

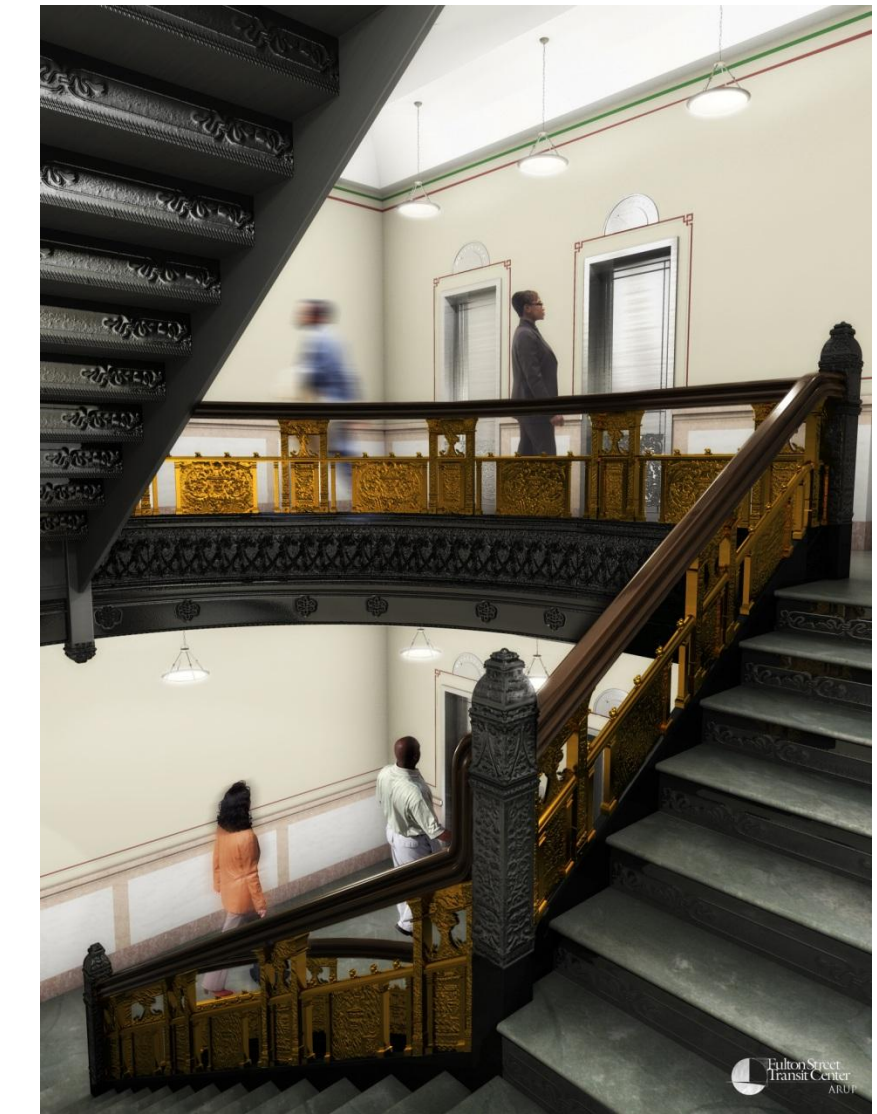


Corbin Building

192 Broadway
New York, NY

Final Thesis Presentation

4/11/2012



Matthew Trethaway | Lighting/ Electrical | Advisor: Dr. Houser | Advisor: Ted Dannerth

Presentation Outline

Corbin Building

Electrical Depth

Lighting Depth

Breadth Topics

Lighting Depth

MAE

Conclusion

Introduction

Wire vs. Bus Duct

Façade | FSTC Lobby

Architectural | Mechanical

Retail

Daylighting

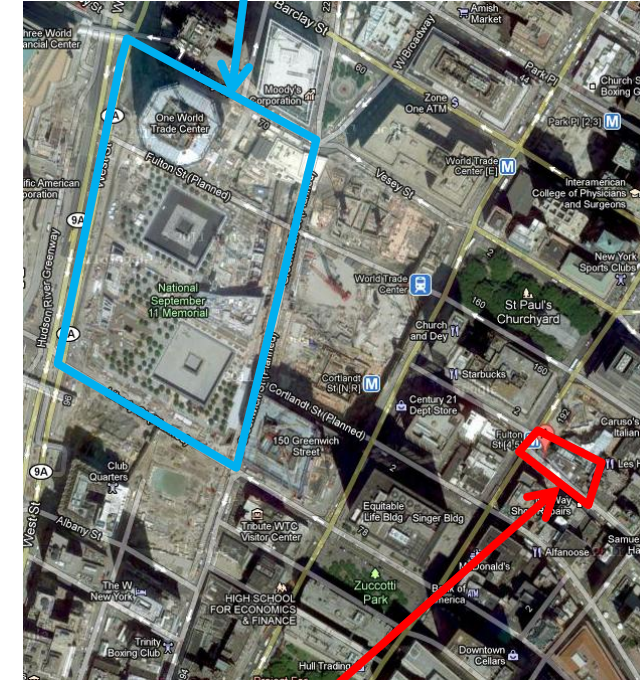
Corbin Building Location

Site Layout

Fulton Street Transit Center



World Trade Center



Corbin Building

Fulton Street Transit Center

Corbin Building



Theme

“Renovation and integration into the design of the Transit Center while preserving its historic character.”



Corbin Building History

- Built in 1888 by Francis Kimball
- Named for Austin Corbin
 - President of Long Island Rail Road (LIRR)
- Wrought-Iron Frame
- First to be dubbed “skyscraper”
- First to use gearless-traction Otis Elevator



Corbin Building Statistics

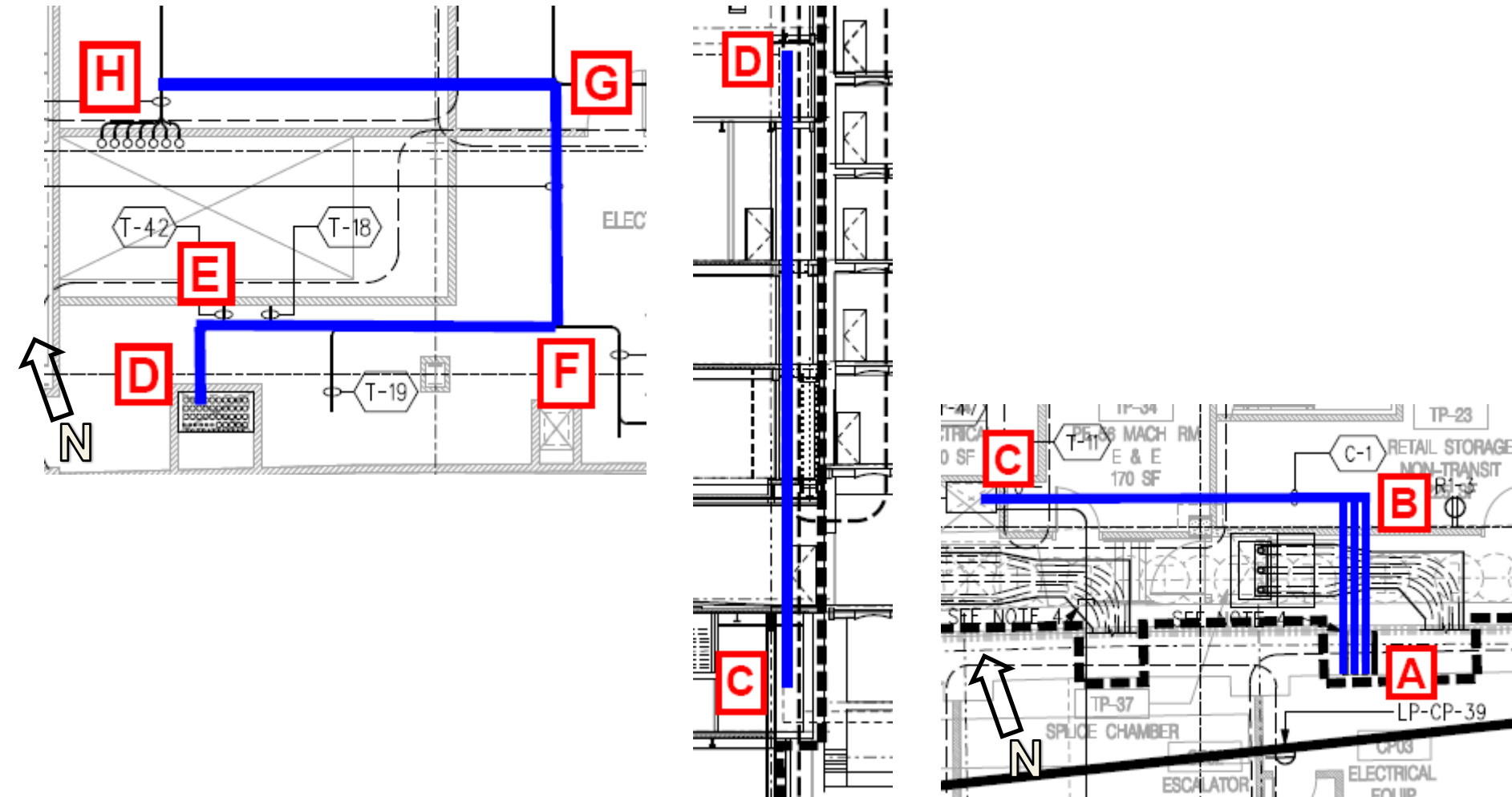
- Renovation of Retail / Office Space
- Size
 - 53,000 Square Feet
- Cost
 - \$59.5 Million
- Owner
 - Metropolitan Transit Authority (MTA)
- Architect
 - Page Ayres Cowley Architects
- SMEP
 - Arup
- Contractor
 - Judlau Contracting

Wire vs. Bus Duct

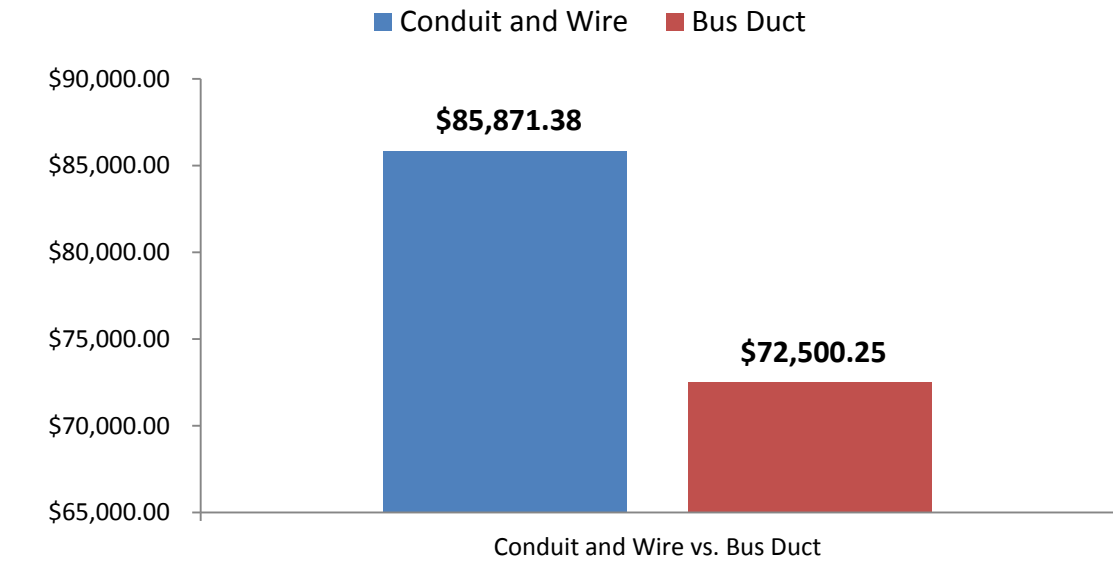
Feeder Pathway

Results

- 800 Amp Main Feeder
 - From: 5th Floor Electric Room in FSTC
 - To: Basement Electric Room in Corbin Building
- Copper Wire- 3 Sets of
 - Phase & Neutral: 500 MCM
 - Ground: 250 MCM
- Conduit- Rigid Galvanized Steel
 - 4 Inch
- Bus Duct- 800Amp Copper



