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Lighting / Electrical
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Natty Boh Building
Baltimore , Maryland



Technical Assignment #1 - Existing Conditions Report

Relevant computer files: P:\Singley_Tech1_files

Executive Summary

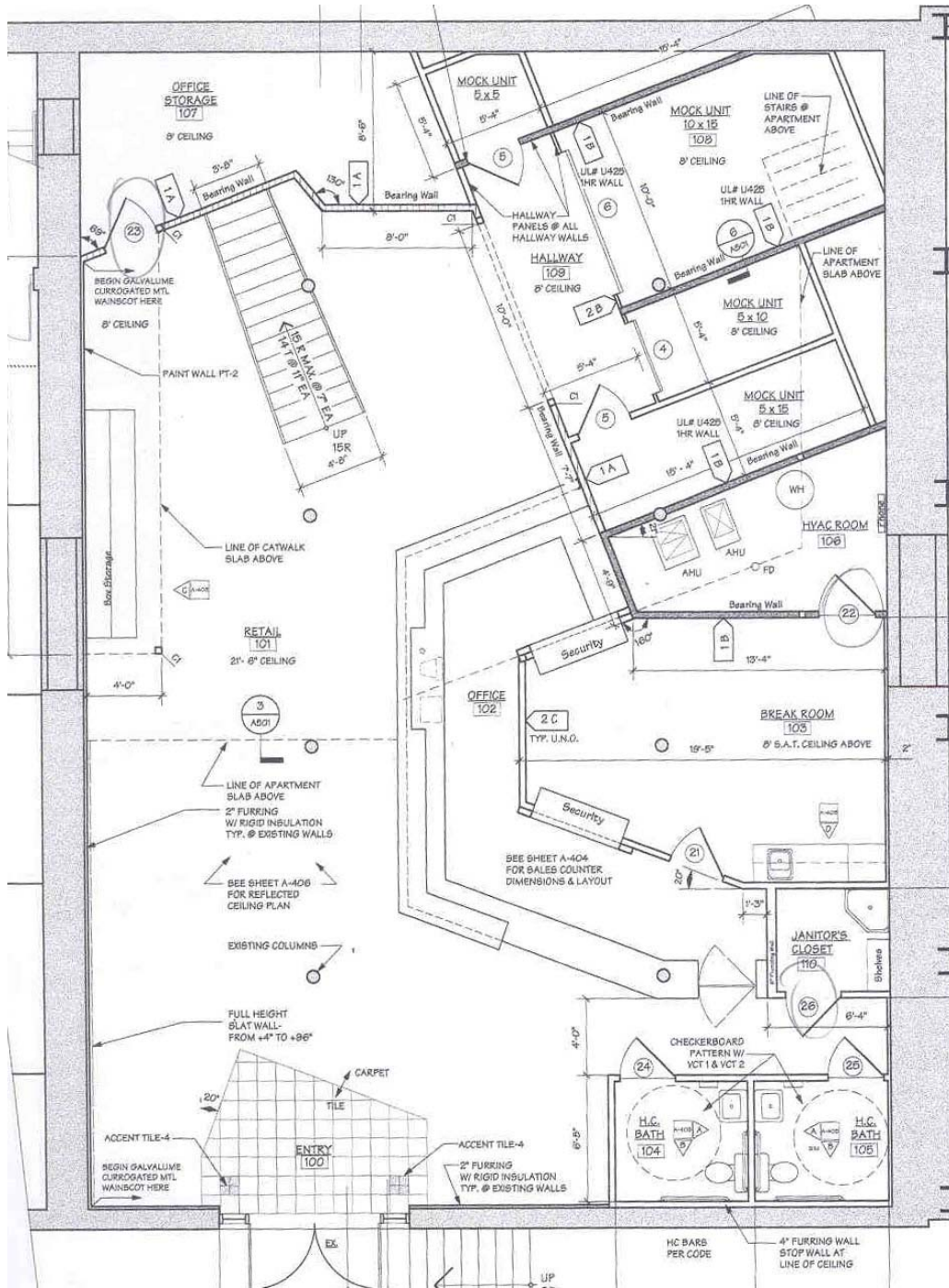
The Natty Boh building is an 186,550 SF mixed-use renovation project in Baltimore, Maryland. The building was initially designed to accommodate early shell construction before prospective tenants. The tenants are Canton Self Storage, Countrywide Insurance Co, and Friday's Daycare. These tenants have required specialized spaces such as a lobby, a daycare center, and a conference room.

I used the IESNA Lighting Handbook and AGI32 to analyze the lighting systems for the lobby, daycare center, conference room, and the Natty Boh parking lot. I discovered definite room for improvement in three of the four spaces.

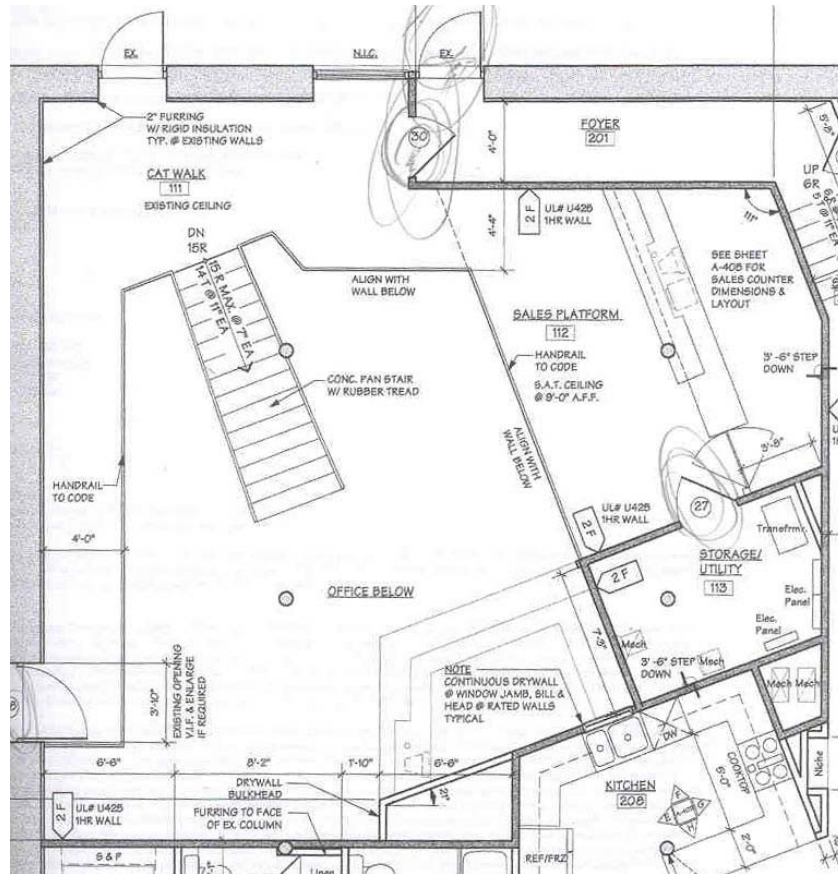
Existing Conditions for Lobby

Layout

Floor 1



Floor 2



Surface Properties

Floor

With the exception of the entrance, which is ceramic tile, the floor space consists of commercial grade carpeting.

Walls

Gypsum walls are painted eggshell white with acrylic paint.

Ceiling

Acoustic ceiling tiles are used everywhere in the lobby with the exception of the two-story area, which is painted flat white.

