

AE 481W
Tech Report 4A

Bucks County Justice Center

Joshua Lange
Lighting/Electrical
Dr. Richard Mistrick

Building Introduction

Bucks County Justice Center
Doylestown, PA

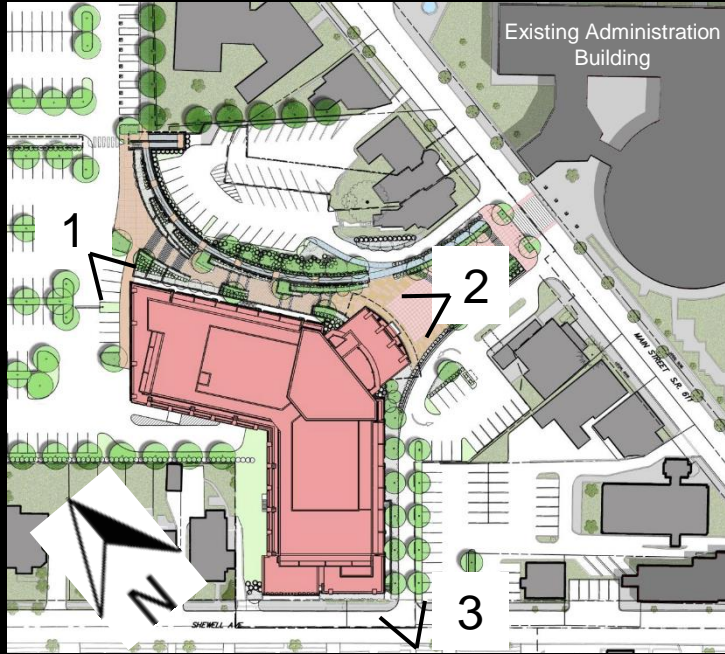
Size: 273,000 GSF

Levels: 7 levels above grade (with penthouse)
2 levels below grade

Dates of construction: July 2011-Early 2015

Overall Project Cost: approximately \$84 million

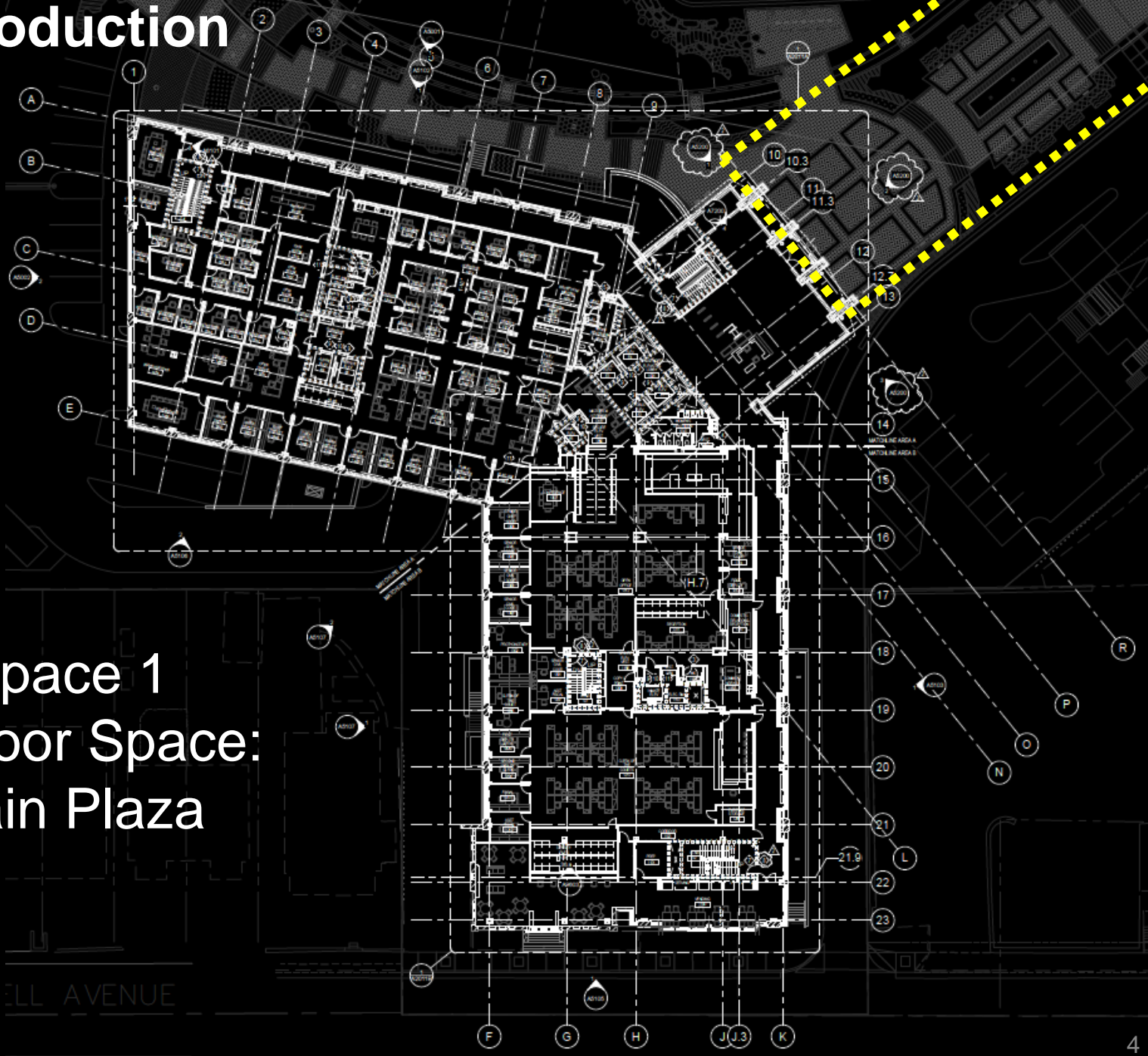
Bucks County Justice Center



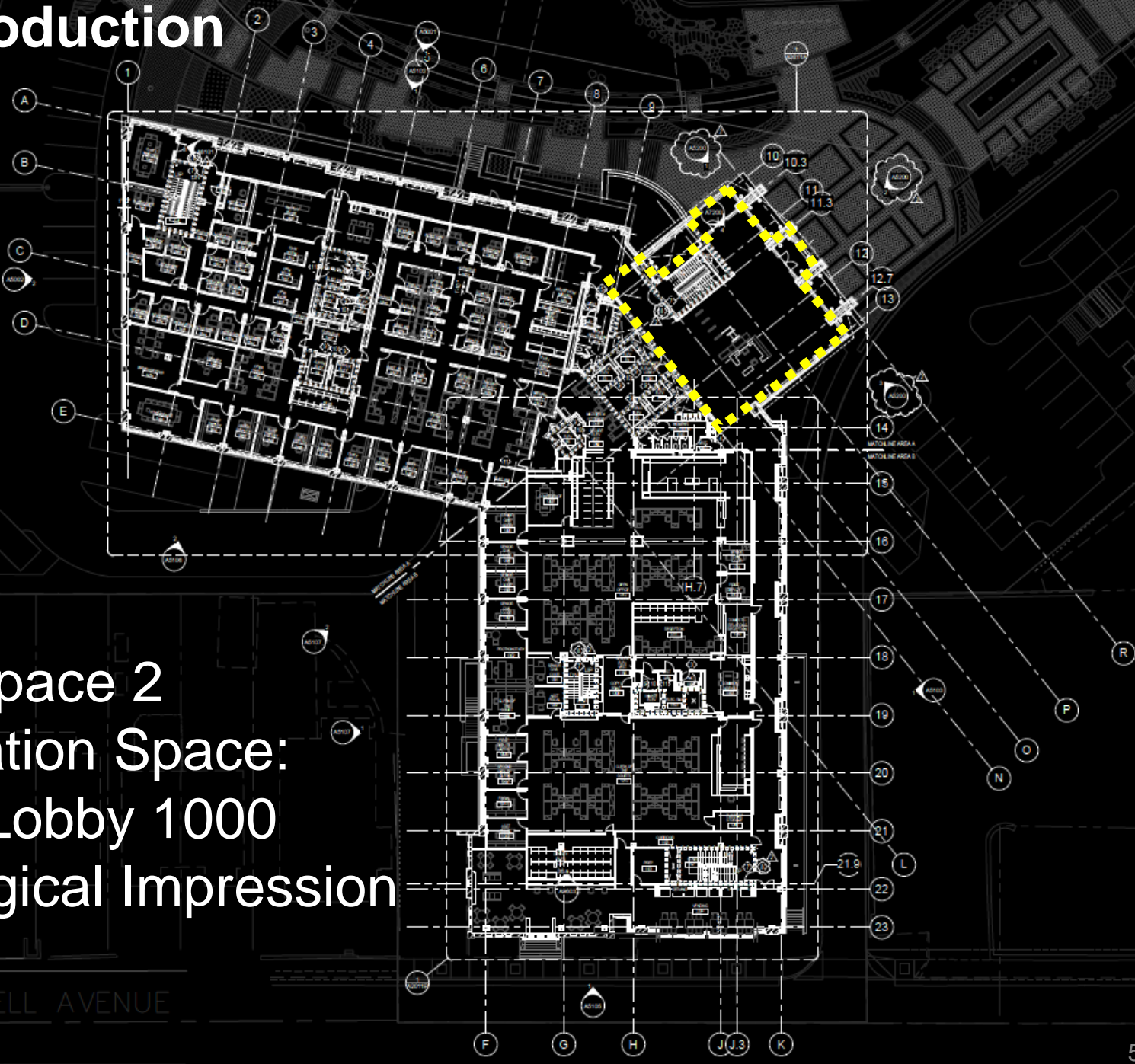
Space Introduction



Space 1
Outdoor Space:
Main Plaza



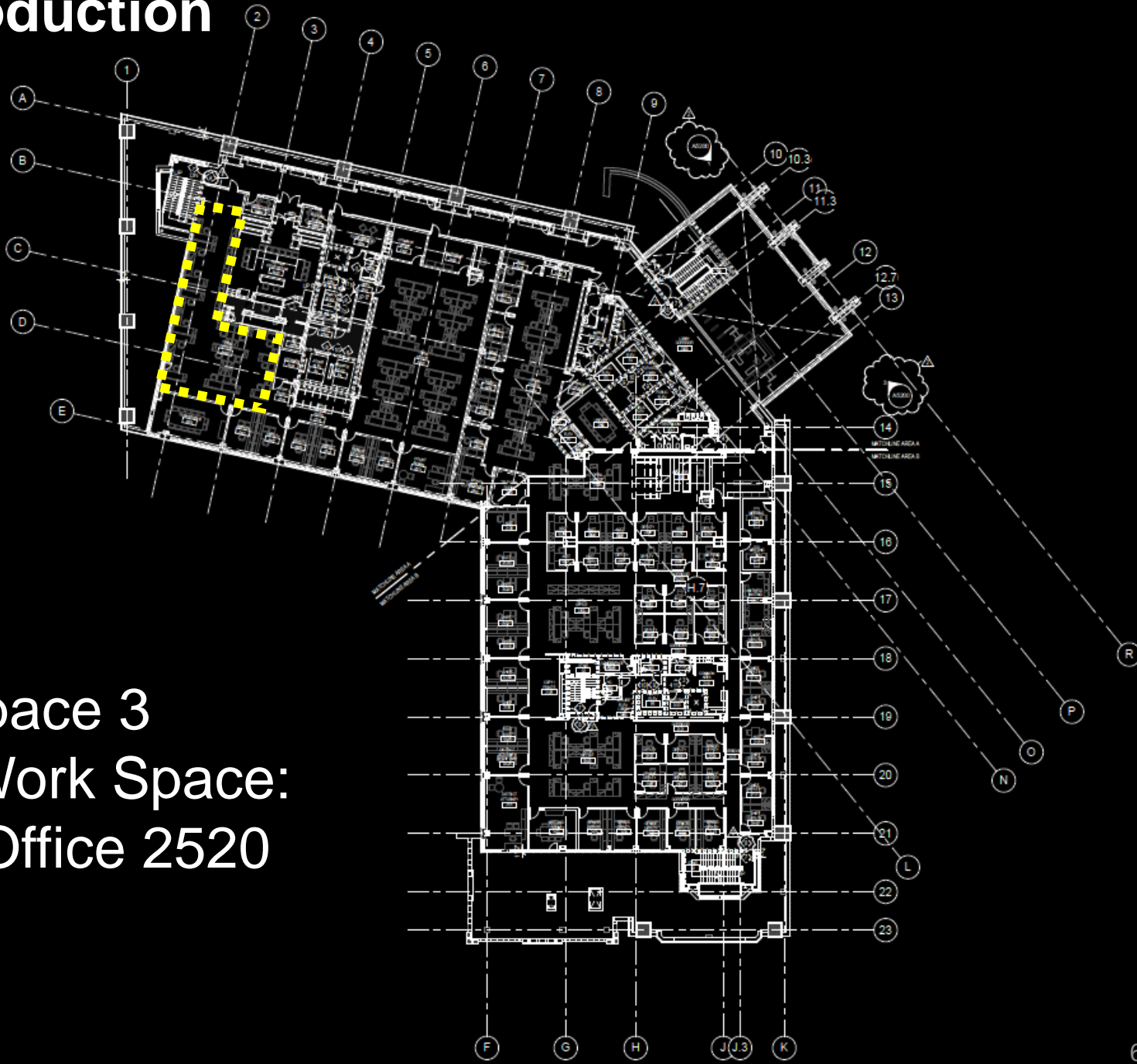
Space Introduction



- Space 2
- Circulation Space:
- Main Lobby 1000
- Psychological Impression

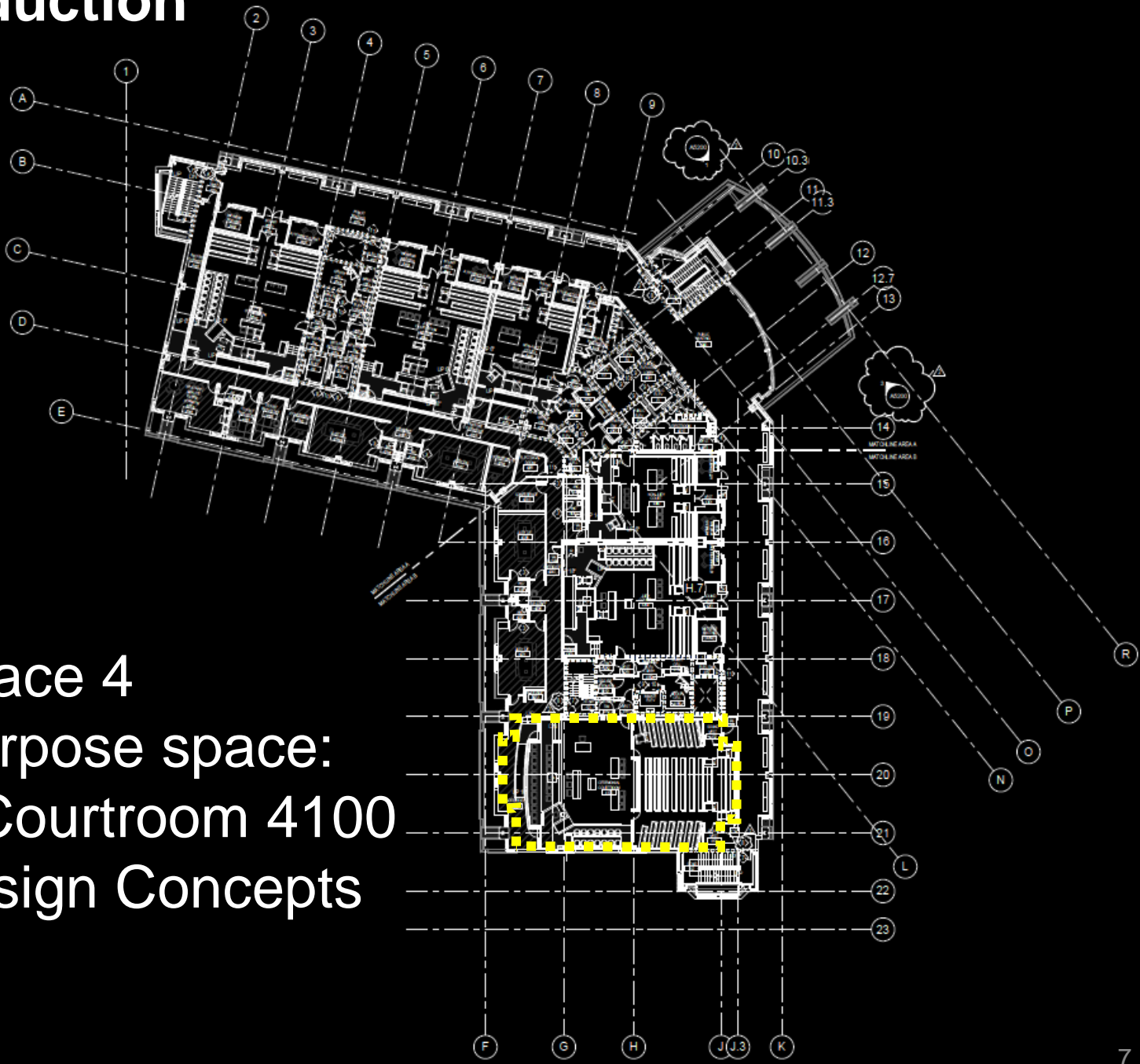
ILL AVENUE

Space Introduction



Space 3
Large Work Space:
Open Office 2520

Space Introduction



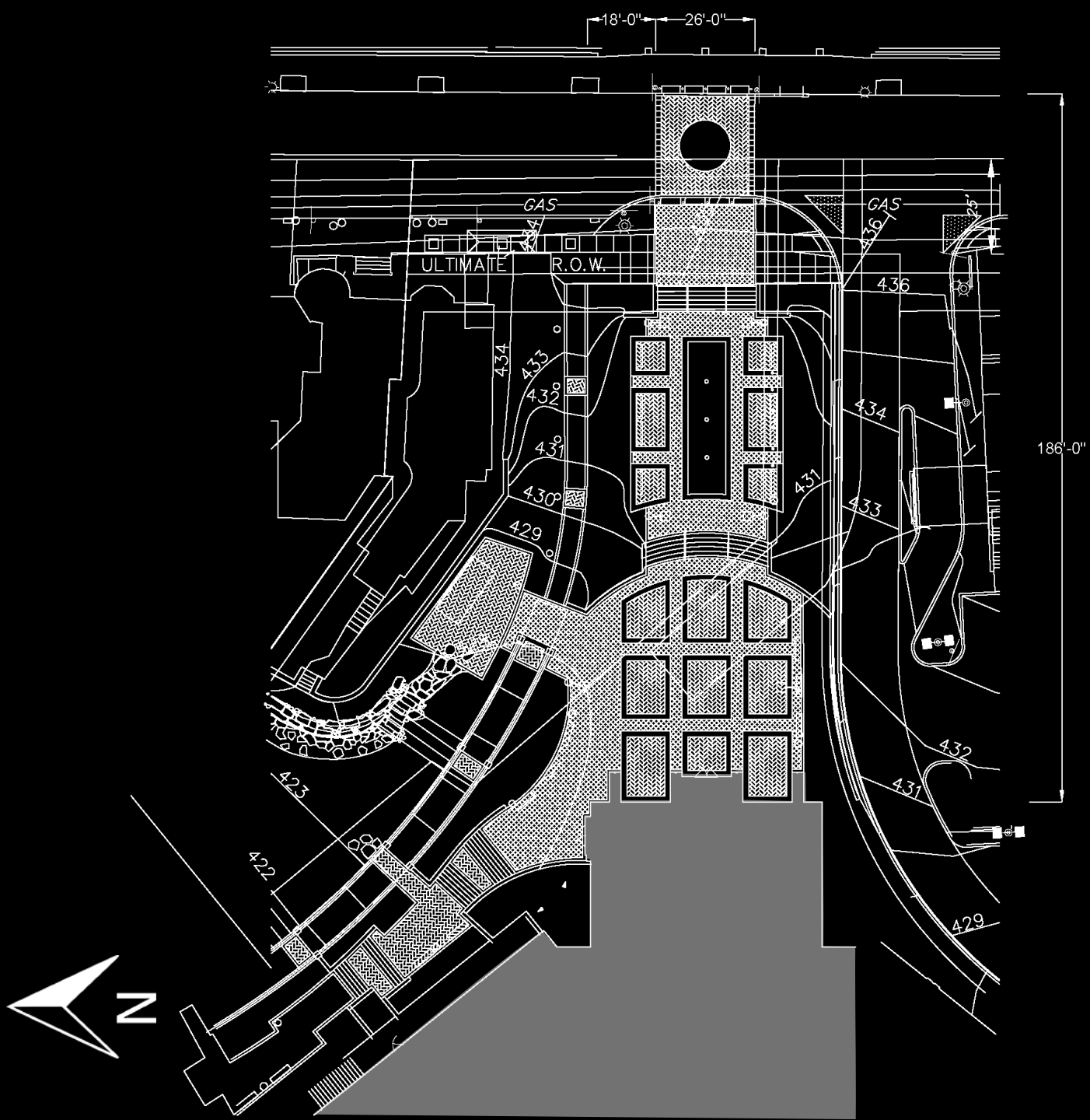
Space 4

Special Purpose space:

Ceremonial Courtroom 4100

- Three Design Concepts

Main Plaza



Qualitative

Inviting

Way finding

Safety

Quantitative
ASHRAE 90.1

Daylight control

Building facade and landscaping shut off
between midnight and 6:00 a.m.

Automatic reduction

Base	Plaza Areas	Main Entries	Building Facades (non tradable)
600 W	0.14 W/SF	20 W/lin ft of door width	0.1 W/SF

Quantitative IES Handbook

Eh (lux)	Ev (lux)	Max:Avg	Avg:Min
4	2	4:1	5:1

IES & LDA MLO

Site lumen limit

Performance method requires bounding box to have:

