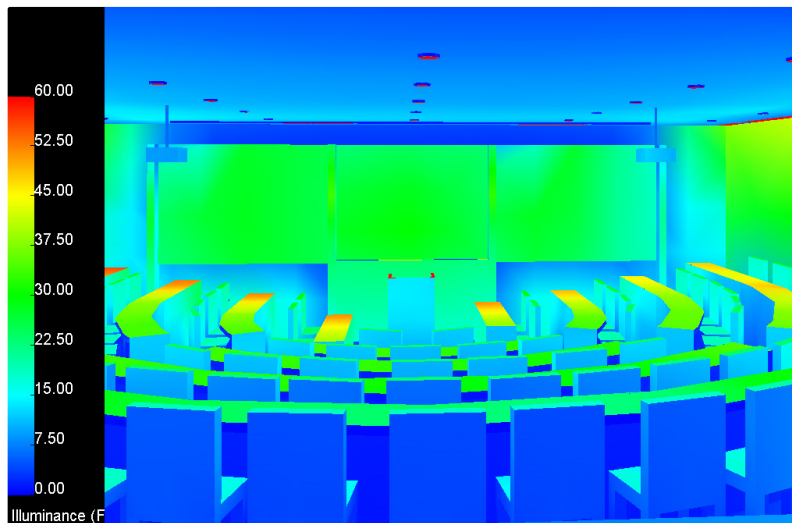
student desk, center row 2 and 3



Classroom - General Mode

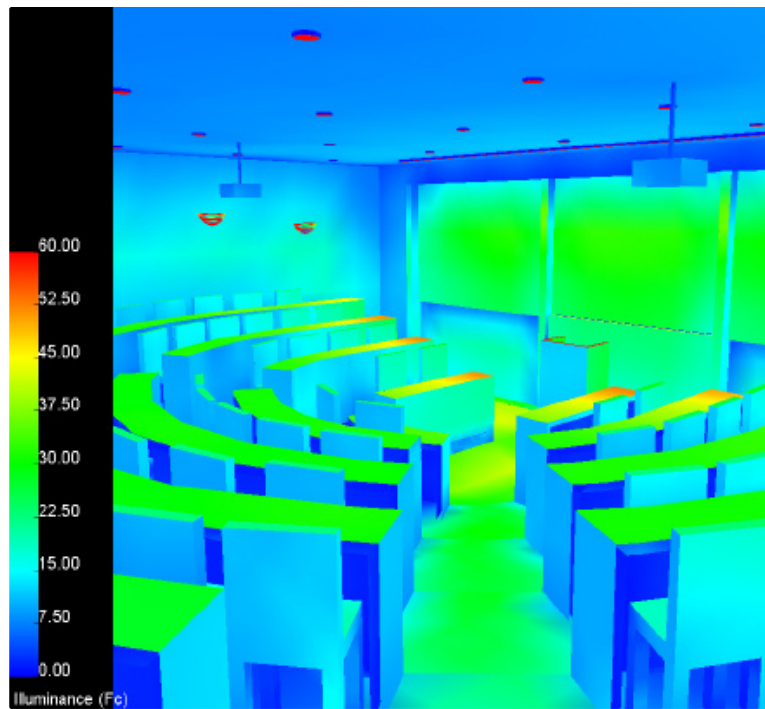
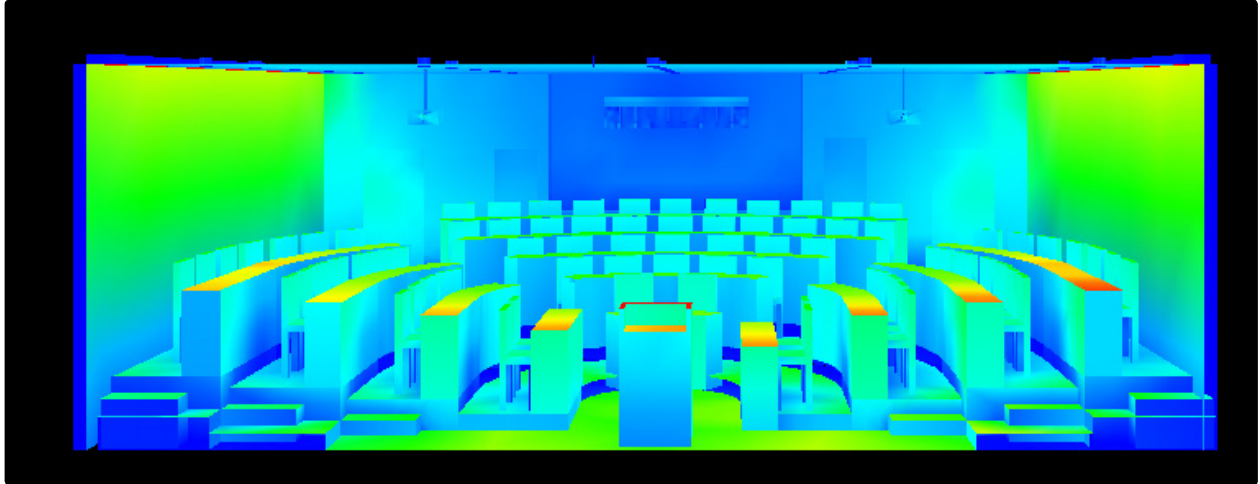