Doors

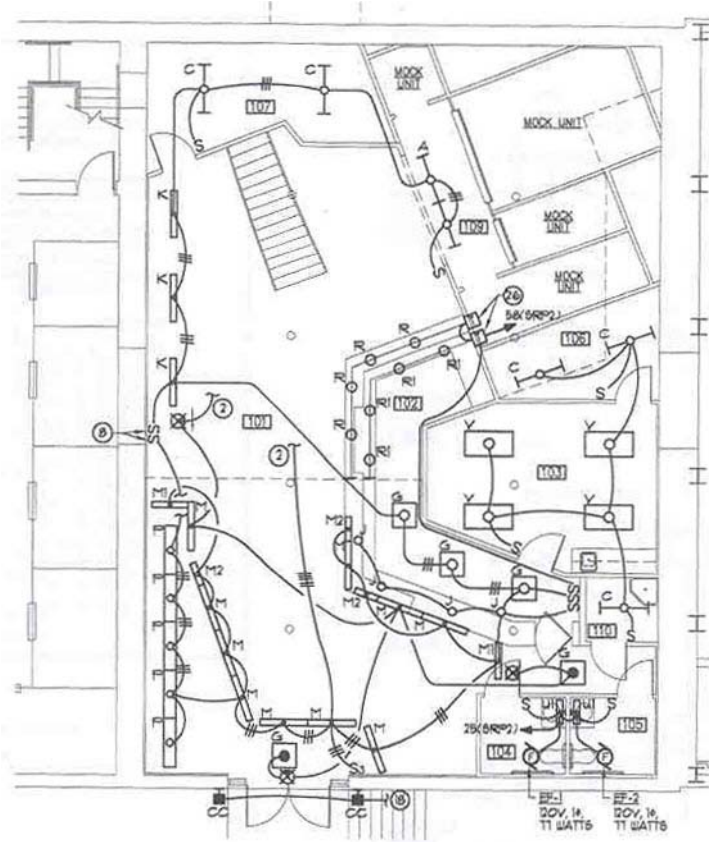
The doors are solid wood.

Furniture and Objects

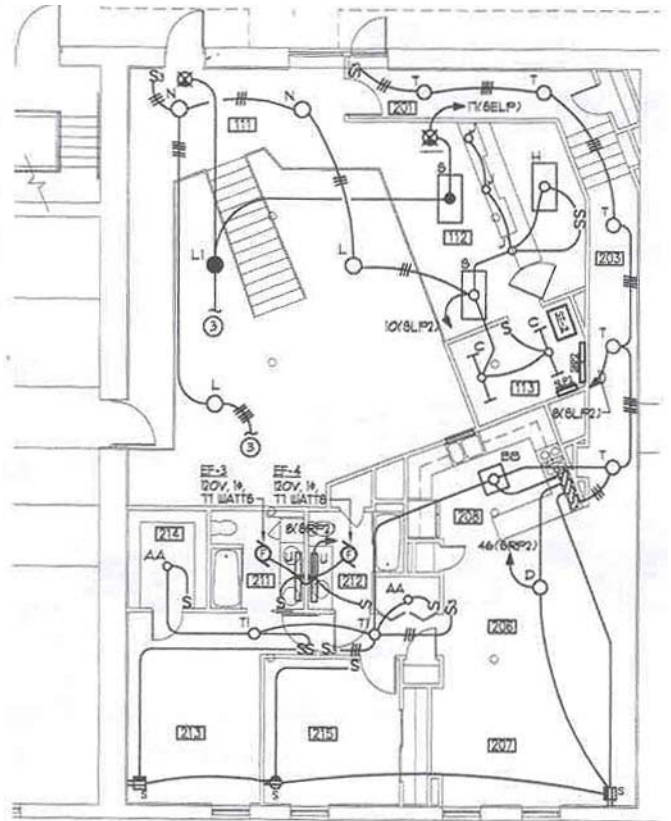
The Lobby area has minimal furniture other than chair behind the sales desk and the small open office space.

Lighting Layouts

Floor 1



PART GROUND FLOOR PLAN - LIGHTING
SCALE: 1/8" = 1'-0"



PART 2ND FLOOR PLAN - LIGHTING
SCALE: 1/8" = 1'-0"

Lighting Fixture Schedule - Office

Type	Description	Lense/ Louver	Mounting	Volts	Lamp Data			Manufacture & catalog no.
					No.	watts	code	
A	(2)4' Solid Top Linear Fluorescent Industrials with Electronic Ballasts mounted end to end.	Solid Top	CC 11'0" A.F.F.	277	4	32	F32/T8 SP35	Lithonia (2) #L 2 32 277 GEB
C	4' Solid Top Linear Fluorescent Industrials with Electronic Ballasts mounted end to end.	Solid Top	CC 12'6" A.F.F.	277	2	32	F32/T8 SP35	Lithonia #L 2 32 277 GEB
G	2' x 2' Parabolic Fixture with Electronic Ballast	Semi Specular	CR	277	2	31	U31/T 8 SP35	Lithonia #2PM3 G 2U31 9ND 277 GEB10
H	2' x 4' Parabolic Fixture with Electronic Ballast	Semi Specular	CR	277	3	32	F32/T8 SP35	Lithonia #2PM3 G 332 18ND 277 GEB10
J	8" Open Aperture Downlight with Electronic Ballast	Semi Specular	CR	277	2	18	18DTT SP35	Gotham #AF 2/18DTT 8AR 277 GEB10
K	4' Channel Fixture with Wireguard and Electronic Ballast	N/A	CS	277	2	32	F32/T8 SP35	Columbia #CS4 232 EB8LH277 CSWG4
L	16" Decorative Low Bay Fixture with Acrylic Reflector and Glass Lens	Glass	CC	277	1	100	100M H SP35	Lightolier #40432A 4048363 404S48
M	4' Linear Fluorescent Cove Fixture with Electronic Ballast	N/A	Cove	277	1	32	F32/T8 SP35	Alera #PIC1T8 EB8277 4SGL
M2	3' Linear Fluorescent Cove Fixture with Electronic Ballast	N/A	Cove	277	1	17	F17/T8 SP35	Alera #PIC1T8 EB8277 2SGL
N	Decorative Low Bay Fixture with Acrylic Reflector	N/A	CC	277	4	26	26DTT SP35	Lightolier #40432 4047333 404S48
P	1' x 4' Recessed Linear Fluorescent Wallwash Fixture with Electronic Ballast	Semi Specular	CR	277	1	32	F32/T8 SP35	Lithonia #WW G 1 32 277 IRLS GEB10
R	Low Voltage Pendant Track Fixture with Red Glass Shade	Glass	Track 8'0" A.F.F.	-	1	50	50W/F L MR16	Light Project International #R80800 R87682 TRNCX300 R86025
R1	Low Voltage Pendant Track Fixture with Chrome Metal Shade	Chrome	Track 8'0" A.F.F.	-	1	50	50W/F L MR16	Light Project International #R80800 R87511 TRNCX300 R86025
S	2' x 4' Parabolic Fixture with Electronic Ballast	Semi Specular	CR	277	2	32	F32/T8 SP35	Lithonia #2PM3 G B 232 18ND 277 GEB10

Lobby Design Criteria

Tasks

- Communicating with sales representative
 - Viewing model storage unit
 - Completing office work including VDT-use
 - Entrance to storage units
-

Illuminance Levels

- Horizontal Illuminance on floor in lobby area
 - 100 lux recommended by IESNA 9th Edition. There are no adjustment factors necessary.
 - Horizontal Illuminance at work plane in office/receptionist areas
 - 300 lux as recommended for an open office plan with intensive VDT usage. No adjustments necessary.
-

Design Considerations

- Extra care needs to be taken due to the complexity of the space to assure that the flow from section to section is not disturbed by changing light patterns between luminaires.
 - The extra surfaces add more opportunities for glare. Care must be taken to keep direct glare to a minimum.
 - In addition to being a lobby, the space is also a sales desk and houses model storage units. This makes maintaining a professional feel very important.
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Control Systems

- All circuits should be connected to a time-of-day operated control device to turn lights off after business hours.
 - All circuits must have manual switching available to owner.
-