- No more than 15% of site lumens
- An illuminance not greater than 3.0 lumens

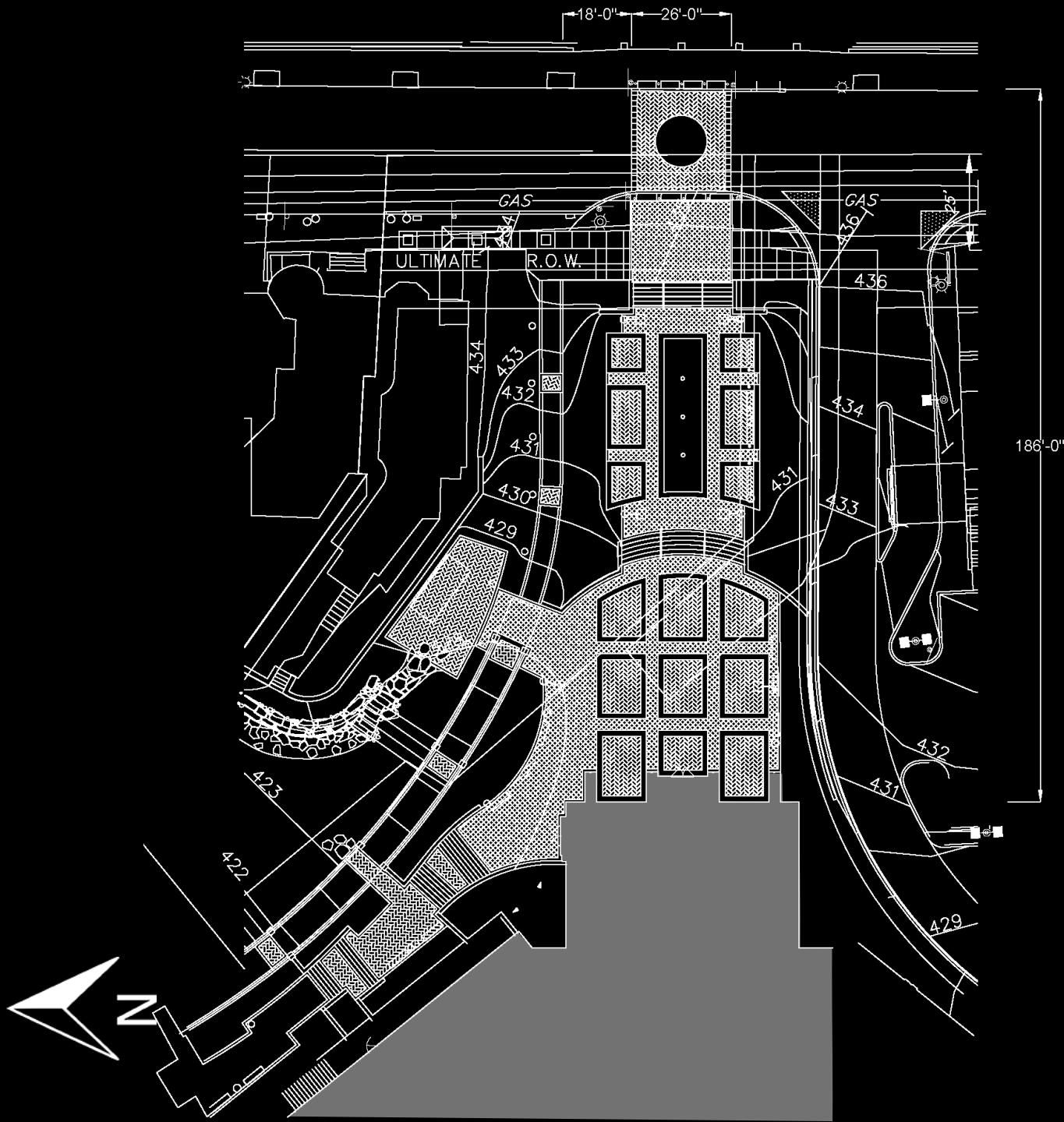
Quantitative Other Criteria

CCT: 3500K

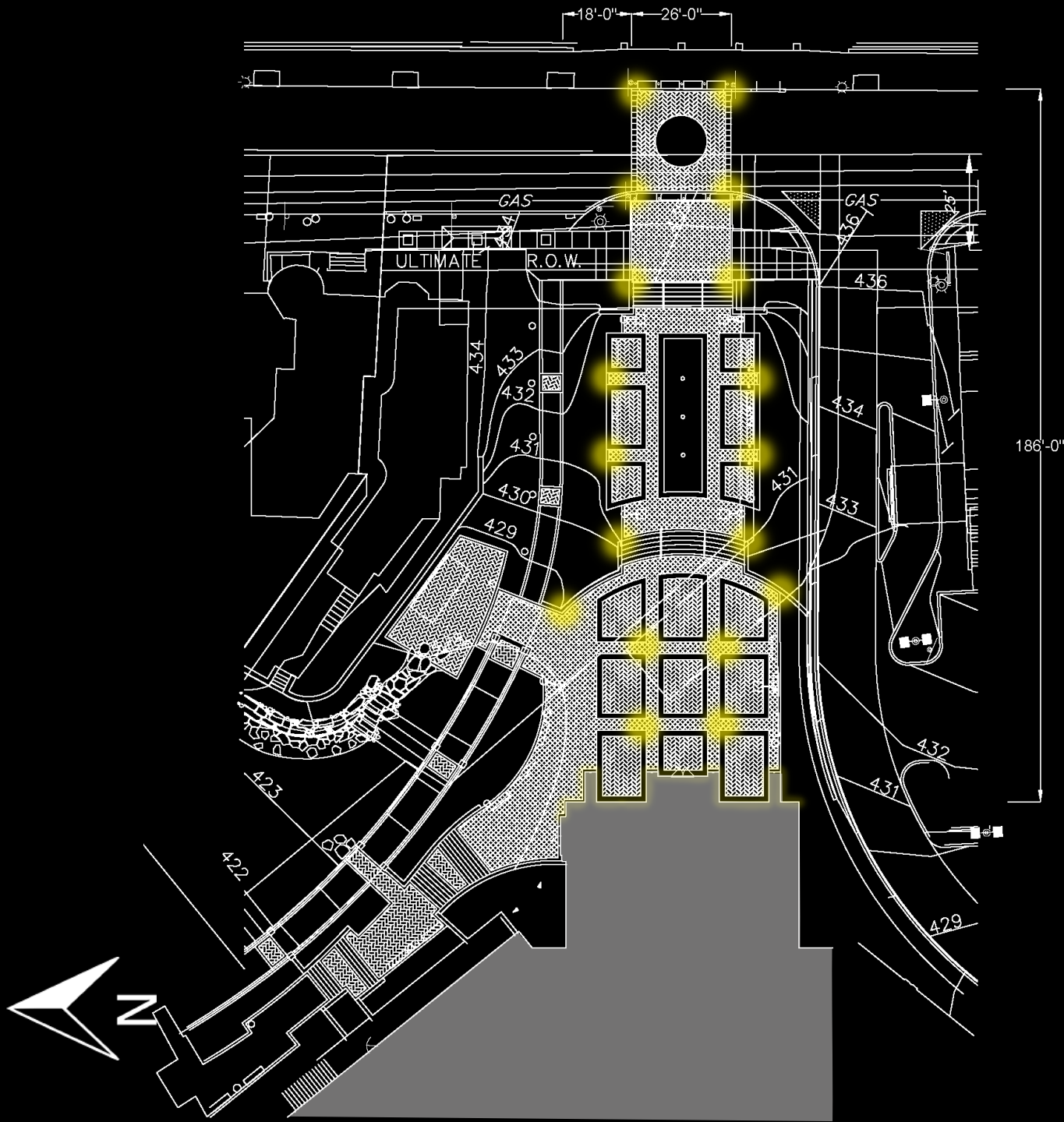
CRI: ≥ 80

Life: very high due to the complexity of maintenance

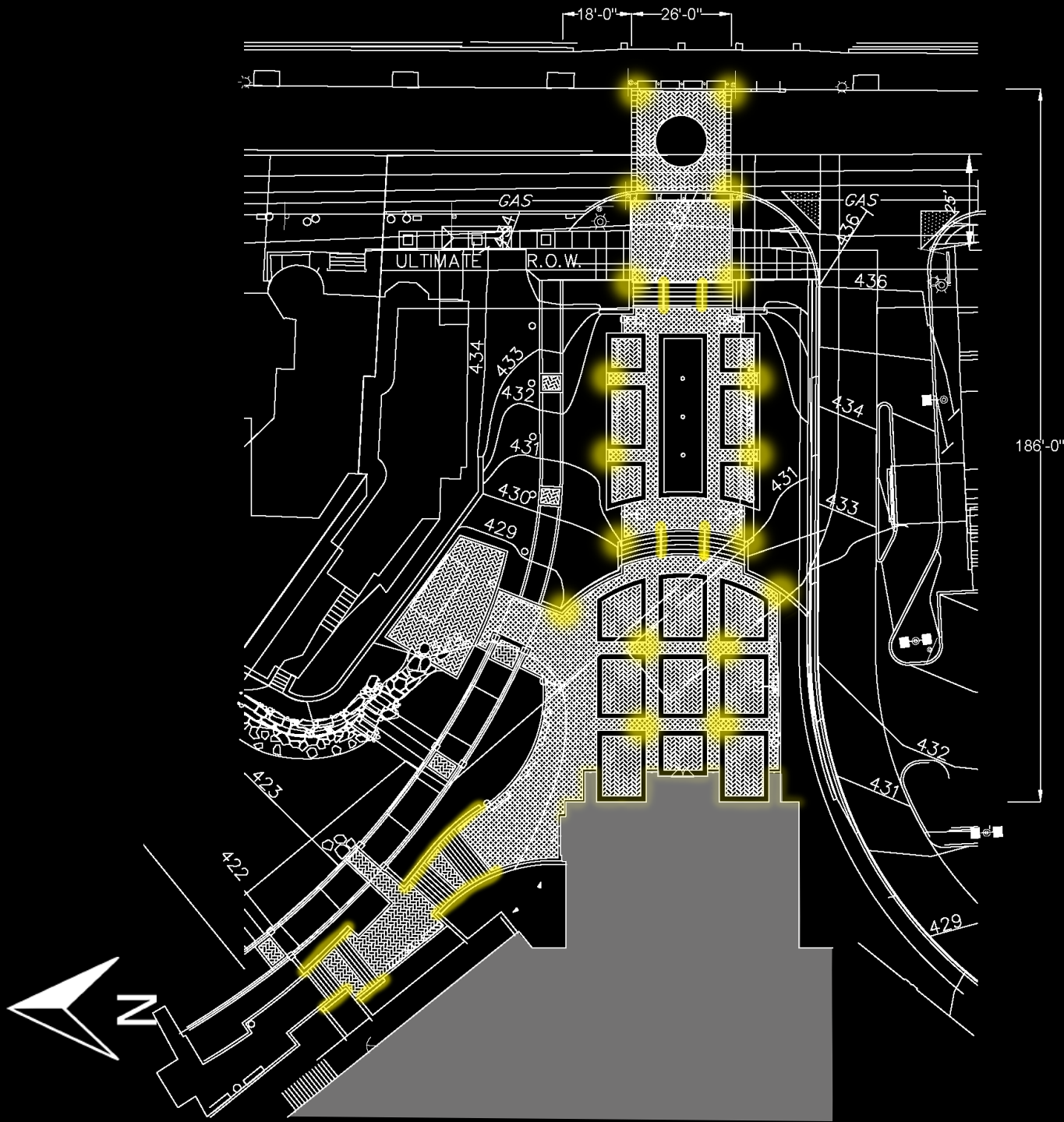
Main Plaza



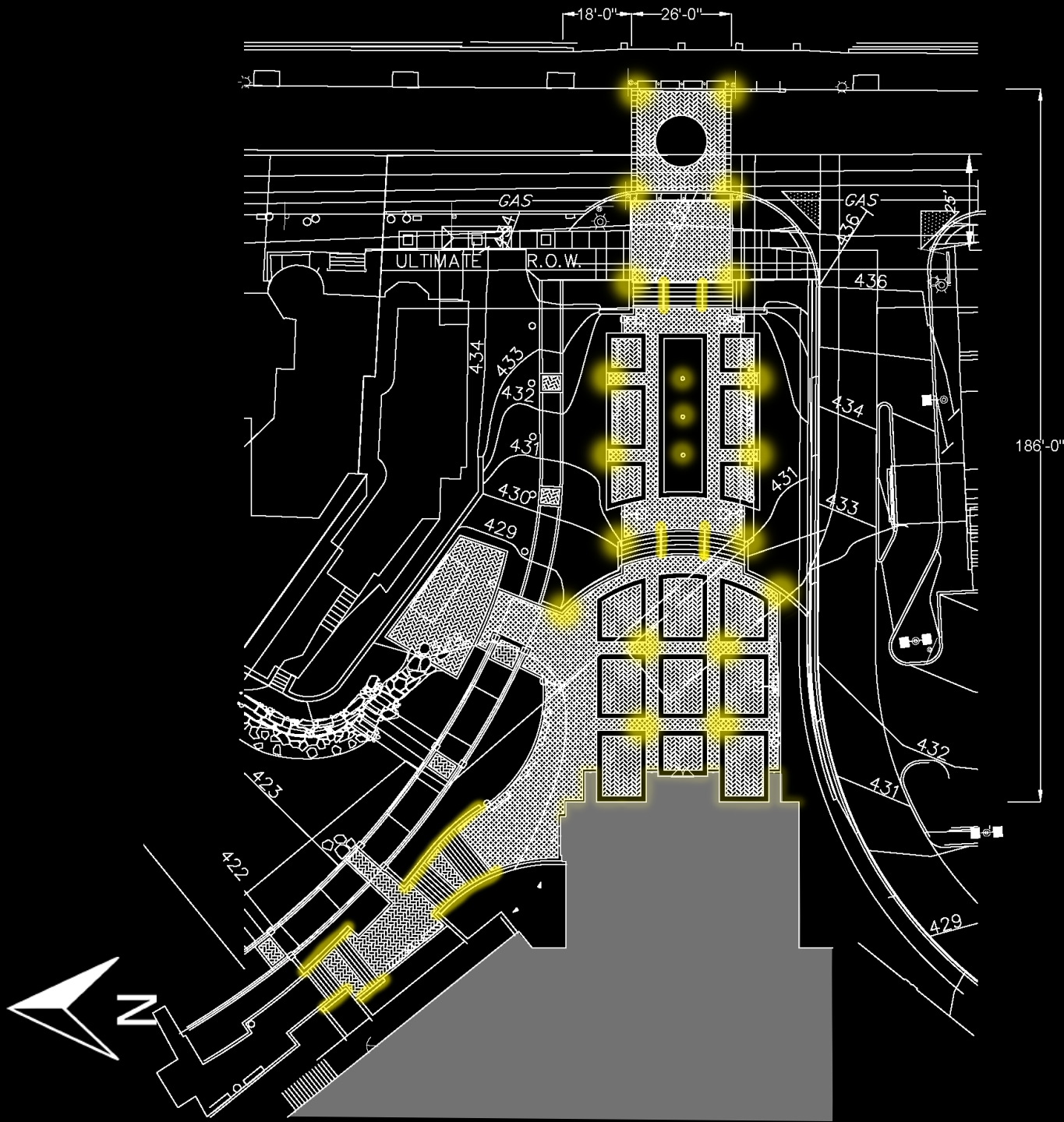
Main Plaza



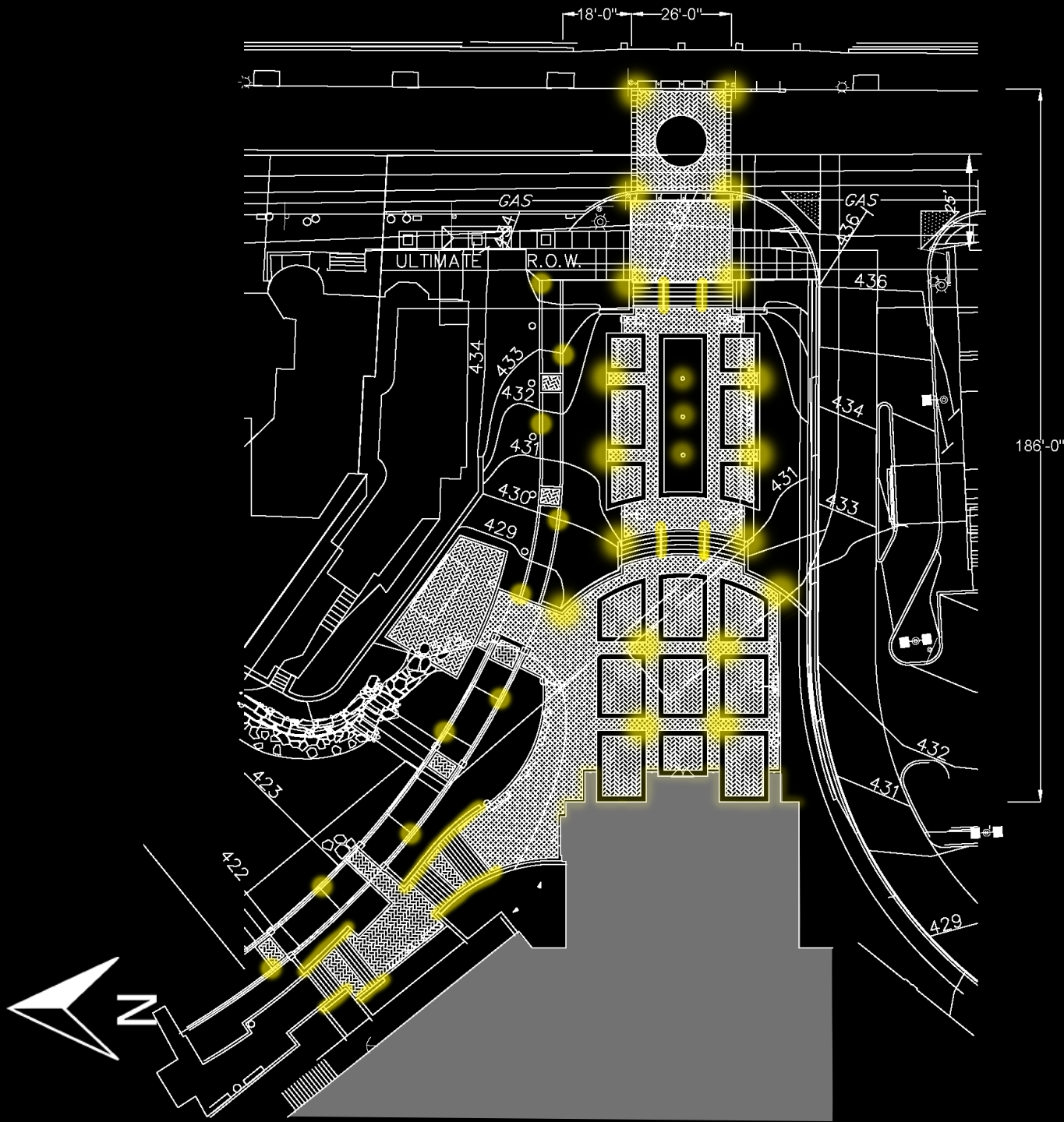
Main Plaza



Main Plaza



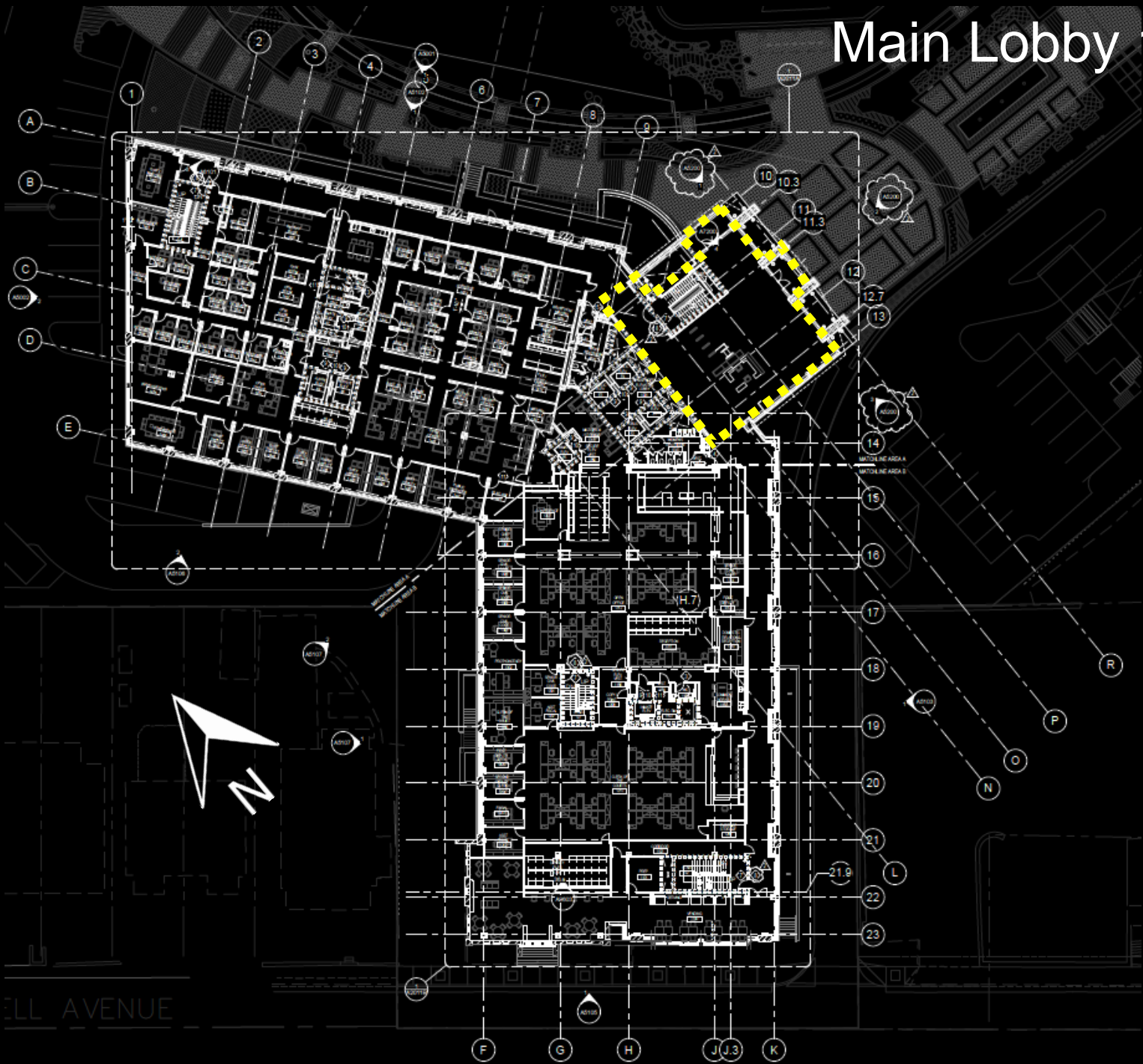
Main Plaza



