

**THE URBN CENTER &
URBN CENTER ANNEX**

AE SENIOR THESIS | FINAL PRESENTATION

JOHNATHAN COOK



URBN CENTER & URBN CENTER ANNEX

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION



- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION

LOCATION

URBN Center: 3501 Market Street
Philadelphia, PA 19104

URBN Center Annex: 3401 Filbert Street
Philadelphia, PA

SIZE

URBN Center: 132,315 sf

URBN Center Annex: 19,399 sf

OCCUPANCY

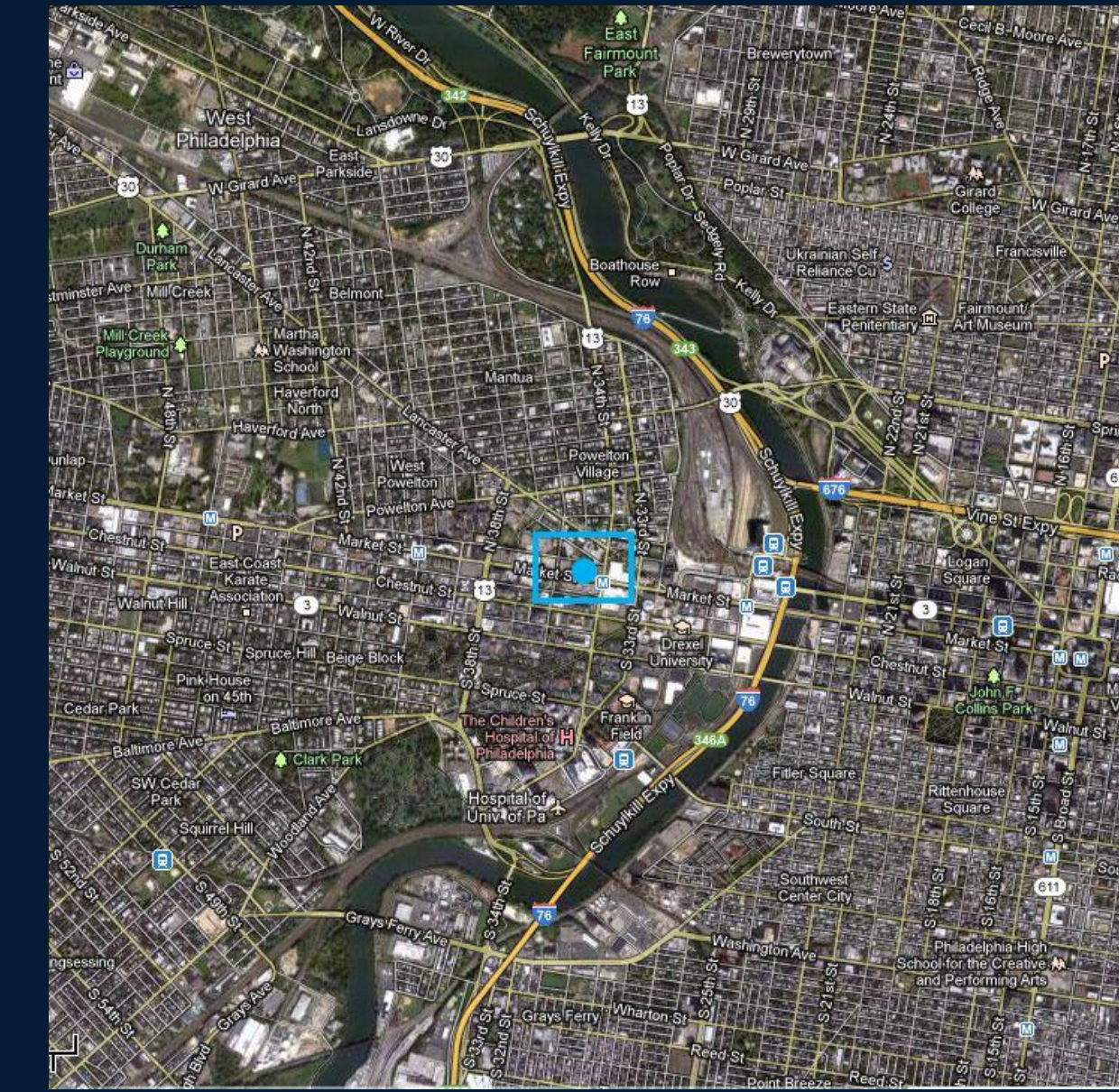
Educational

PROJECT TEAM

Owner: Drexel University

Former Architect: Venturi, Scott Brown & Associates

Architect: Meyer, Scherer & Rockcastle, Ltd.



➤ INTRODUCTION

➤ LIGHTING DESIGN SCHEME

➤ MAIN LOBBY

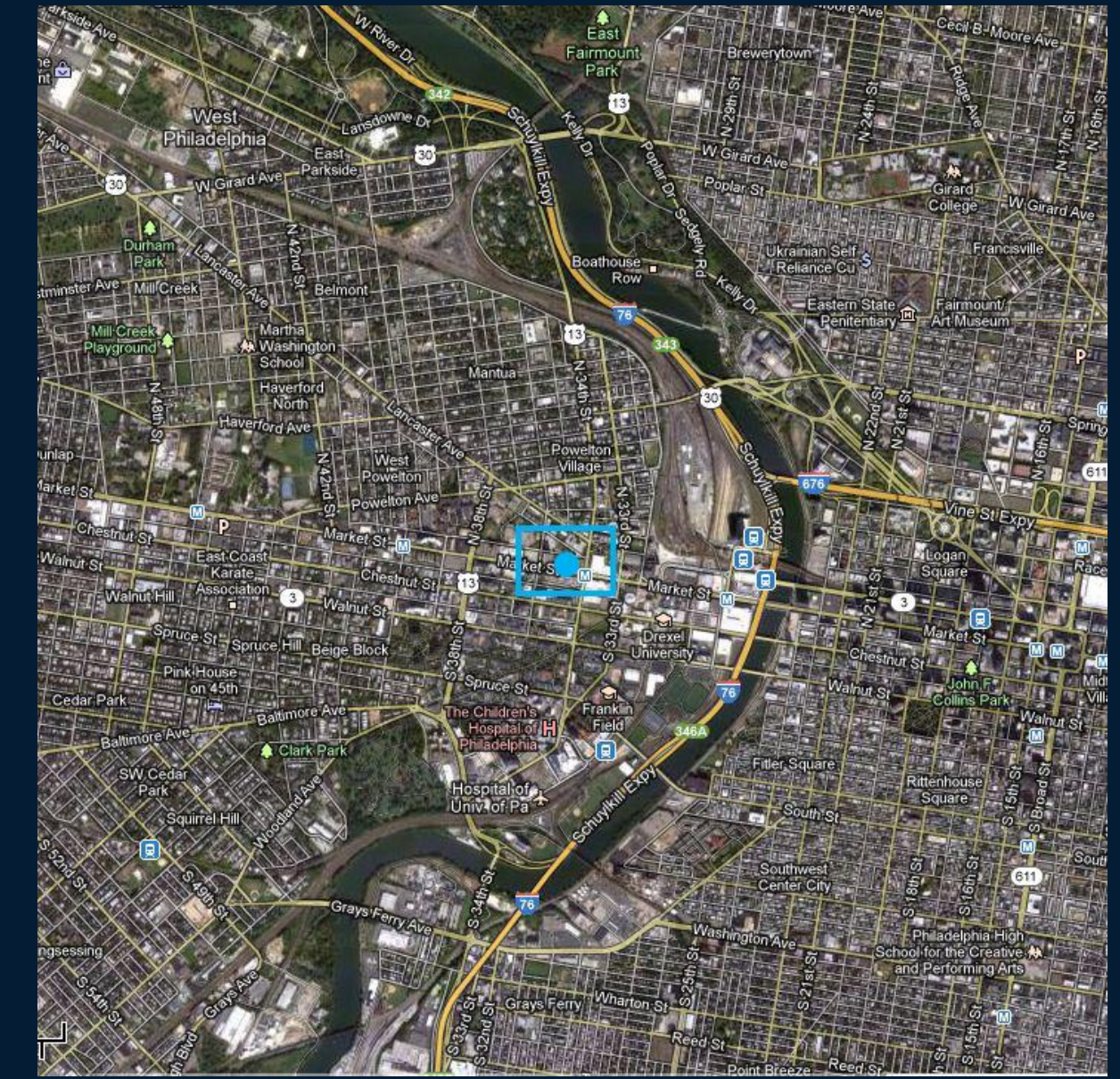
➤ ELECTRICAL DISTRIBUTION

➤ ARCHITECTURAL BREADTH

➤ MECHANICAL BREADTH

➤ EXTERIOR FAÇADE

➤ CONCLUSION



- INTRODUCTION
- **LIGHTING DESIGN SCHEME**
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION

Antoinette Westphal College of Media Arts & Design



The URBN Center will become Drexel University's hub for **creative** minds to **gather, share** ideas and **work together** to bring those ideas **from the mind to the page**, and into the world of tomorrow.

The Robert Venturi-designed building is being transformed into a bold new center for **imagination** and high-end production. With the intention of **sharing** the URBN Center with the **community**, students will enjoy newfound **collaboration** with industry professional in addition to other Drexel schools and colleges.

The URBN Center will be the new home for programs in the Antoinette Westphal College of Media Arts & Design including *Animation, Architecture, Arts Administration, Design & Merchandising, Digital Media, Entertainment & Arts Management, Fashion Design, Game Art & Production, Graphic Design, Interior Design, Music Industry, Product Design, and Web Development & Interaction.*

-<http://drexel.edu/ia/urbn/home.html>

"At Westphal College, we **boldly re-imagine** the world through inspired design, media and the arts. And our **imagination** is boundless. Our faculty members, distinguished leaders in their fields, challenge our students to push the boundaries of their **creativity** in order to **transform** the world around us. The new URBN Center will greatly enhance our students' educational experiences by offering more resources and **opportunities to create** than ever before."