Power Density

- 1.3 W/sq. ft. as per the open office plan in ASHRAE 90.1

Light Loss Factors

<u>Luminair(s)</u>	<u>Ballast Factor</u>	<u>Luminair Dirt Depreciation</u>	<u>Lamp Lumen Depreciation</u>	<u>Total LLF</u>
A, C, H, K, & P	.94	.94 (maintenance category IV) (Very Clean Atmosphere) (12 month cleaning cycle)	.95 <i>Mean/Initial</i> 2710 / 2850	.84 = .94*.95*.94
J	1.0	.94 (maintenance category IV) (Very Clean Atmosphere) (12 month cleaning cycle)	.84 <i>Mean/Initial</i> 1010/1200	.79 = 1.0*.94*.84
L	1.0	.94 (maintenance category IV) (Very Clean Atmosphere) (12 month cleaning cycle)	.88 <i>Mean/Initial</i> 8190/9300	.83 = 1.0*.94*.88
M	.94	.93 (maintenance category VI) (Very Clean Atmosphere) (12 month cleaning cycle)	.95 <i>Mean/Initial</i> 2710 / 2850	.83 = .94*.93*.95
M2	.94	.93 (maintenance category VI) (Very Clean Atmosphere) (12 month cleaning cycle)	.93 <i>Mean/Initial</i> 1300 / 1400	.81 = .94*.93*.93
R	.94	.93 (maintenance category VI) (Very Clean Atmosphere) (12 month cleaning cycle)	.93 <i>Mean/Initial</i> 1300 / 1400	.81 = .94*.93*.93

Analysis of Existing Conditions

Complications arose with the modeling of the lobby space and I was unable to complete it in time for this submission.

Existing Conditions for Daycare Center

Friday's Daycare Center occupies a 66'x62' space adjacent to the second floor of the main lobby. The space contains two enclosed storage spaces and a semi-open kitchen, as well as a large space for the children. The room contains an exposed ceiling with a height of 14'.

Assumptions

I was unable to obtain anything but the shell drawings of this space presently, and as such all existing conditions are treated as assumptions. I was recently in the space and have a contact whom has spent some time in the space, and all assumptions are based upon our memory of those visits.

Surface Properties

Floor

Indoor / Outdoor carpet is throughout most of the space. The only exception is in the kitchen where there is industrial tile.

Walls

Gypsum walls are painted in bright, primary colors with acrylic paint.

Ceiling

The concrete ceiling is exposed along with the mechanical equipment and lighting fixtures.

Doors

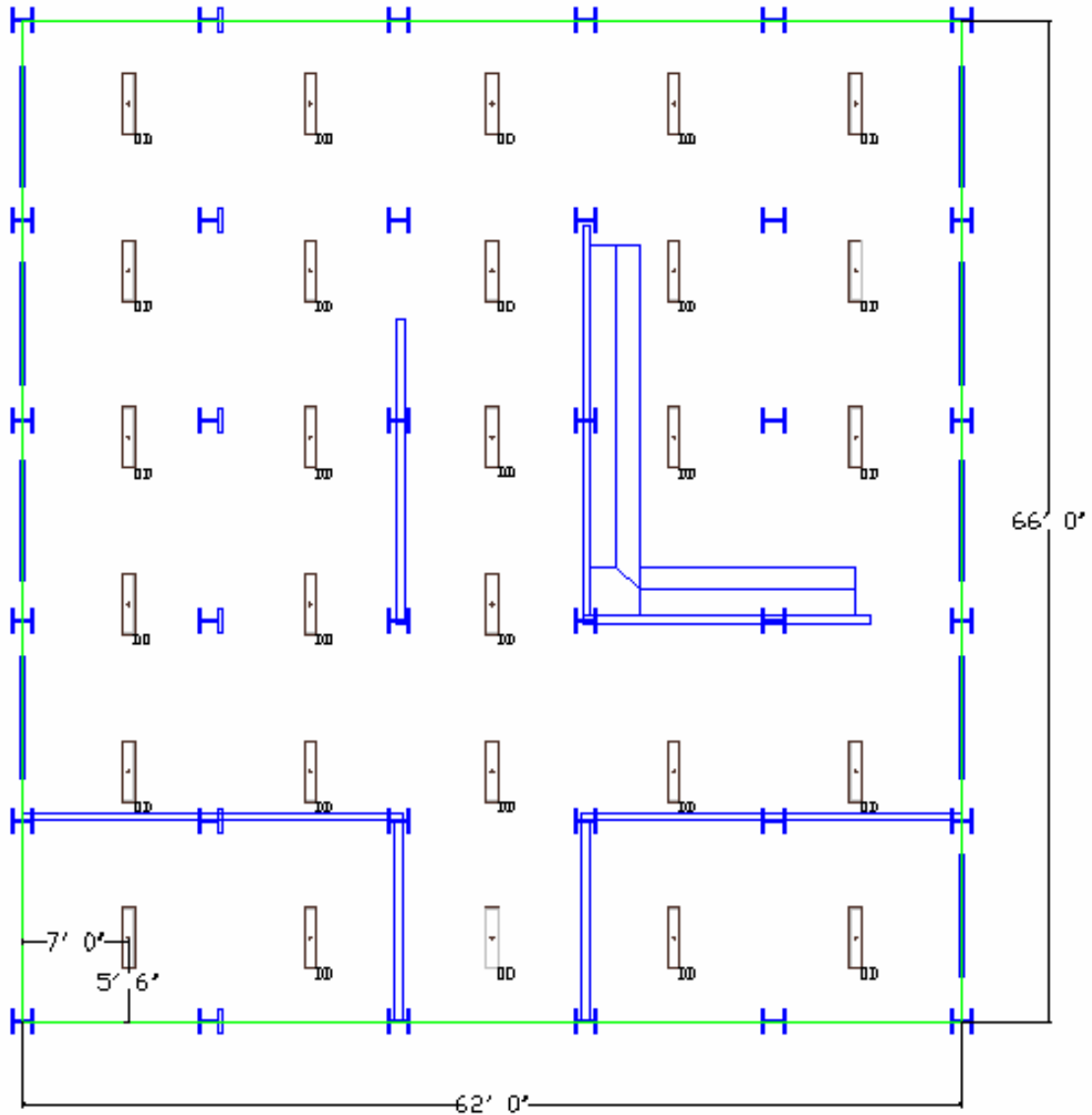
The exterior doors are glass with metal frames, while the doors to the storage spaces are solid wood.

Furniture and Objects

The children's area contains child size tables and chairs as well as a divider / shelving unit separating it from the rest of the room. The kitchen area contains counters and eye-level cabinets. The entire room contains equally-spaced exposed steel columns, some of which are hidden within the storage and kitchen walls.

Lighting Layout

The lighting in this space is standard Fluorescent downlights equally spaced throughout. The visual interest in the space is provided by the walls, columns, and dividers rather than the lighting system.



Lighting Fixture Schedule – Daycare Center

Type	Description	Lense/ Louver	Mounting	Volts	Lamp Data			Manufacture & catalog no.
					No.	watts	code	
DD	4' Linear Fluorescent Louvered Downlight with Electronic Ballast	Solid Top	-	277	2	32	F32/T8 SP35	Lithonia MS8 2 32 WD PERF

Daycare Design Criteria

- Tasks**
- Activity area for small children
 - Light cooking in kitchen area
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- Illuminance Levels**
- Horizontal Illuminance at work plane – children’s area
 - 300 lux recommended by IESNA 9th Edition for child care areas. I would suggest a slightly higher value as there may be more visually intensive activities than in the type of child care facility the manual used (mall child care area)
 - Suggested : 400-500 lux
-

- Design Considerations**
- The lighting between the different spaces should maintain an even distribution on the floor surface.
 - Due to the visual nature of most tasks performed by young children, it is important to maintain a high quality of light within the space. This includes having a high color rating index, good facial modeling, little direct glare, and reducing the amount of shadows within the children’s area.
-

- Control Systems**
- Use a tamper-free switching system that allows the occupant to turn the lighting system on and off while preventing the children from doing so.
 - Use a time-of-day control device to turn off the lighting system when the daycare center is closed.
-

- Power Density**
- Classroom/lecture/training : 1.4-1.6 W /sq. ft.