Conduit and Wire vs. Bus Duct



Cost Savings: **\$13,370**

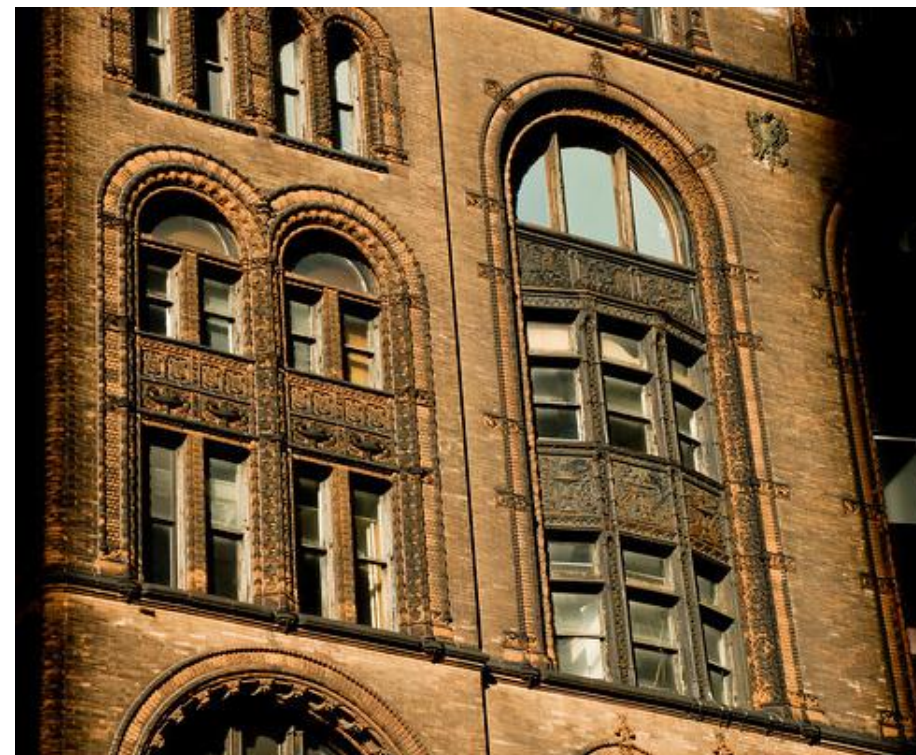
Façade

Design Criteria

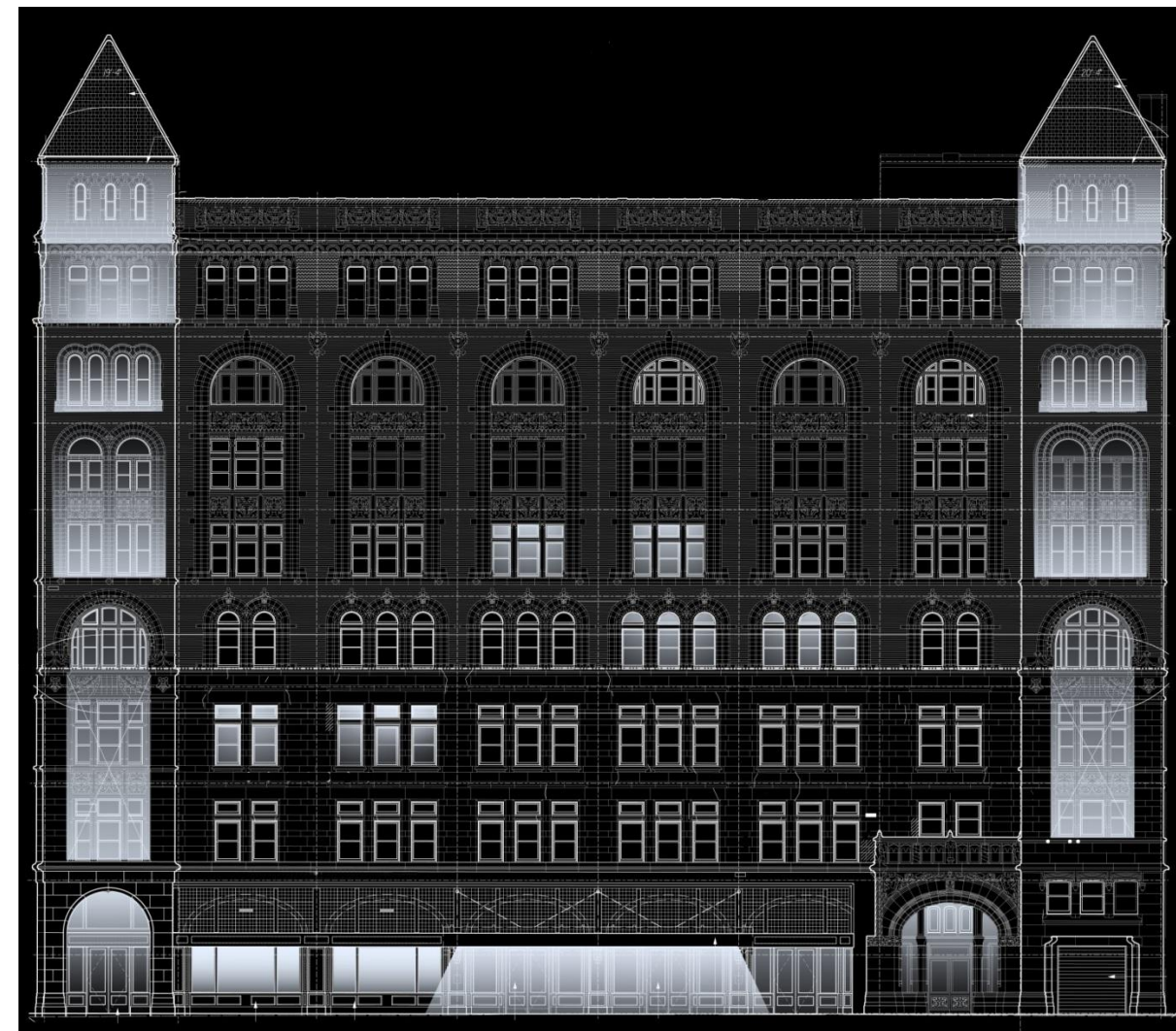
Appearance- historical landmark

Hierarchy- guidance

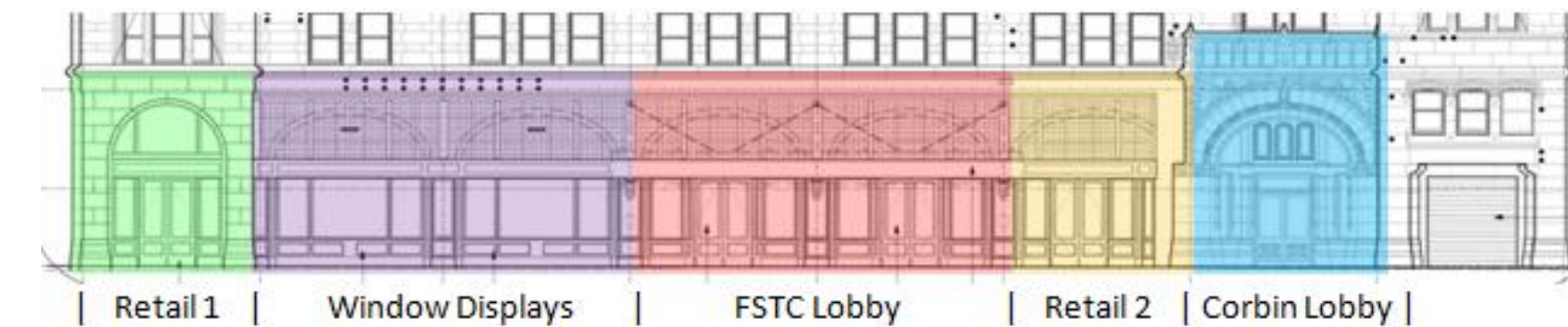
Connection- historic & modern



Schematic Design



Façade Layout



Façade

Schematic Design

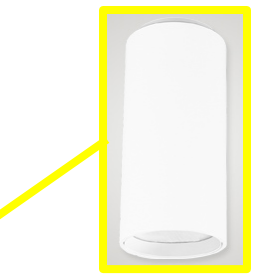
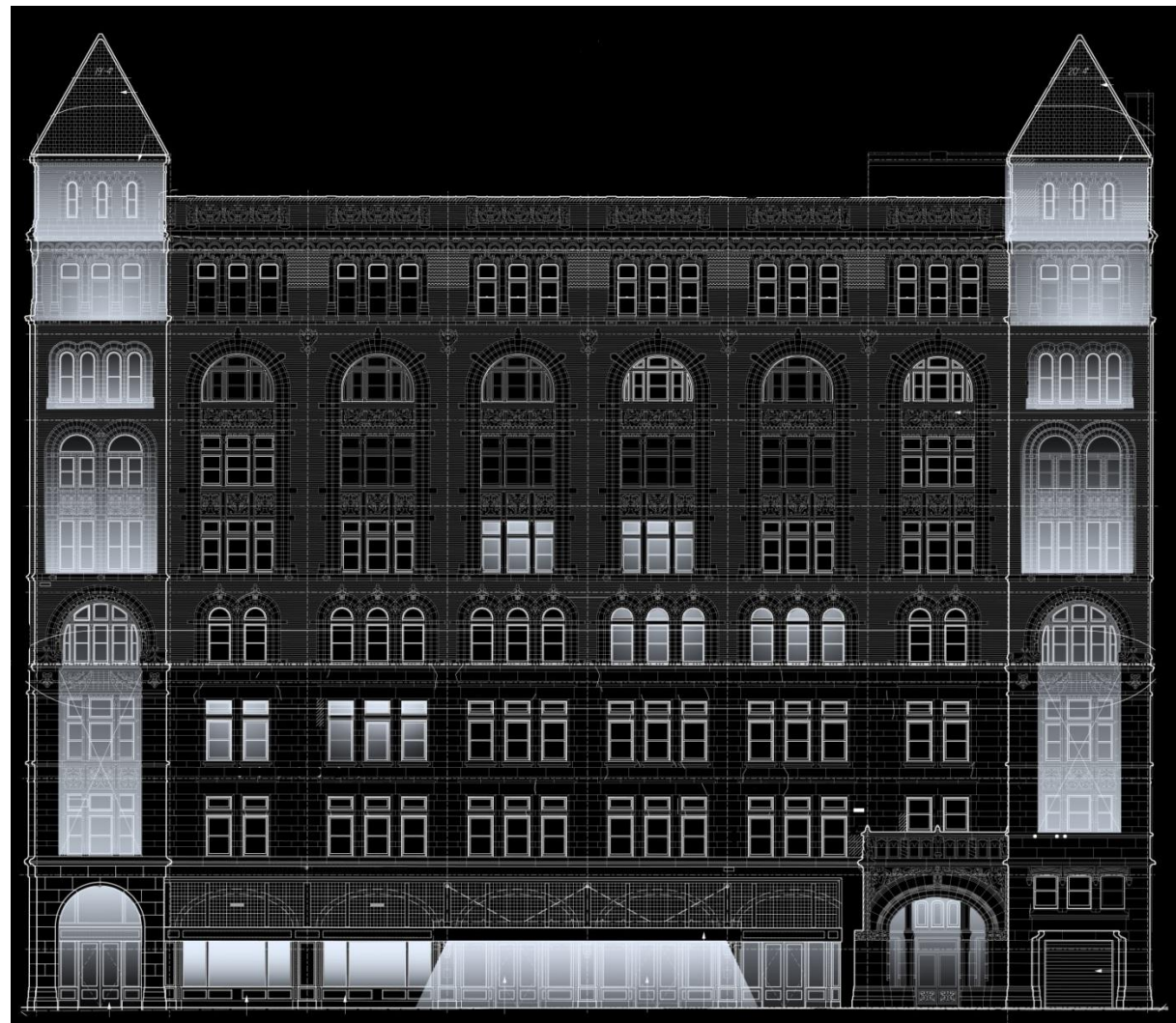
Final Lighting Plan

Design Criteria

Appearance- historical landmark

Hierarchy- guidance

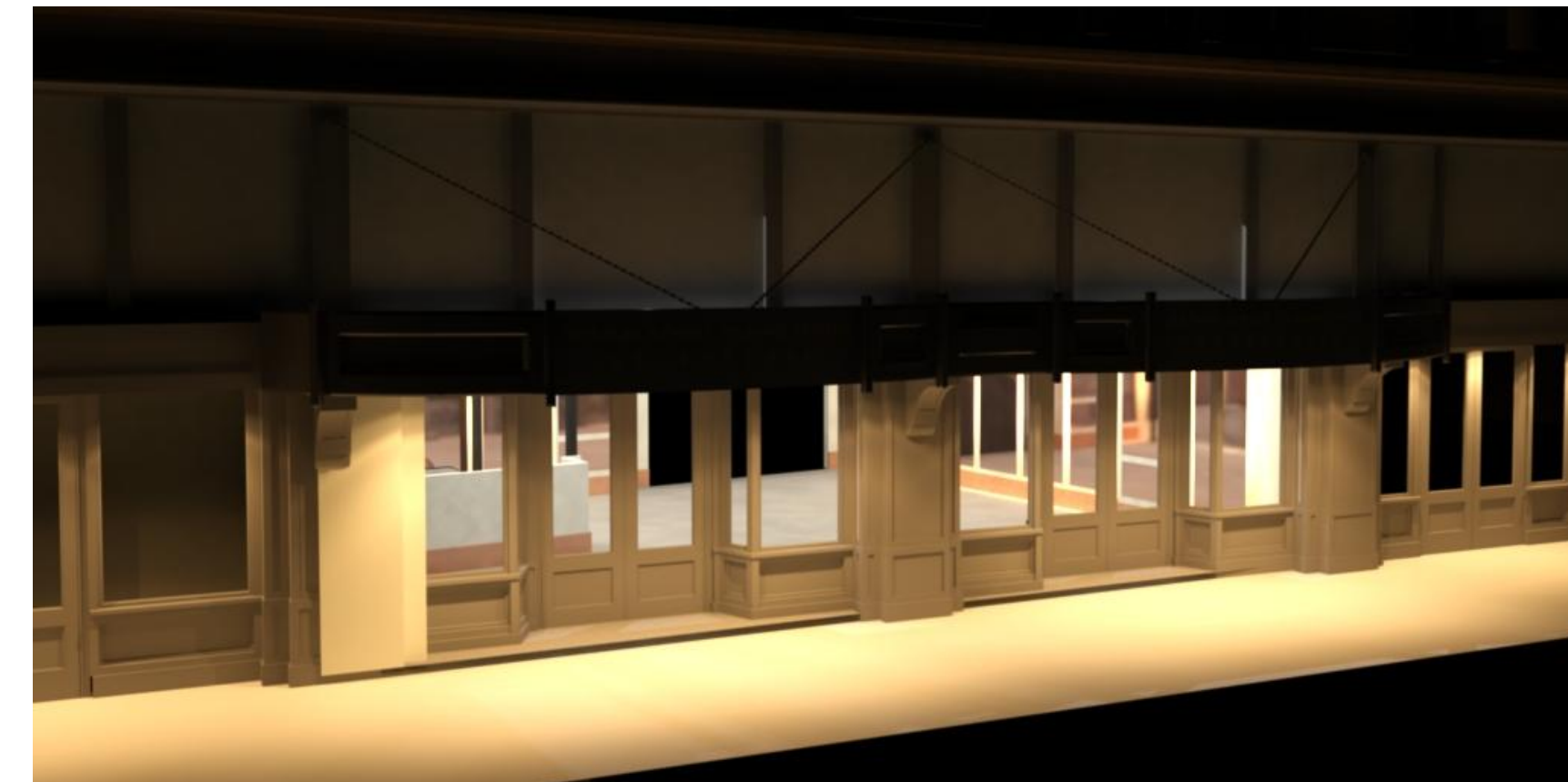
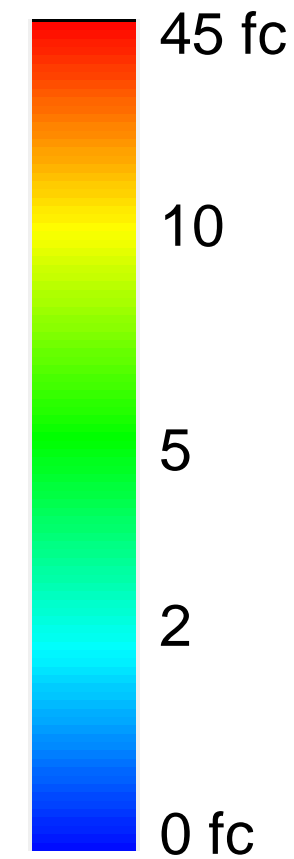
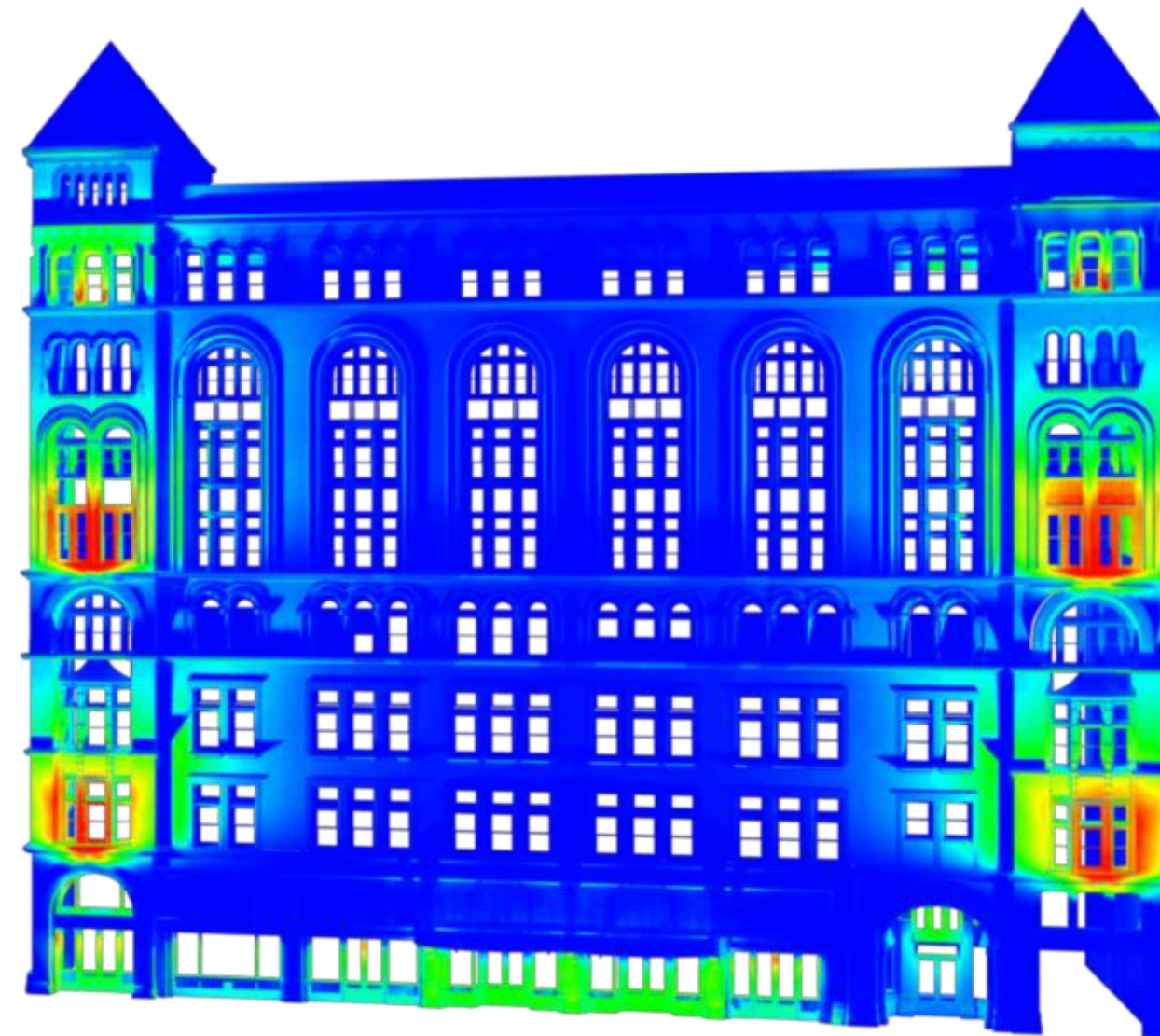
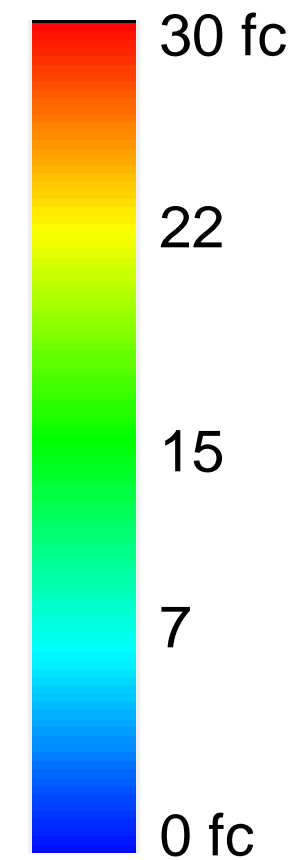
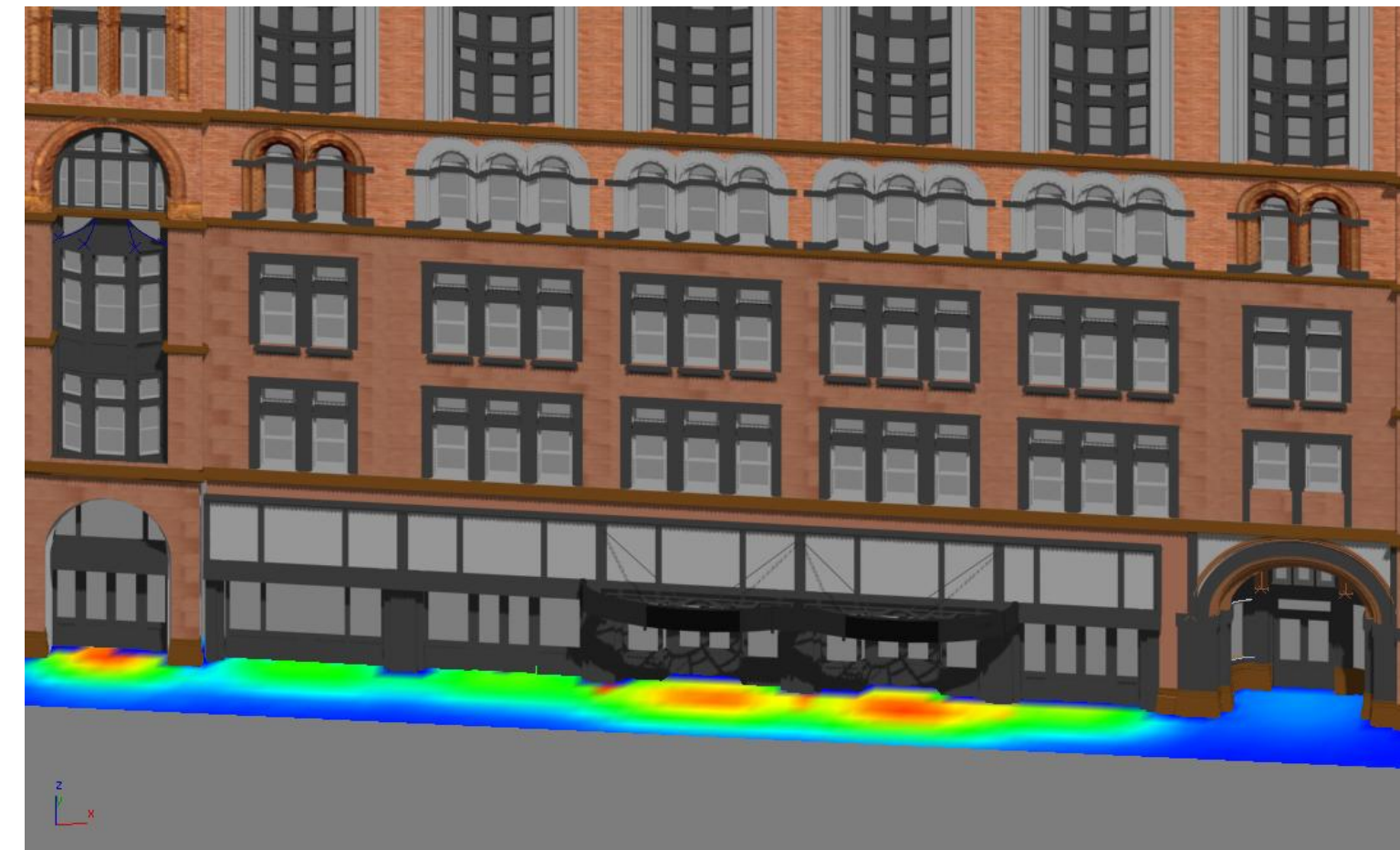
Connection- historic & modern