- Allen Sabinson, Dean

Connection



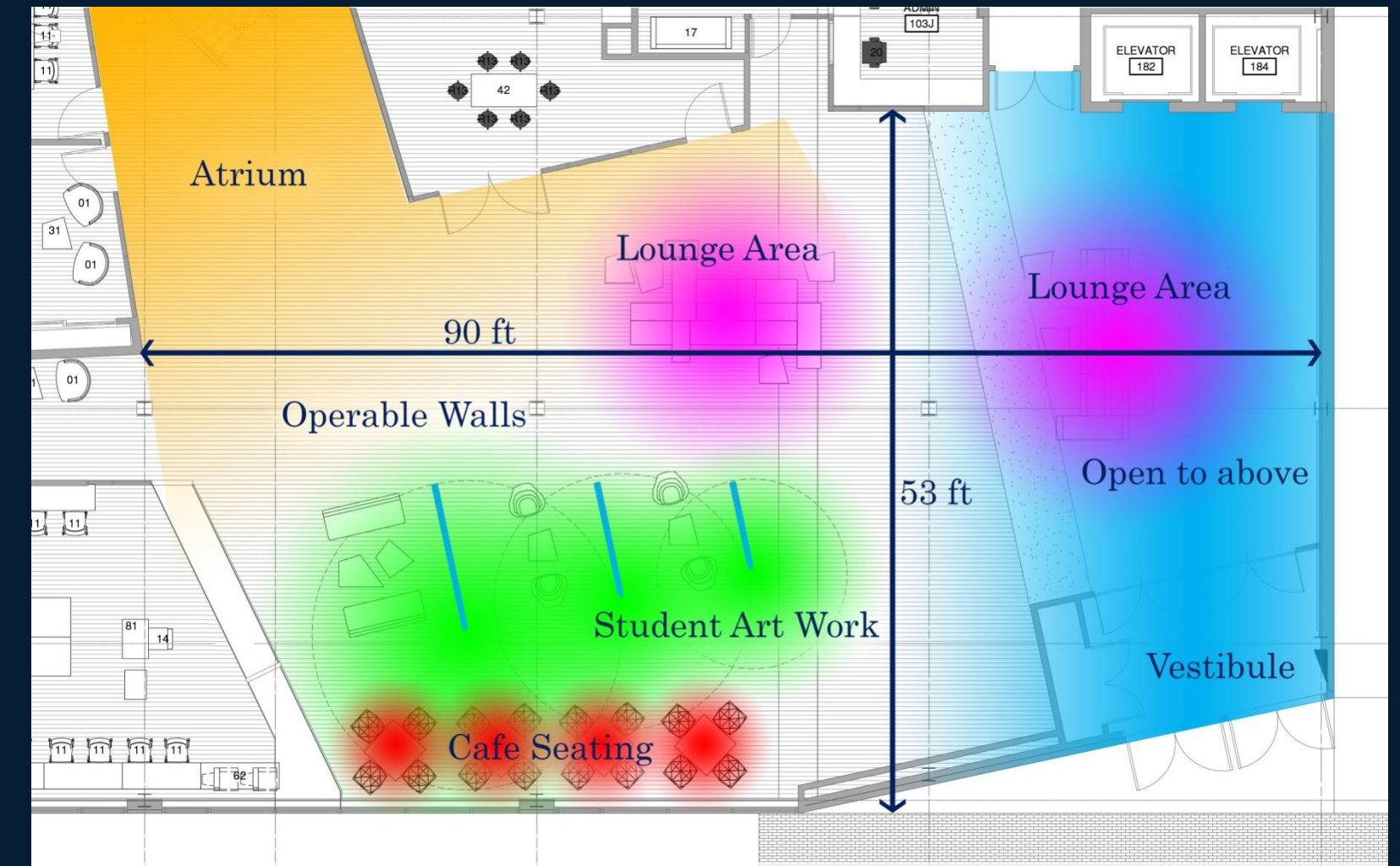
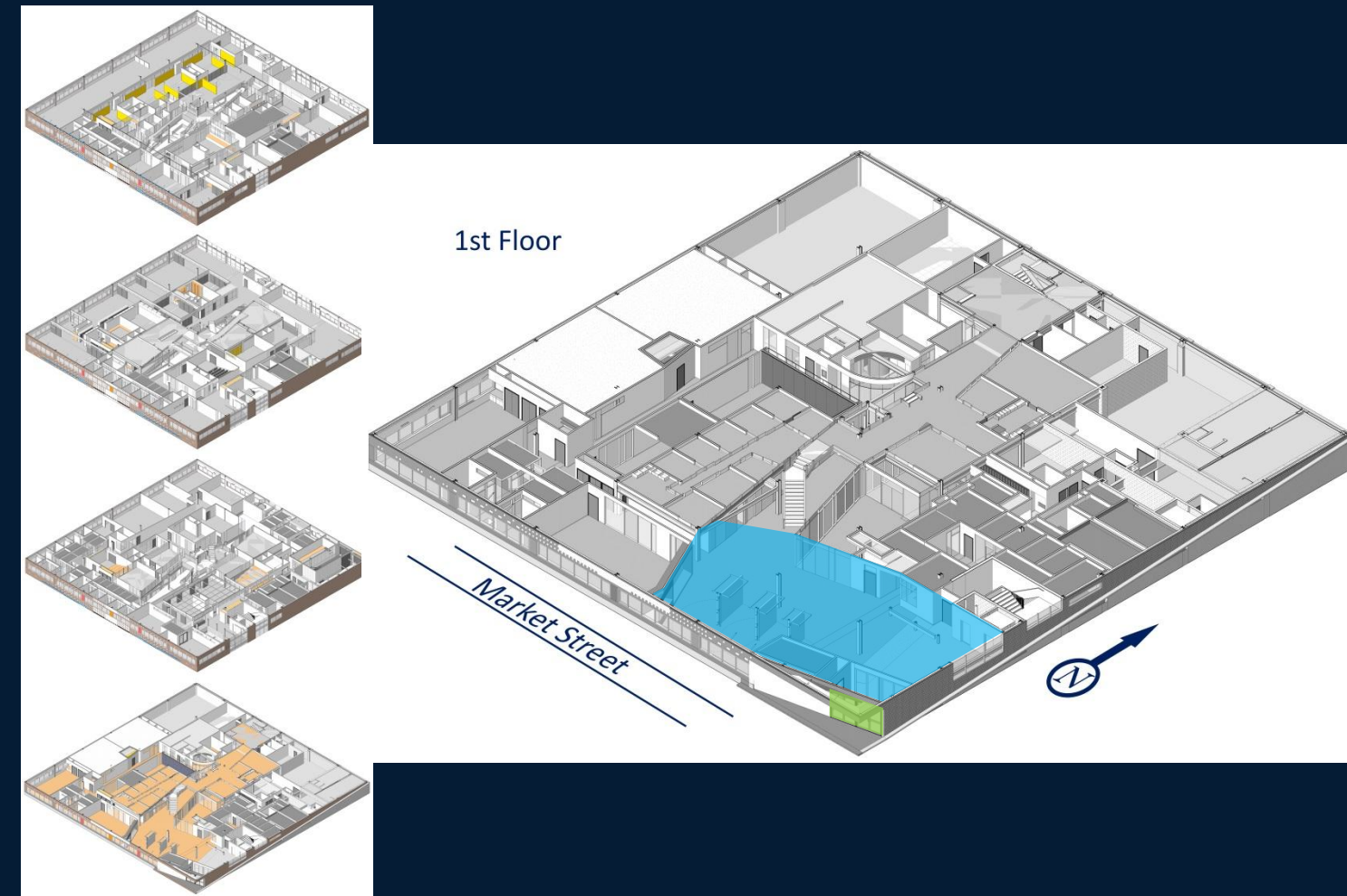
Collaboration



Creation



- INTRODUCTION
- LIGHTING DESIGN SCHEME
- **MAIN LOBBY**
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION



- INTRODUCTION
- LIGHTING DESIGN SCHEME
- **MAIN LOBBY**
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION

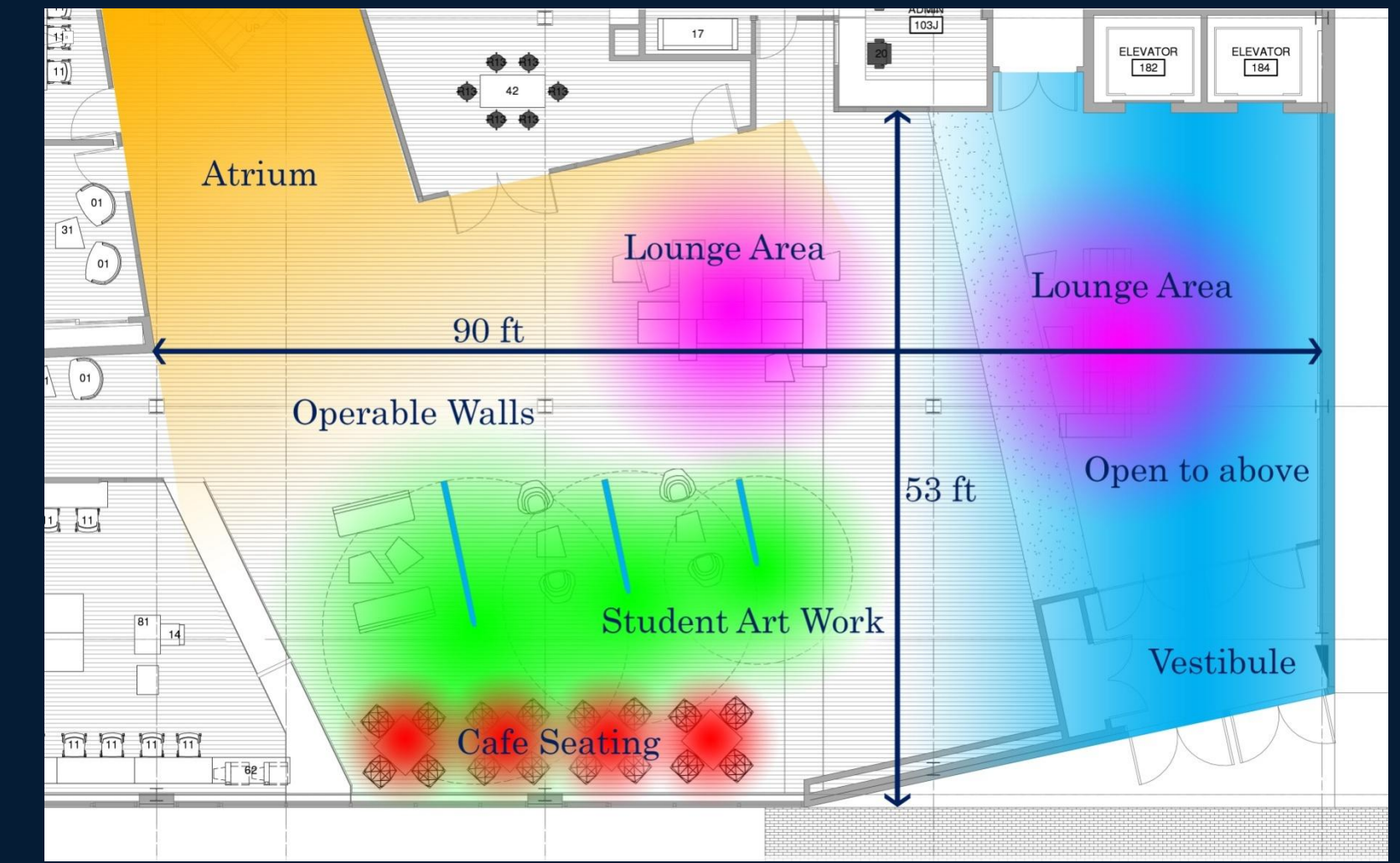
Draw people together
 Public Space
 Face rendering
 Occupant interaction
 Playfulness | Patterns of light
 Focal points | Operable walls – Café