Light Loss Factors

<u>Luminair(s)</u>	<u>Ballast Factor</u>	<u>Luminair Dirt Depreciation</u>	<u>Lamp Lumen Depreciation</u>	<u>Total LLF</u>
DD	.94	.90 (maintenance category III) (Clean Atmosphere) (12 month cleaning cycle)	.95 <i>Mean/Initial</i> <i>2710/2850</i>	.804 = .94*.90*.95

Power Density

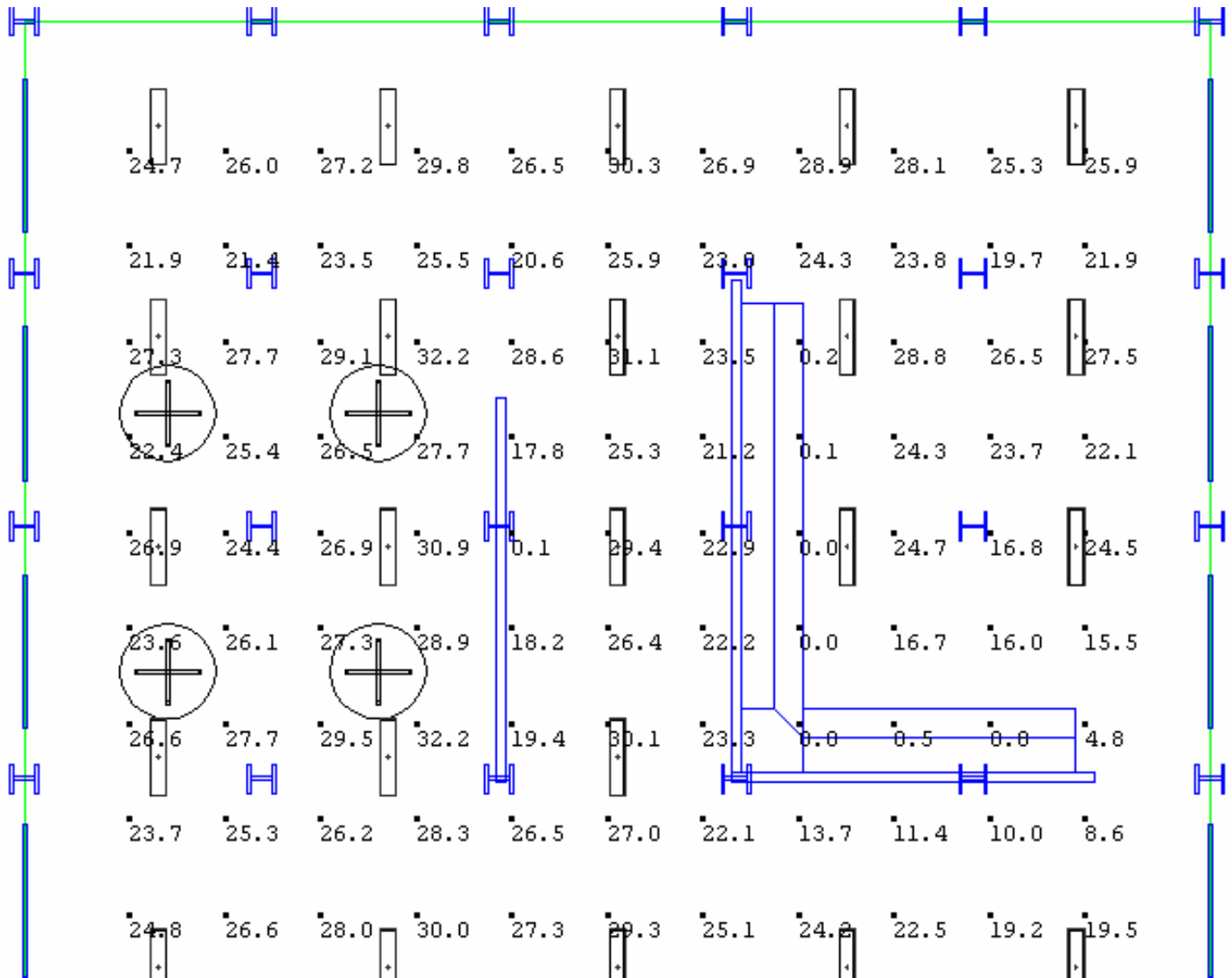
Fixture	#	Watts	Total Watts P = # x Watts
DD	26	62W	P = 26 x 62W = 1612W
Total Watts			1612W

$$\begin{aligned} \text{Power Density} &= 1612\text{W} / (66' * 62') \\ &= .39 \text{ W} / \text{sq. ft.} \end{aligned}$$

Power density is **well within** ASHRAE 90.1 power allowances.

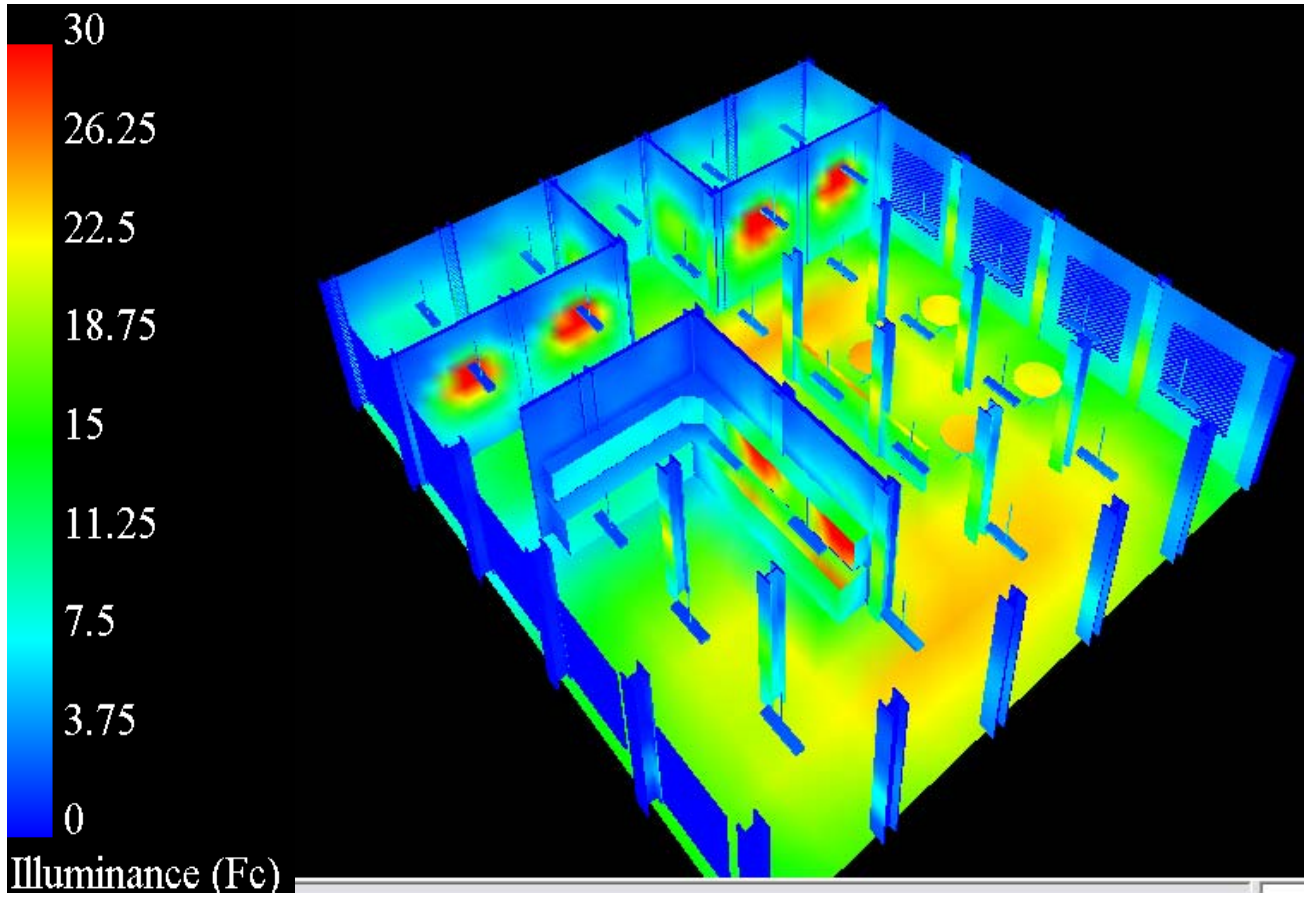
Analysis of Existing Conditions

- Light levels on the work plane are fairly consistent throughout the space, and conforming to the IESNA-suggested lighting levels as listed above. I am more concerned that the space may be a little too dark.