plan, psuedo rendering



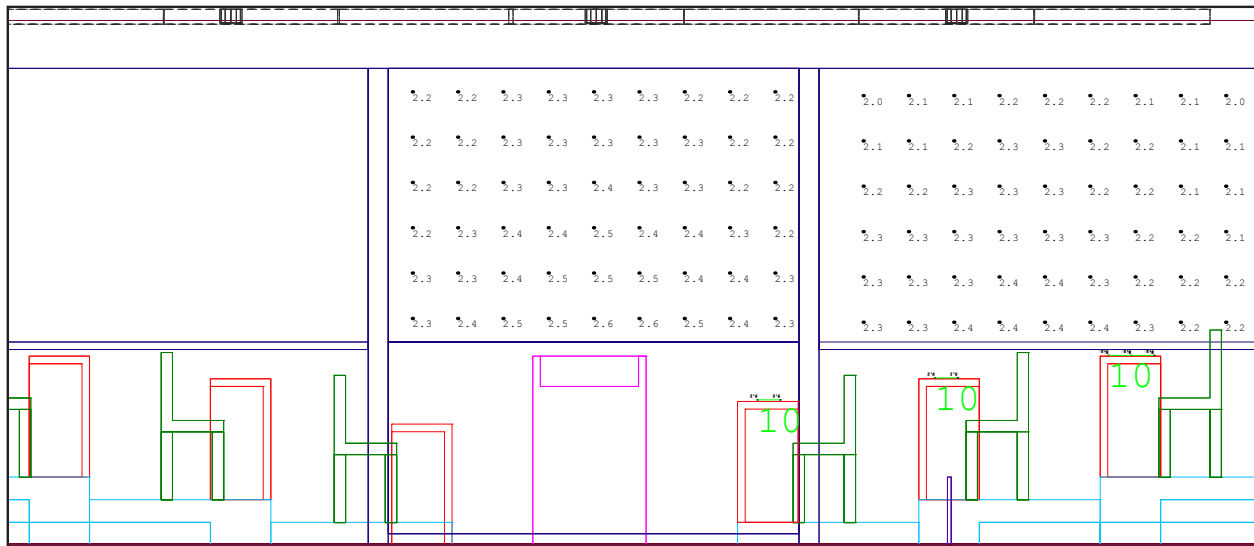
perspective, psuedo rendering

Classroom - General Mode



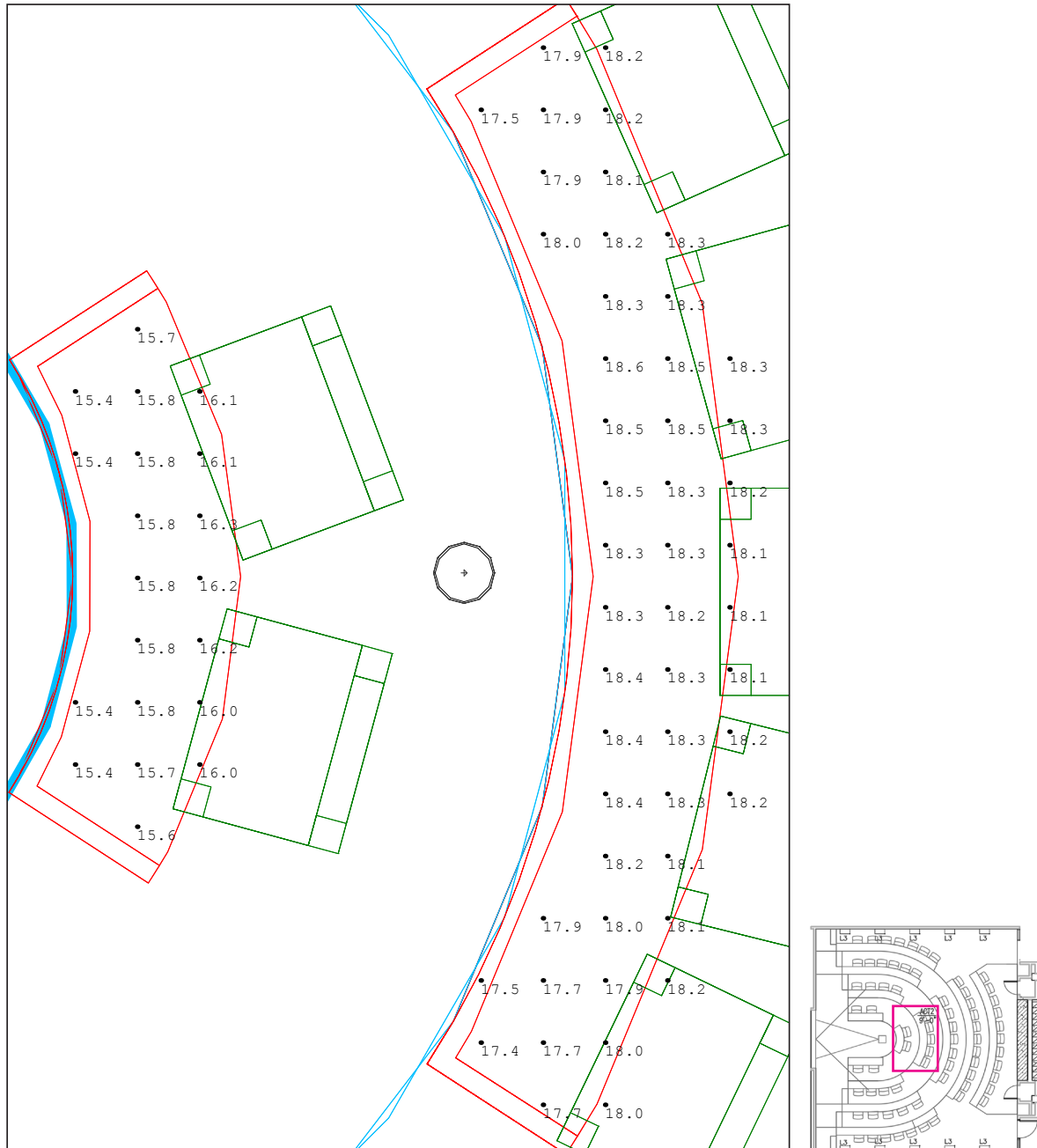
Classroom - Presentation Mode

Calculation Summary: Classroom: Presentation Mode						
Label	Calculation Type	Units	Avg	Max	Min	Avg/Min
White Board 5	Illuminance	Fc	2.33	2.60	2.20	1.06
White Board 4	Illuminance	Fc	2.23	2.40	2.00	1.12
Table Level 1	Illuminance	Fc	10.56	13.30	8.10	1.30
Table Level 2	Illuminance	Fc	12.50	16.30	7.70	1.62
Table Level 3	Illuminance	Fc	12.69	18.30	6.10	2.08
Table Level 4	Illuminance	Fc	13.28	19.70	5.40	2.46
Table Level 5	Illuminance	Fc	17.35	16.40	14.20	1.22
Back Area Cabinet	Illuminance	Fc	10.36	16.40	3.30	3.14
Side Wall	Illuminance	Fc	0.44	2.50	0.00	NA
1 ft away from board	Illuminance	Fc	1.32	1.60	1.00	1.32
3 ft away from board	Illuminance	Fc	1.27	1.40	1.10	1.15
Table 4 (center)	Illuminance	Fc	18.93	19.80	18.30	1.03
Table 1 (center)	Illuminance	Fc	15.82	16.30	15.40	1.03
Table 2 (center)	Illuminance	Fc	18.14	18.60	17.40	1.04