LIGHTING FOR EDUCATION | TRANSITION SPACES | LOBBIES | CIRCULATION, ELEVATOR LOBBIES

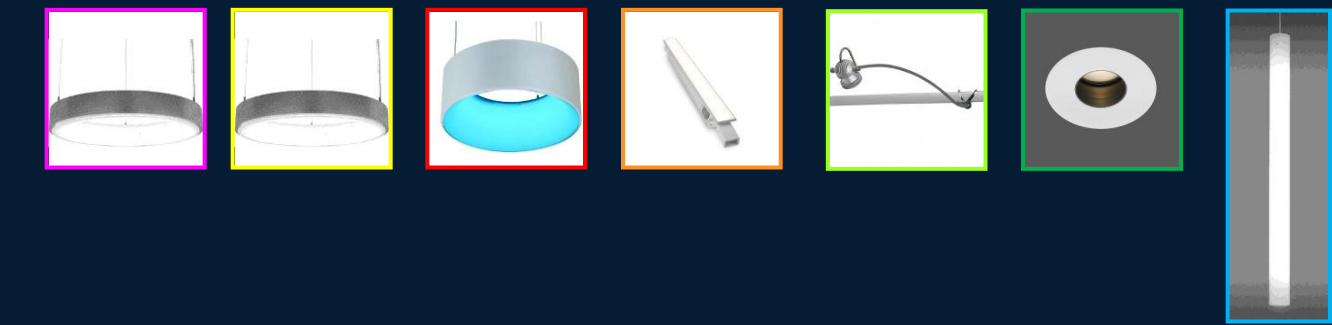
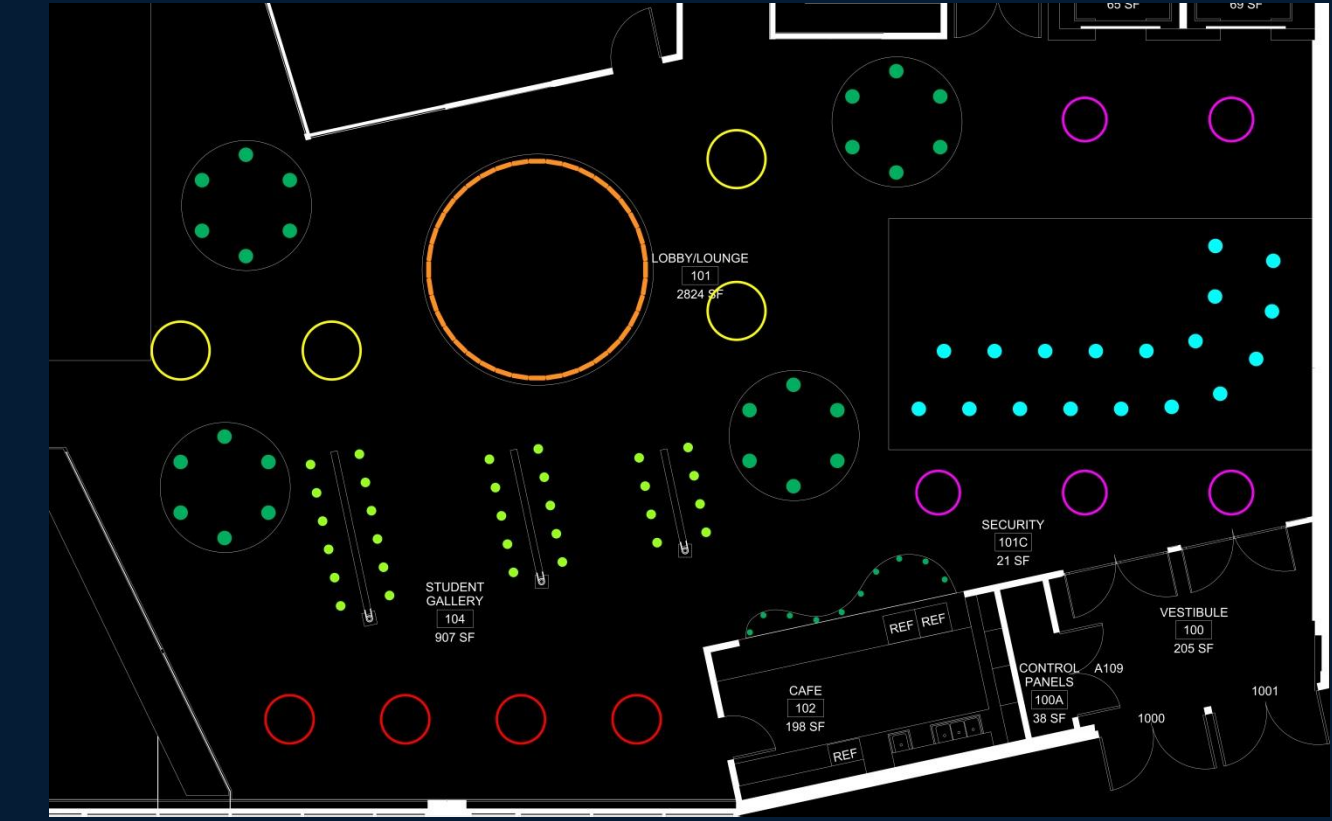
RECOMMENDED MAINTAINED ILLUMINANCE TARGETS		
Avg. Horizontal at 0' (lux)	Avg. Vertical (lux)	Avg/Min (Hor.)
100 (Day)	30 (Day)	4
50 (Night)	20 (Night)	4

TABLE 9.6.1 | SPACE-BY-SPACE METHOD

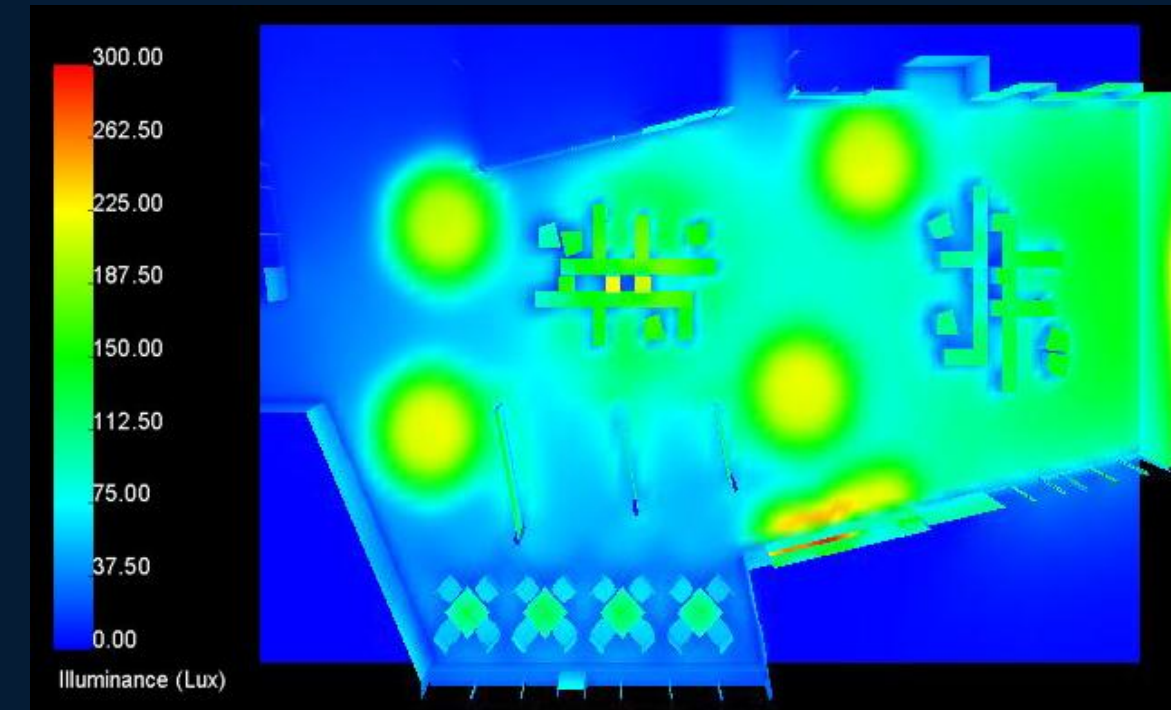
LIGHTING POWER DENSITY	
Common Space Type	LPD (W/ft ²)
Lobby	0.90



- INTRODUCTION
- LIGHTING DESIGN SCHEME
- **MAIN LOBBY**
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION



- INTRODUCTION
- LIGHTING DESIGN SCHEME
- **MAIN LOBBY**
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION



ILLUMINANCE SUMMARY DAY		
Calculation	Horizontal at 0' (lux)	Target
Average Illuminance	107	100
Maximum Illuminance	263	--
Minimum Illuminance	37	--
Avg/Min	2.91	4

LIGHTING POWER DENSITY			
Luminaire	Watts/Luminaire	Quantity	Total Watts/Luminaire Type
A1[E]	44	5	220.0
A2	55	4	220.0
B[E]	75.3	4	301.2
C	12.5	40	500.0
D	3	31	93.0
F	32	33	1,056.0
G1	19	5	95.0
G2	25.8	6	154.8
G3	32.6	7	228.2
Total Watts			2,868.2
Area (ft²)			3,483.0
LPD			0.82

LIGHTING POWER DENSITY	
Common Space Type	LPD (W/ft ²)
Lobby	0.90

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- **ELECTRICAL DISTRIBUTION**
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION

NORMAL POWER LOAD CALCULATION						
Luminaire Type	Amount	Operating Voltage	Input Current	VA	Continuous Loading	Total kVA
A1	5	277	0.39	108.03	135.04	0.675
A2	4	277	0.39	108.03	135.04	0.540
B	4	277	0.39	108.03	135.04	0.540
C	5	277	0.05	12.63	15.79	0.079
D	4	277	0.14	39.89	49.86	0.199
F	34	277	0.12	33.24	41.55	1.413
G1	5	277	0.12	33.24	41.55	0.208
G2	6	277	0.09	24.93	31.16	0.187
G3	7	277	0.07	19.39	24.24	0.170
Total						4.011

CKT 10	
Luminaire Type	Total kVA
A1[E]	0.675
A2	0.540
B[E]	0.540
C	0.632
D	0.199
Total	2.587