Partial Plan with Calculation points at 2.5'

Radiosity Solution to provide an overall idea of lighting in space



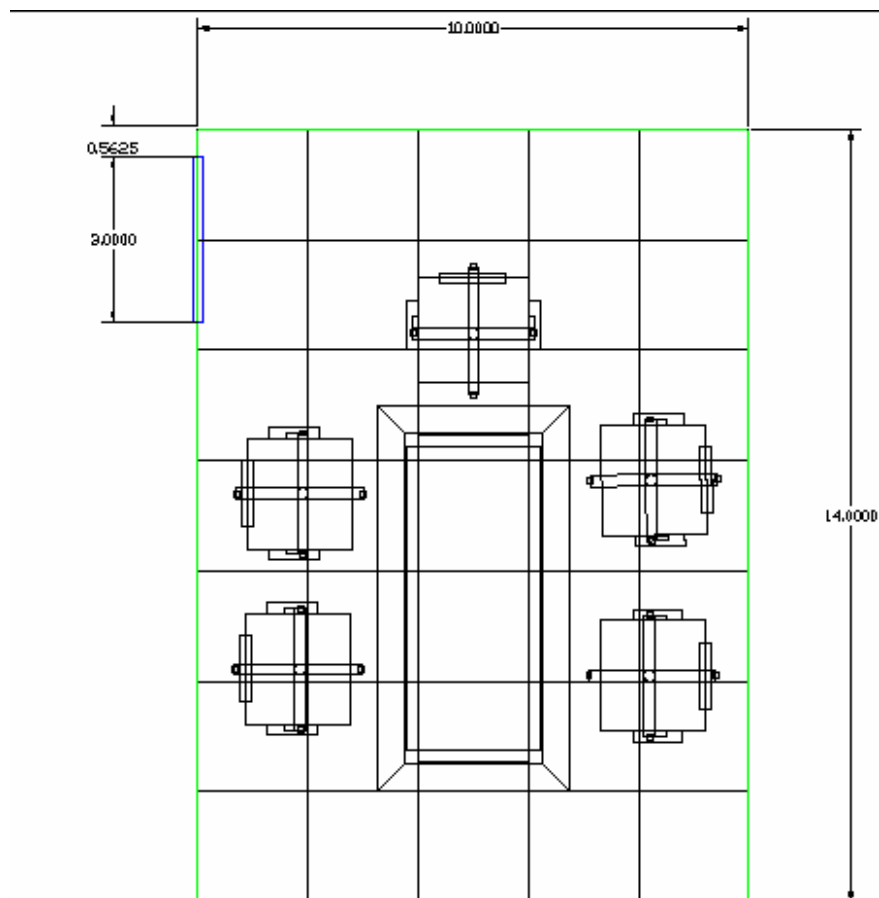
Existing Conditions for Conference Room

The Conference room belongs with the Countrywide Insurance tenant and is located just inside their office in the Natty Boh building. It is a small space with an 8' acoustic ceiling and not designed for video-conferencing.

Assumptions

I was unable to obtain anything but the shell drawings of this space at this point in time, and as such all existing conditions are to be treated as assumptions. I was recently in the space and have a contact who has spent some time in the space, and all assumptions are based upon memory of those visits.

Layout



Surface Properties

Floor

Light colored carpet (tan, light brown)

Walls

Gypsum walls painted white with acrylic paint.

Ceiling

Acoustic ceiling tile at 8'

Doors

Solid wood

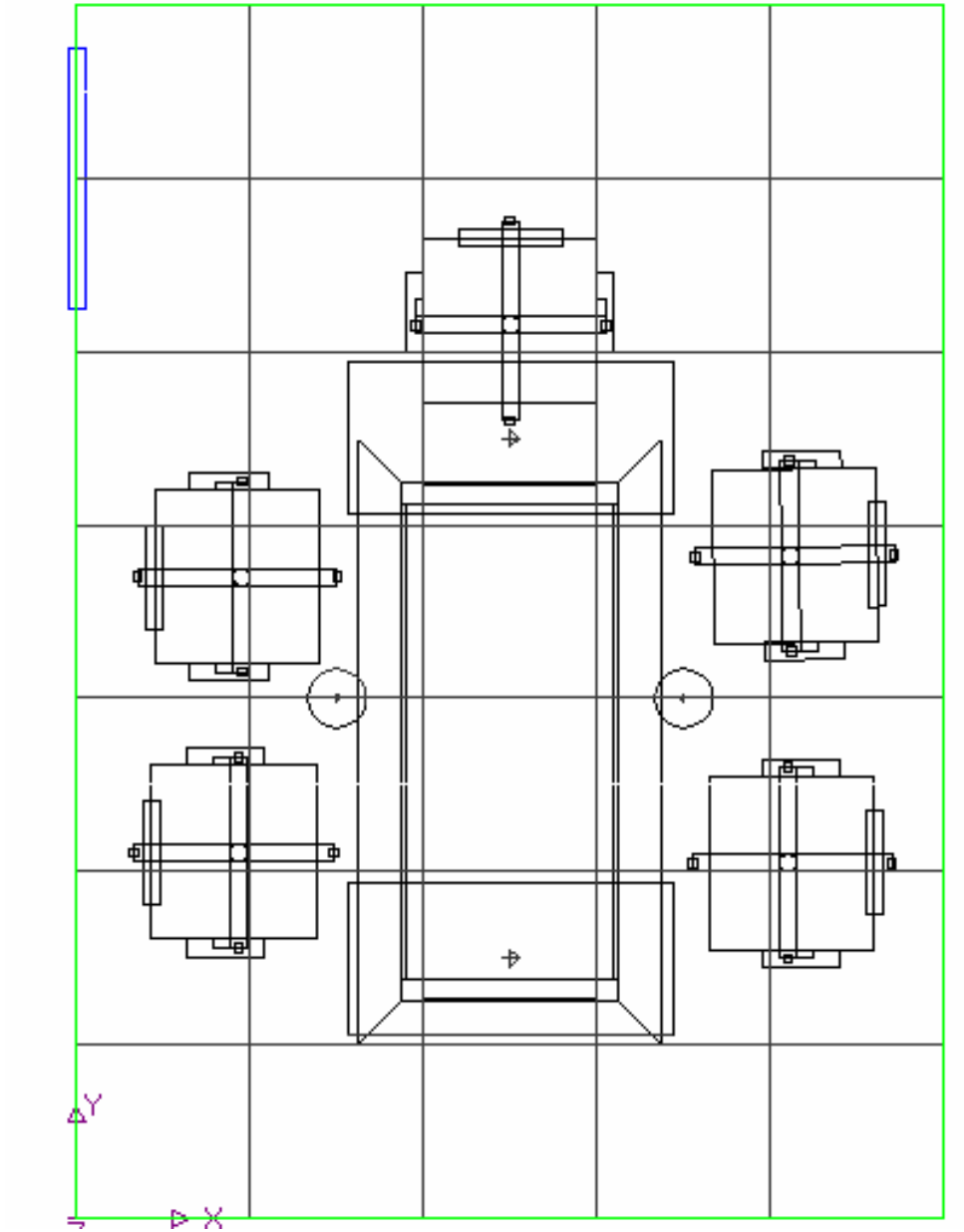
Furniture and Objects

Due to the small size of the room I selected a small conference table and five office chairs to furnish this space.