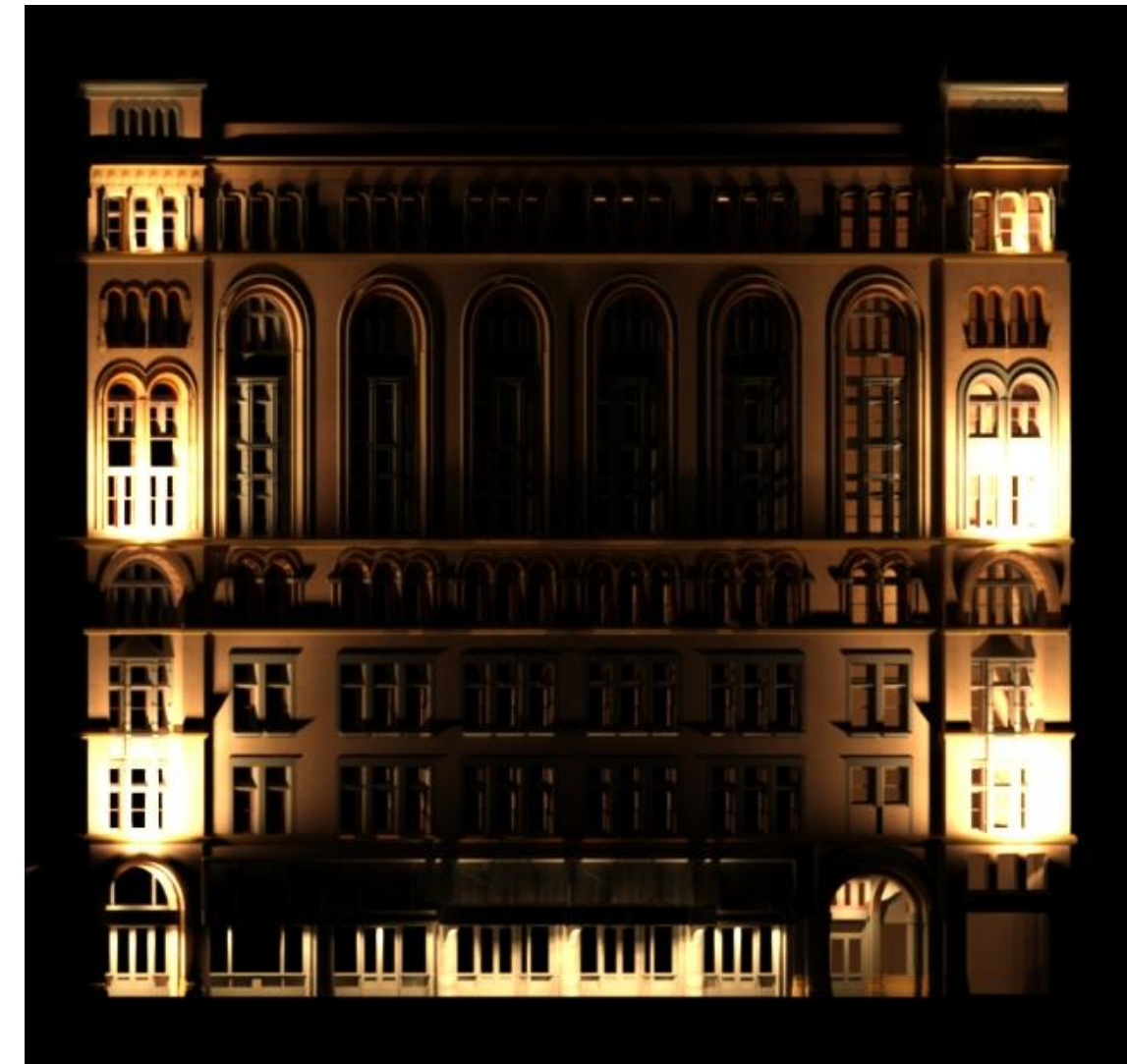
Sidewalk Illuminance

Façade Pseudo Rendering

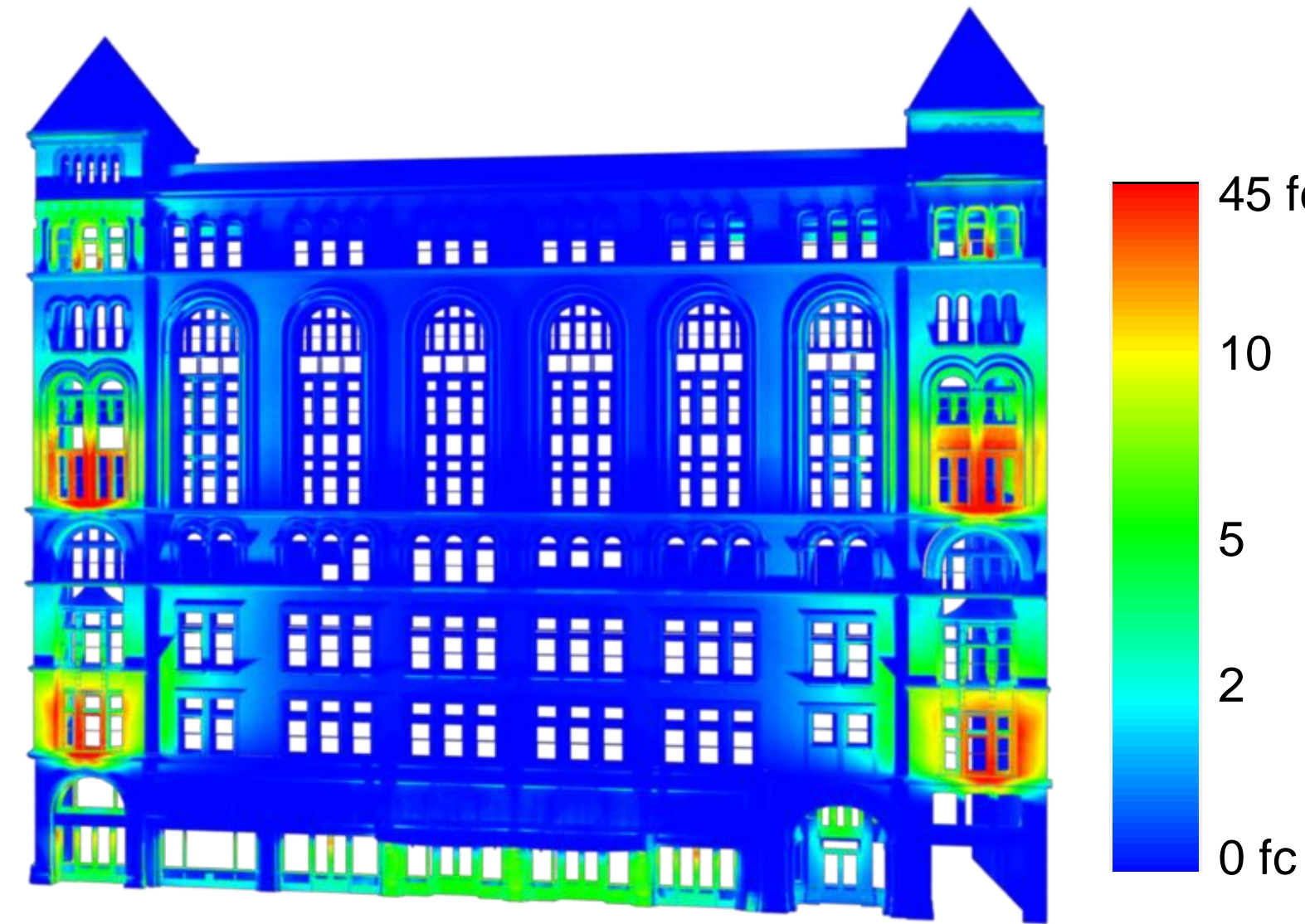
Rendering Lobby Entrance



Final Rendering



Façade Pseudo Rendering



Façade Statistics

Façade Lighting Power Density			
	ASHRAE	Watts Allowed	Watts Used
Tradable			
Retail 1 Door	20 W/LF	388	244
FSTC Lobby	30 W/LF	1224	726
Retail 2 Door	20 W/LF	408	108
Corbin Lobby	30 W/LF	612	108
Total Tradable		2632	1186
Non-Tradable			
Façade	.2W/SF	3240	1832
Total Non-Tradable		3240	1832