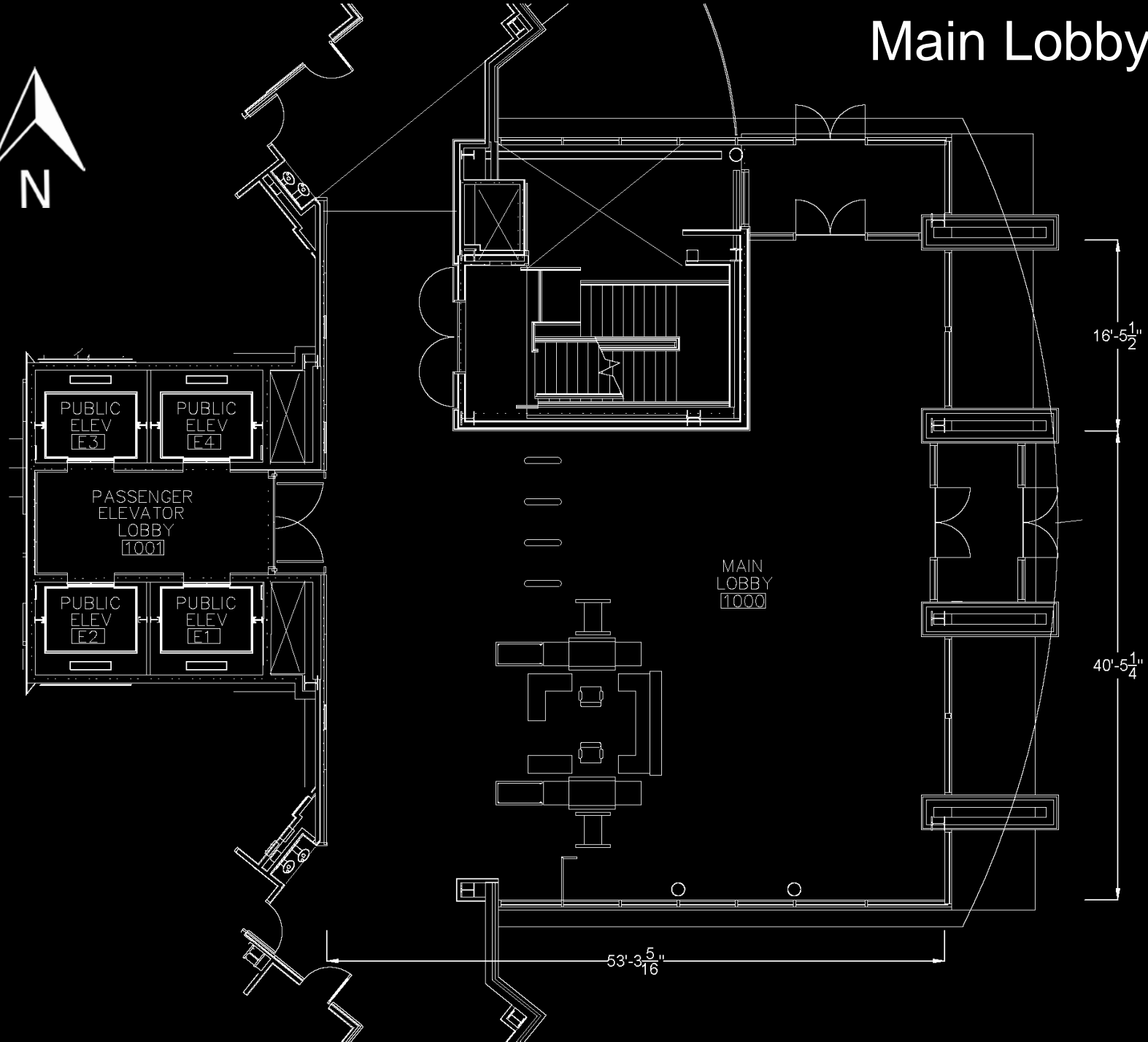
Equipment



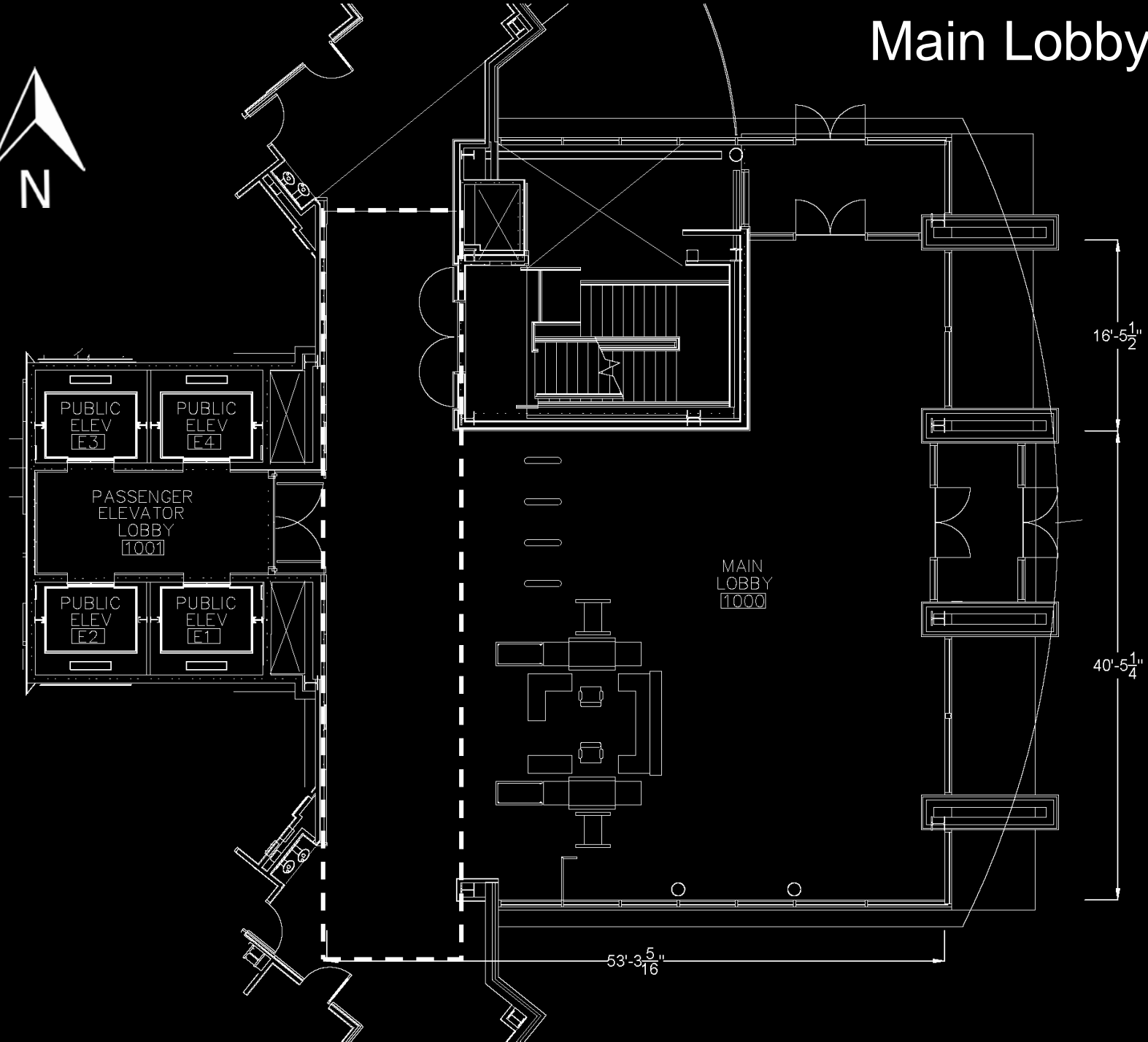
Main Lobby 1000



Main Lobby 1000



Main Lobby 1000



Qualitative

Spacious

Way finding

Safety

Quantitative
ASHRAE 90.1

Local control

Automatic Daylight Responsive Controls
for Sidelighting

Allocated LPD: 0.9 W/SF

Quantitative IES Handbook

Location	Eh (lux)	Elevation Eh	Ev (lux)	Elevation Ev	Avg:Min
Security screening	200	3'-0"	100	5'-0"	2:1
Lobbies near entries (day)	100	Floor	30	5'-0"	4:1