Luminaire Schedule

Type	Description	Volts	Lamp Data			Manufacture & catalog no.
			No.	watts	code	
F32T8	2' x 4' Recessed Parabolic Troffer with (2)Electronic ballasts	277	4	32	F32/T8 SP35	Lithonia 2PM4 4 32 32LD TUBI
32TRT	AFV 8" APERTURE OPEN DOWNLIGHT	277	1	32	32TRT	Gotham AFV 32TRT 8AR

Lighting Layout



Conference Room Design Criteria

Tasks	<ul style="list-style-type: none">○ Small group meetings○ Possible videoconferencing
Illuminance Levels	<ul style="list-style-type: none">○ Horizontal Illuminance on conference table<ul style="list-style-type: none">- 500 lux recommended by IESNA 9th Edition for conference rooms with video conferencing. No adjustment necessary.○ Vertical Illuminance on Walls<ul style="list-style-type: none">- 300 lux recommended by IESNA 9th Edition for conference rooms with video conferencing. No adjustment necessary.
Design Considerations	<ul style="list-style-type: none">○ The conference room needs to feel comfortable for the occupants while maintaining proper light levels.○ Care must be taken to avoid any unnecessary light on the lens of the camera for video conferencing.○ Must maintain a professional feel to the space.
Control System	<ul style="list-style-type: none">○ Entire room controlled manually and on an automatic motion sensor○ Control system needs to be highly adjustable due to the multiple uses of the space. Including:<ul style="list-style-type: none">- General lighting capable of switching to half capacity (or dimming)- Wall-washers and spot lighting on separate circuits
Power Density	<ul style="list-style-type: none">○ 1.5 W / sq. ft. allowed according to ASHRAE 90.1

Light Loss Factors

<u>Luminair(s)</u>	<u>Ballast Factor</u>	<u>Luminair Dirt Depreciation</u>	<u>Lamp Lumen Depreciation</u>	<u>Total LLF</u>
F32T8	.94	.95 (Maintenance category IV) (Very clean atmosphere) (9 month cleaning cycle)	.95 <i>Mean/Initial</i> 2800/2950	.85 = .94*.95*.95
32TRT	1.0	.95 (Maintenance category VI) (Very clean atmosphere) (9 month cleaning cycle)	.84 <i>Mean/Initial</i> 1850/2200	.80 = 1.0*.95*.84

Power Density

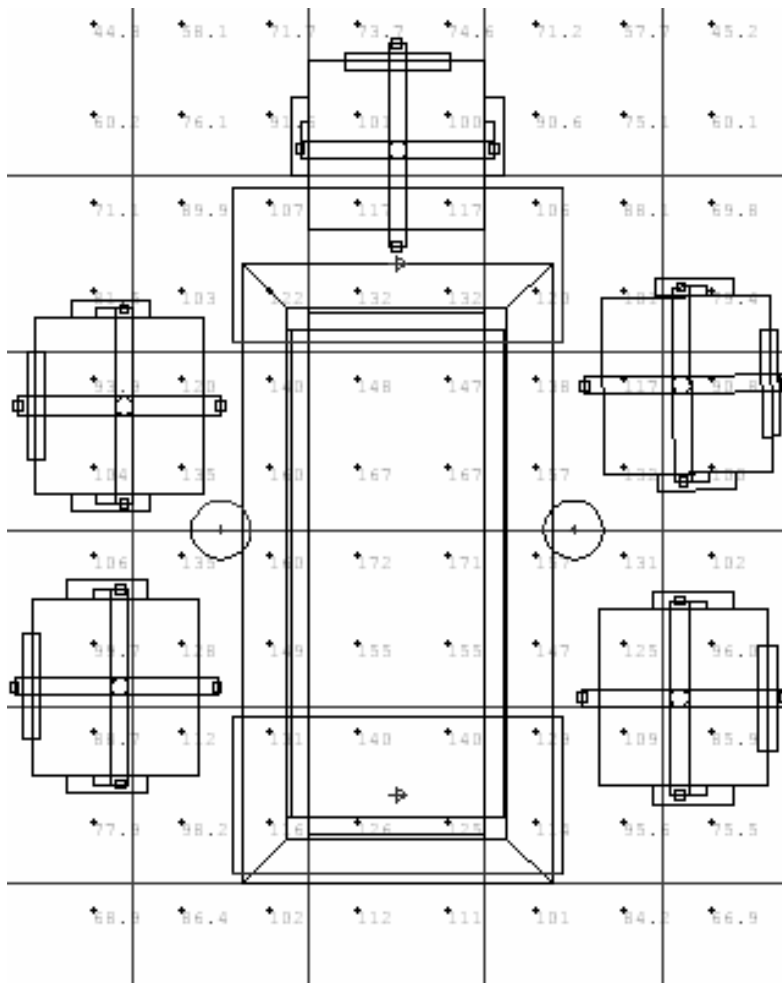
Fixture	#	Watts	Total Watts P = # x Watts
F32T8	2	124W	P = 2 x 124W = 248W
32TRT	2	36W	P = 2 x 36 W = 72W
Total Watts			248 + 72 = 320W

$$\begin{aligned} \text{Power Density} &= 320\text{W} / (14' * 10') \\ &= 2.3 \text{ W} / \text{sq. ft.} \end{aligned}$$

Power Density **does not conform** to ASHRAE 90.1

Analysis of Existing Conditions

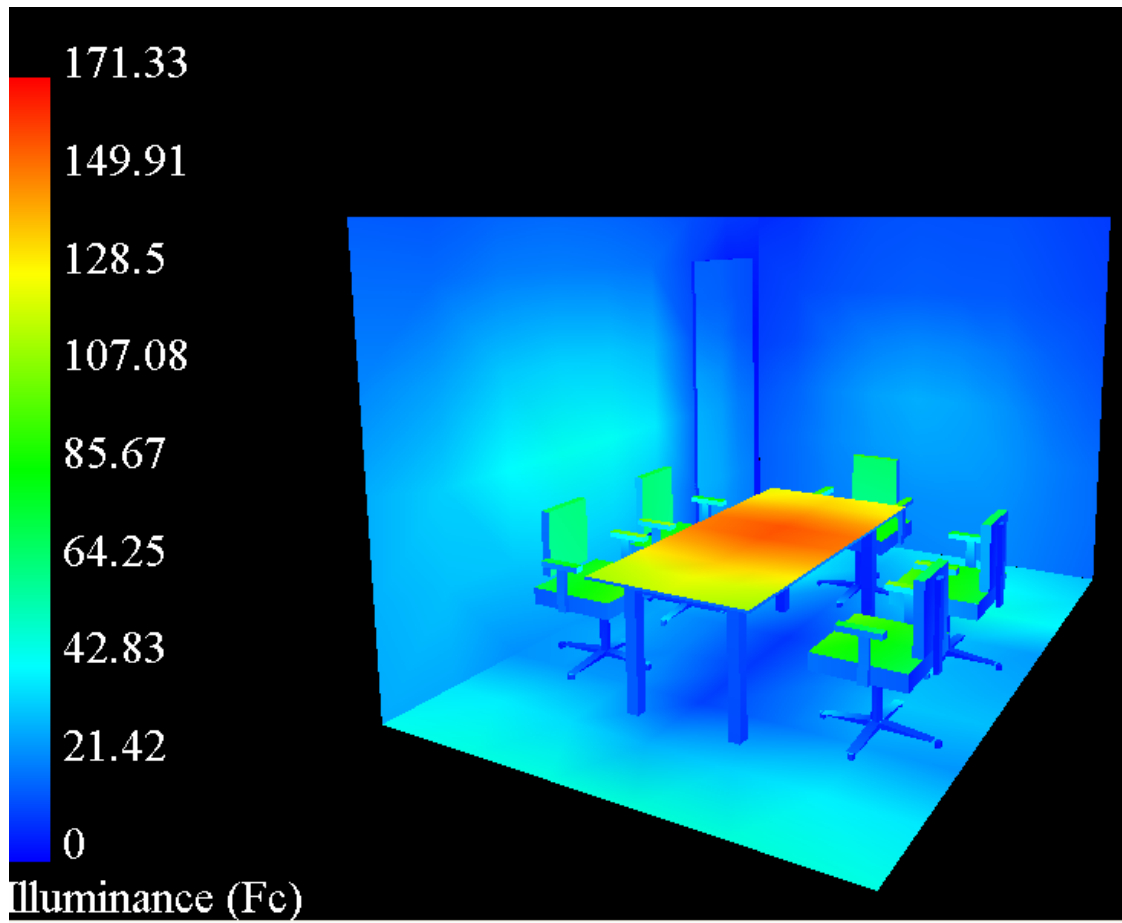
Existing Light on the Conference Table



- Illuminance values are clearly too high and likely to cause severe problems with glare