Front of room, white board and presentation screen

Classroom - Presentation Mode



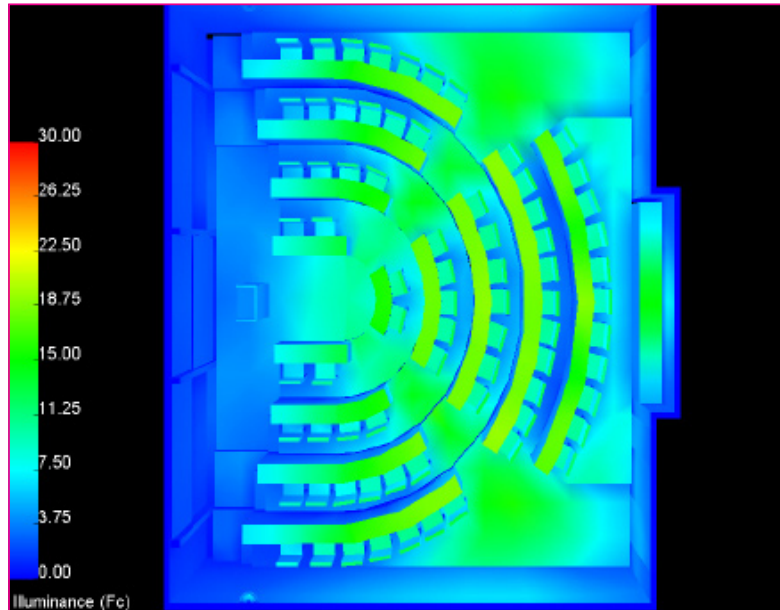
Student desk, center front two rows

Classroom - Presentation Mode

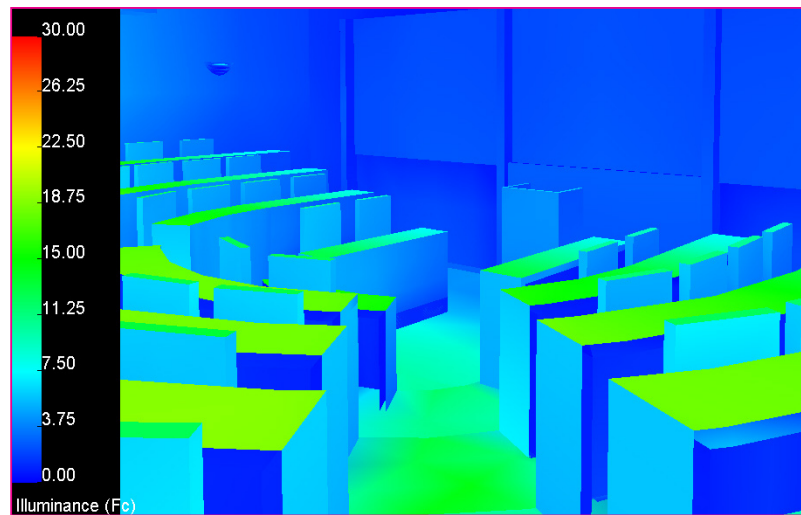


student desk, center back two rows

Classroom - Presentation Mode



plan, psuedo rendering



perspective, psuedo rendering

Classroom - Design Summary

Overall, the lighting system for the classroom meets the design purpose of the classroom. The two lighting modes are able to provide a flexible lighting system to help enhance the learning experience.

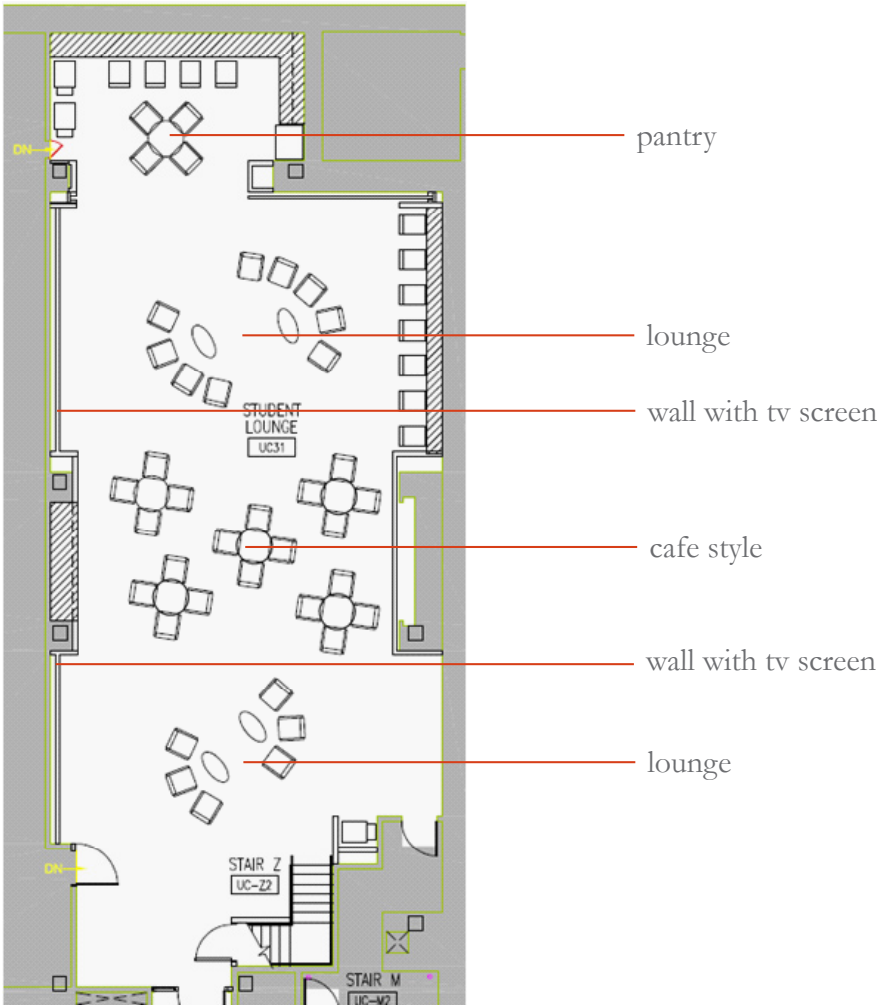
For the general lecture mode lighting, the average illuminance level on the desks range from 27 fc to 45 fc, the lighting level does meet the suggested 30 fc by the IESNA handbook. Furthermore, an average of 26 fc is measured on the white board at the front of the room, which is also sufficient for viewing.

In terms of the presentation mode, an average of 3 fc is measured across the projection screens, which is less than the suggested 5 fc requirement from the IESNA DG-17. The table desk maintains an average of 10-17 fc for sufficient light levels to write in the dark.

The lighting system for the classroom is able to address the design criteria and meets the standards of the IESNA Handbook. The lighting design meets the ASHRAE Standard 90.1 2007. A total of 1914W was used, which is under the allowed 1946W.