Quantitative Other Criteria

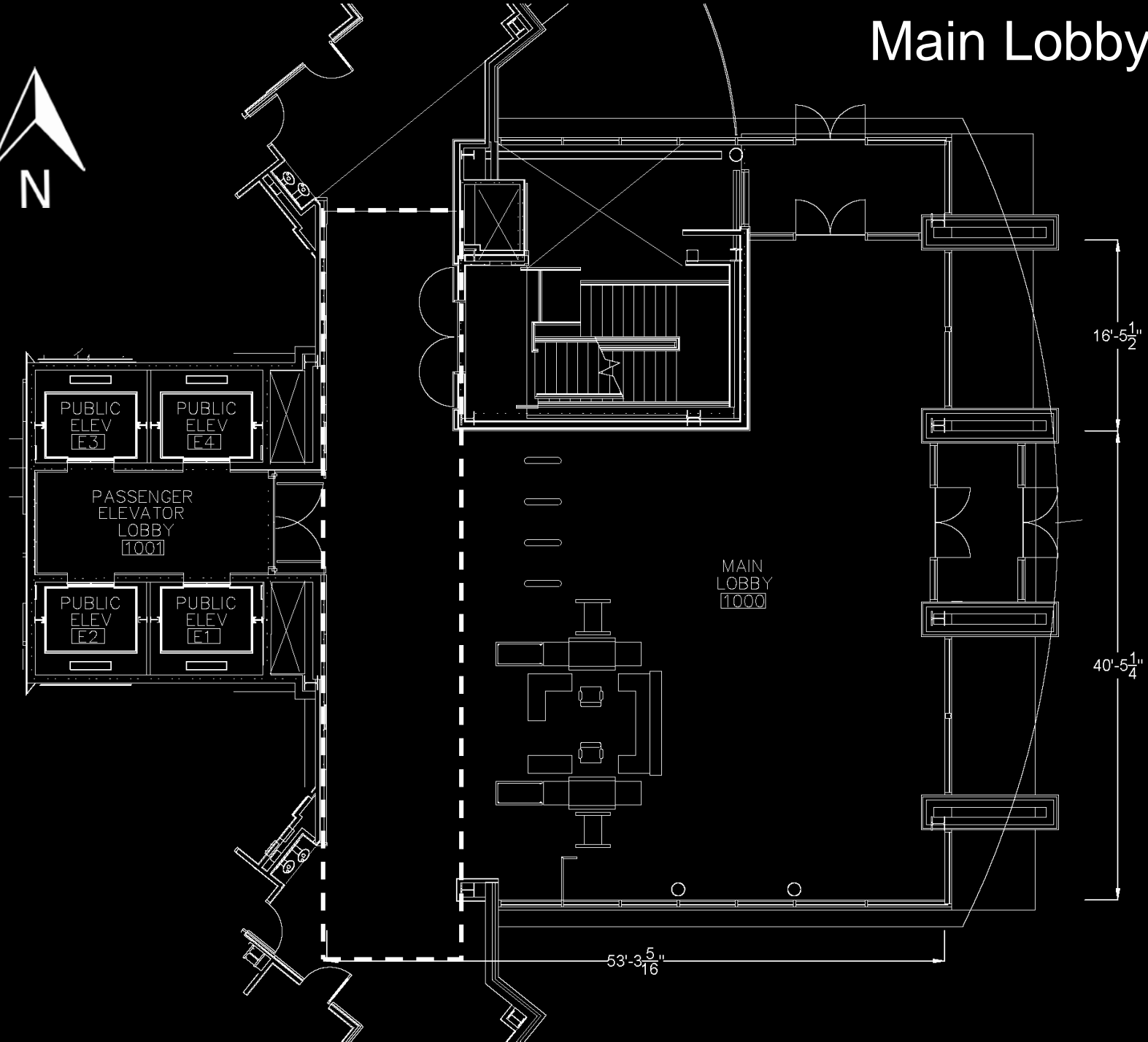
CCT: 3500K

CRI: ≥ 80

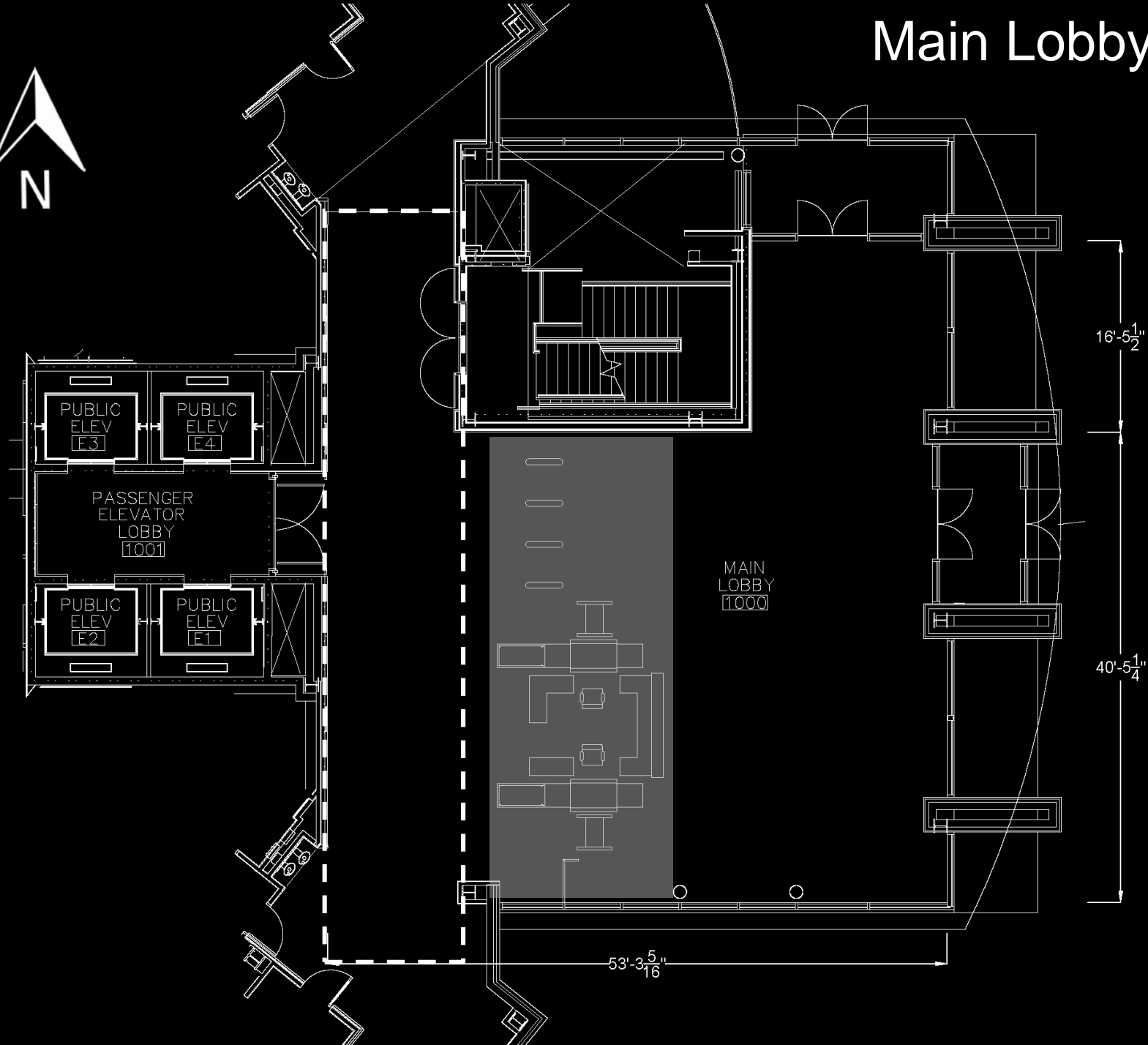
Life: very long

Efficacy/Efficiency: 20% reduction from ASHRAE 90.1

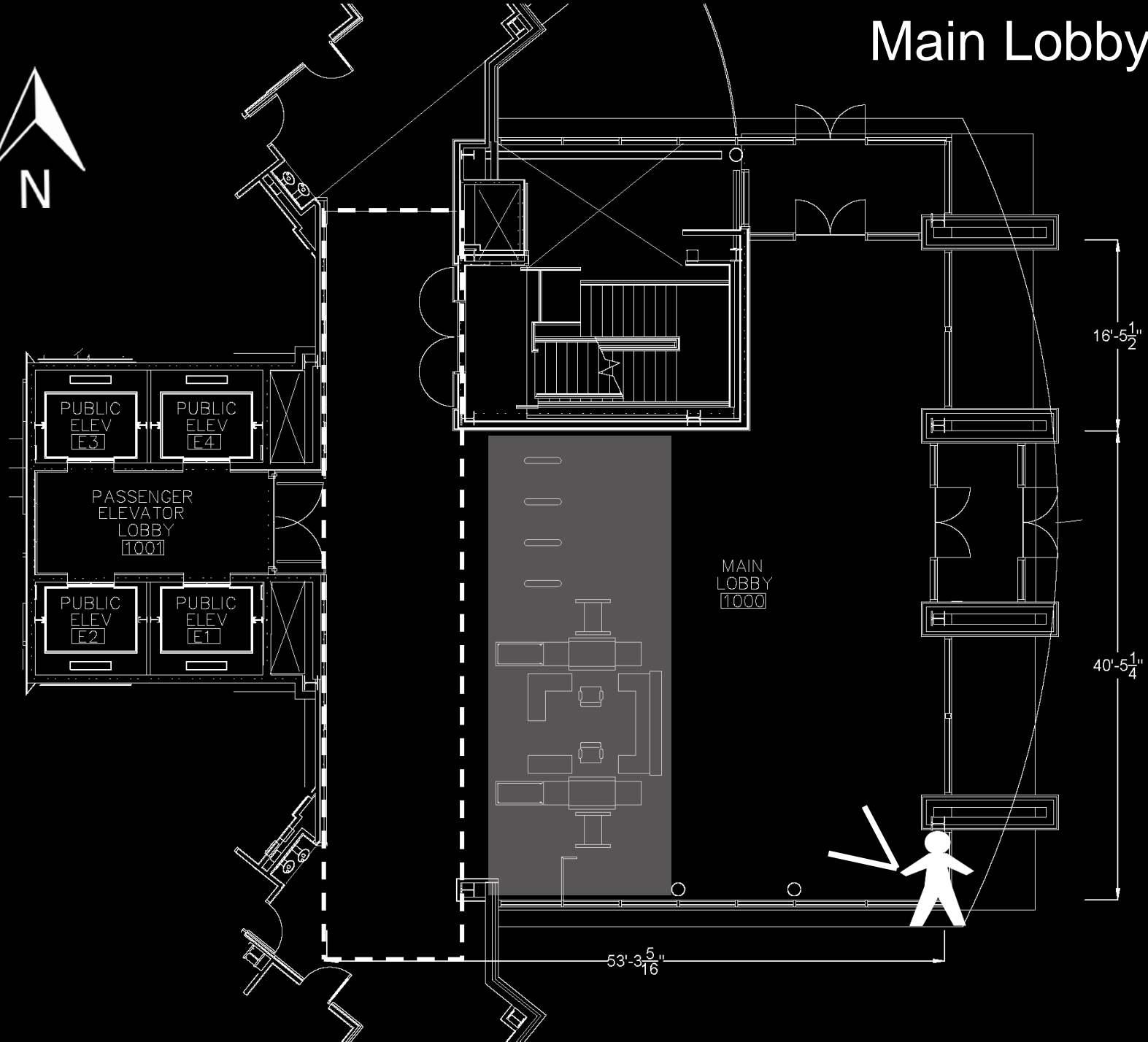
Main Lobby 1000



Main Lobby 1000

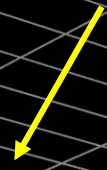


Main Lobby 1000



Main Lobby 1000

Acoustical Ceiling Panels



Terracotta Panels