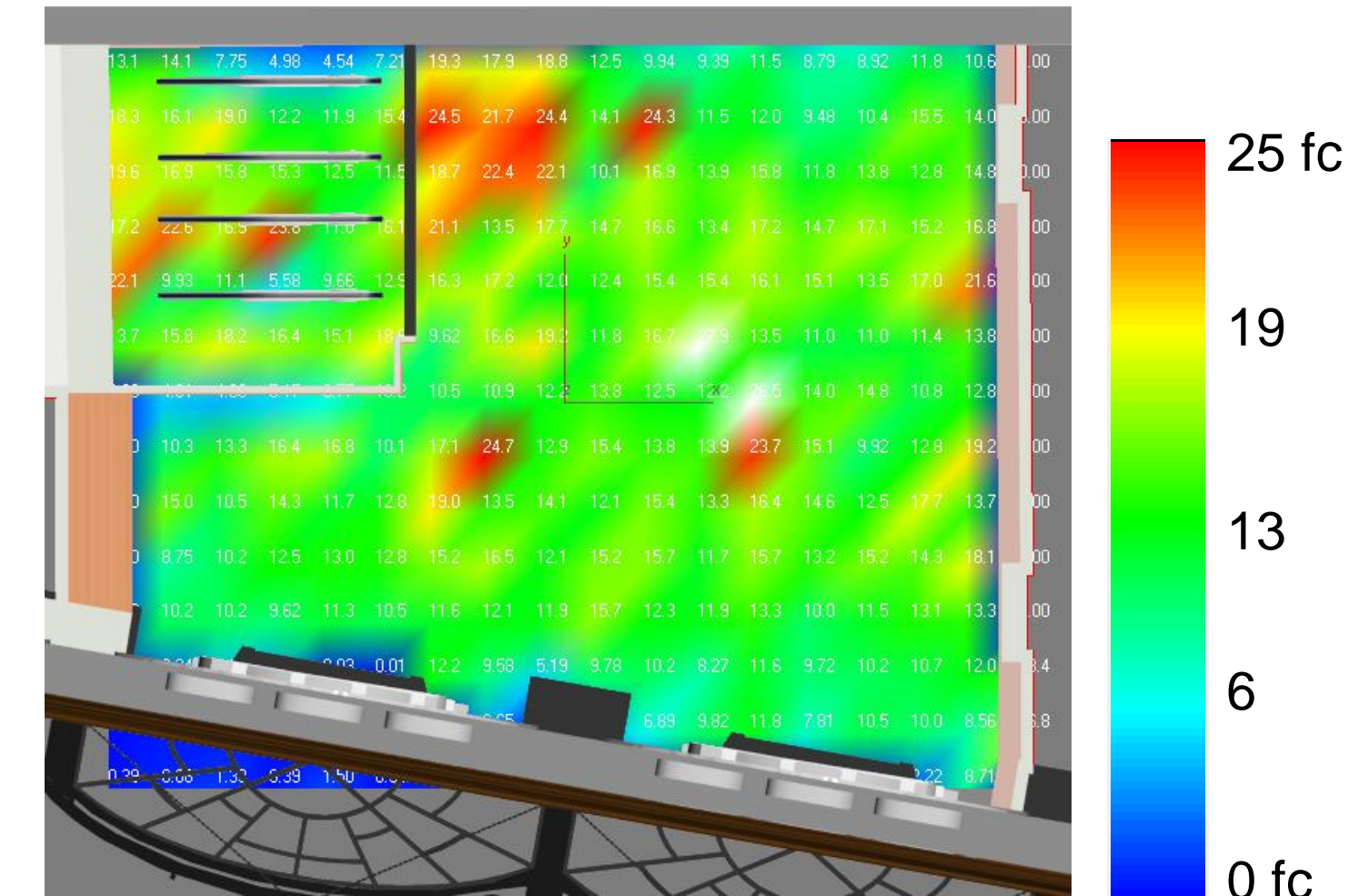
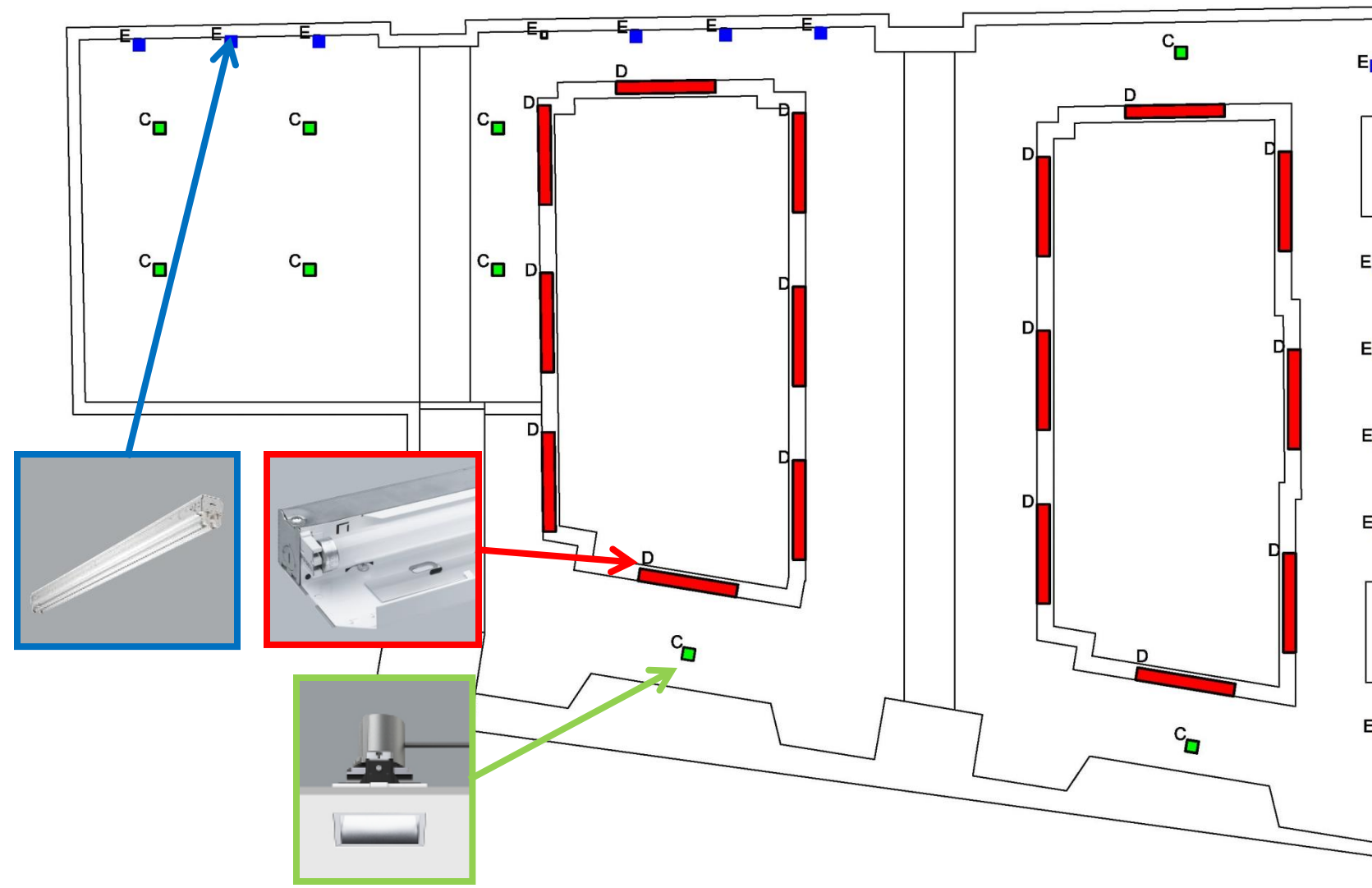
Lobby

Lighting Layout

Illuminance

Design Criteria

- **Welcoming-** Inviting interior to draw one in
- **Connection-** Linking Corbin Building & Fulton Street Transit Center
- **Guiding-** Lead to a destination
- **Safety-** Illuminated area
- **Illuminance**
 - **Horizontal-** 10 fc
 - **Vertical-** 3 fc at 5' AFF



Avg. Illuminance= 13.4 fc

Final Rendering



Final Rendering



Lobby Statistics

Lobby Lighting Power Density			
Type	Quantity	Input Watts	Total Watts
C	9	45	405
D	16	30	480
E	13	31	403
Total Watts			1288
Total SF			1460
ASHREA 90.1 (W/SF)			1.3
LPD (W/SF)			0.88

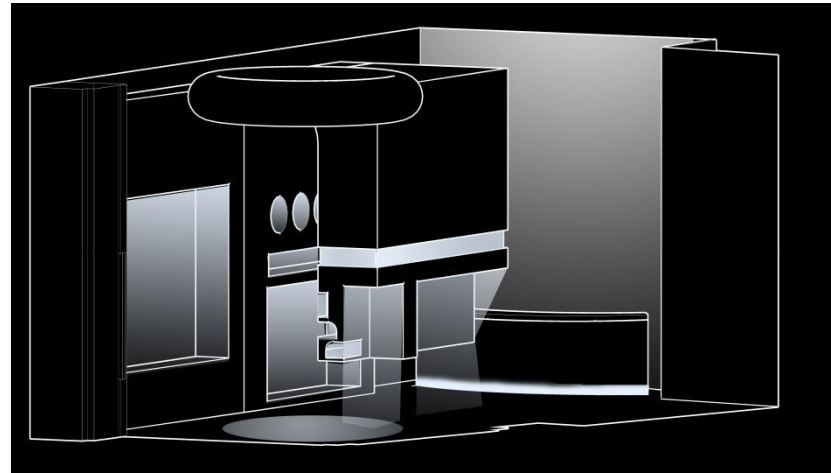
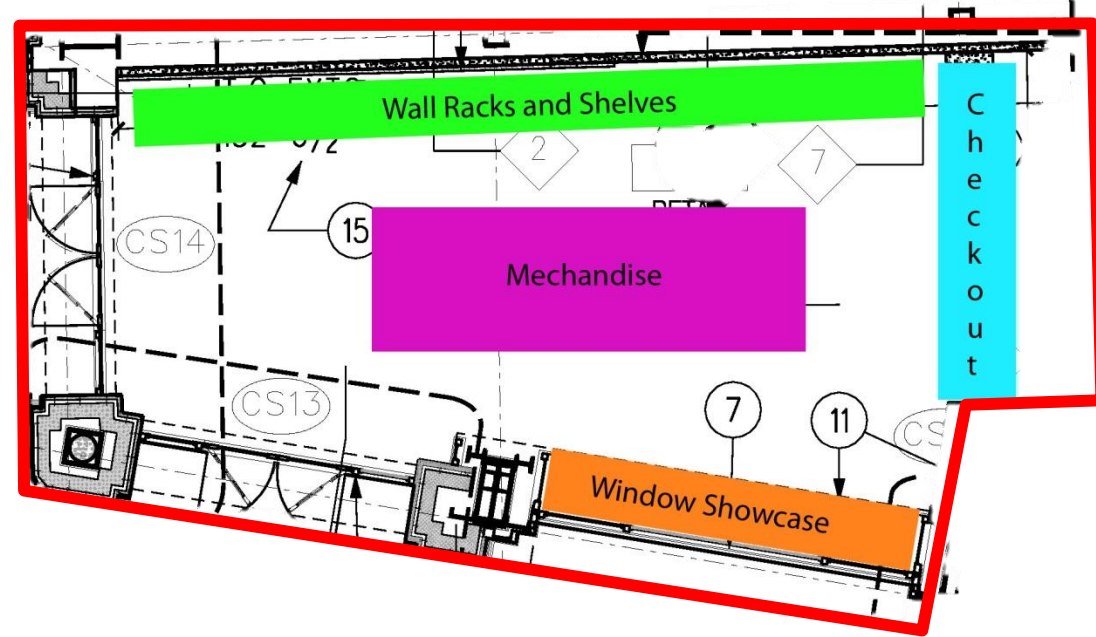
Architectural- Retail Space

Schematic Design

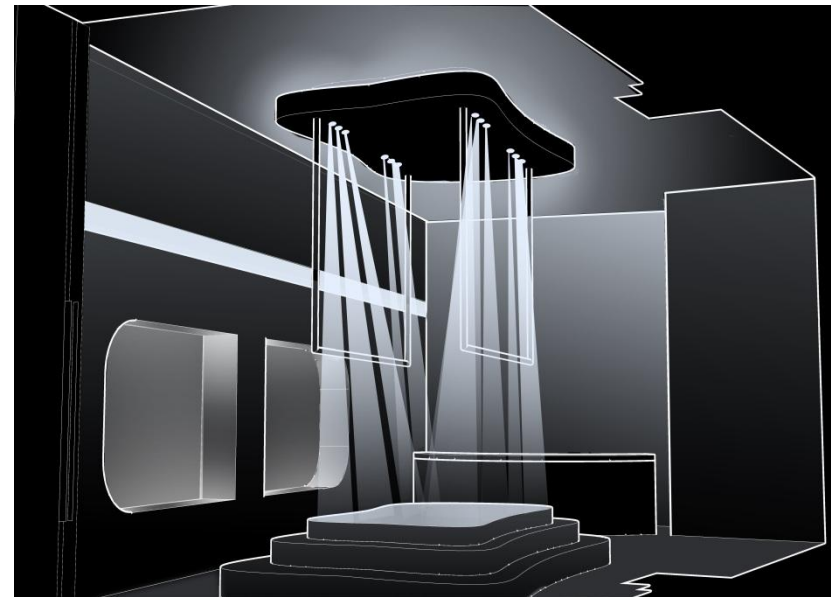
Final Design

Retail Statistics

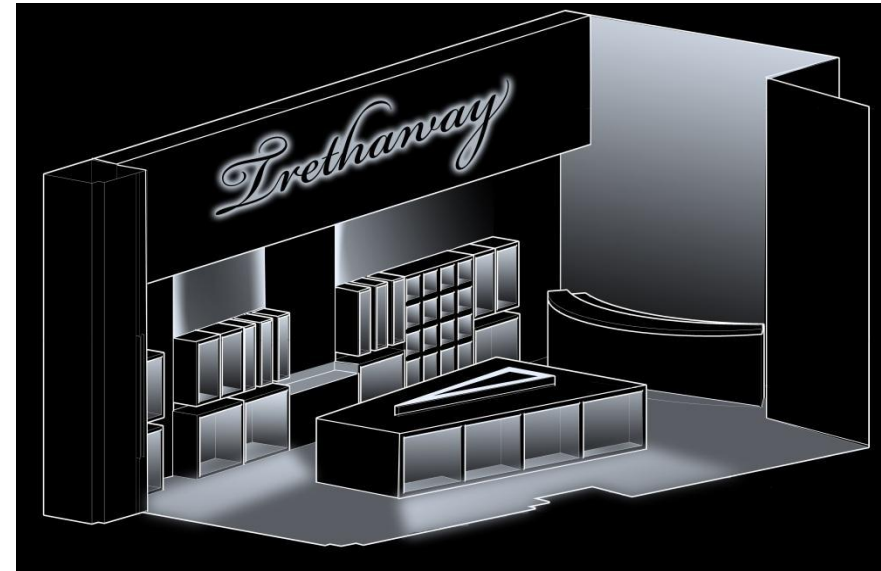
- Fit out by Tenant
- Size: 840 Square Feet
- Boutique Clothing
- Upscale