CalcPts
Illuminance Values (Fc)
Average=103.40
Maximum=172
Minimum=29.3
Avg/Min=3.53
Max/Min=5.88

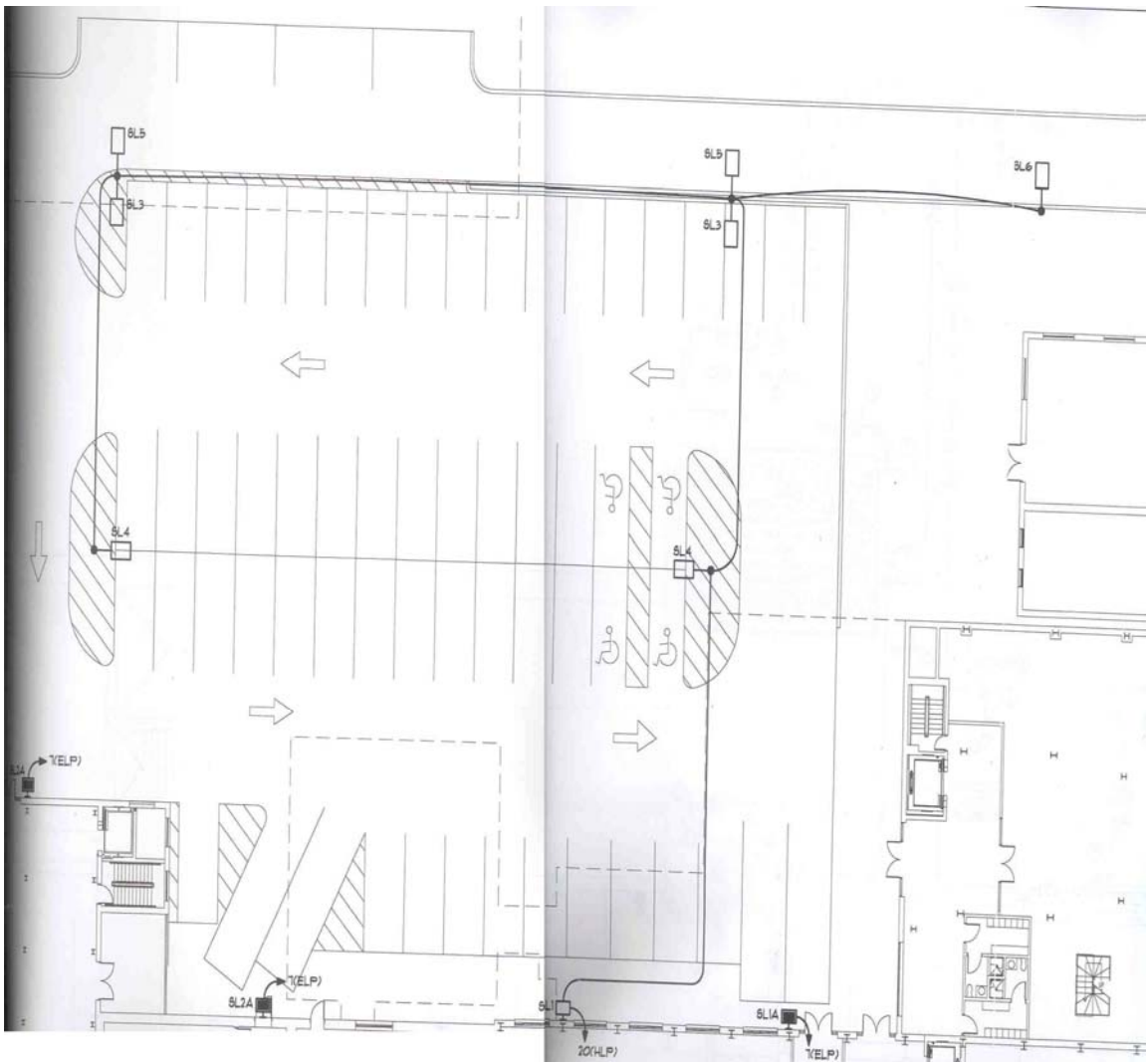
The Radiosity Solution shows that the space is also very unevenly illuminated, with patches of light on each of the walls and a large bright spot in the middle of the table.



Existing Conditions for Parking Lot

The Parking Lot for the Natty Boh building share two sides with the building itself, one side with a neighboring building with the same owner, and its last with Dillon Street. Due to the number of different entrances to the building, there are no clearly defined paths for pedestrian movement throughout the lot.

Lighting Layout



Luminair Schedule

Type	Description	Volts	Lamp Data			Manufacture & catalog no.
			No.	watts	code	
Pole	Pole mounted full cut-off outdoor luminair	277	1	175	MH17 5/U/M	Eurotique EM17 175M MED ACD SR3
Wall	12" wall mounted outdoor fluorescent fixture	277	2	42	42PL	Peachtree Ltg. 10 APTR 2/42PL T HORZ OPEN CONE

Objects

The only obstructions within the lot are two islands to help define the flow of traffic through the space.

Parking Lot Design Criteria

-
- | | |
|--------------|---|
| Tasks | <ul style="list-style-type: none"> ○ Parking ○ Walking from vehicle to building ○ Entering the lobbies |
|--------------|---|
-

- | | |
|---------------------------|---|
| Illuminance Levels | <ul style="list-style-type: none"> ○ Horizontal Illuminance on ground in Parking area <ul style="list-style-type: none"> - 2 lux recommended by IESNA 9th Edition - 20:1 maximum uniformity ratio - Slightly higher illuminance values to be used near lot entrance, exit, and cross-isles. Approximatly 5-10 lux ○ Horizontal Illuminance on ground in pedestrian paths <ul style="list-style-type: none"> - 5-10 lux to be used for pedestrian safety ○ Vertical Illuminance 5ft above pavement <ul style="list-style-type: none"> - 1 lux to allow good visibility of obstructions such as curbs and poles |
|---------------------------|---|

Design Considerations

- Must comply National Park Service Recommendations for Historic Buildings.
- Must use Darksky compliant fixtures.

Control System

- The circuit should be on a time-controlled device to turn them on at dusk and off at dawn.

Power Density

- 0.3 W / sq. ft. allowed for parking garages

Light Loss Factors

<u>Luminair(s)</u>	<u>Ballast Factor</u>	<u>Luminair Dirt Depreciation</u>	<u>Lamp Lumen Depreciation</u>	<u>Total LLF</u>
Pole	1.0	.84 (maintenance category III) (Dirty Atmosphere) (12 month cleaning cycle)	.73 <i>Mean/Initial</i> 9300 / 12800	.62 = 1.0*.84*.73
Wall	1.0	.84 (maintenance category I) (Dirty Atmosphere) (12 month cleaning cycle)	.85 <i>Mean/Initial</i> 2720/3200	.71 = 1.0*.84*.85

Power Density

Fixture	#	Watts	Total Watts P = # x Watts
Pole	8	213.5W	P = 8 x 213.5W = 1708W
Wall	4	89W	P = 4 x 89W = 356W
		Total Watts	1708 + 356 = 2064W

Power Density = 2064W / (173' x 248')
= .05 W / sq. ft.