MBA Student Lounge Background Information

Located in the upper concourse, the MBA student lounge is a student lounge for the students of the master's business administration program. The 2,100 sq.ft is divided into four sections. There is a pantry in the back, area for lounge tables and working counter, café style table area, and another lounge area. On the west walls, there are three sets of television monitors.



MBA Student Lounge

Materials for MBA Student Lounge

Finishes for MBA Student Lounge			
Type	Description	Finish	Reflectance (assumed)
Wall			
P-1	Eggshell Finish	White	0.9
WD-3	Bamboo Patina panel	Light Brown	0.4
Wall Base Finish			
CT-5	Gateway Ceramic Flooring	Sterling Grey	0.5
CT-5B	Gateway Ceramic Flooring	Sterling Grey	0.5
Floor			
CT-5	Gateway Ceramic Flooring	Sterling Grey	0.5
CT-5A	Gateway Ceramic Flooring	Sterling Grey	0.3
RF-2	Rubber Sheet Flooring	Fossil	0.3
Ceiling			
ACT-3	Acoustical panels	White	0.9
ACT-4	Acoustical panels	white metal panels	0.9

Considerations & Criteria

Appearance of Space and Luminaires

- The MBA student lounge is intended to create a relaxing atmosphere. The objective is to
- provide a comfortable space in which students can study, relax, and have a good time. The
- student lounge has a lounge area, tables, counter for computers, and pantry area.
- Luminaires in the lounge can be artistic and decorative to emphasize the playfulness and relaxing atmosphere. Non-uniform lighting can be addressed to help create visual interest in the space. The challenge is to attract people into a space with no daylight or windows.

Color Appearance (and color contrast)

- The MBA student lounge consist a variety of wall panels and finishes.

Daylight integration and control

- Daylight integration will not be a concern since there are no windows in the student lounge.

Direct Glare

- Direct glare should be a concern to avoid any discomfort in the lounge area. Luminaires need to be positioned to avoid glare.

Light Distribution surfaces

- The idea is to light the space to make it relaxing and interesting so that students will be attracted to the space. To create an interesting atmosphere, wood and iconic panel can be lighted to highlight the rich patterns to bring out the architectural features of the lounge. Lighting on the wall can create a dramatic effect to make a person enjoy the space.
- Light should not fall on the flat screen to minimize the glare reflection.

Considerations & Criteria

Light distribution on Task Plane (Uniformity)

- Light distribution on the tables and chairs will need to be uniform to provide a good writing/reading environment. The pantry and computer counter will also need to provide uniform light levels.

Luminances of Room Surfaces

- Avoid high luminance levels on television screen
- The hierarchy of the luminance levels is divided between the surfaces in which work will be done (table, pantry table, computer table) and the decorative surfaces (bamboo patterns on the wall, ceiling). The decorative surfaces should have higher luminance values so that the attention will be on the architectural features. Based on the lighting impression studies done by John Flynn, there is a tendency for people to be in remote areas of lower intensity lighting [The luminance level on the tables, lounge table, computer tables, and pantry table will have enough lighting for reading and writing].

Points of Interest

- Since the MBA student lounge is designed to give students a chance to relax and study, the points of interest to be lighted are the architectural details in the space, creating a visual interest in the space to attract people to come into the lounge.

Surfaces Characteristics

- A few of the materials (ceiling [ACT-3 &ACT-4] and wall [P-1]) in the lounge have high reflectance so will help illuminate the space. The matte and satin finishes in the room provide a beautiful finish to the architecture of the space. The colors of the surfaces are white, sterling grey, metallic, bamboo brown and fossil white.

System Control and Flexibility

- The lighting system in the student lounge can be flexible for different modes (study and entertainment/parties/special events). Occupancy sensors can be incorporated into the lighting system so energy can be saved when there is no one in the lounge.

Illuminance (Horizontal)

- [Study Mode] 30 fc –(IESNA Handbook: Reading Handwriting tasks- #2 pencil and softer leads)

Energy

- 1.2 W/sq ft – (IESNA Standard 90.1-2007: Lounge/Recreation)

MBA Student Lounge Lighting Design

The challenge for the lighting design is to attract students down to the basement. There are no windows or skylights in the lounge. The ceiling heights in the basement are low (8ft and 9ft). The design emphasis will need to make the space feel comfortable and spacious.

Lighting the peripheral

A combination of recessed fluorescent wallwashers and LEDs are used to light the walls and cove of the ceiling. By washing the walls, the occupant will perceive the space to be larger. The lighting design also avoids suspending luminaires since the lounge is not very high.