CKT 12	
Luminaire Type	Total kVA
F	1.412
G2	0.186
G3	0.169
G1	0.207
Total	1.977

BRANCH PANEL: LP1 1												
Location:		Level 1 West Elec. Closet		Volts:		480/277 Y		A.I.C. Rating:		25 kAIC		
Supply From:		LMPD		Phases:		3		Mains Type:		MLO		
Mounting:		Surface		Wires:		4		Mains Rating:		100 A		
Enclosure:		Type 1						MCB Rating:				
Wire	CKT	Load Name	Trip	Poles	A (VA)	B (VA)	C (VA)	Poles	Trip	Load Name	CKT	Wire
1		LTG. SWITCHED ROOMS	20A	1	20142298			1	20A	LTG. SWITCHED ROOMS	2	
3		LTG. SWITCHED ROOMS	20A	1		30223213		1	20A	LTG. SWITCHED ROOMS	4	
5		LTG. SWITCHED ROOMS	20A	1			24661413	1	20A	LTG. SWITCHED ROOMS	6	
7		LTG. ZONES TZ11, TZ11U, TZ11D	20A	1	3386500			1	20A	LTG. 1A, TZ1A, TZ1AU, TZ1AD	8	
9		TMIRP1	45A			117802000		1	20A	LTG. GZ11, GZ15, GZ16	10	
11	--	--	--	--			126902000	1	20A	LTG. GZ12	12	
13	--	--	--	--	113402000			1	20A	LTG. GZ13	14	
15	Spare	20A	1			02000		1	20A	LTG. GZ14	16	
17	Spare	20A	1				00	1	20A	Spare	18	
19	Spare	20A	1		00			1	20A	Spare	20	
21	Spare	20A	1			00		1	20A	Spare	22	
23	Spare	20A	1				00	1	20A	Spare	24	
25	Spare	20A	1		00			1	20A	Spare	26	
27	Spare	20A	1			00		1	20A	Spare	28	
29	Spare	20A	1				00	1	20A	Spare	30	
31	Spare	20A	1		00			1	20A	Spare	32	
33	Spare	20A	1			00		1	20A	Spare	34	
35	Spare	20A	1				00	1	20A	Spare	36	
37	Spare	20A	1		00			1	20A	Spare	38	
39	Spare	20A	1			00		1	20A	Spare	40	
41	Spare	20A	1				00	1	20A	Spare	42	
Total Load (VA)					21538	22015	18569					
Total Amps (A)					78	79	67					
Load Classification		Connected Load	Demand Factor	Estimated Load	Panel Totals							
Lighting		18312	100%	18312	Total conn. Load:		62122					
Power		8000	80%	6400	Total Est. Demand:		53360					
AV		9450	80%	7560	Total Conn. Current:		75					
AV IG		26360	80%	21088	Total Est. Demand Current:		64					

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- **ELECTRICAL DISTRIBUTION**
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION

NORMAL POWER LOAD CALCULATION						
Luminaire Type	Amount	Operating Voltage	Input Current	VA	Continuous Loading	Total kVA
A1	5	277	0.39	108.03	135.04	0.675
A2	4	277	0.39	108.03	135.04	0.540
B	4	277	0.39	108.03	135.04	0.540
C	5	277	0.05	12.63	15.79	0.079
D	4	277	0.14	39.89	49.86	0.199
F	34	277	0.12	33.24	41.55	1.413
G1	5	277	0.12	33.24	41.55	0.208
G2	6	277	0.09	24.93	31.16	0.187
G3	7	277	0.07	19.39	24.24	0.170
Total						4.011

CKT 10	
Luminaire Type	Total kVA
A1[E]	0.675
A2	0.540
B[E]	0.540
C	0.632
D	0.199
Total	2.587

CKT 12	
Luminaire Type	Total kVA
F	1.412
G2	0.186
G3	0.1696
G1	0.207
Total	1.977

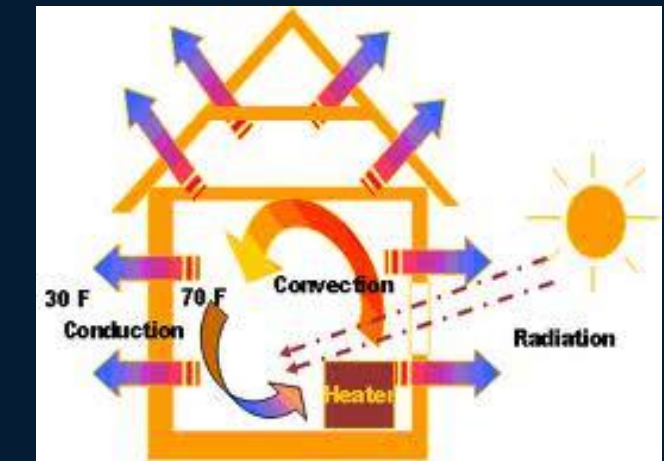
BRANCH PANEL: LP1 1 REVISED													
Location: Level 1 West Elec. Closet				Volts: 480/277 V				A.I.C. Rating: 25 kAIC					
Supply From: LMPD				Phases: 3				Mains Type: MLO					
Mounting: Surface				Wires: 4				Mains Rating: 100 A					
Enclosure: Type 1								MCB Rating:					
Wire	CKT	Load Name	Trip	Poles	A (VA)	B (VA)	C (VA)	Poles	Trip	Load Name	CKT	Wire	
	1	LTG. SWITCHED ROOMS	20A	1	20142298			1	20A	LTG. SWITCHED ROOMS	2		
	3	LTG. SWITCHED ROOMS	20A	1		30223213		1	20A	LTG. SWITCHED ROOMS	4		
	5	LTG. SWITCHED ROOMS	20A	1			24661413	1	20A	LTG. SWITCHED ROOMS	6		
	7	LTG. ZONES TZ11, TZ11U, TZ11D	20A	1	3386500			1	20A	LTG. 1A, TZ1A, TZ1AU, TZ1AD	8		
	9	TMIRP1	45A			117802587		1	20A	LTG. LOBBY	10		
	11	--	--				126901977	1	20A	LTG. LOBBY	12		
	13	--	--	113400				1	20A	Spare	14		
	15	Spare	20A	1		00		1	20A	Spare	16		
	17	Spare	20A	1			00	1	20A	Spare	18		
	19	Spare	20A	1	00			1	20A	Spare	20		
	21	Spare	20A	1		00		1	20A	Spare	22		
	23	Spare	20A	1			00	1	20A	Spare	24		
	25	Spare	20A	1	00			1	20A	Spare	26		
	27	Spare	20A	1		00		1	20A	Spare	28		
	29	Spare	20A	1			00	1	20A	Spare	30		
	31	Spare	20A	1	00			1	20A	Spare	32		
	33	Spare	20A	1		00		1	20A	Spare	34		
	35	Spare	20A	1			00	1	20A	Spare	36		
	37	Spare	20A	1	00			1	20A	Spare	38		
	39	Spare	20A	1		00		1	20A	Spare	40		
	41	Spare	20A	1			00	1	20A	Spare	42		
Total Load (VA)					19538	20602	18546						
Total Amps (A)					71	74	67						
Load Classification			Connected Load	Demand Factor	Estimated Load			Panel Totals					
Lighting			14321	100%	14321			Total conn. Load:		58686			
Power			8000	80%	6400			Total Est. Demand:		49369			
AV			9450	80%	7560			Total Conn. Current:		71			
AV IG			26360	80%	21088			Total Est. Demand Current:		60			

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- **ARCHITECTURAL BREADTH**
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- CONCLUSION

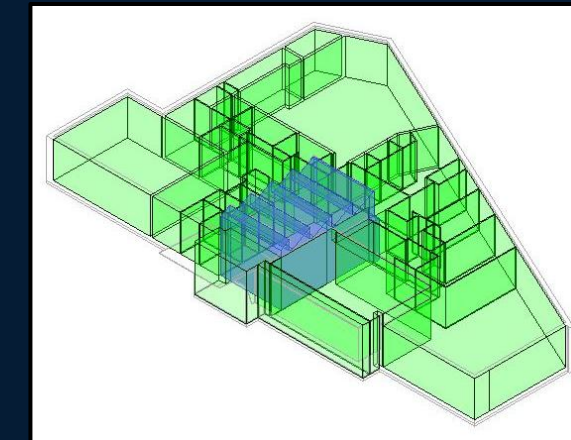
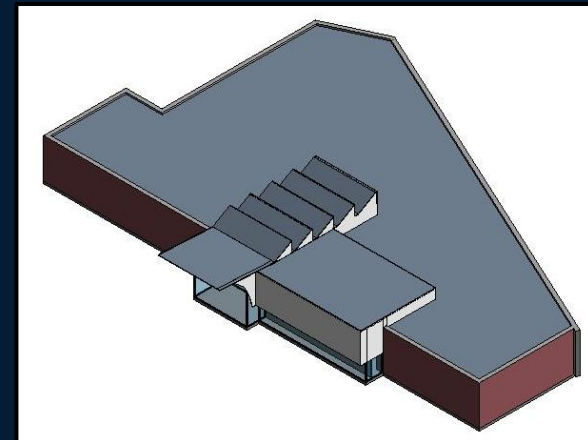
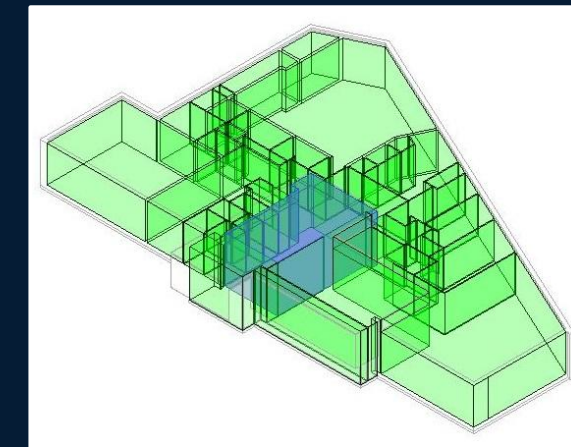
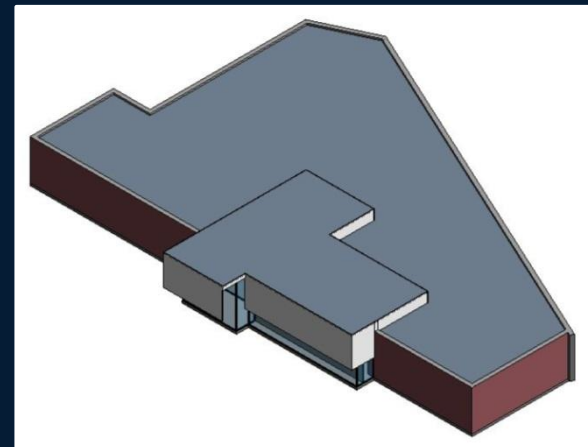


- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- **MECHANICAL BREADTH**
- EXTERIOR FAÇADE
- CONCLUSION

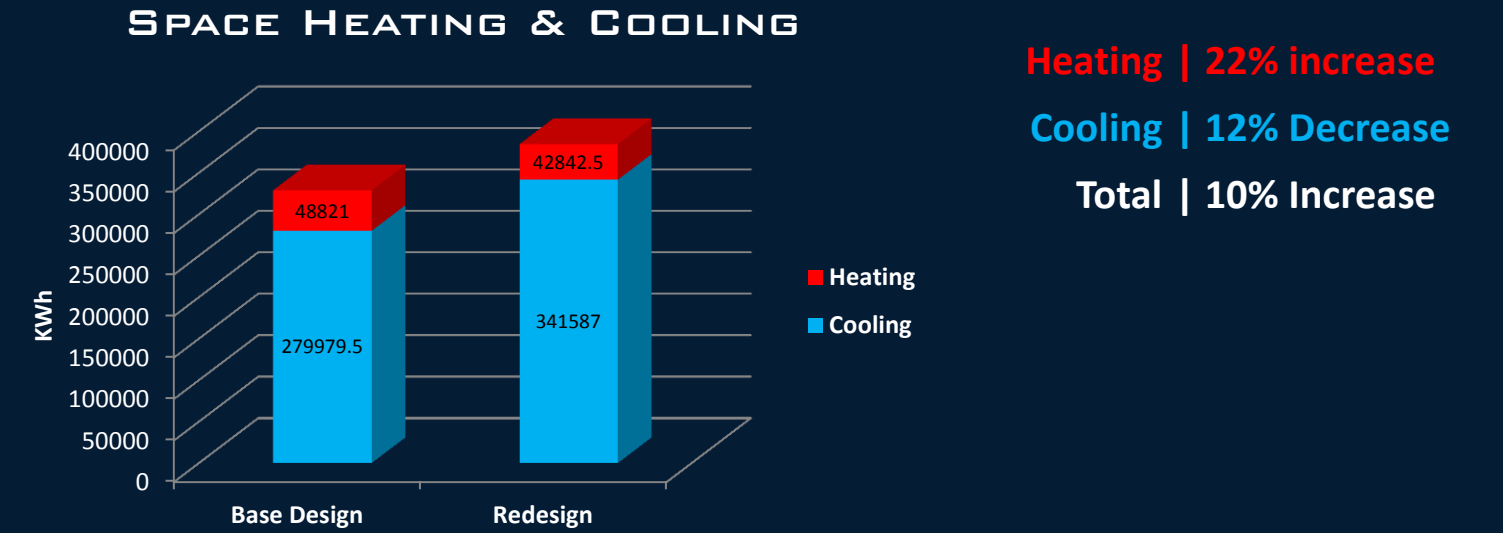
LIGHTING LOAD VS. HEATING & COOLING LOAD



- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- **MECHANICAL BREADTH**
- EXTERIOR FAÇADE
- CONCLUSION

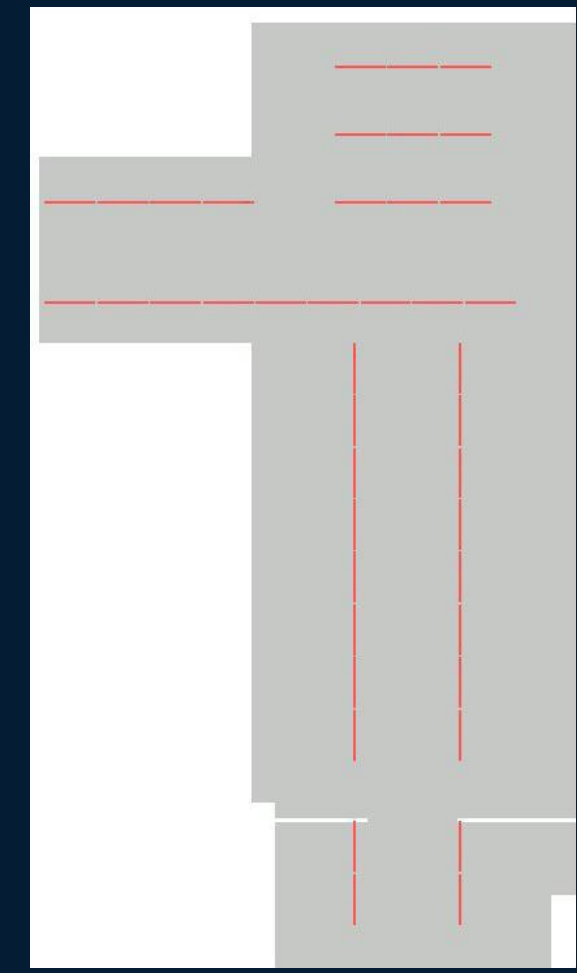
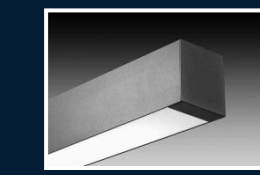
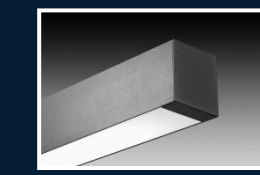
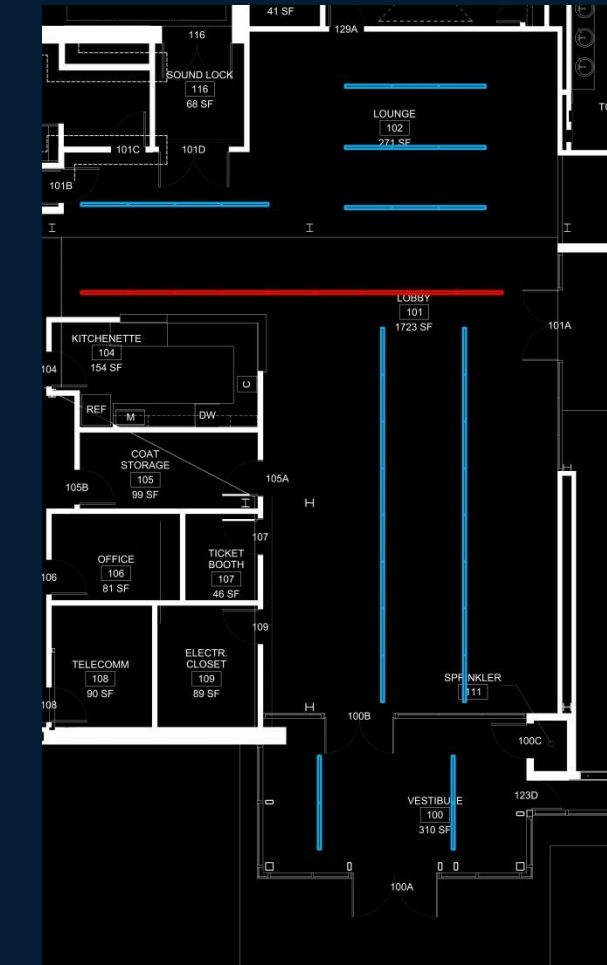
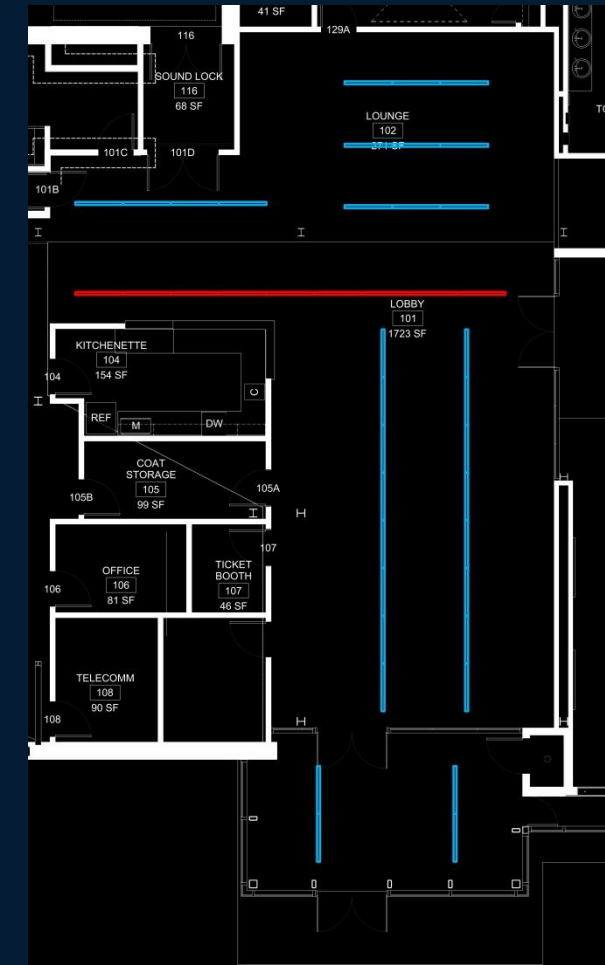


Autodesk Green Building Studio

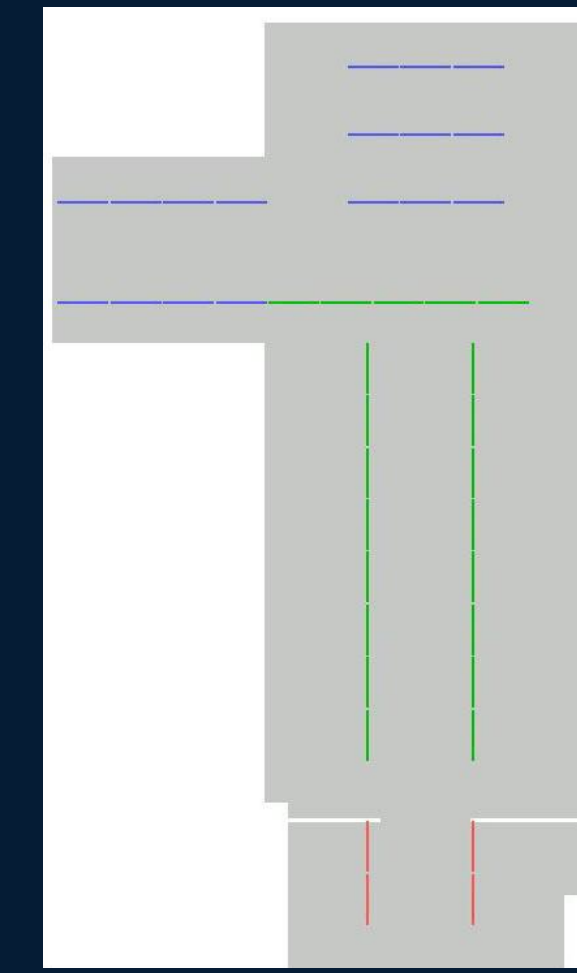


SPACE HEATING & COOLING - ENERGY ANALYSIS		
Design	Annual kWh	
	Space Cooling	Space Heating
Original Design	279,979.5	48,821
Redesign	341,587	42,842.5
Change	61,607.5	-5,978.5
Total Difference	55,629	