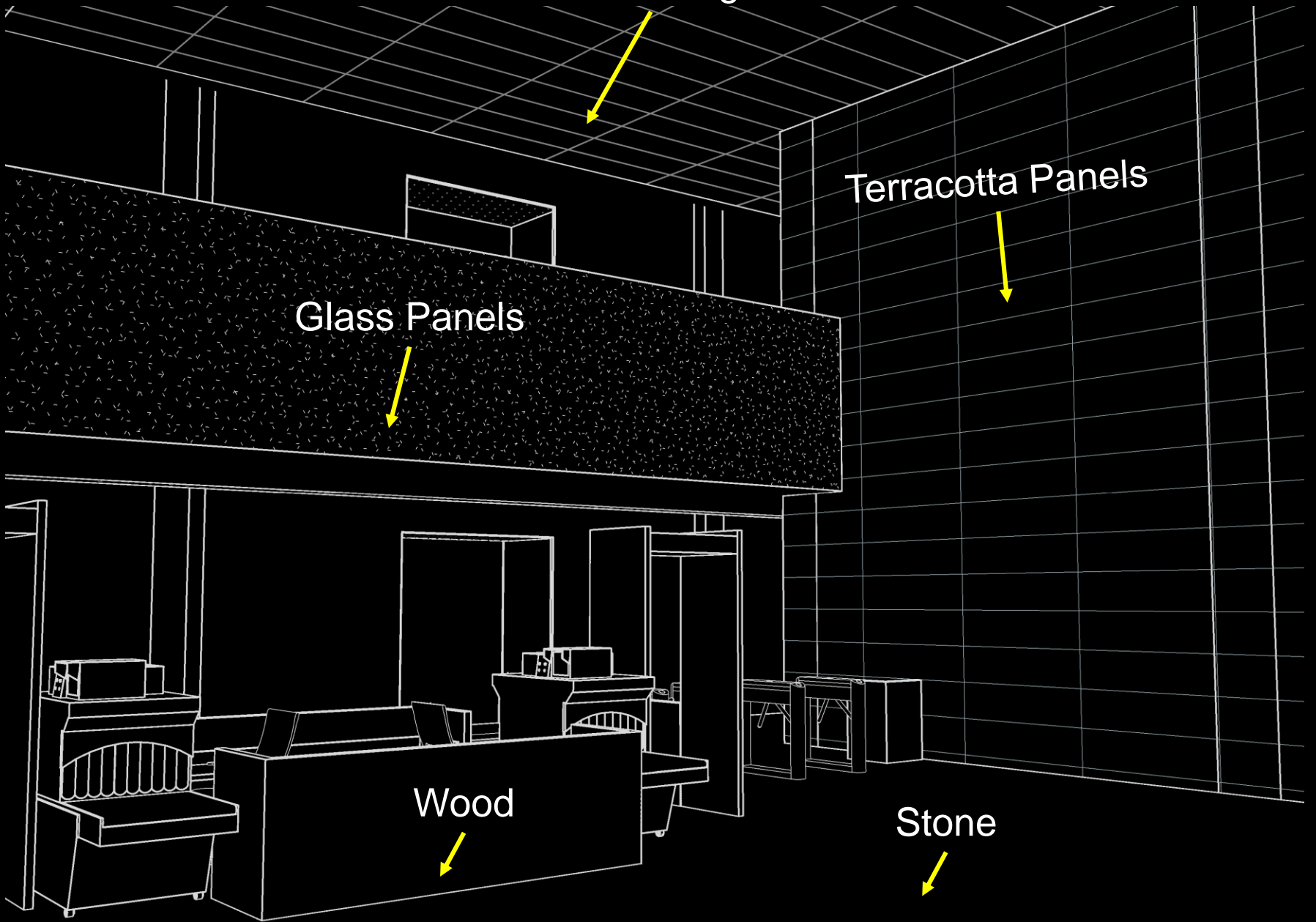
Glass Panels



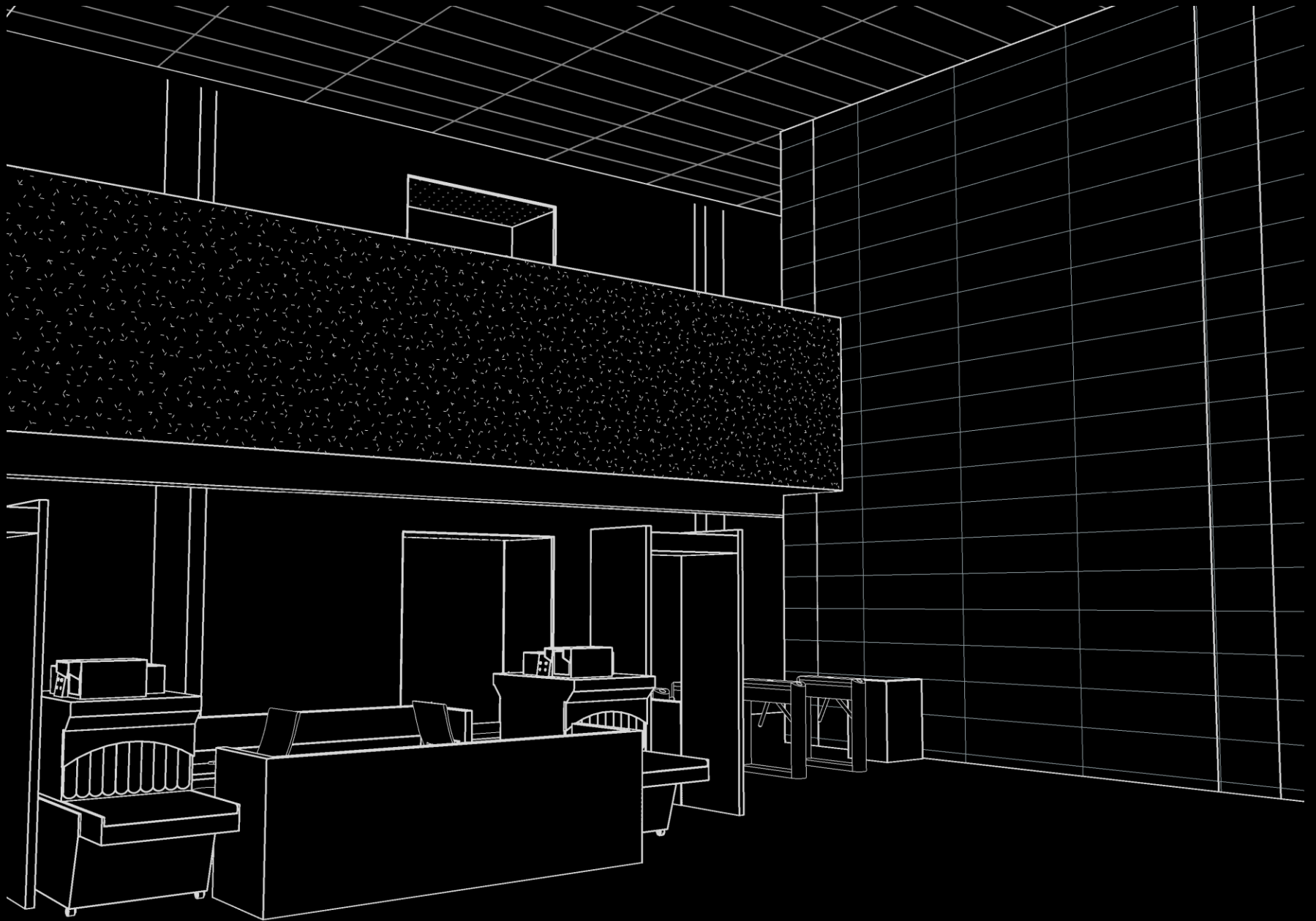
Wood



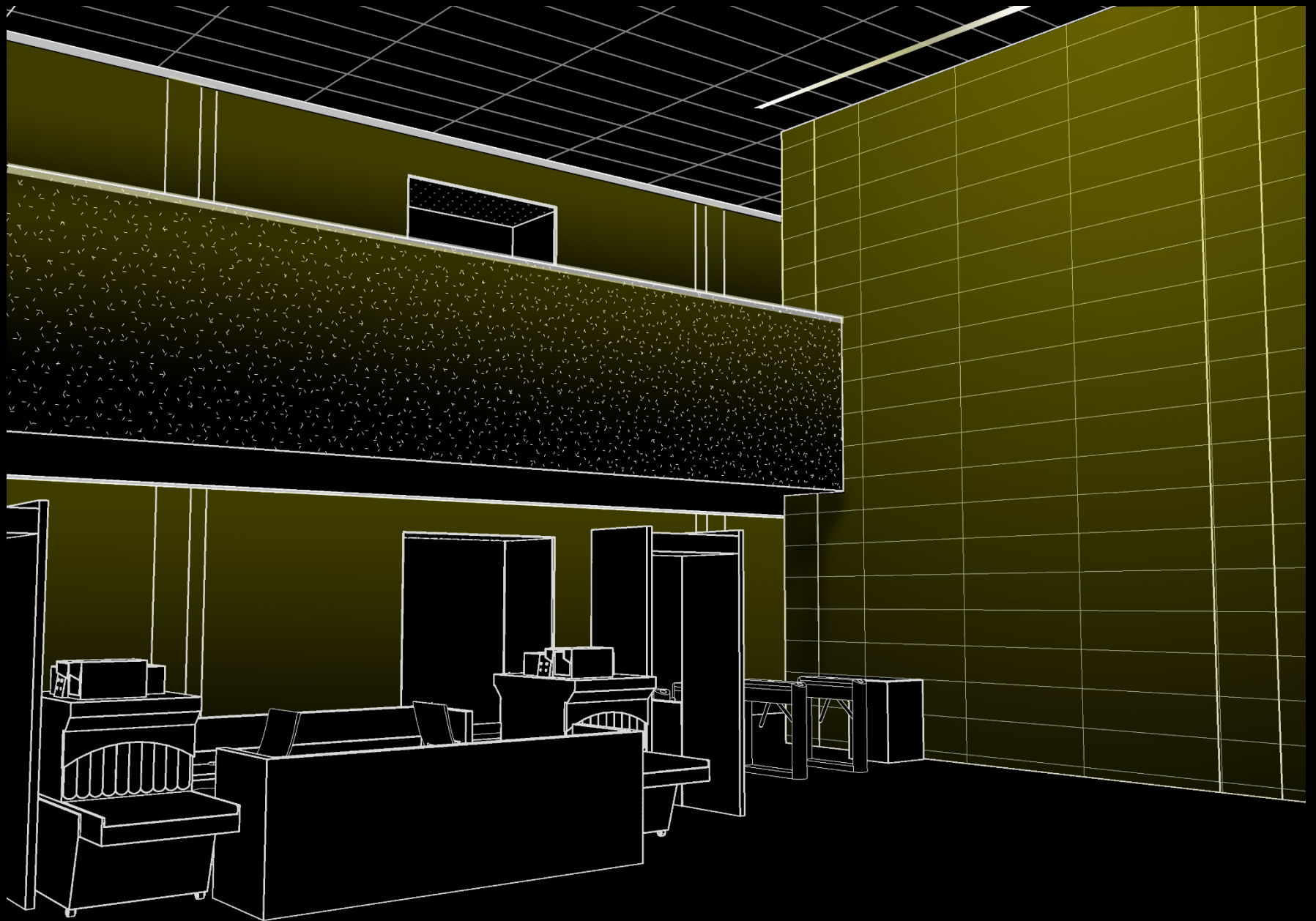
Stone



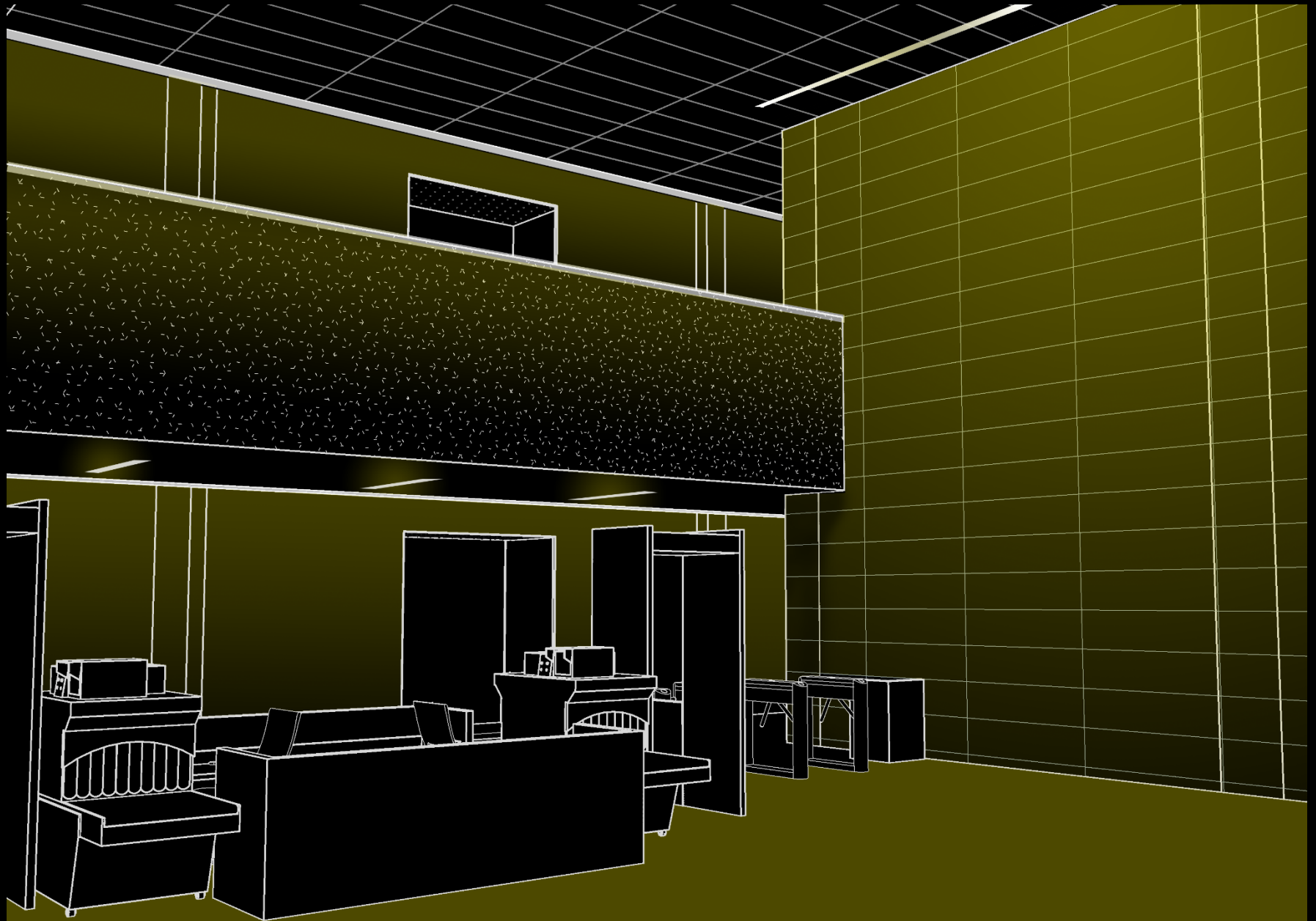
Main Lobby 1000



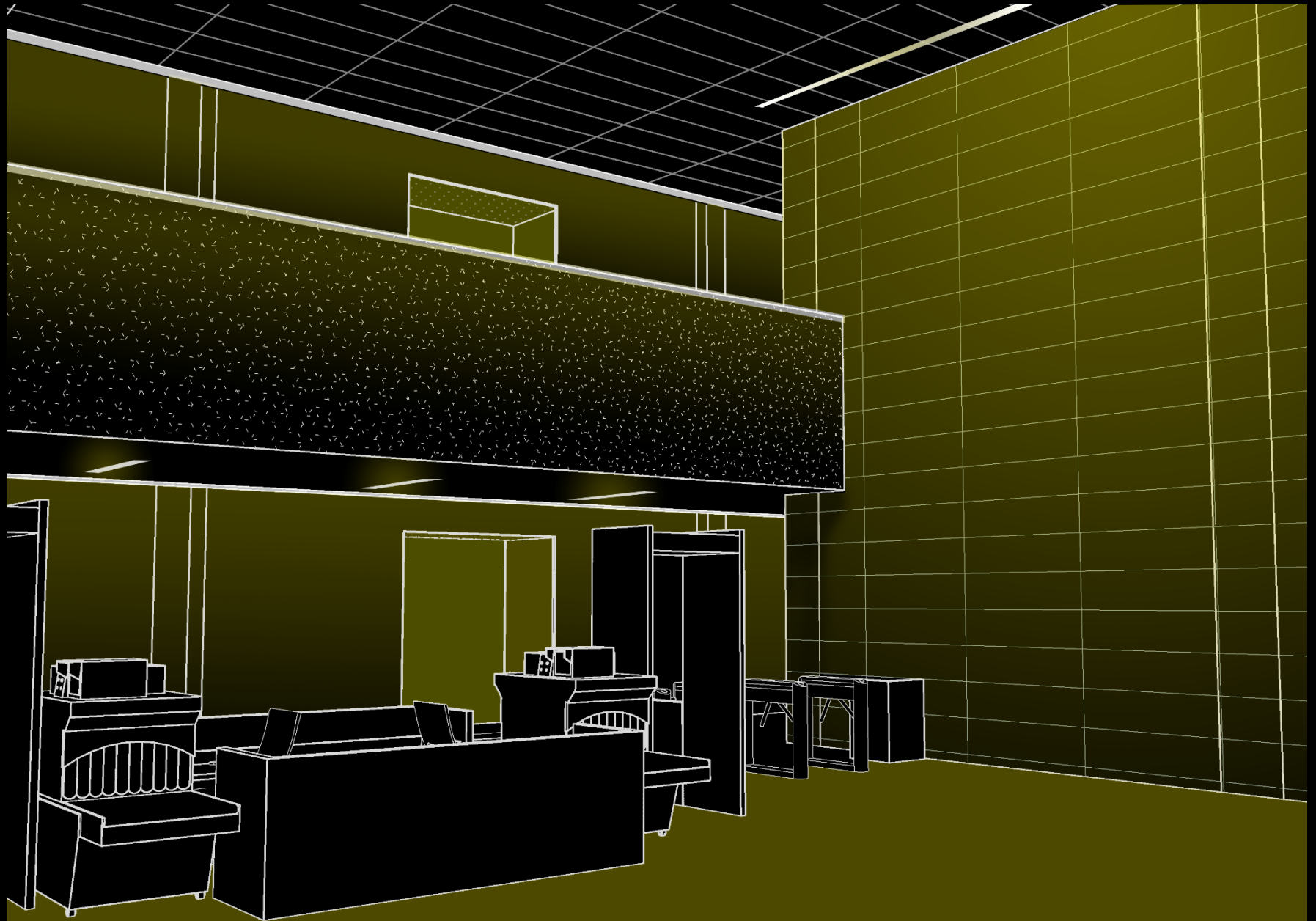
Main Lobby 1000



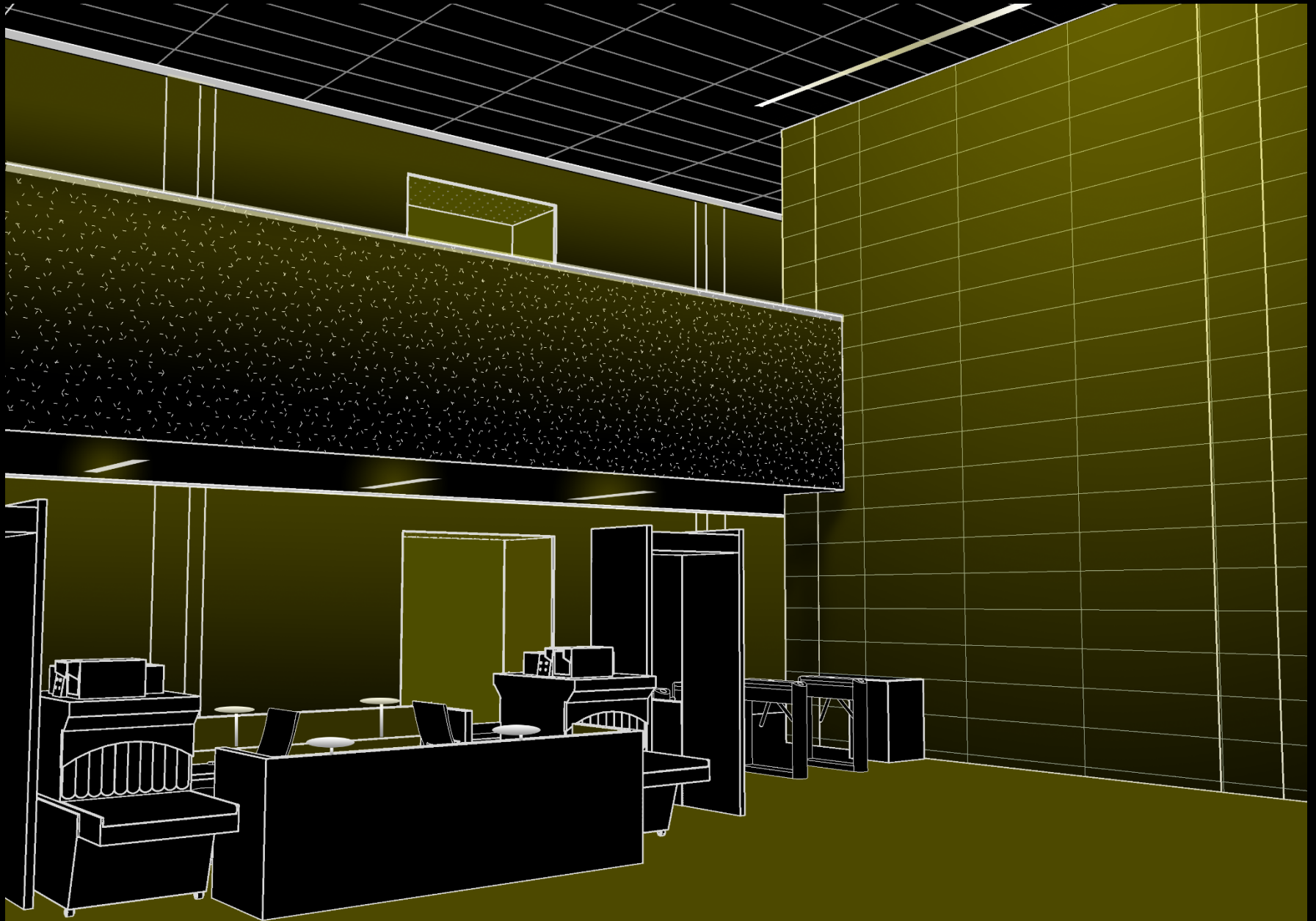
Main Lobby 1000



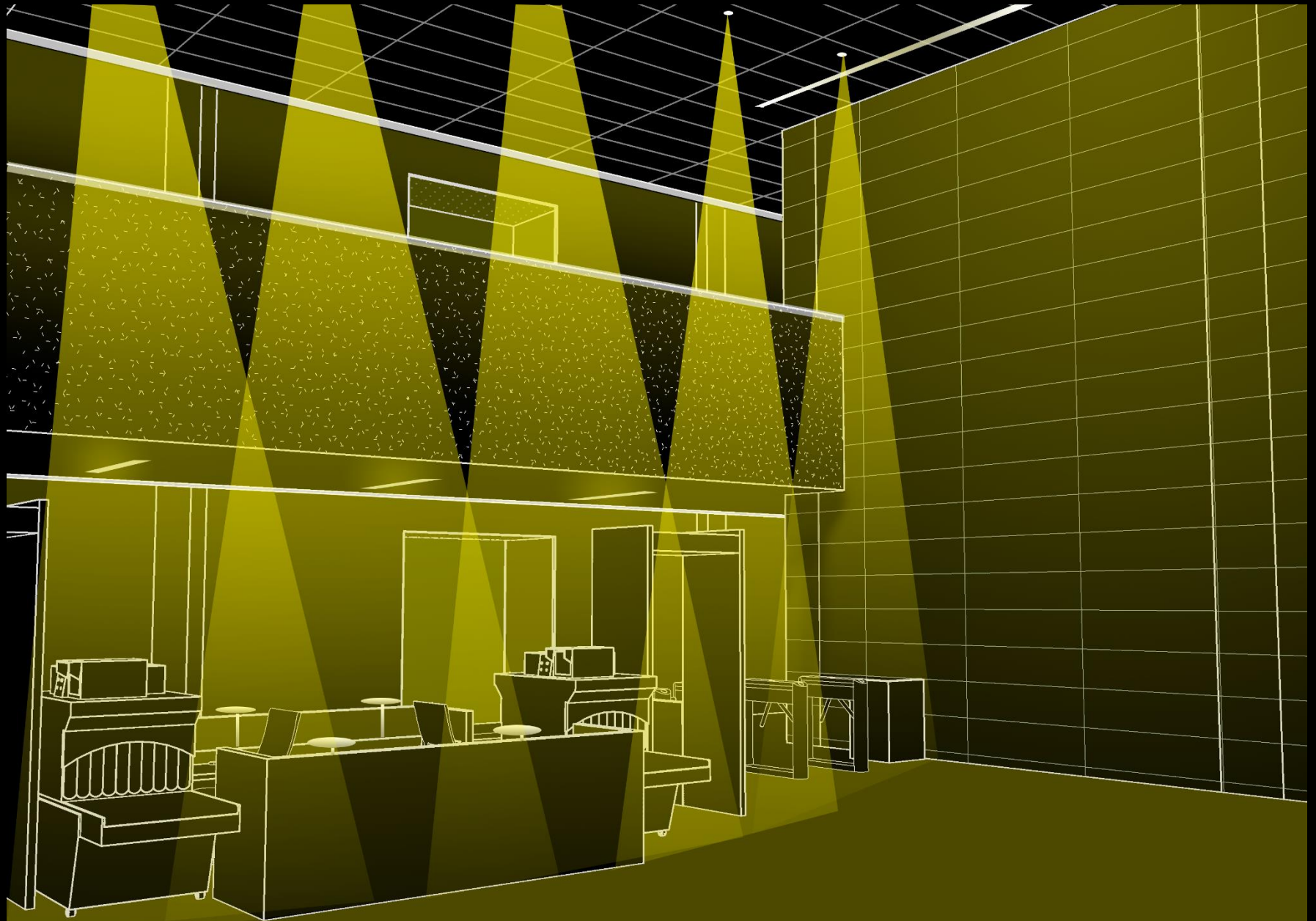
Main Lobby 1000



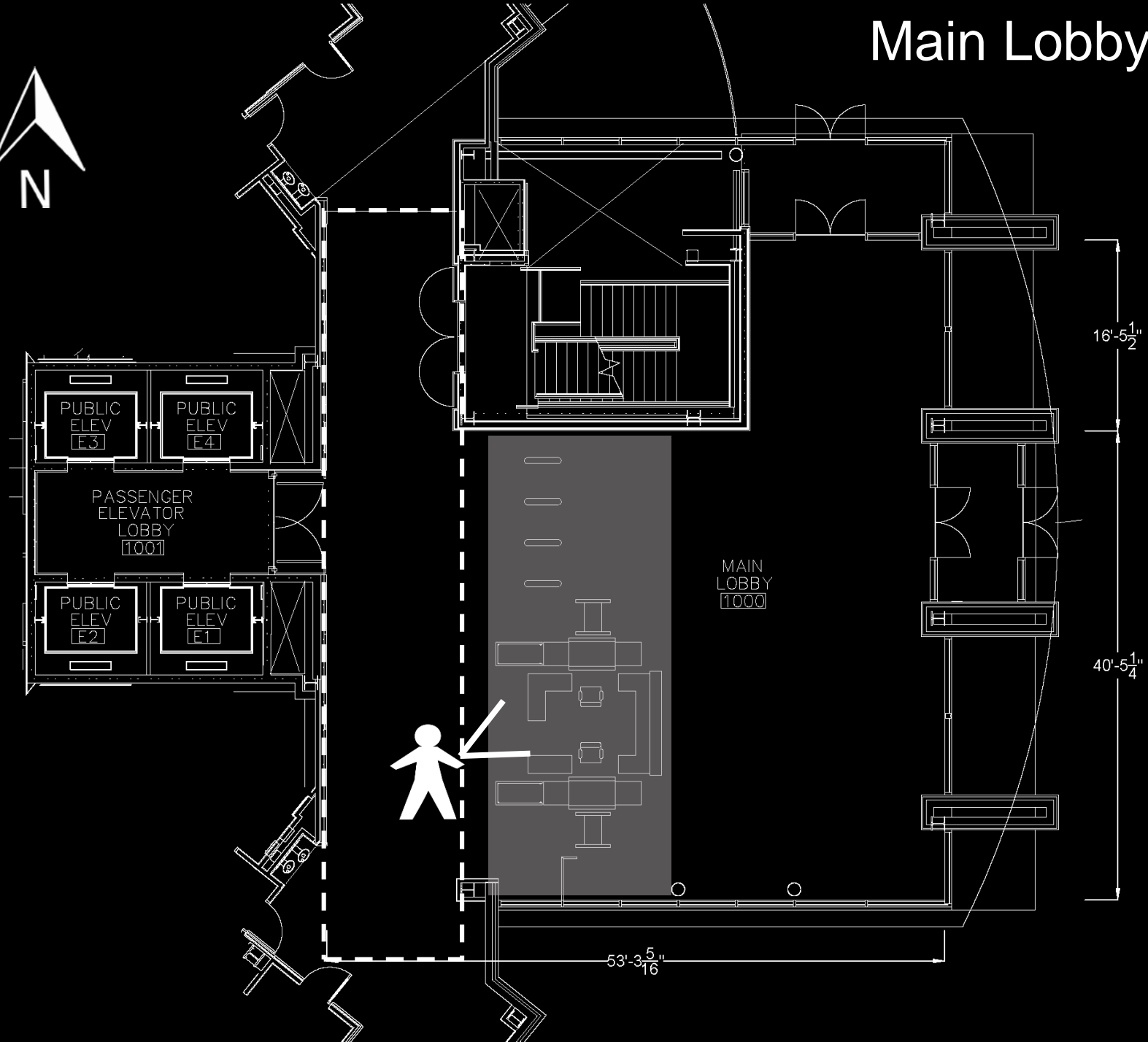