Relaxing Atmosphere

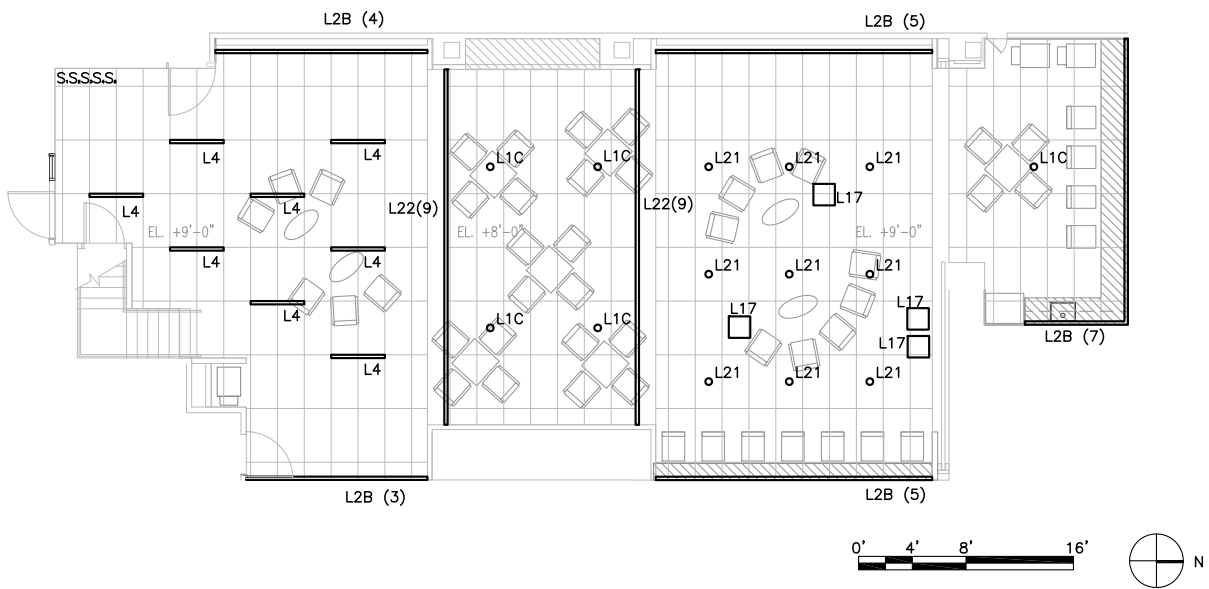
The placement of the light boxes in zone 3 of the lounge creates a fun atmosphere in which students can play with the lighted furniture.

Reading/Writing

Provide 30 fc on the tables.

MBA Student Lounge







Note: L17 is not mounted to ceiling but
moveable light cube.



Lighting Reflected Ceiling Plan

*Larger lighting plan can be found in Appendix I : L401

MBA Student Lounge

Lighting Fixture Schedule for MBA Student Lounge								
Image	Type	Manufacture	Fixture Description	Watt	Quantity	Lamp	Ballast	Model
	L1C	Kurt Versen Downlight	Recessed compact fluorescent downlight	36	5	CF32DT/E/IN/835/ECO Osram Sylvania	Advance IDL-2S26-M5-BS	P926
	L2B	Selux M100 Super Recessed	Recessed linear fluorescent wall washer	31	24	FP28/835/ECO Osram Sylvania	Advance ICN-2S28-N@120	M1B1S-1T5-SD-PM-68-SV-277
	L4	Selux M60	Recessed linear fluorescent	31	8	FP28/835/ECO Osram Sylvania	Advance ICN-2S28-N@120	M6R1-1T5-MA-PM-004-SV-277
	L17	Daifuku Designs Lite Cube	Light-seats in white polyethylene	13	4	CF19EL/SUPER/850BL Osram Sylvania	Integral Ballast	Lite Cube
	L21	Lightolier Vetro Downlight	Architectural Decorative Vetro Downlight	50	9	50MR16/IR/FL35/C Osram Sylvania	-	-
	L22	io line 1.5	Led based linear flood	28	18	LED	Driver	series 1.5

Light Loss Factor for MBA Student Lounge									
Type	Mainenance Category	Dirt Conditions	Cleaning Period	LDD	Initial Lumens	Mean Lumens	LLD	BF	Total LLF
L1C	IV	Clean	12 months	0.88	2400	2064	0.86	1	0.76
L2B	IV	Clean	12 months	0.88	2900	2697	0.93	1.05	0.86
L4	IV	Clean	12 months	0.88	2900	2697	0.93	1.05	0.86
L17	V	Clean	12 months	0.88	1200	960	0.80	1	0.70
L21	IV	Clean	12 months	0.88	800	-	-	1	0.88
L22	VI	Clean	12 months	0.96	29	-	-	1	0.96