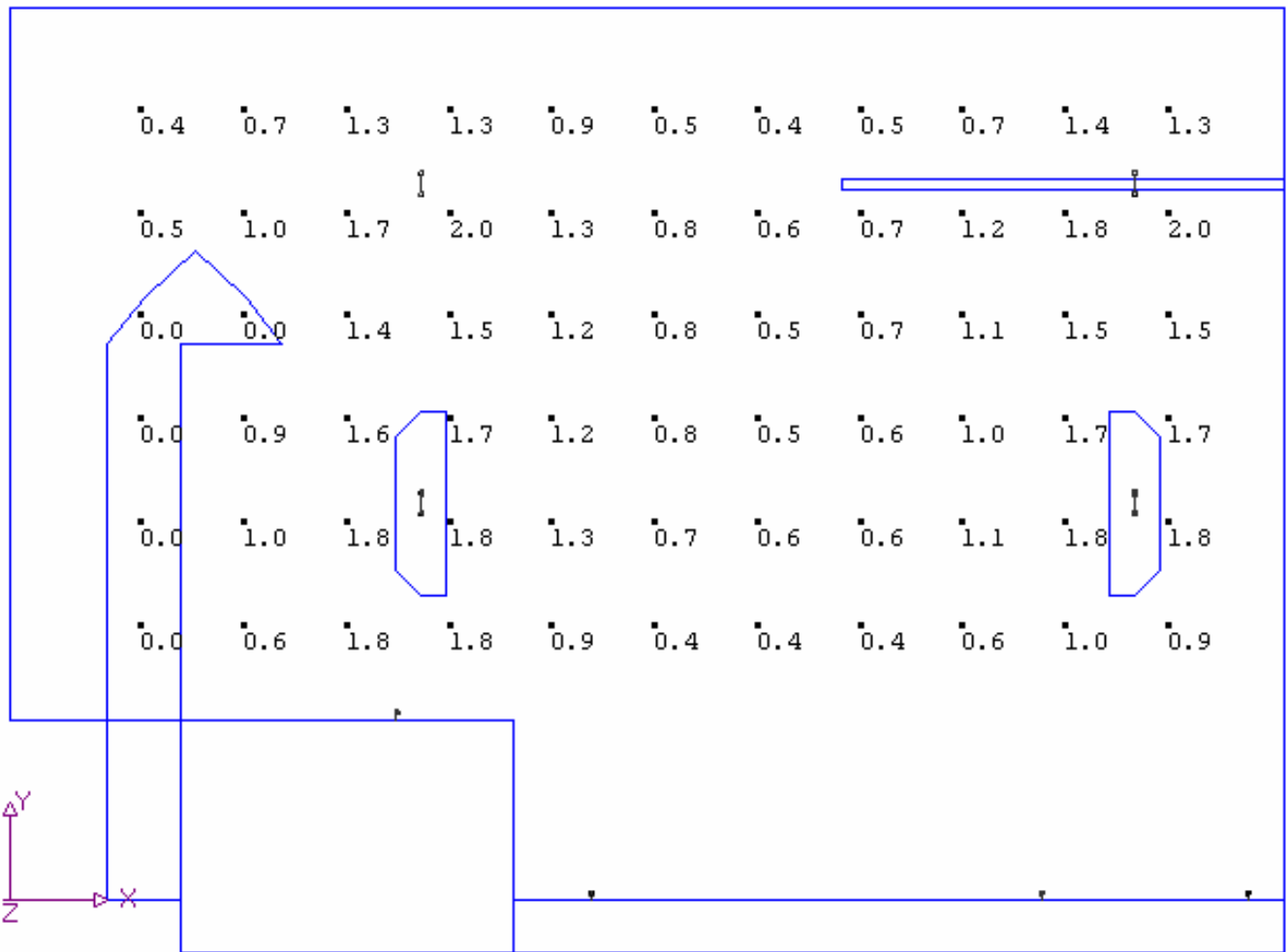
Power density is **well within** ASHRAE 90.1 power allowances.

Analysis of Existing Conditions

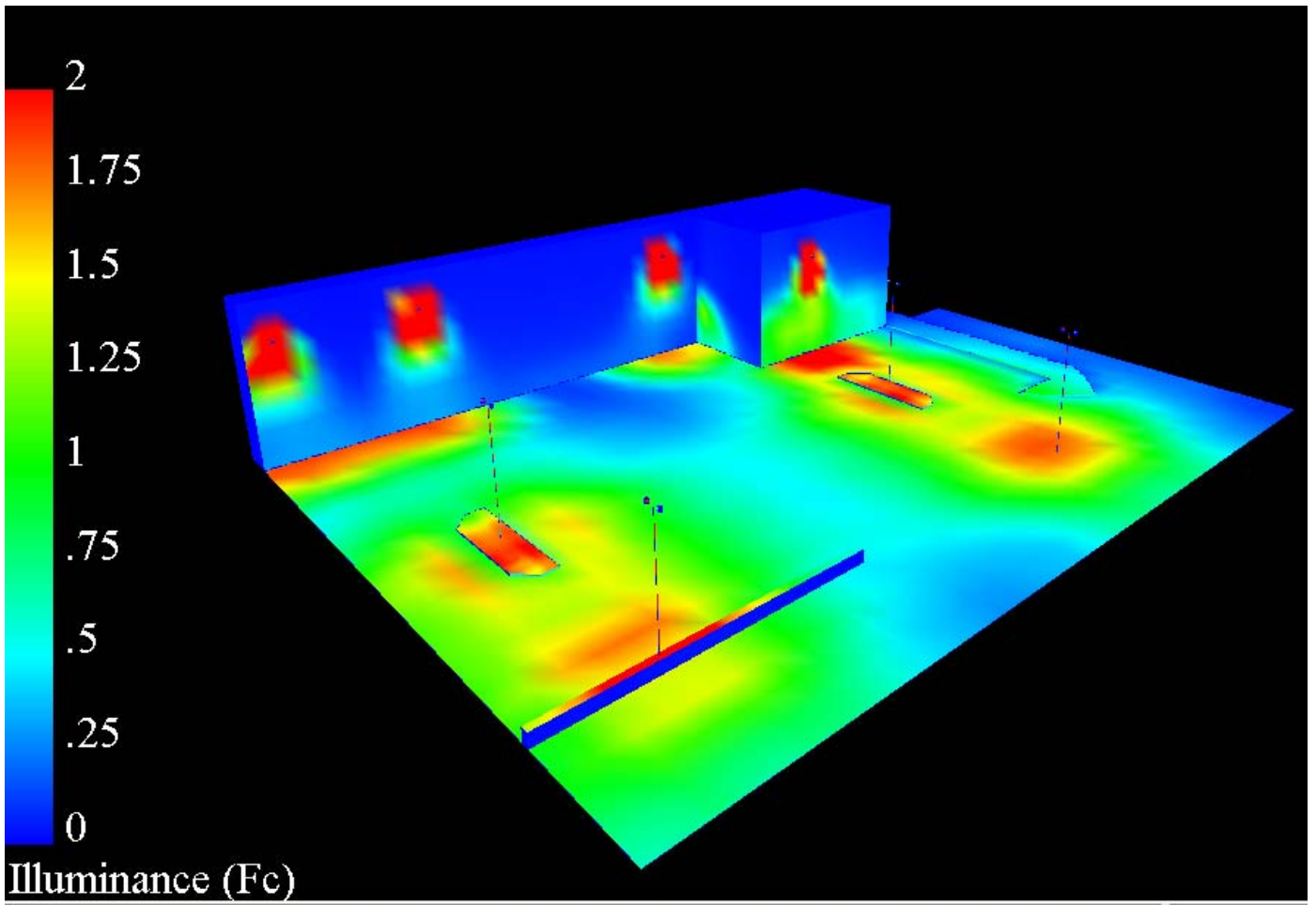
Simplified Parking Lot

The Illuminance Values at ground level in the parking lot are , on average, 1 fc lower than is suggested. More luminaires are probably needed

CalcPts
Illuminance Values (Fc)
Average=1.00
Maximum=2.0
Minimum=0.0
Avg/Min=0.00
Max/Min=0.00



Radiosity Solution



Illuminance (Fc)