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- **MECHANICAL BREADTH**
- EXTERIOR FAÇADE
- CONCLUSION



BASE DESIGN



REDESIGN

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- **MECHANICAL BREADTH**
- EXTERIOR FAÇADE
- CONCLUSION

BASE DESIGN

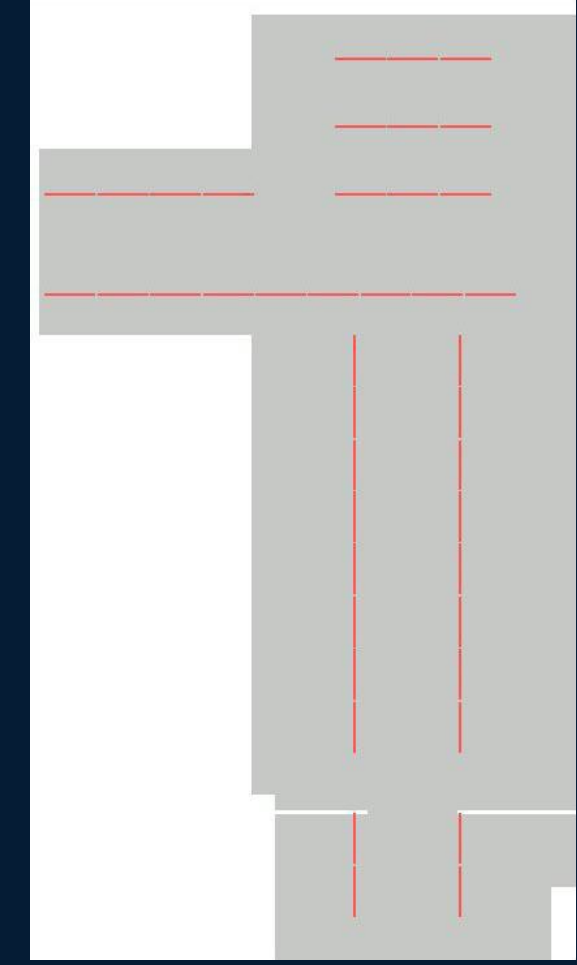
OCCUPANCY – 8 AM TO 6 PM

REDESIGN

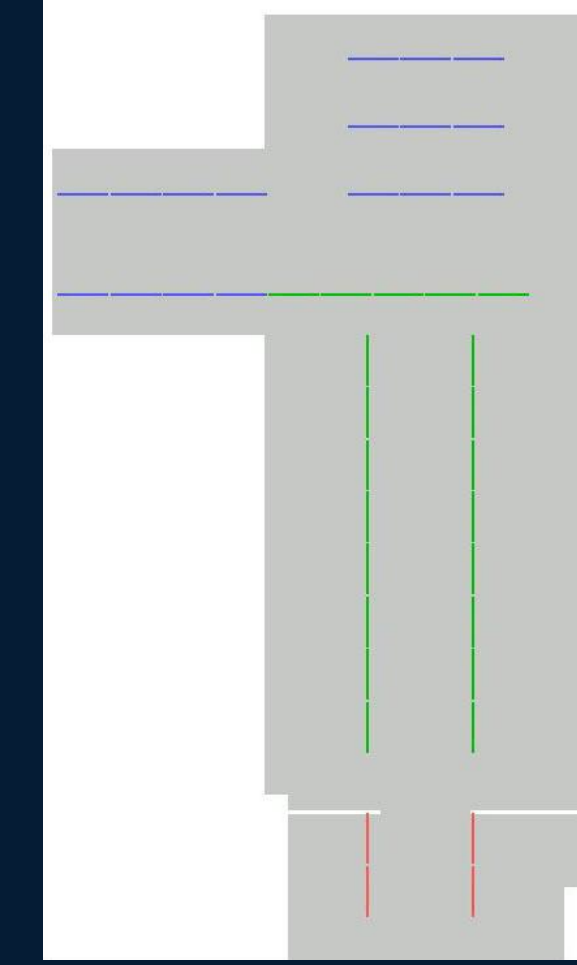
OCCUPANCY – 8 AM TO 6 PM

CLOSED LOOP DIMMING CONTROL | ZONE 1 & 2

ONE PHOTO SENSOR | COSINE DISTRIBUTION



BASE DESIGN



REDESIGN

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- **MECHANICAL BREADTH**
- EXTERIOR FAÇADE
- CONCLUSION

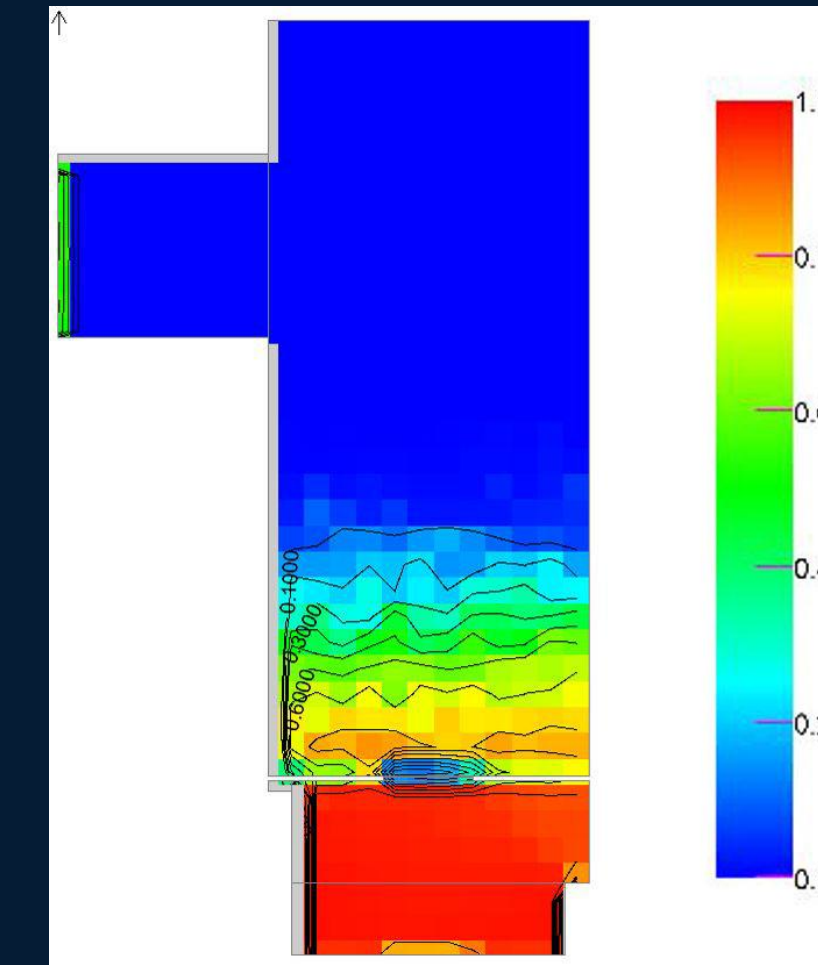
BASE DESIGN

OCCUPANCY – 8 AM TO 6 PM

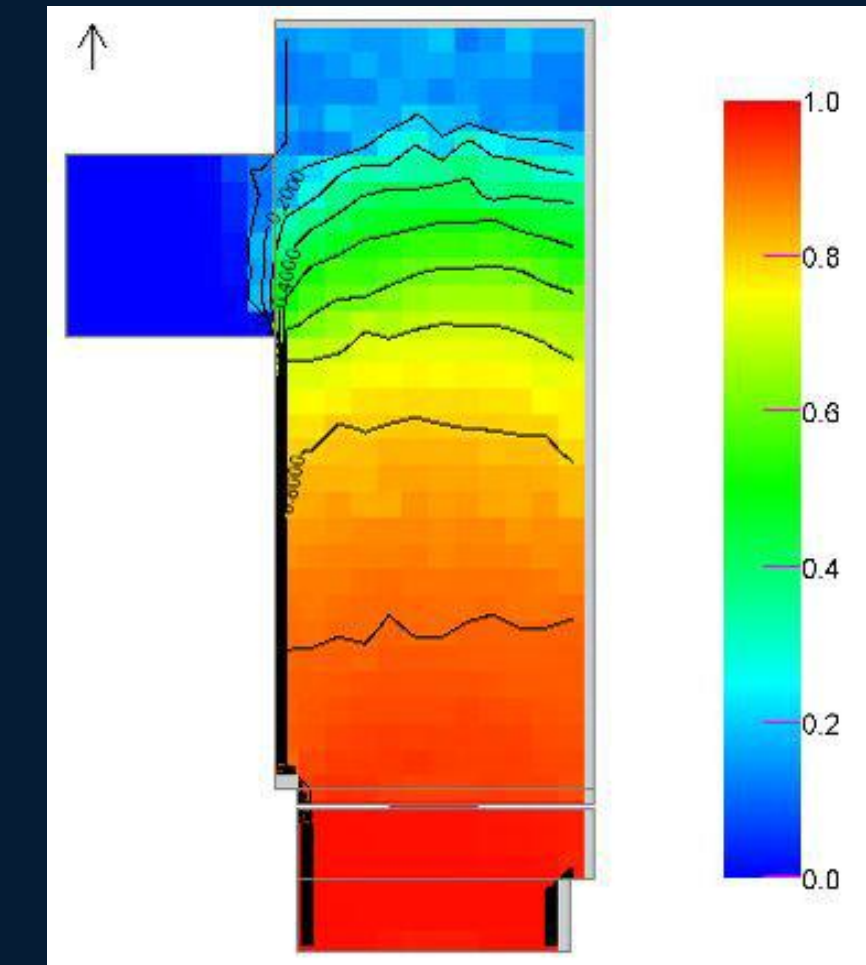
REDESIGN

OCCUPANCY – 8 AM TO 6 PM

CLOSED LOOP DIMMING CONTROL | ZONE 1 & 2
ONE PHOTO SENSOR | COSINE DISTRIBUTION



BASE DESIGN

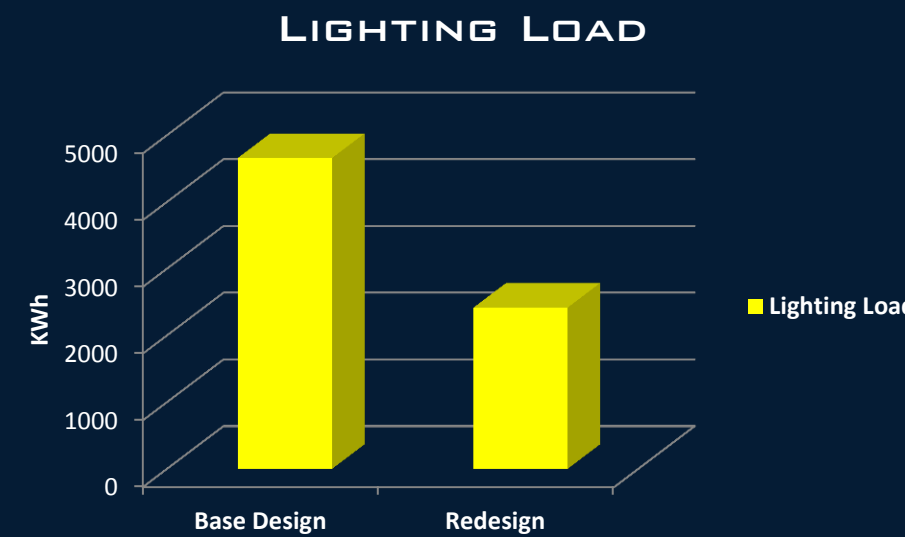


REDESIGN

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- **MECHANICAL BREADTH**
- EXTERIOR FAÇADE