MBA Student Lounge

MBA Student Lounge Controls

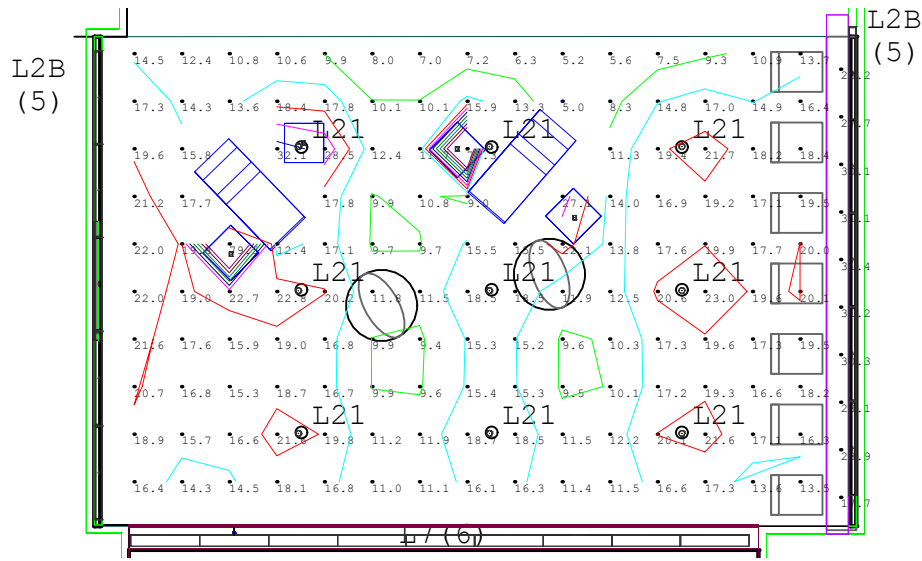
The control system of the student lounge will consist of 5 switches for 5 zones. No dimming is required in the space. There are no preset zones. The zones are divided as following:

- Zone 1 - Cove lighting in ceiling and perimeter wallwash fluorescents
- Zone 2 - Recessed fluorescents in lounge zone 1 (near the stairs)
- Zone 3 - Downlights in lounge zone 2 (table area)
- Zone 4 - Ceiling mount luminaires in lounge zone 3 (with computer counter)
- Zone 5 - Pantry lighting

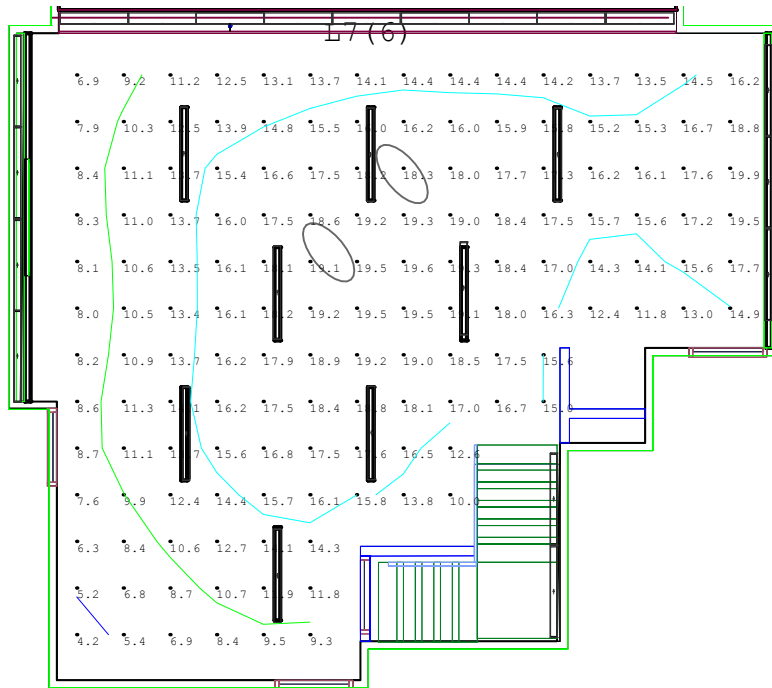
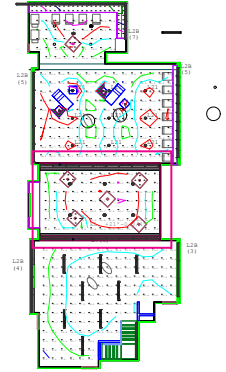
Energy

Energy Calculation for MBA Student Lounge					
Type	Manufacture	Watt	Quantity	Watt	Energy Allowed
L1C	Kurt Versen Downlight	36	5	180	2100 sq.ft x 1.2W/sq.ft
L2B	Selux M100 Super Recessed	31	24	744	
L4	Selux M60	31	8	248	
L17	Daifuku Designs Lite Cube	13	4	52	
L21	Lightolier Vetro Downlight	50	9	450	
L22	io line 1.5	28	18	504	
Consumed Power				2178	2520
Power Density				1.04	1.2
Red - Designed Blue - IESNA recommended					