Main Lobby 1000



Main Lobby 1000



Main Lobby 1000



Terracotta Panels

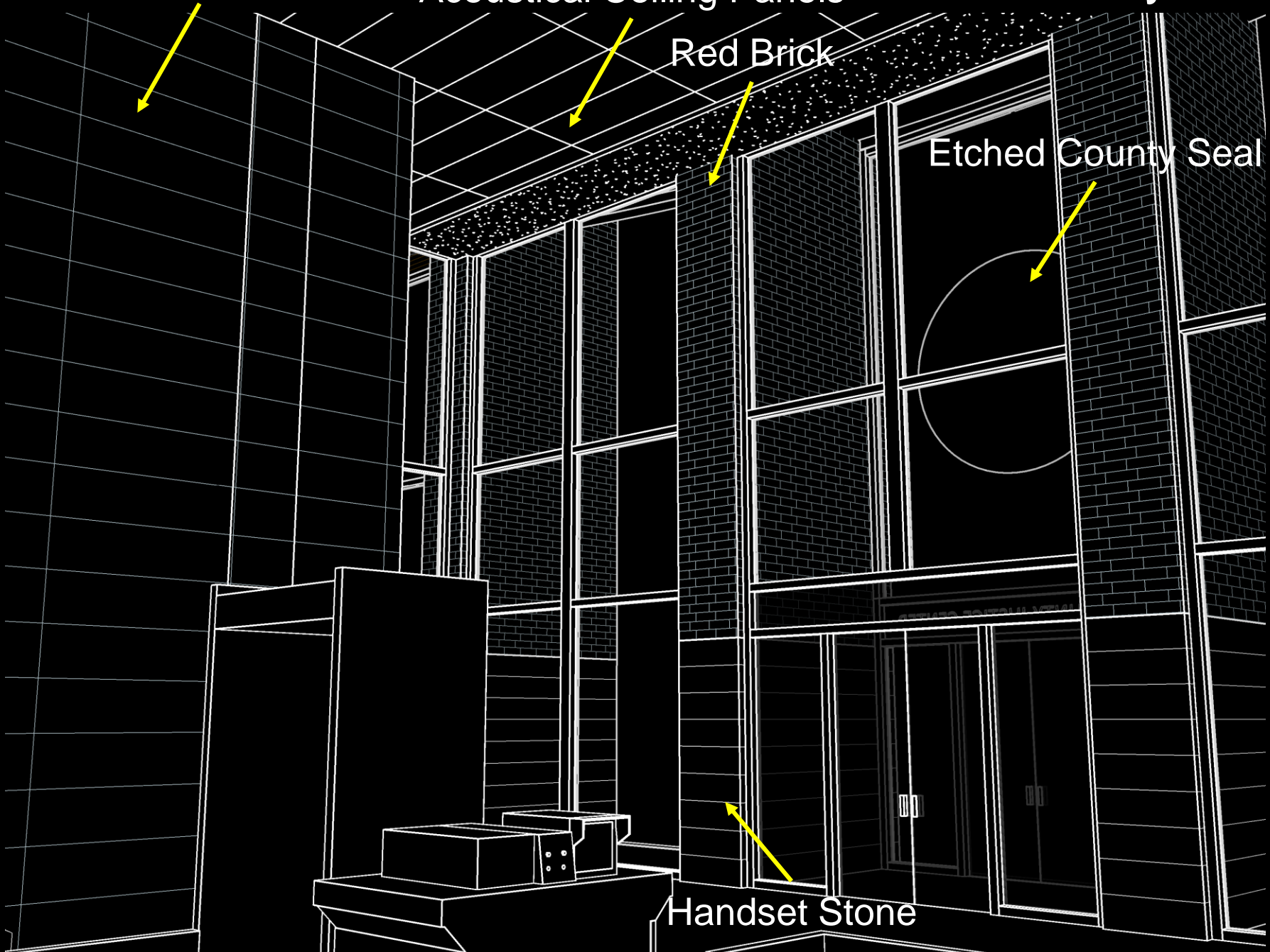
Acoustical Ceiling Panels

Main Lobby 1000

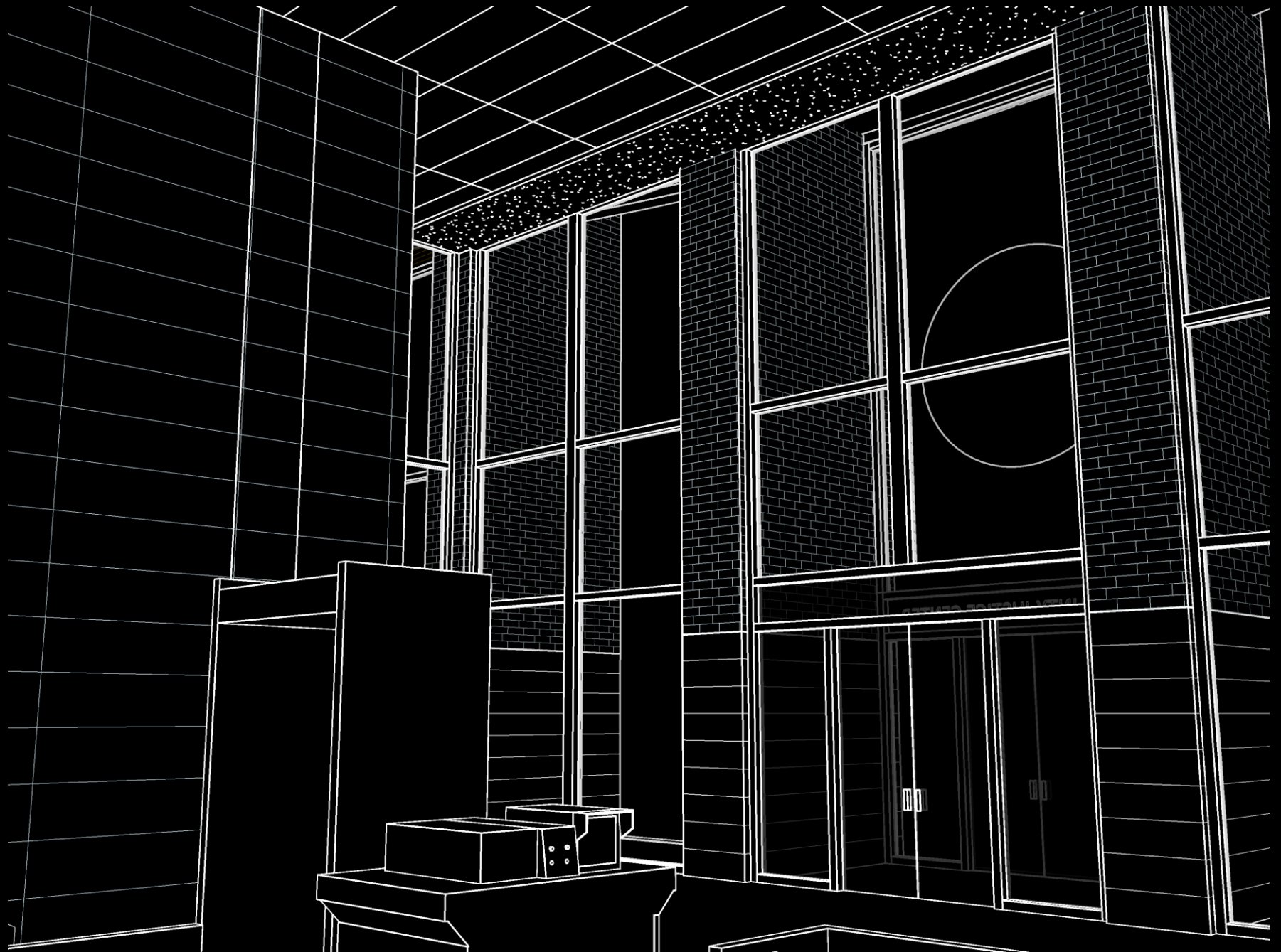
Red Brick

Etched County Seal

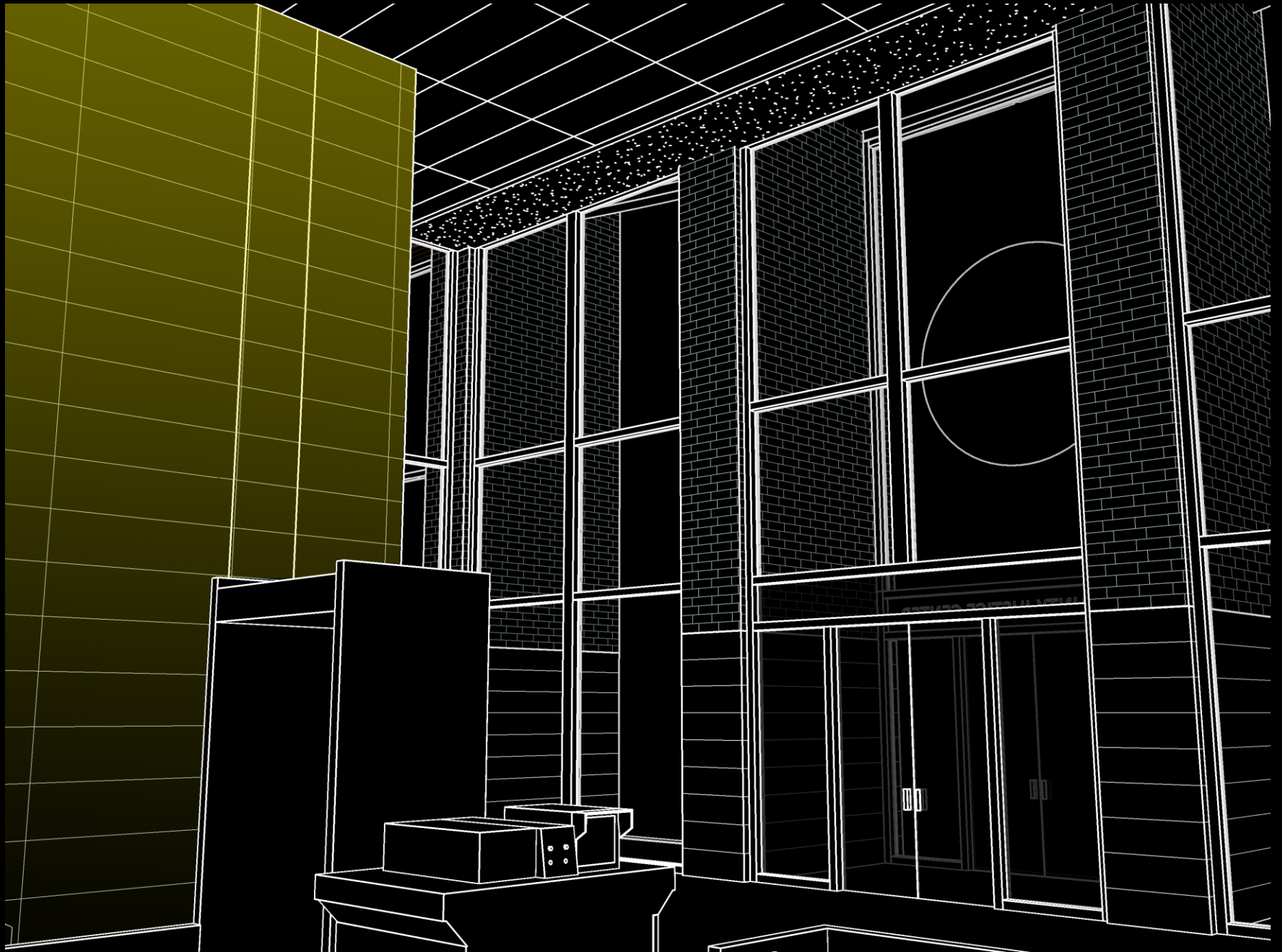
Handset Stone



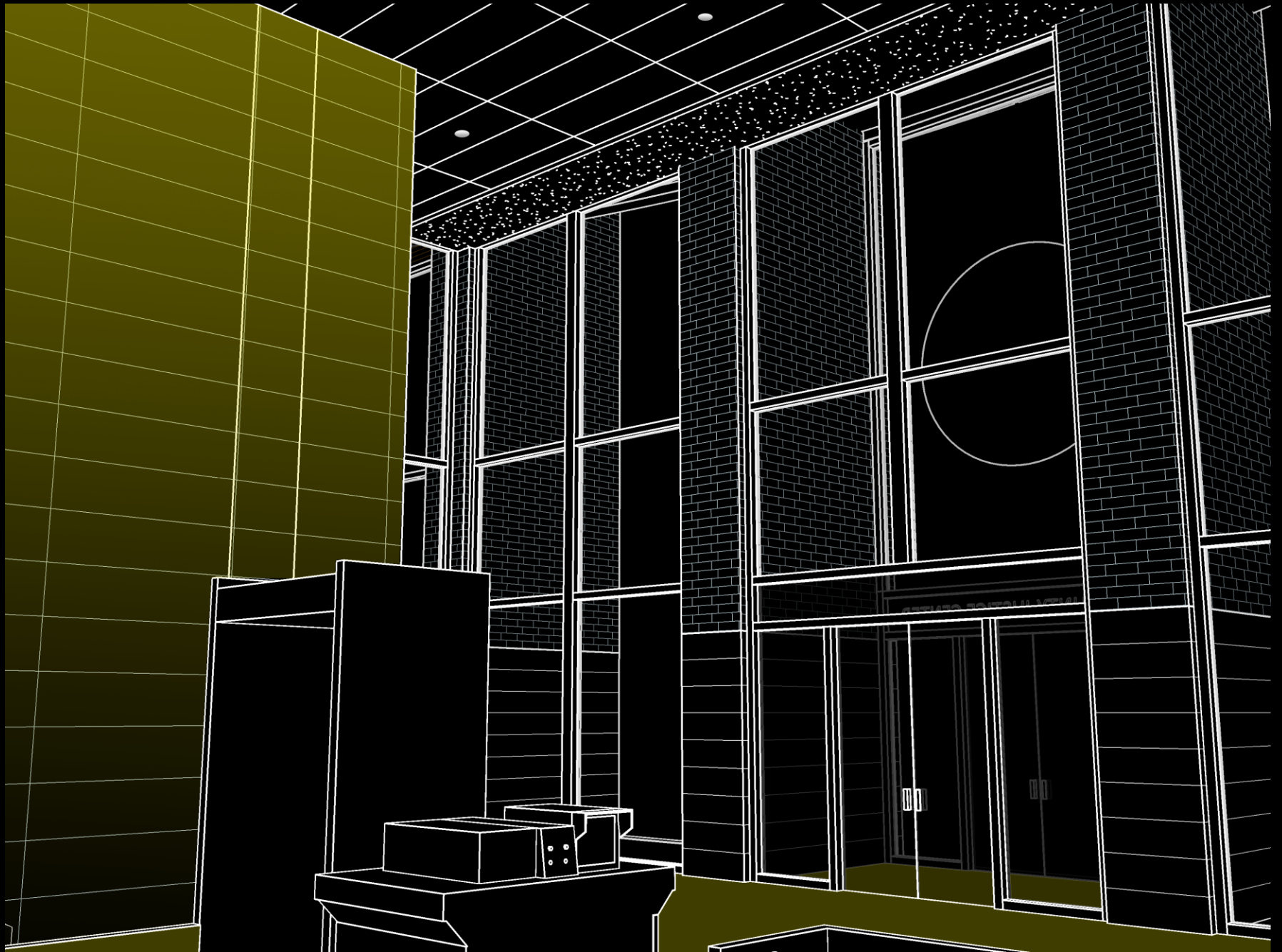
Main Lobby 1000



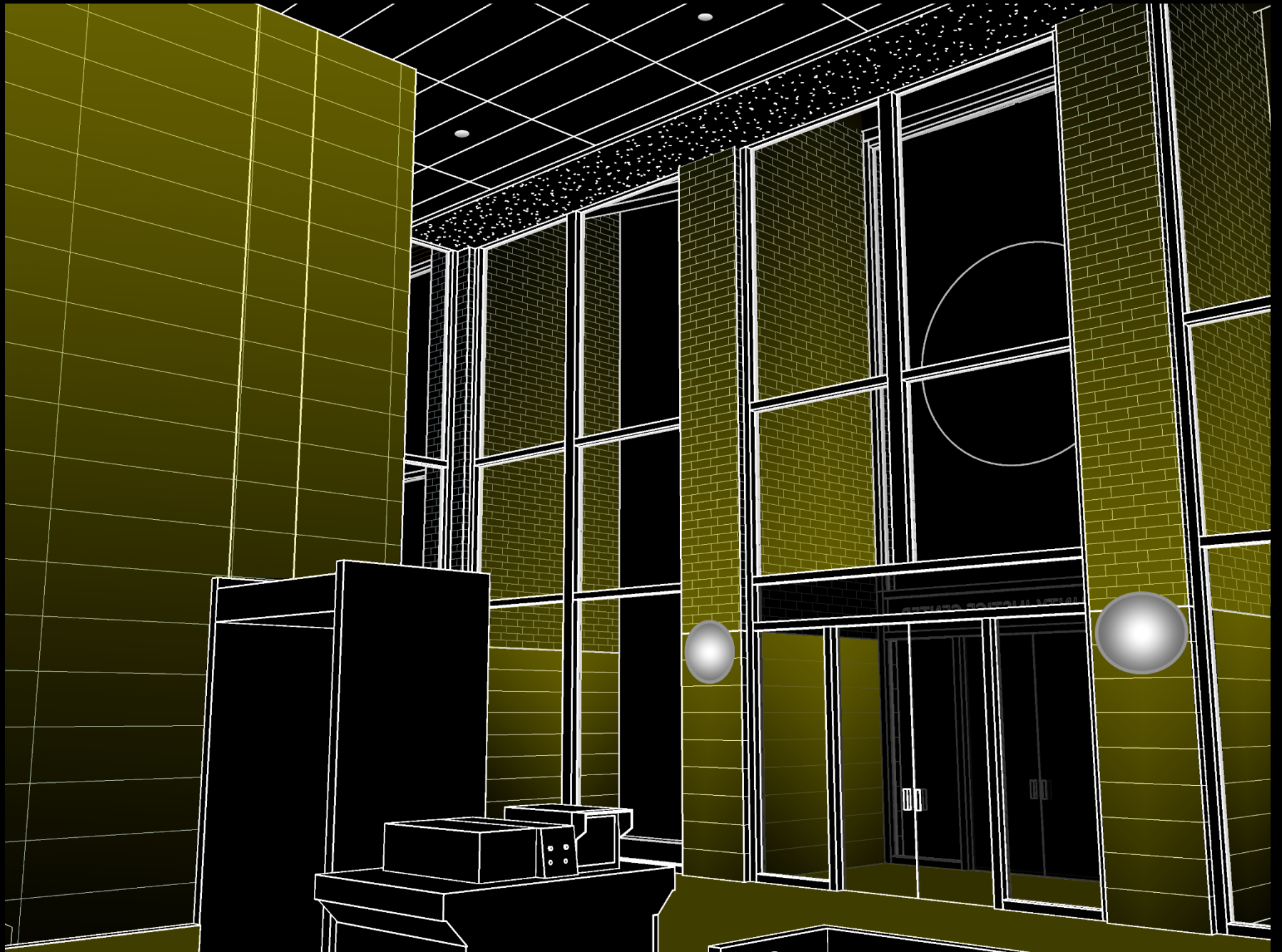