Design 1



Design 2



Design 3



Rendering



Plan View

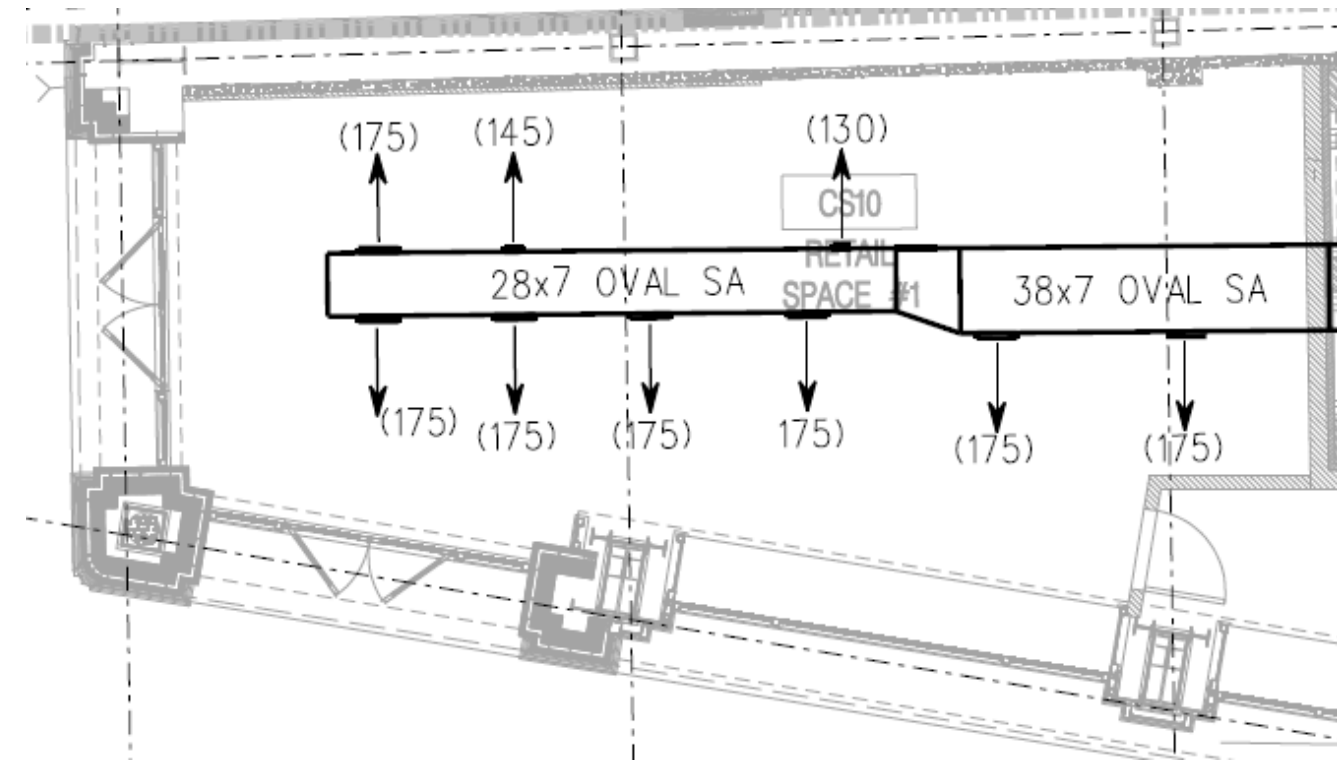


North Elevation

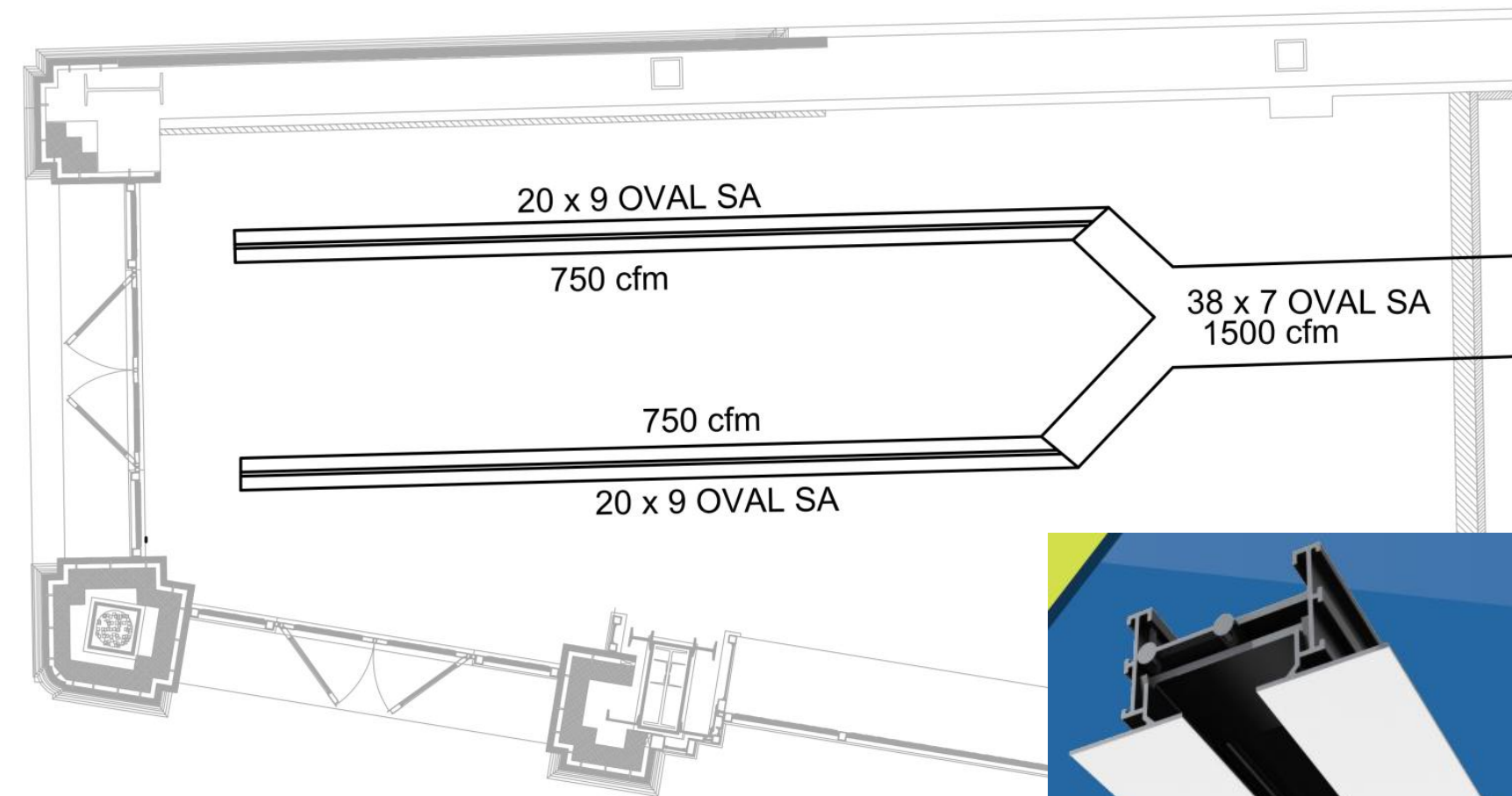


Mechanical- Retail Space

Rendering



Existing Duct Layout



Redesign Duct Layout



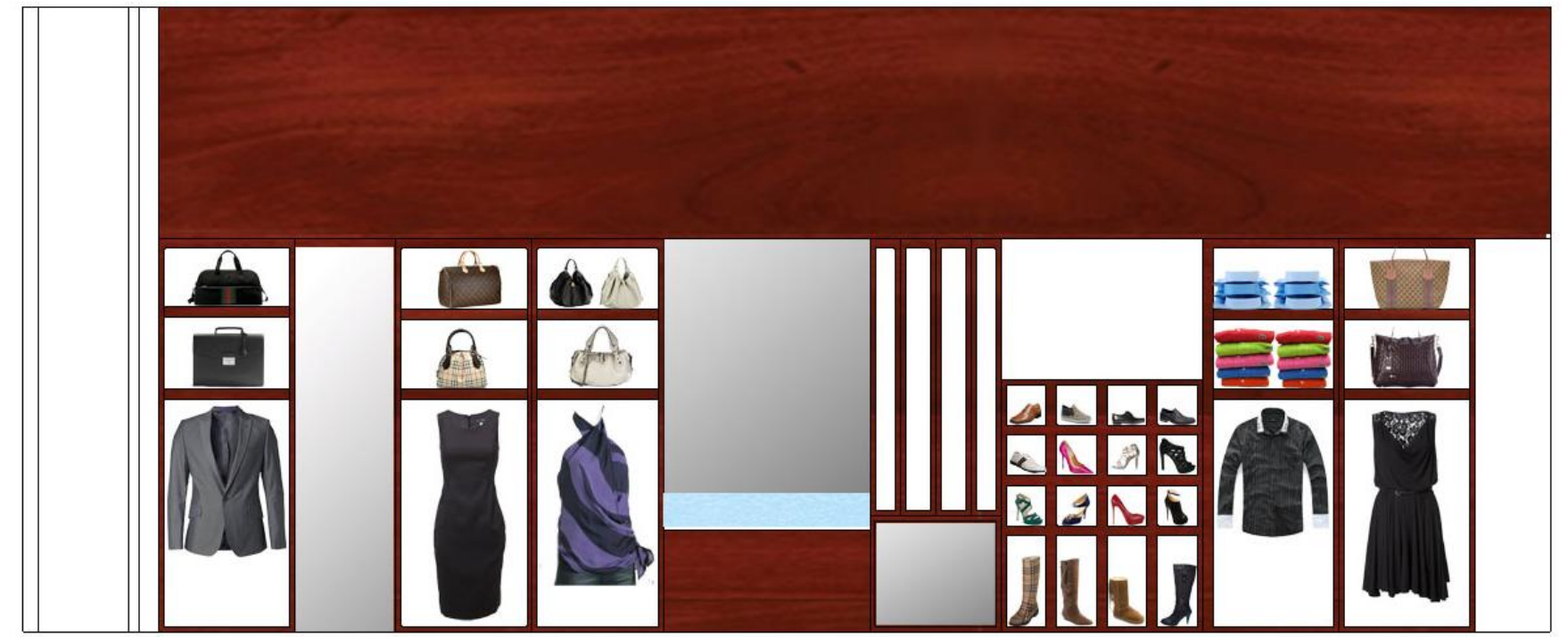
Retail Space

Store Layout

Store Layout

Design Goals

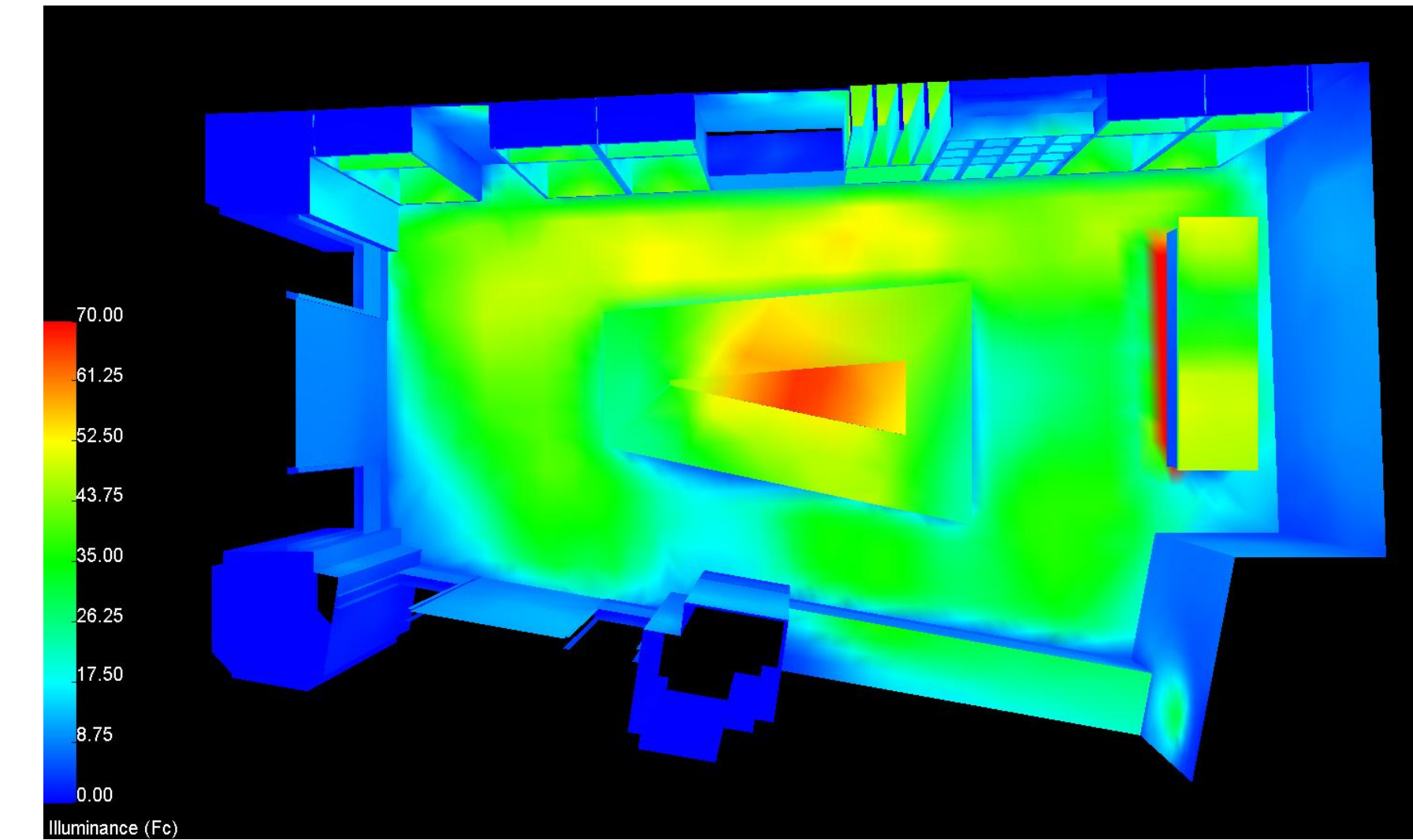
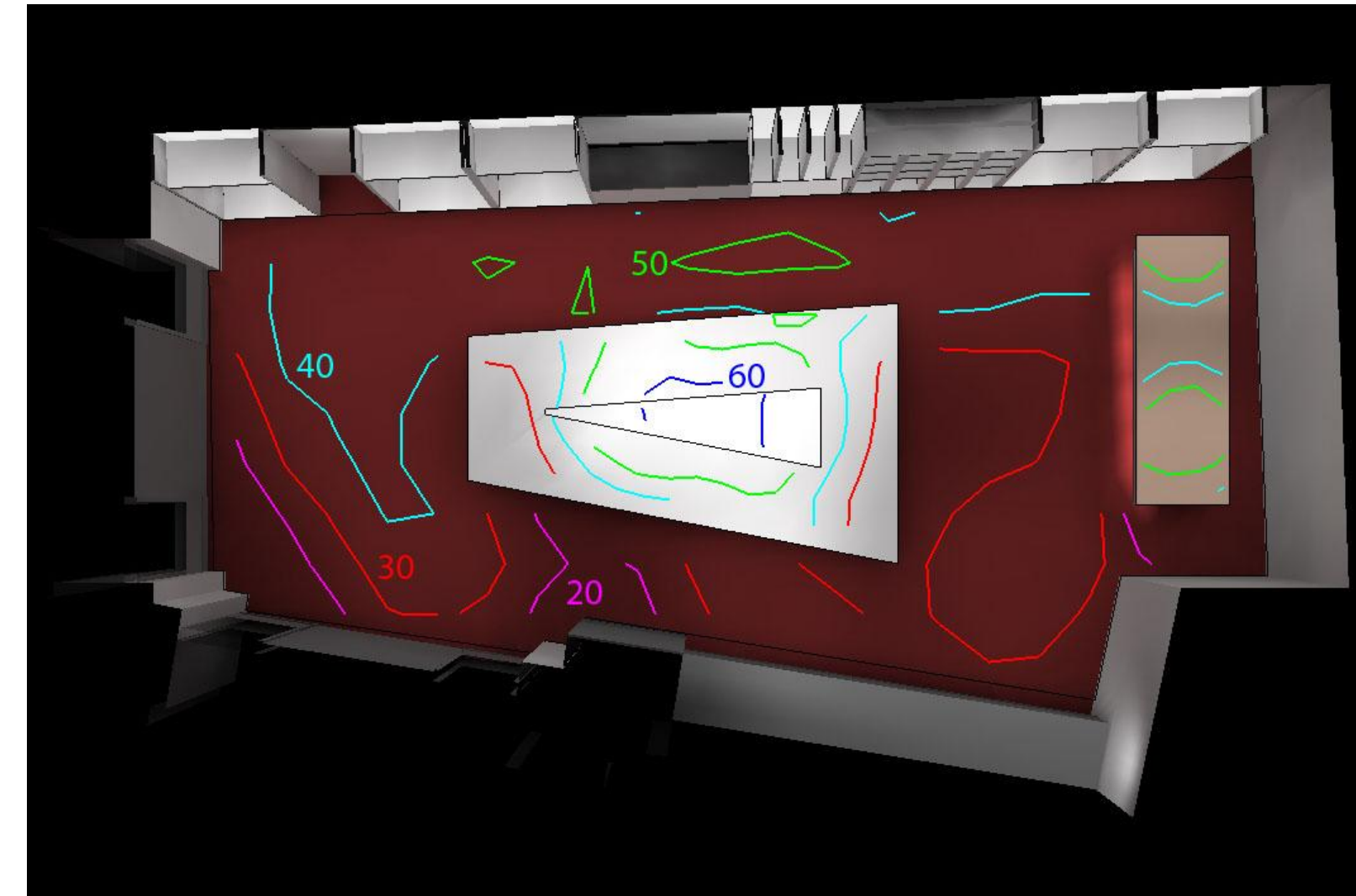
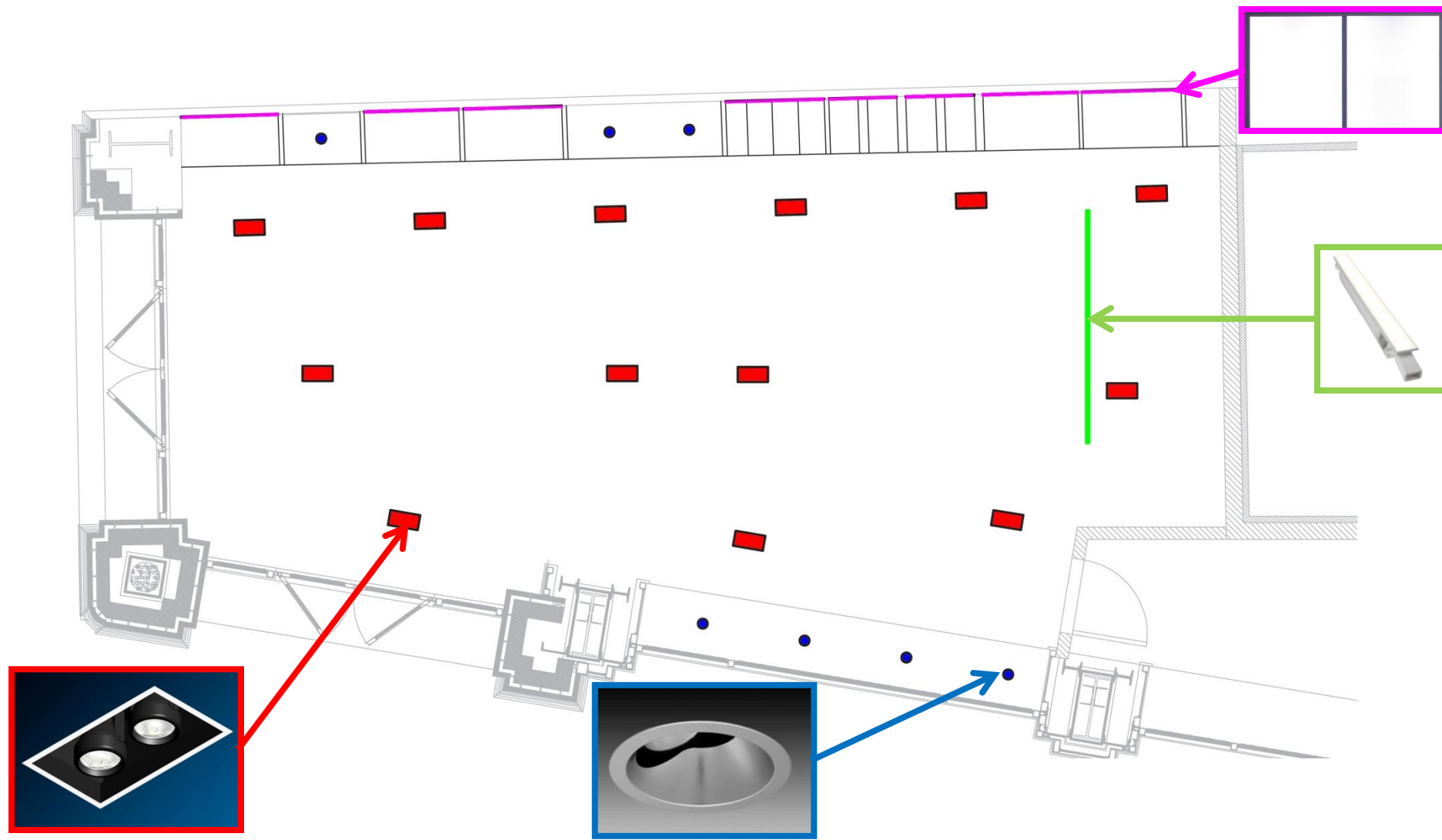
- **Welcoming**- inviting interior to draw one in
- **Guiding**- lead to a destination
- **Comfort**- minimal glare & view of fixtures
- **Dynamic**- ability to adjust
- **General Retail Illuminance**- 30 fc at 2'-6" AFF
- **Feature Displays**- x10 fc greater than illuminance of adjacent spaces