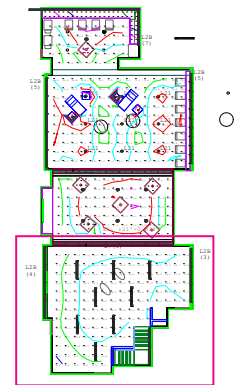
MBA Student Lounge



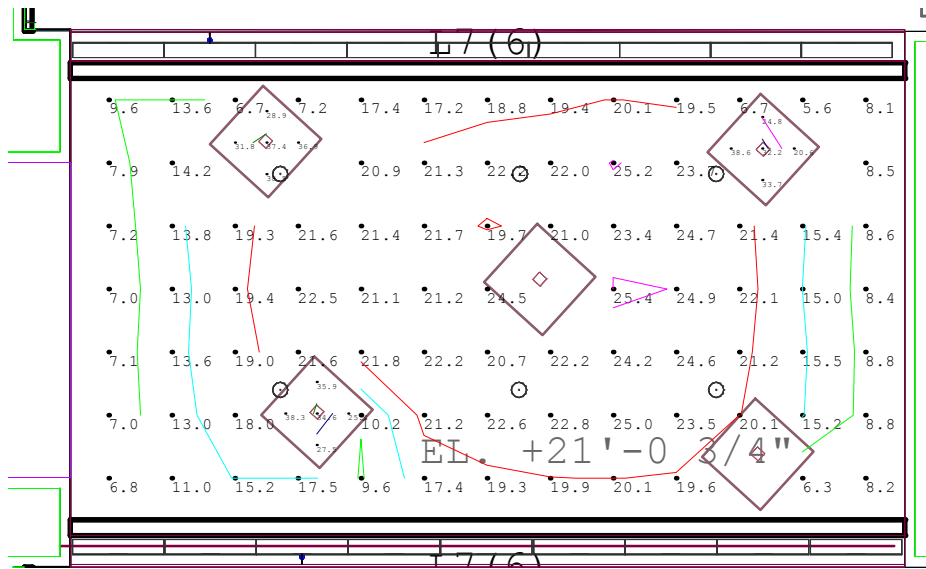
Lounge Zone 2 (Table Area)



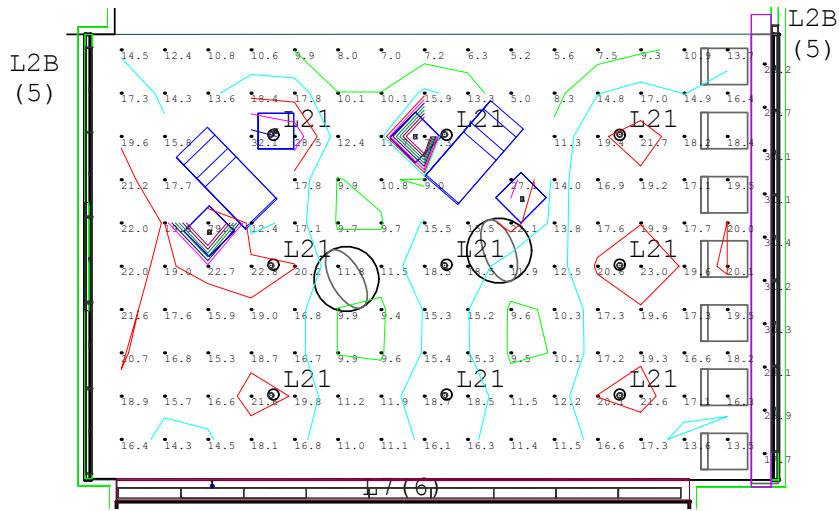
Lounge Zone 1



MBA Student Lounge



Pantry



Lounge Zone 3 (with computer counter)

MBA Student Lounge Design Summary

Overall, the lighting system for the MBA Student Lounge meets the design purpose of the classroom. The lighting design is able to make the lounge feel spacious and pleasant. By washing the walls of the lounge and recessing the luminaires, the space feels larger. The proposed light boxes helps creates a relaxing and fun atmosphere in the space. An average of 30-35 fc is provided on the desk for writing/reading purposes. The lighting design meets the ASHRAE Standard 90.1 2007. A total of 1914W was used, which is under the allowed 1946W.

Calculation Summary: MBA Student Lounge							
Label	Calculation Type	Units	Avg	Max	Min	Avg/Min	Max/Min
Pantry Table	Illuminance	Fc	25.67	33.60	19.60	1.31	1.71
Pantry Counter	Illuminance	Fc	30.20	36.20	17.60	1.72	2.06
Pantry	Illuminance	Fc	15.65	26.70	5.90	2.65	4.53
Computer Counter	Illuminance	Fc	27.47	31.40	17.70	1.55	1.77
Lounge Z1 (Near stairs)	Illuminance	Fc	14.42	19.90	4.20	3.43	4.74
Lounge Z2 (Table Area)	Illuminance	Fc	16.91	25.40	5.60	3.02	4.54
Lounge Z3 (Near Computer Station)	Illuminance	Fc	16.34	79.50	5.00	3.27	15.90
Table 3	Illuminance	Fc	29.98	38.60	20.60	1.46	1.87
Table 2 (center)	Illuminance	Fc	32.34	38.30	25.40	1.27	1.51
Table 1 (center)	Illuminance	Fc	34.70	38.50	28.90	1.20	1.33
TV Screen	Illuminance	Fc	6.45	7.10	5.80	1.11	1.22