Main Lobby 1000



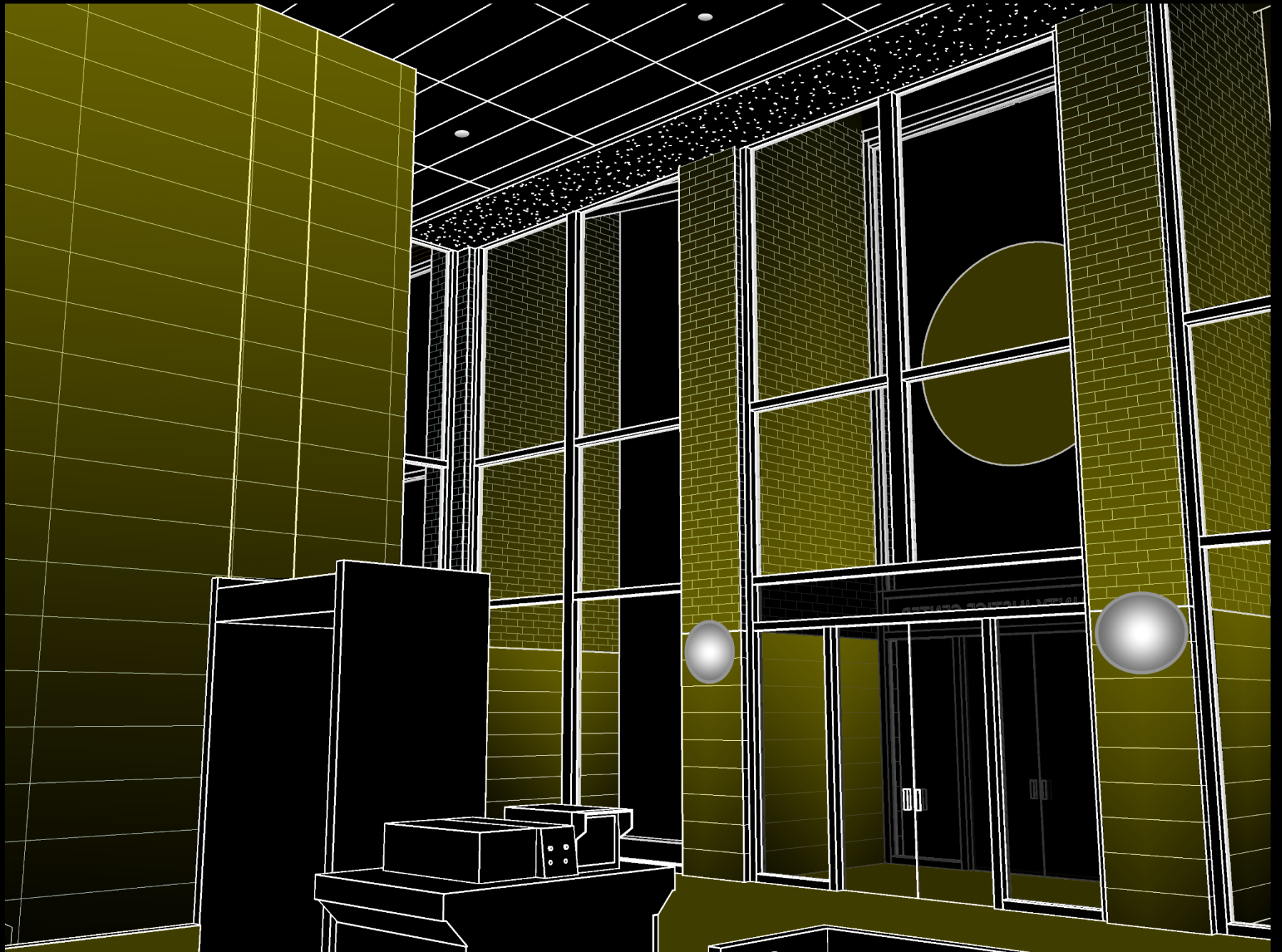
Main Lobby 1000



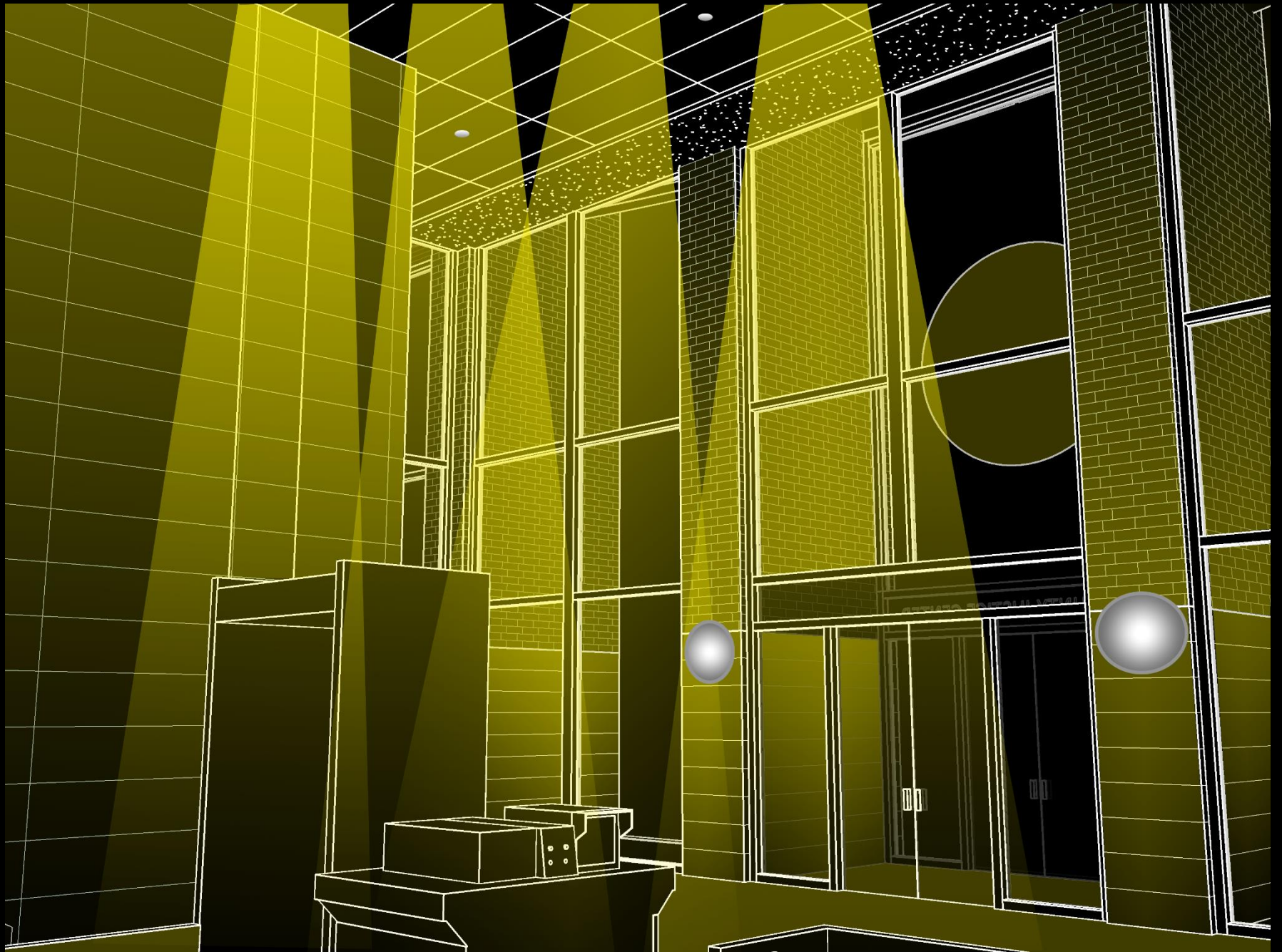
Main Lobby 1000



Main Lobby 1000



Main Lobby 1000



Equipment



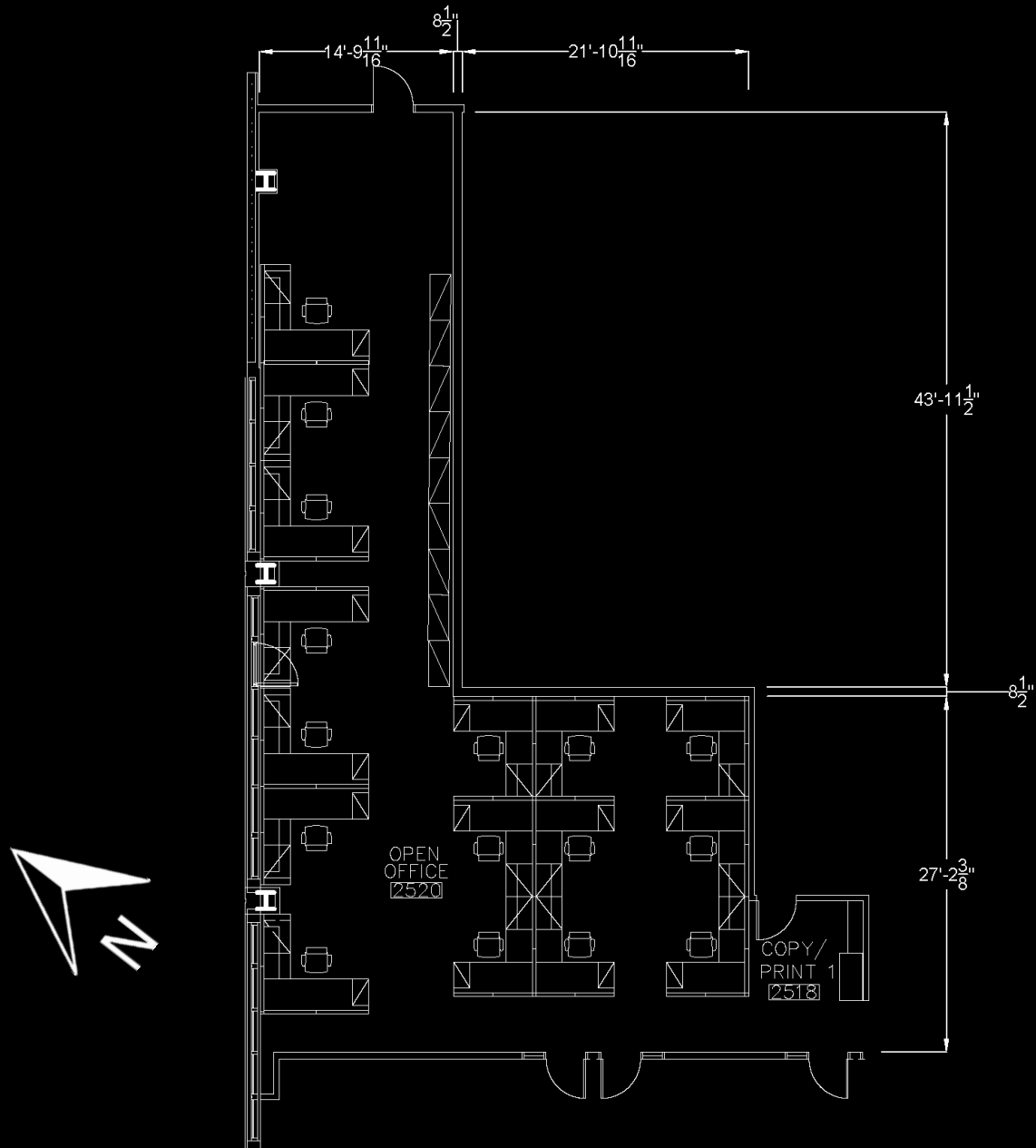
Emergency Power

Generator connected

Exit signs

Egress illumination

Open Office 2520



Qualitative

Openness

Community

Views/Daylight

Quantitative
ASHRAE 90.1

Local control