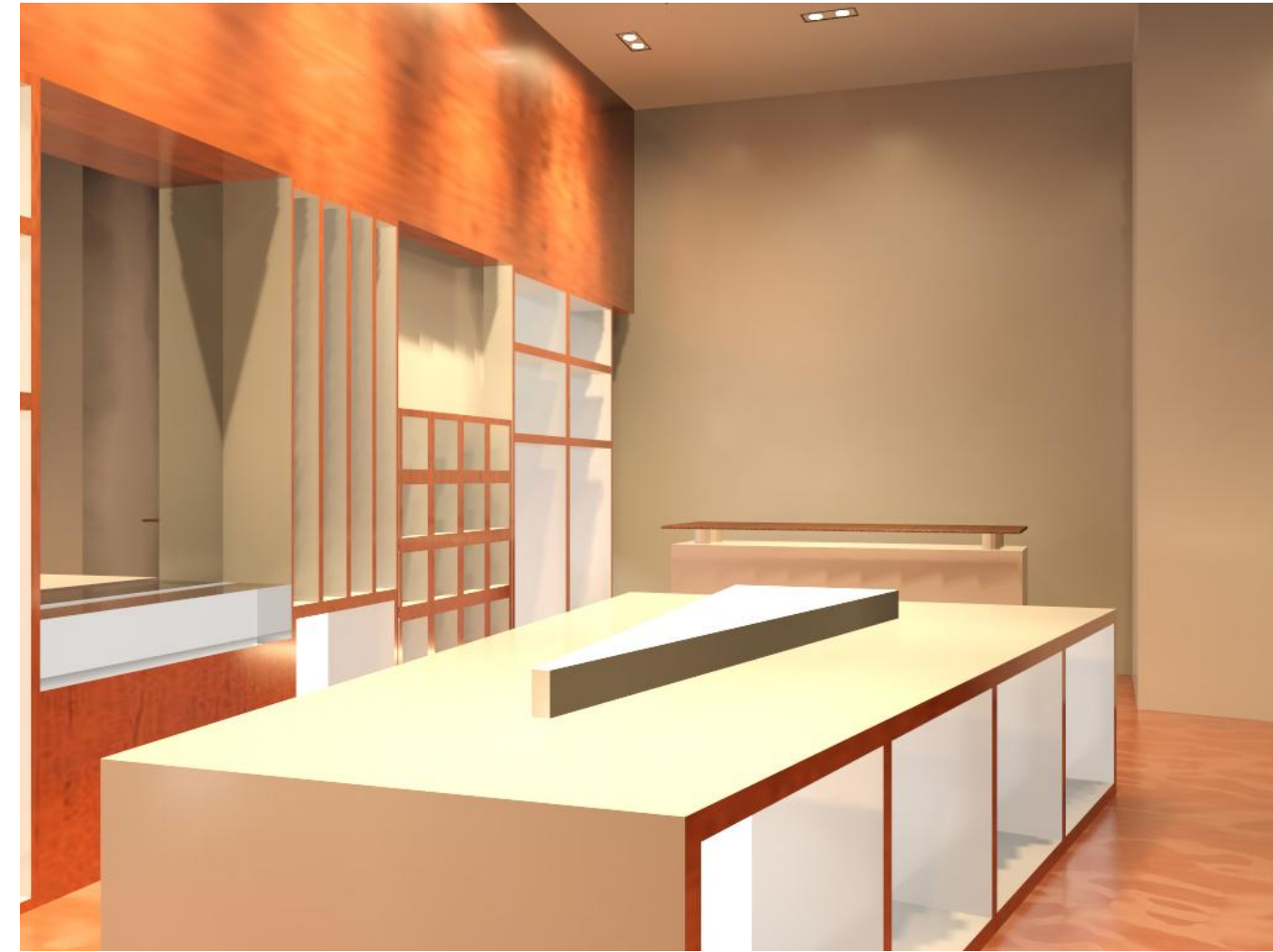
Lighting Plan

Illuminance

Pseudo Illuminance



East Interior View



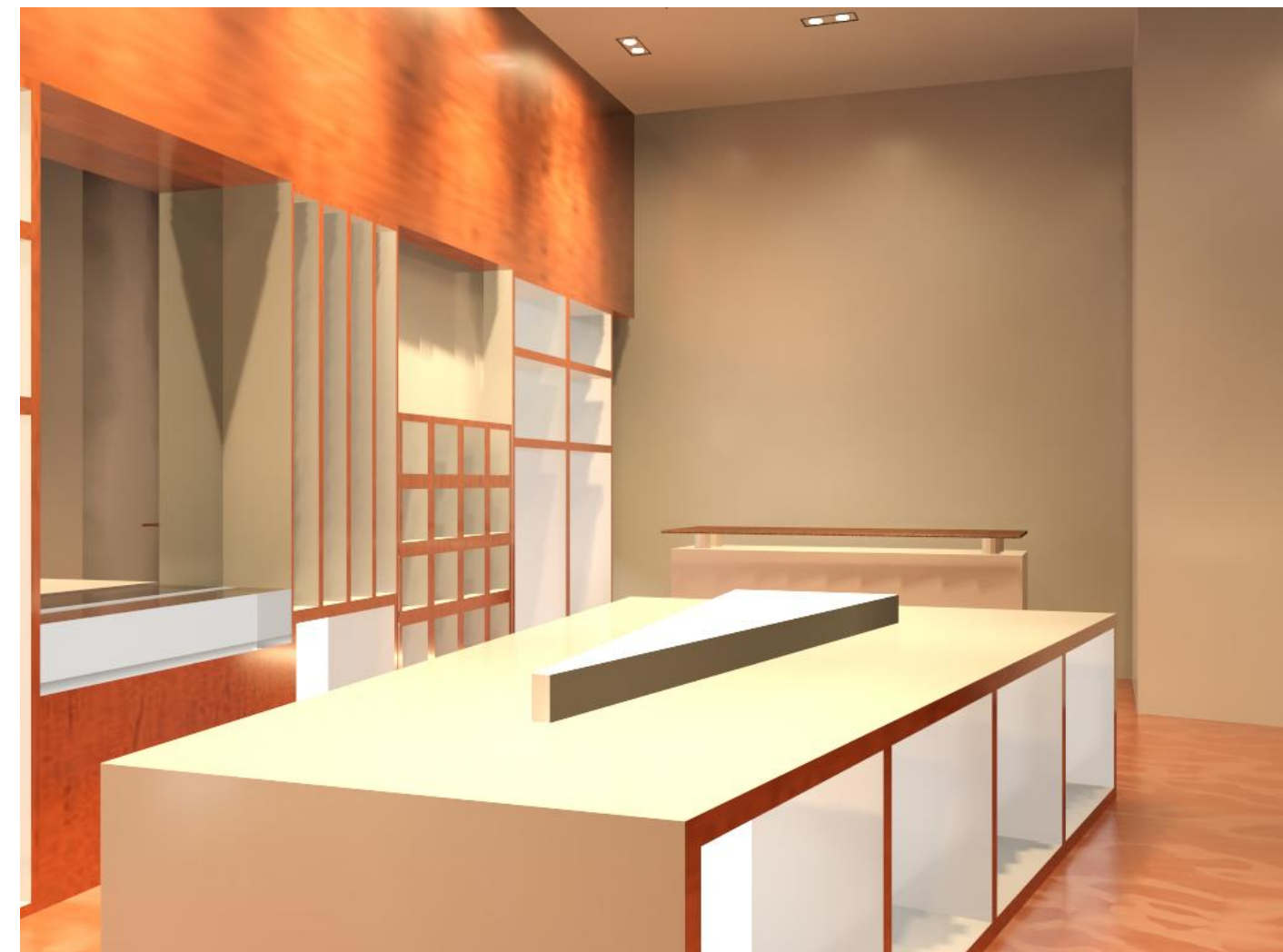
West Interior View



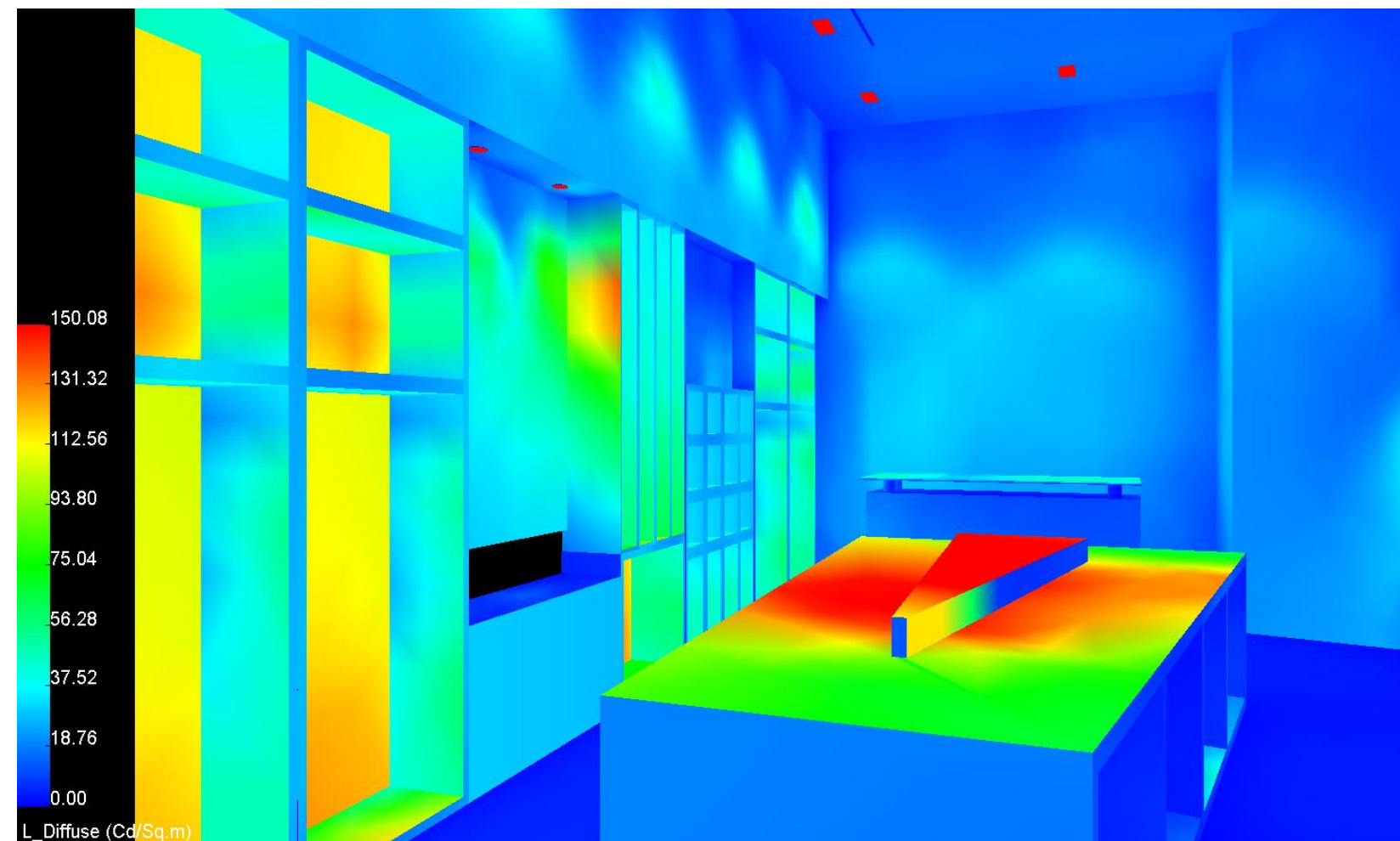
North Interior View



East Interior View



East Pseudo Color View



Retail Statistics

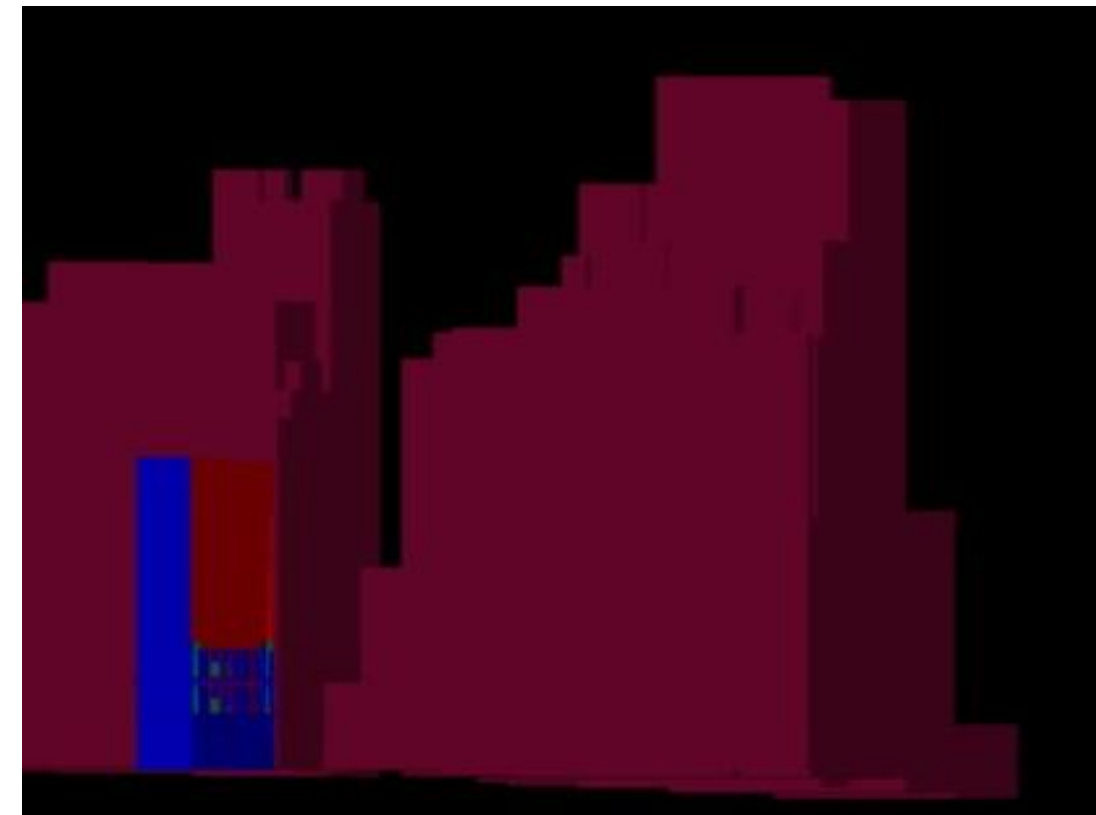
Retail Lighting Power Density			
Type	Quantity	Input Watts	Total Watts
K	13	89	1157
L	9	12.5	112.5
M	9	170	1530
N	7	14	98
		Total Watts	2897.5
		Total SF	840
ASHREA 90.1 (W/SF)			1.4
Additional Power Allowance (W)			2176
Decorative Lighting (1.0 W/SF)			840
Total Watts Allowed (W)			3016
Total Watts Used (W)			2897.5
LPD (W/SF)			3.45