- CONCLUSION

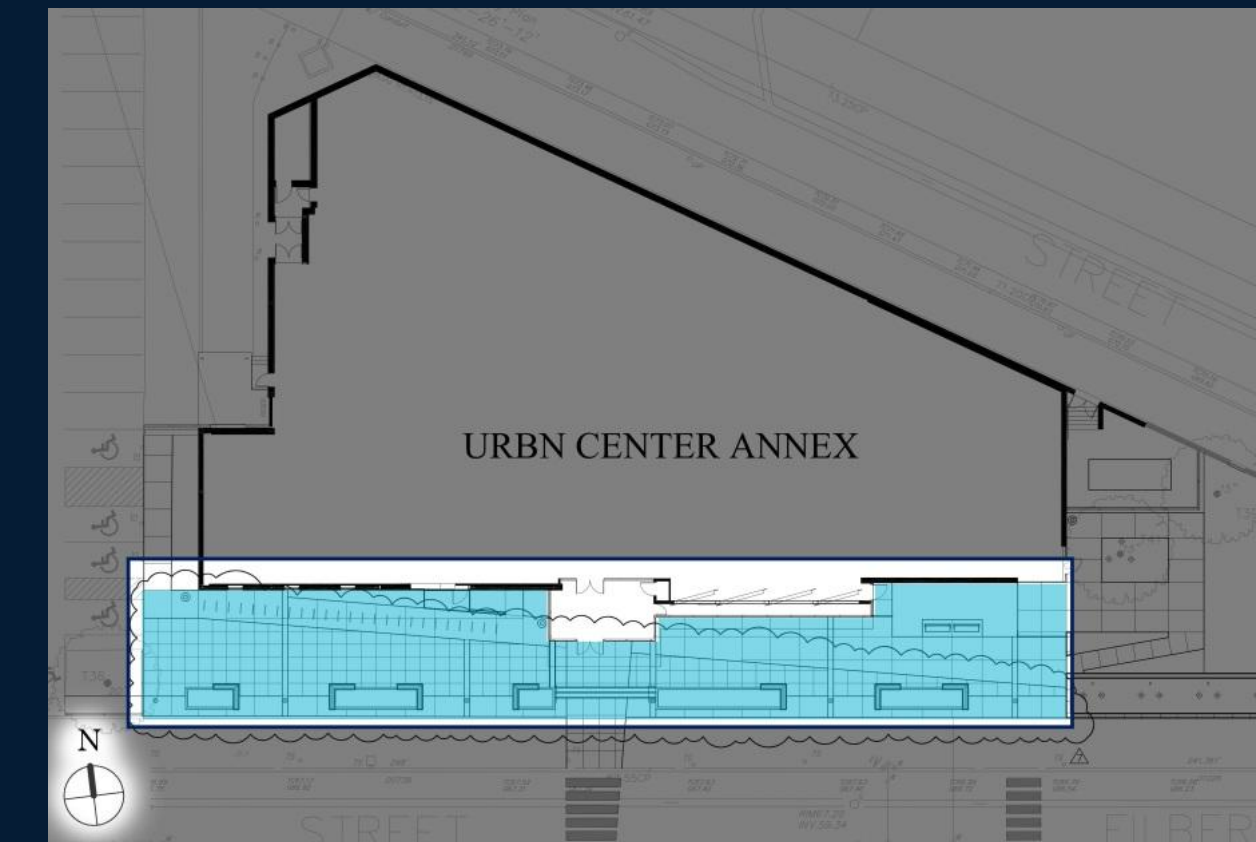
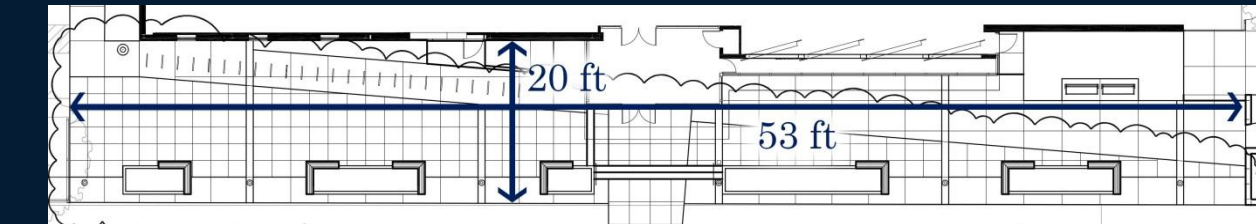
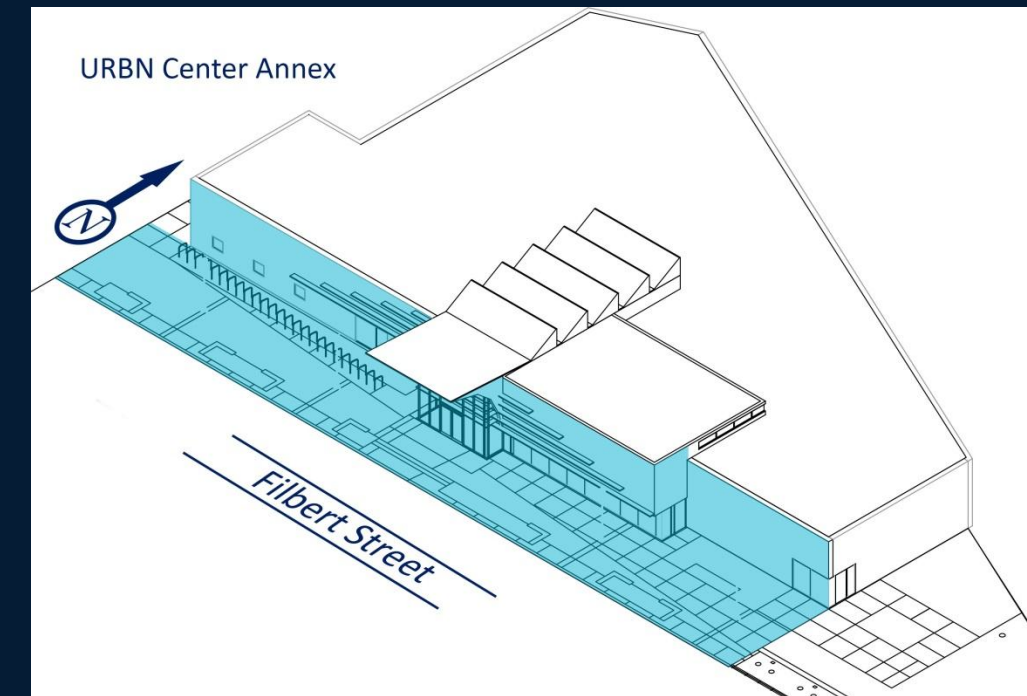
DAYLIGHT HARVESTING - ENERGY ANALYSIS	
Design	Annual KWh
Original Design	4,658
Redesign	2,416
Savings	2,242

ENERGY COMPARISON	
Type	ΔKWh
Space Heating & Cooling	55,629
Lighting	-2,242
Result	53,387



Lighting | 48% decrease

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- **EXTERIOR FAÇADE**
- CONCLUSION



- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- **EXTERIOR FAÇADE**
- CONCLUSION

- Draw people together
- Face rendering
- Occupant interaction
- Sense of security
- Focal point | Main Entrance

LIGHTING FOR EXTERIORS | BUILDING ENTRIES | CANOPIED ENTRIES/EXITS | HIGH ACTIVITY LZ3

RECOMMENDED MAINTAINED ILLUMINANCE TARGETS		
Avg. Horizontal at 0' (lux)	Avg. Vertical (lux)	Uniformity Ratio (Hor.)
30	15	2

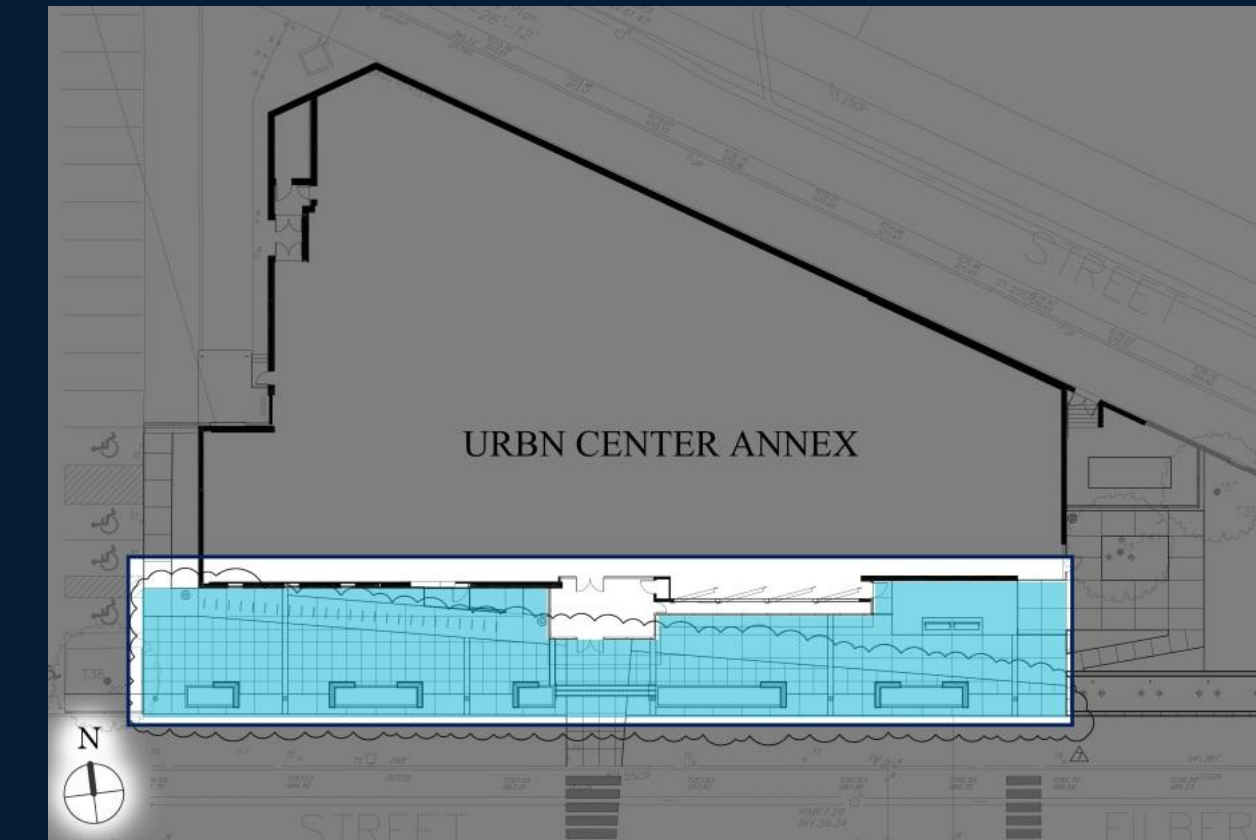
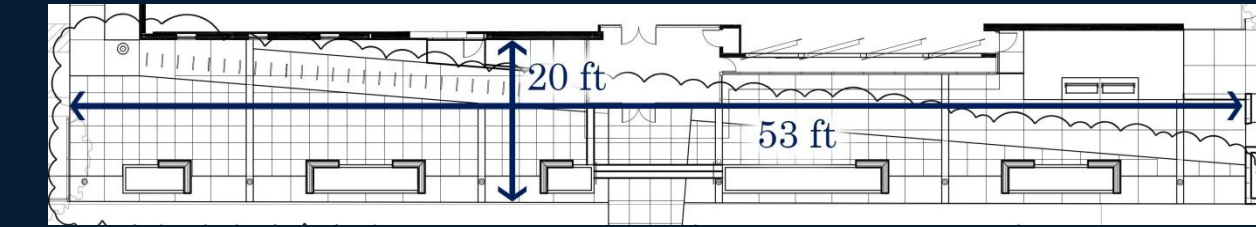
TABLE 9.4.3B | INDIVIDUAL LIGHTING POWER ALLOWANCES FOR BUILDING EXTERIORS