MAE Focus- Daylighting

Site Location

Street View

- Daylight penetration on 3rd floor office

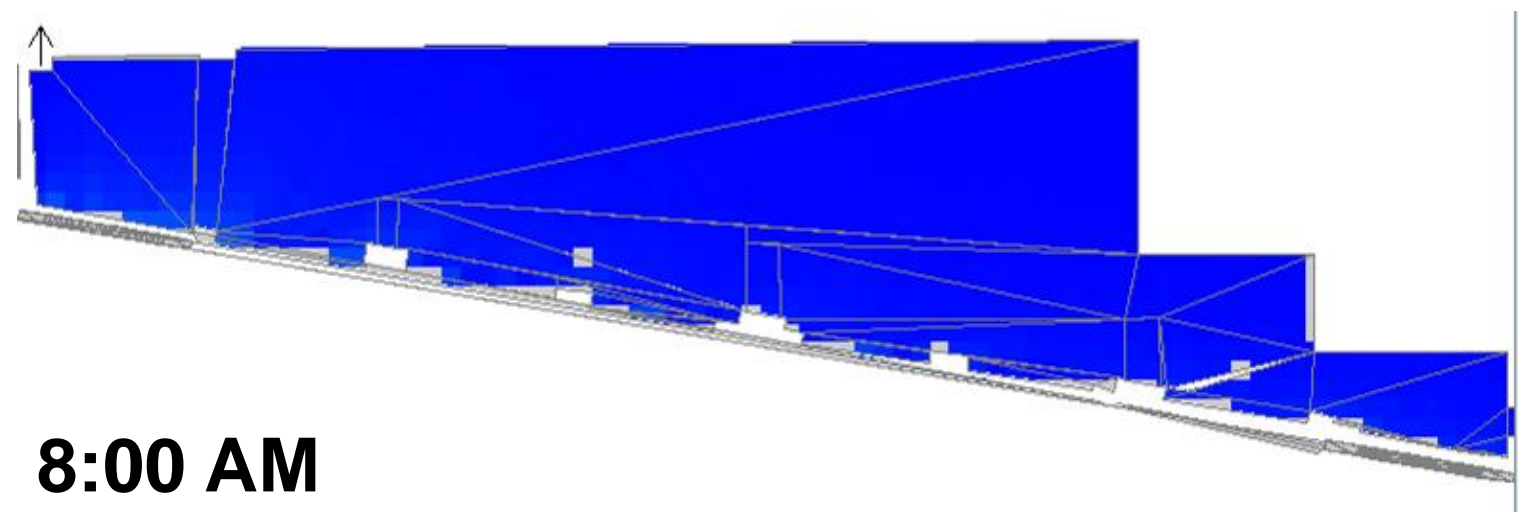


Lower
Manhattan
New York, NY

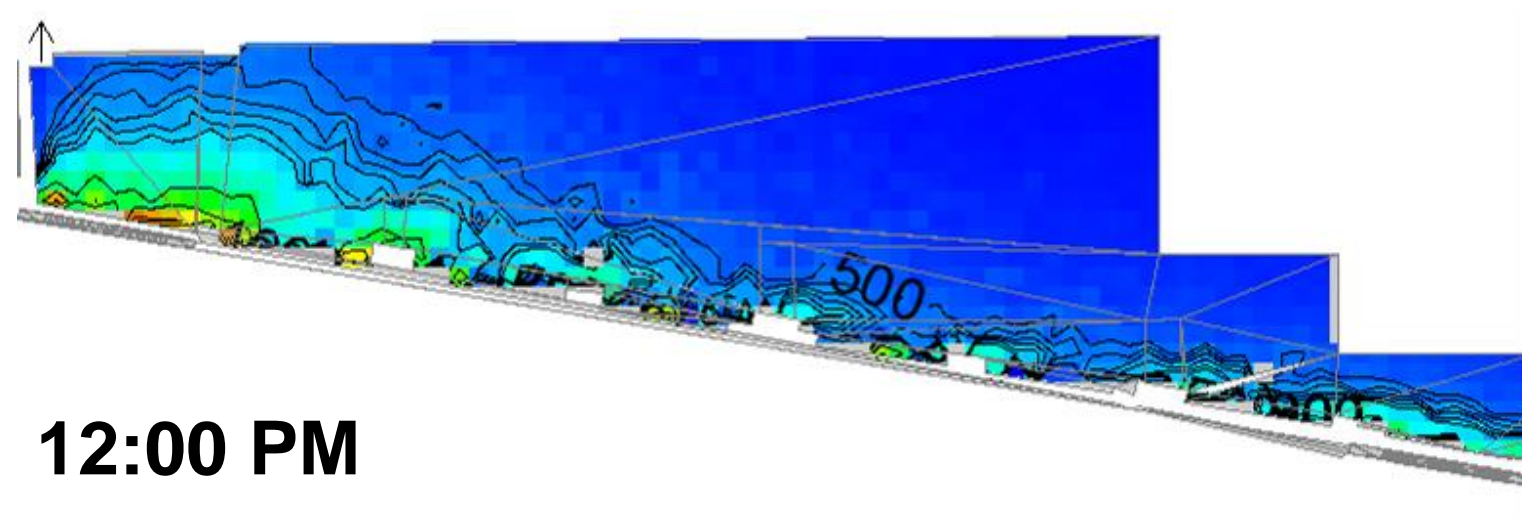
Congested
area of tall
buildings



December 21st

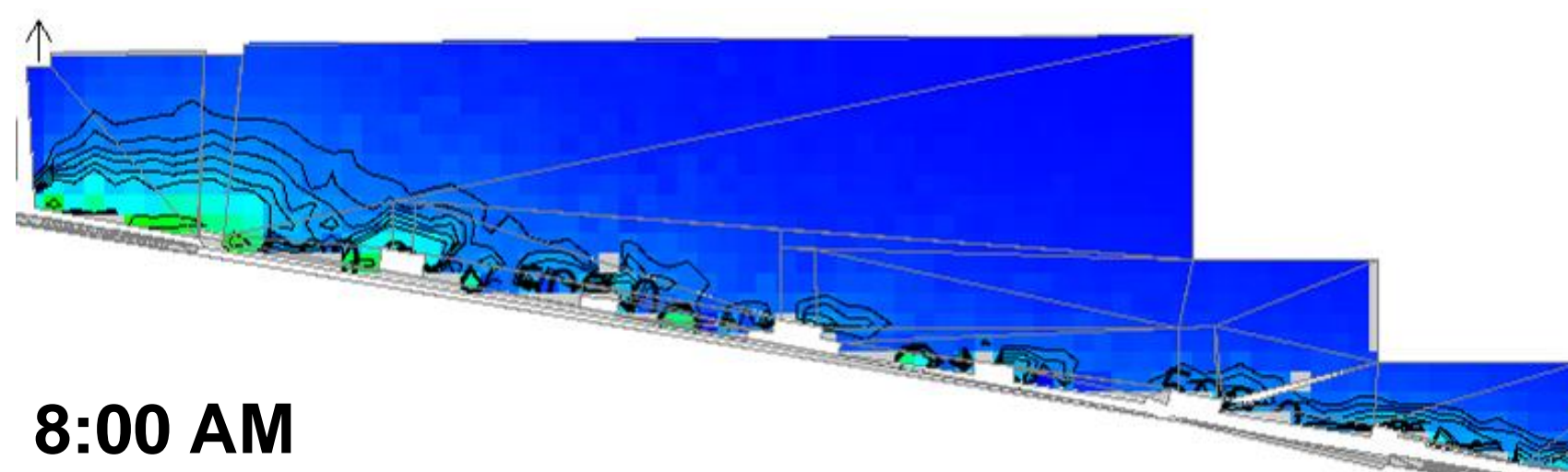


8:00 AM

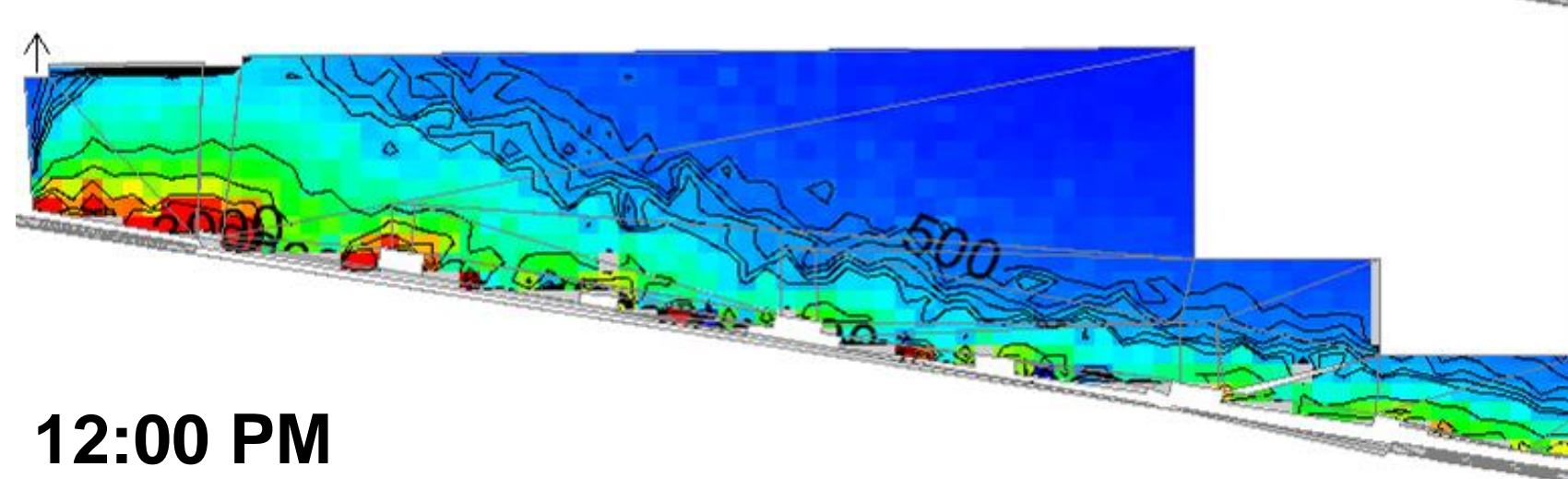


12:00 PM

March 20th

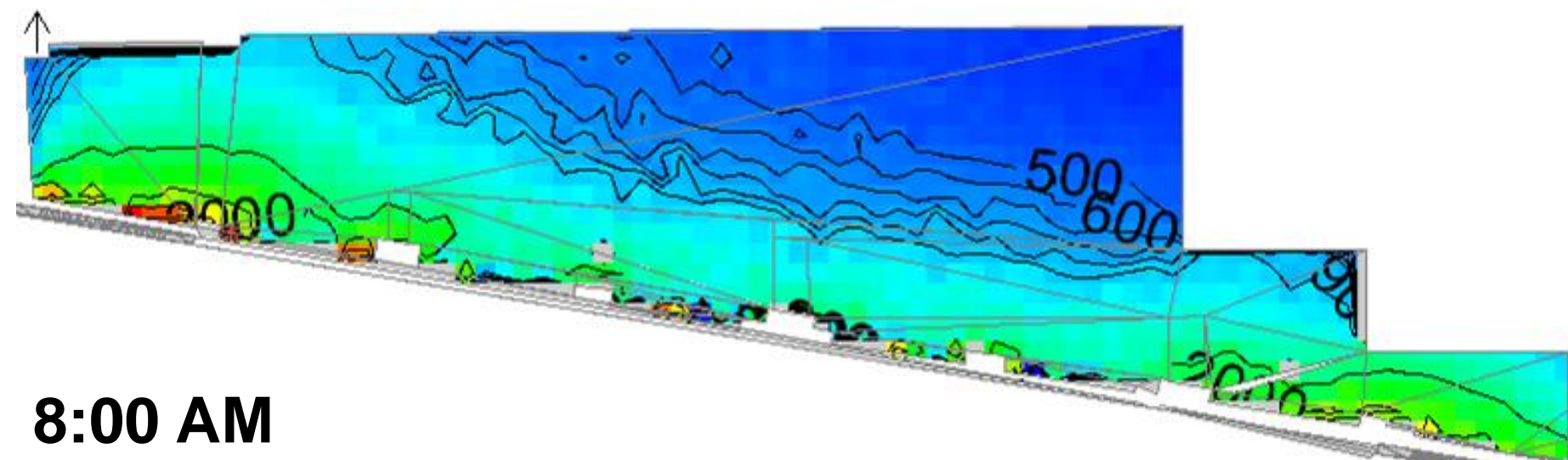


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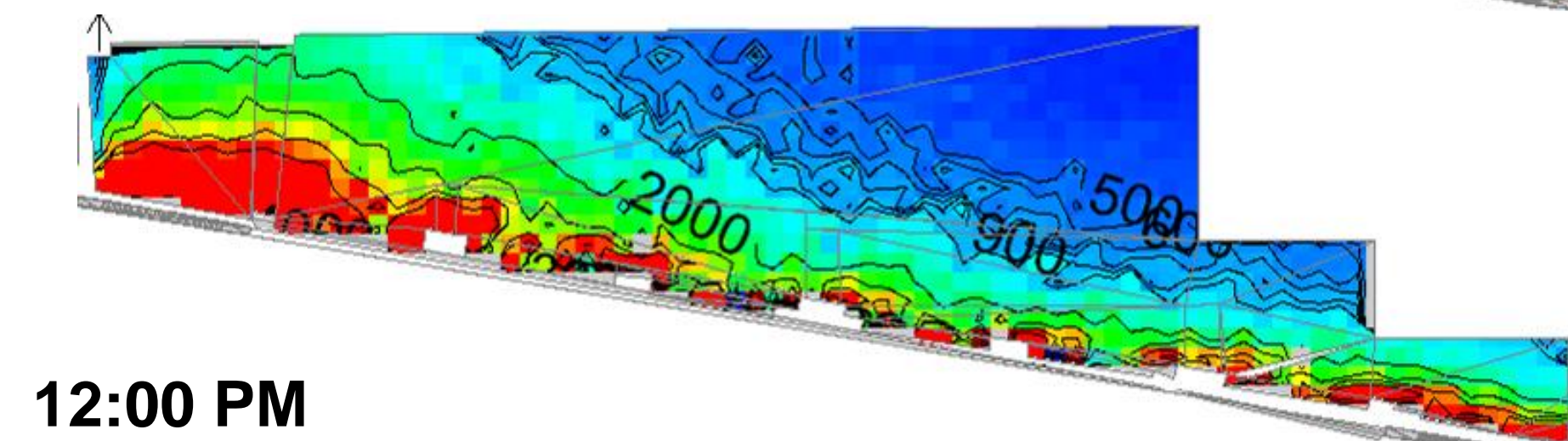


12:00 PM

June 21st



8:00 AM

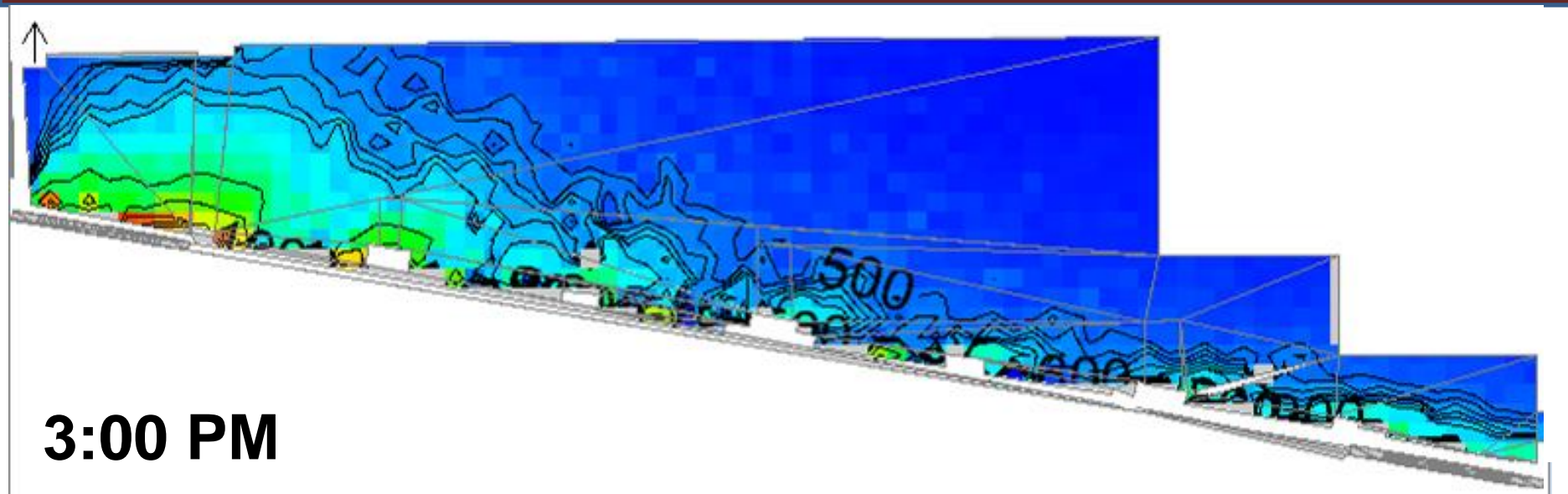


12:00 PM

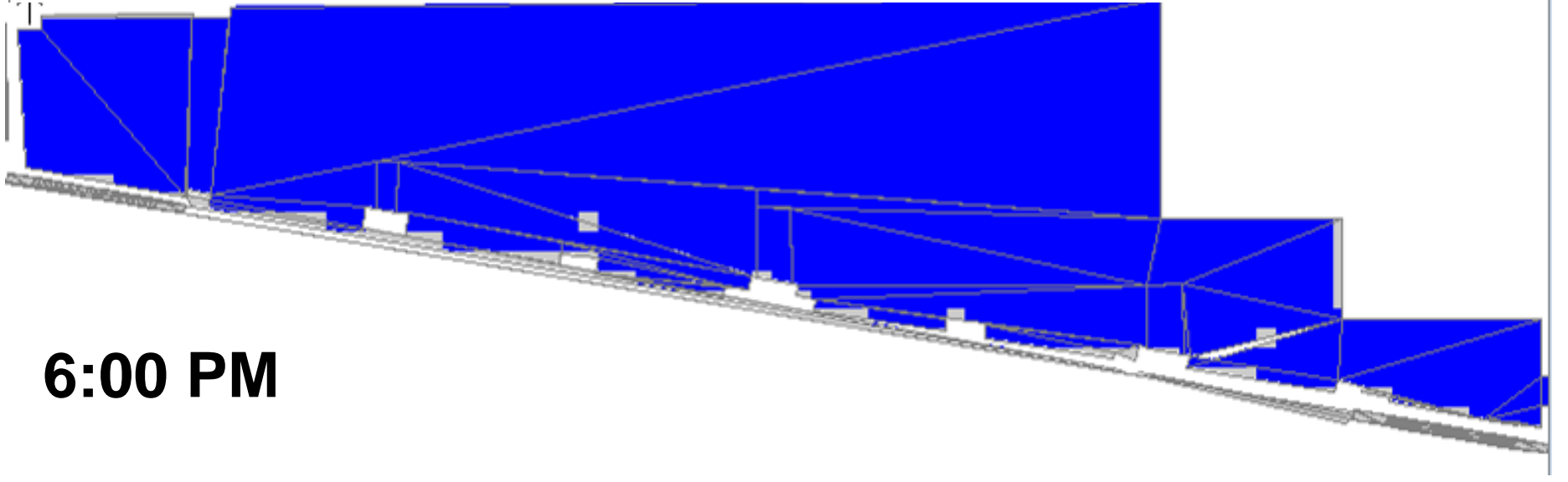
December 21st

March 20th

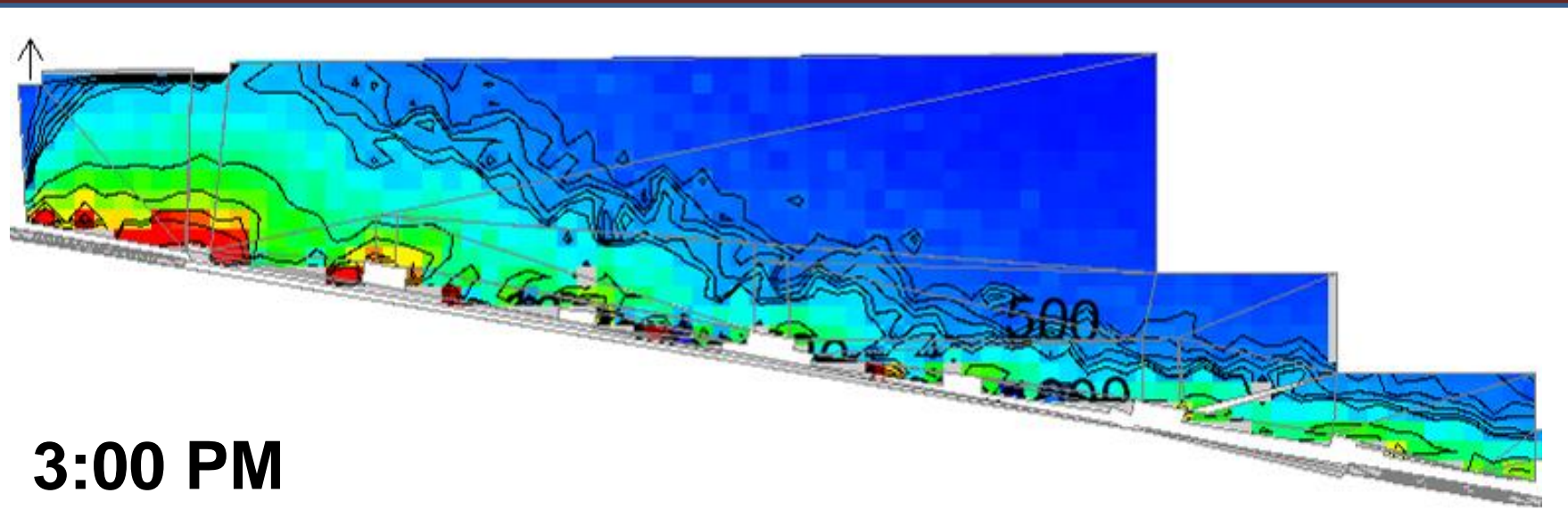
June 21st



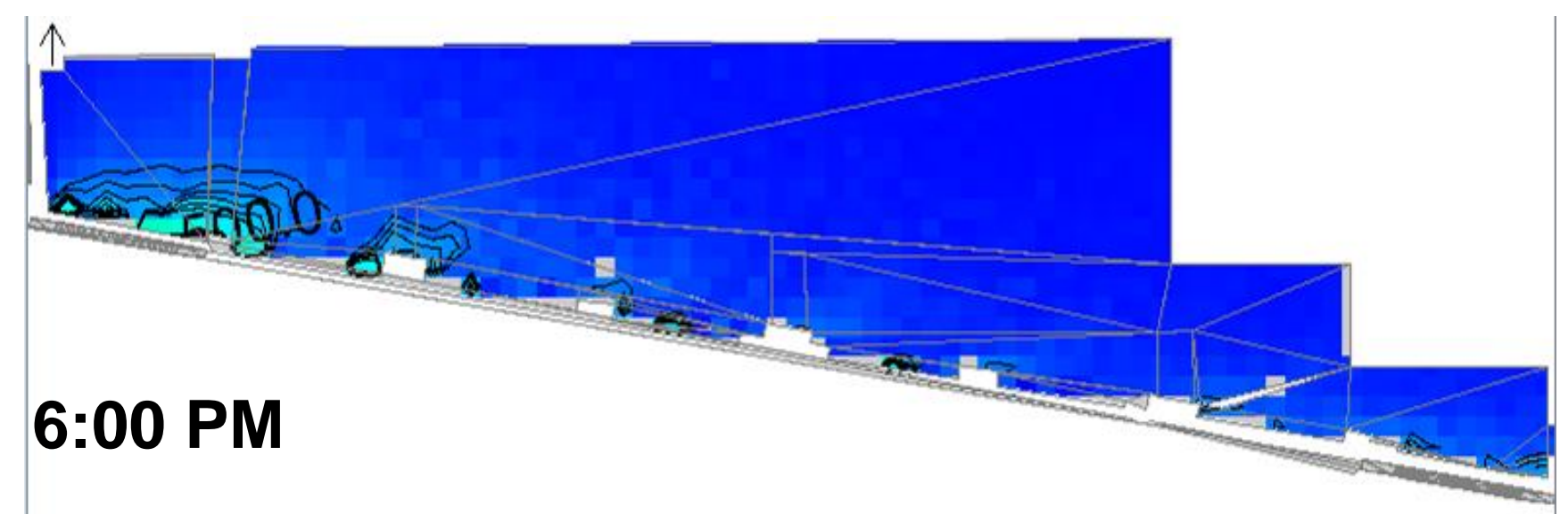
3:00 PM



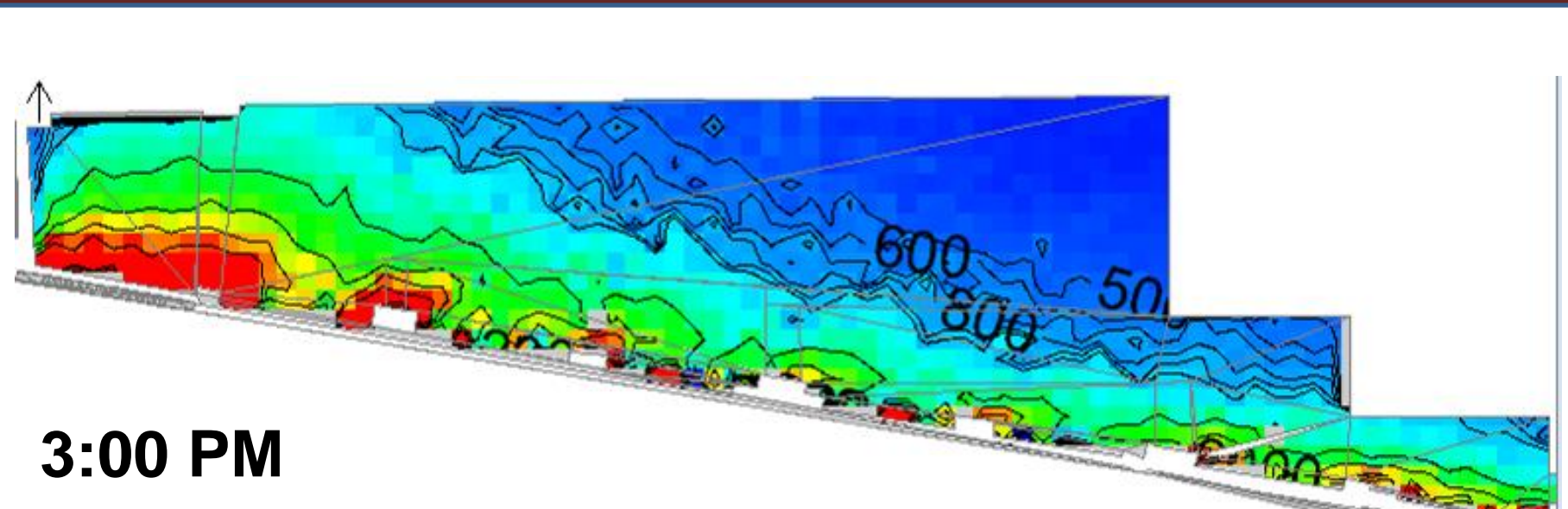
6:00 PM



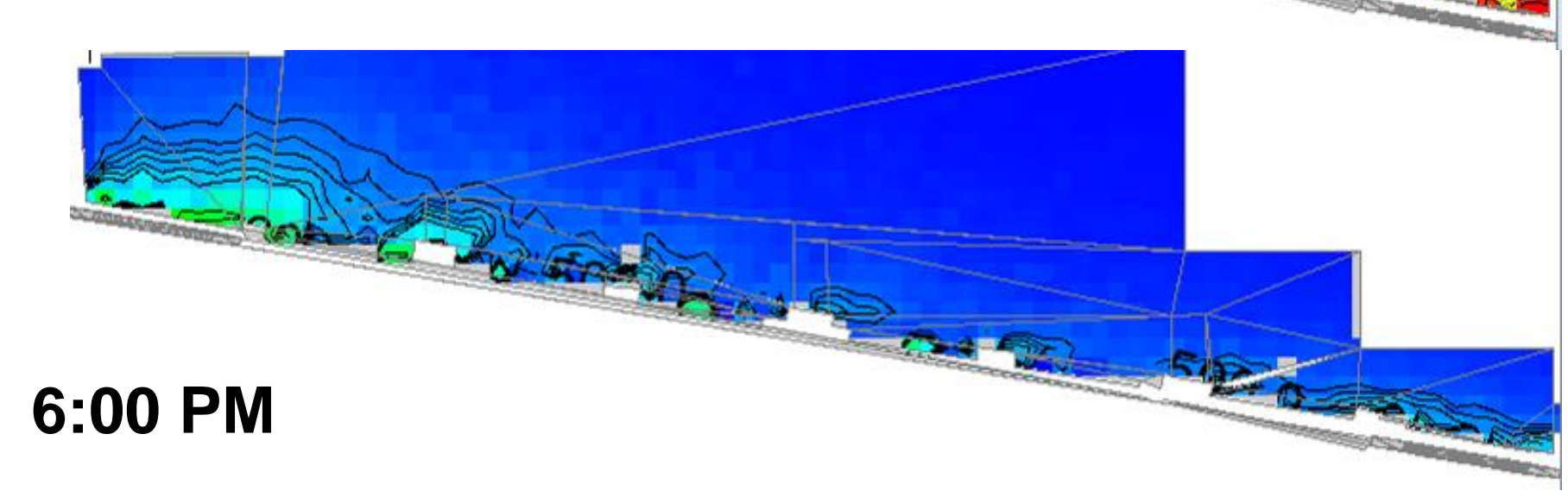
3:00 PM



6:00 PM



3:00 PM

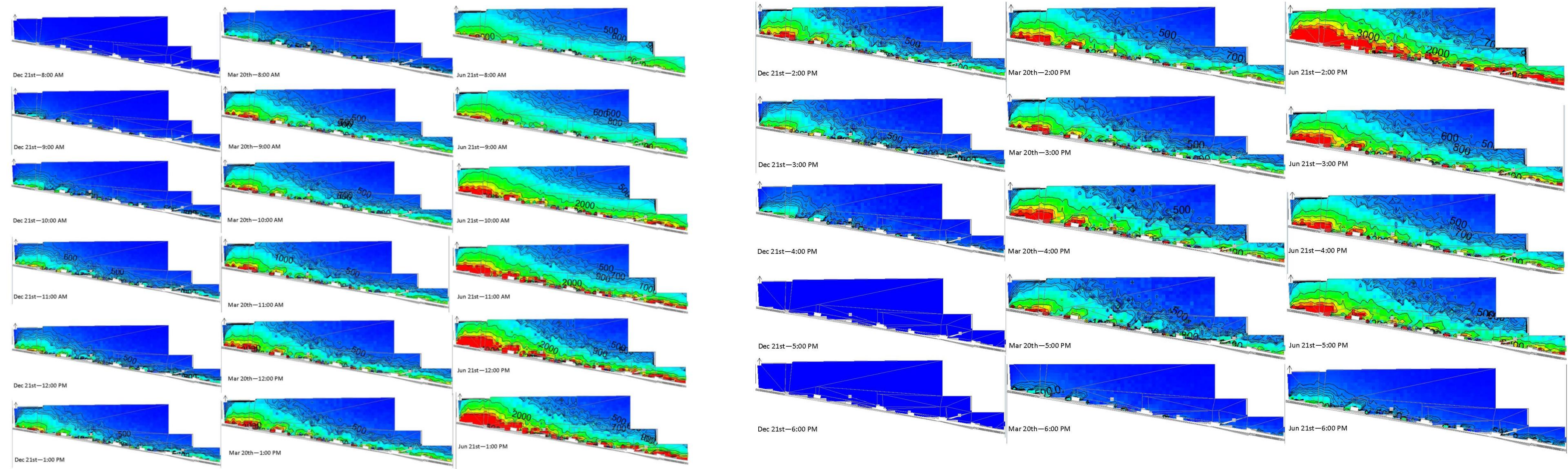


6:00 PM

8:00 AM- 1:00 PM

2:00 PM- 6:00 PM

Conclusions



- Most sunlight penetration on west side
- Shades would best be optimized on the west
- Shading on east from exterior buildings

Conclusions

Lighting Design

- Highlight architectural details
 - Clean modern design
- Promote safety and integration

Daylighting

- Sufficient daylight penetration

Architectural & Mechanical

- Redesign provides a modern and upscale design

Acknowledgements

Penn State AE Faculty

- Dr. Mistrick
- Dr. Houser
- Mr. Dannerth

Arup

Family and Friends

Comments and Questions