LIGHTING POWER DENSITIES	
Type	LPD (W/ft ²)
Building grounds – Walkways 10 ft. wide or greater	0.16
Building facades	0.15
Building entrances and exits – Entry Canopies	0.4
Type	LPD (W/linear ft door width)
Building entrances and exits – Main Entries	30

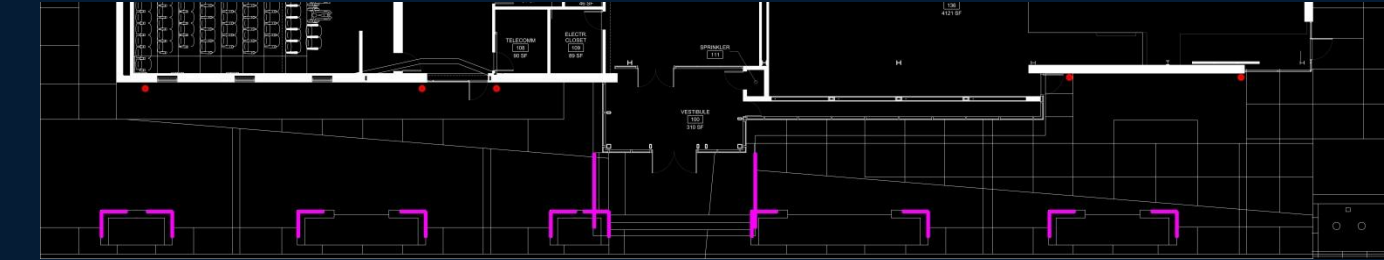
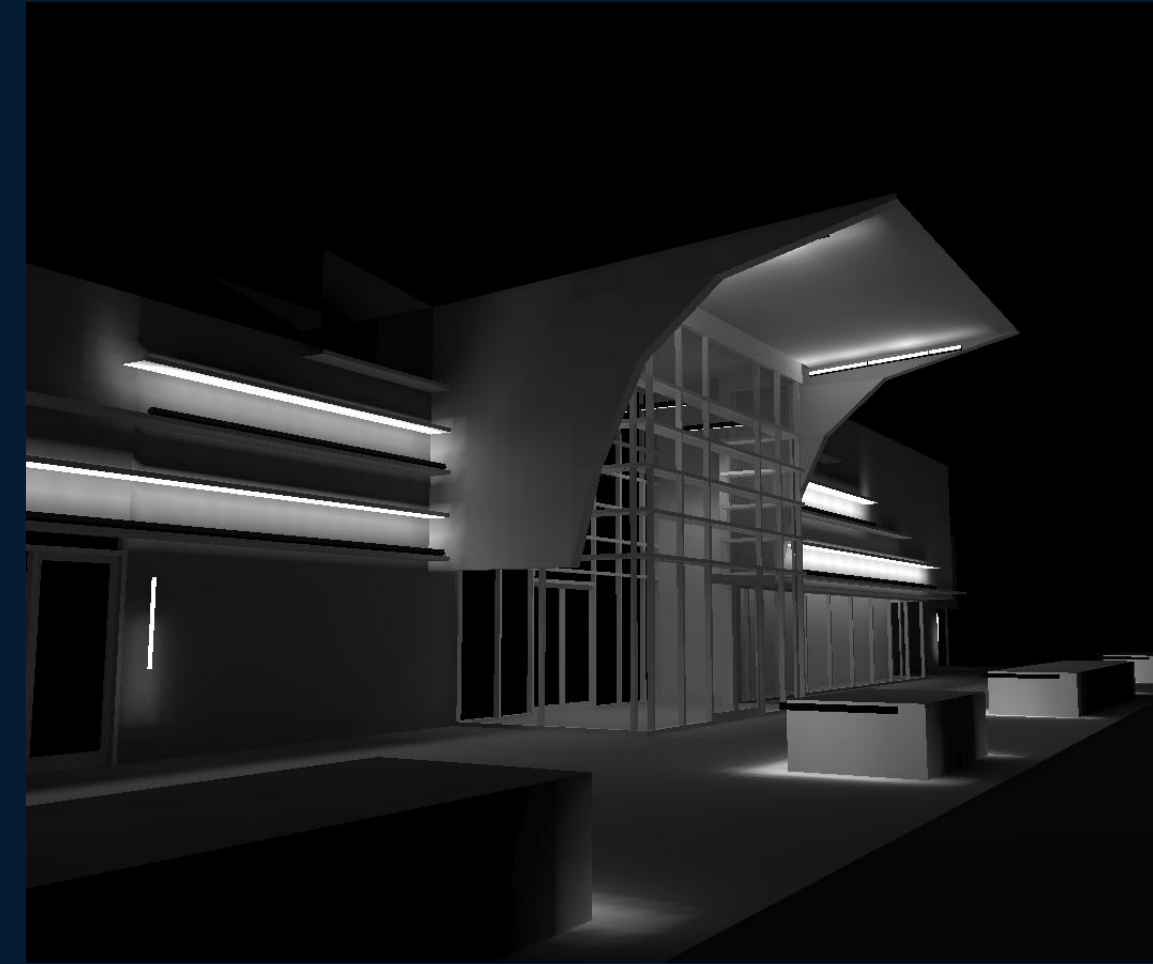
Door Width = 7' - $30 \times 7 = 210$ Watts

Façade Area = 4,666 ft²

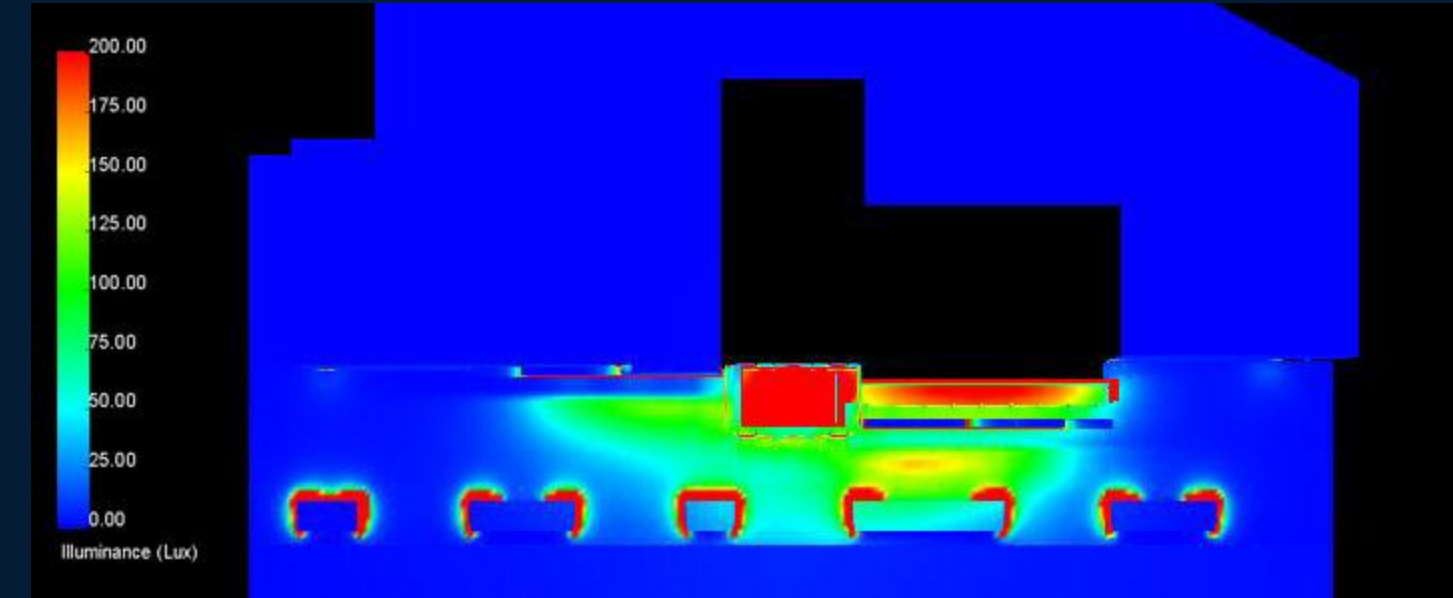
Total Watts Allowed = $210 + (4954 \times 0.15) + (5594 \times 0.16) + (607 \times 0.4) = 2,091$ Watts



- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- **EXTERIOR FAÇADE**
- CONCLUSION



- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- **EXTERIOR FAÇADE**
- CONCLUSION



ILLUMINANCE SUMMARY ZONE 1		
Calculation	Horizontal at 0' (lux)	Target
Average Illuminance	50	30
Maximum Illuminance	229	--
Minimum Illuminance	28.3	--
Avg./Min	1.77	2

ILLUMINANCE SUMMARY ZONE 2		
Calculation	Horizontal at 0' (lux)	Target
Average Illuminance	31	--
Maximum Illuminance	200	--
Minimum Illuminance	1.3	--
Avg./Min	24.36	--

POWER DENSITY			
Luminaire	Watts/Luminaire	Quantity	Total Watts/Luminaire Type
N1	60	26	1560.0
N2	15	32	480.0
P	10.5	4	42.0
Total Watts			2082.0
Total Watts Allowed			2090.0
LPD			1.00

- INTRODUCTION
- LIGHTING DESIGN SCHEME
- MAIN LOBBY
- ELECTRICAL DISTRIBUTION
- ARCHITECTURAL BREADTH
- MECHANICAL BREADTH
- EXTERIOR FAÇADE
- **CONCLUSION**

THANK YOU



AUDIENCE



PSU AE DEPARTMENT



TURNER CONSTRUCTION