Bilevel Lighting Control

Scheduled Shutoff

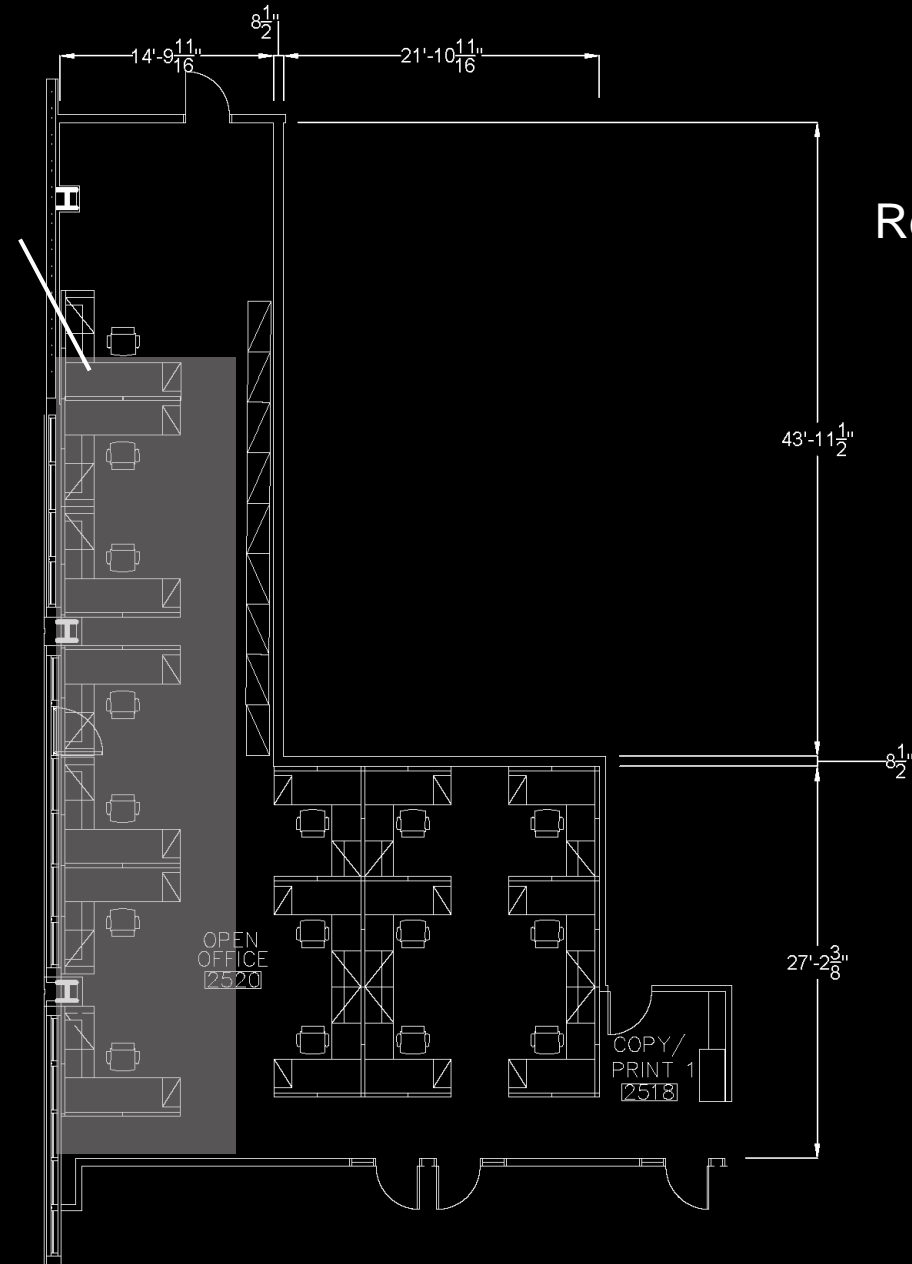
Manual on

Allotted LPD: 0.98 W/SF

Open Office 2520

ASHRAE 90.1
Primary sidelighted
area

Automatic Daylight
Responsive Controls for
Sidelighting



Quantitative IES Handbook

Illuminance values
Eh: 300 lux @ 2'-6"

Uniformity
Avg: Min 1.5:1

Quantitative Other Criteria

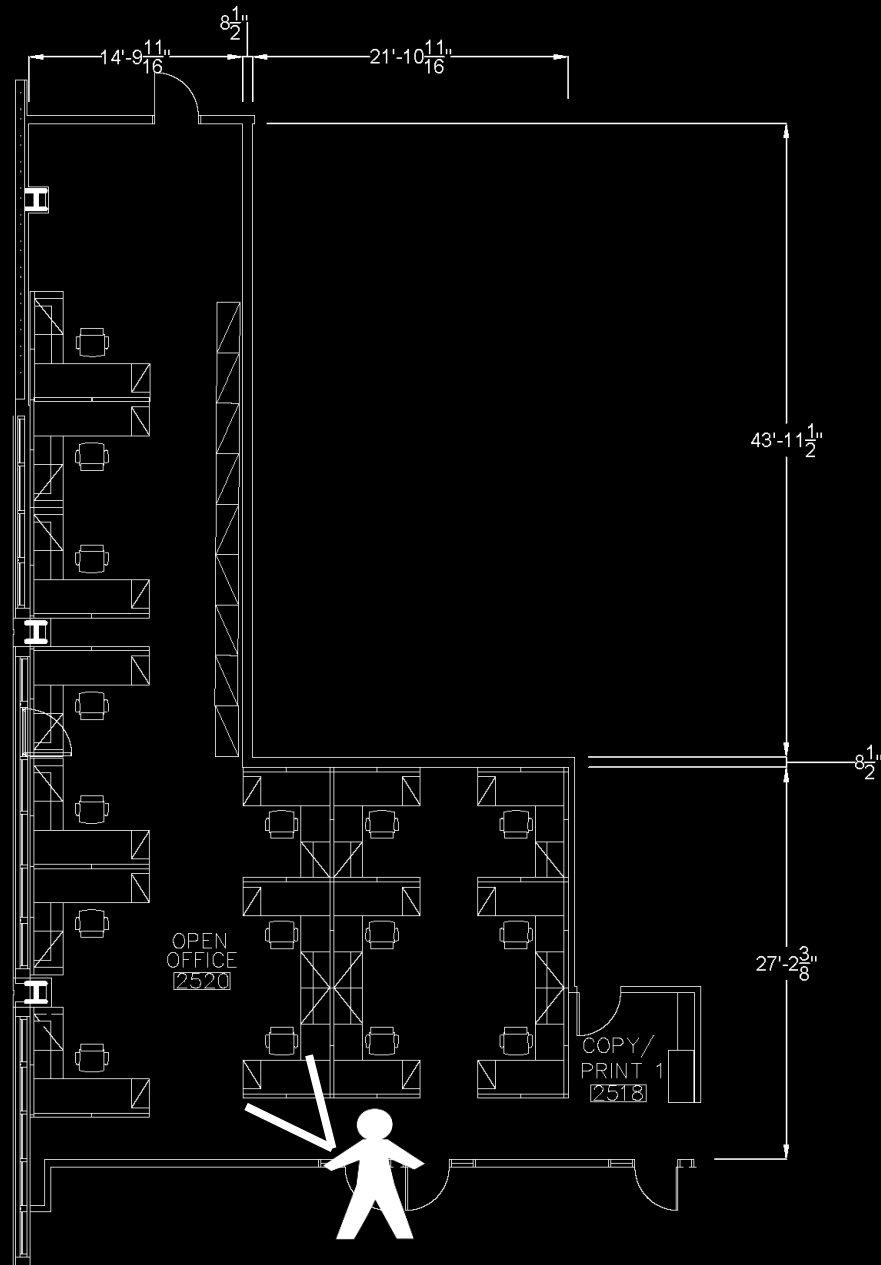
CCT: 3500K

CRI: ≥ 80

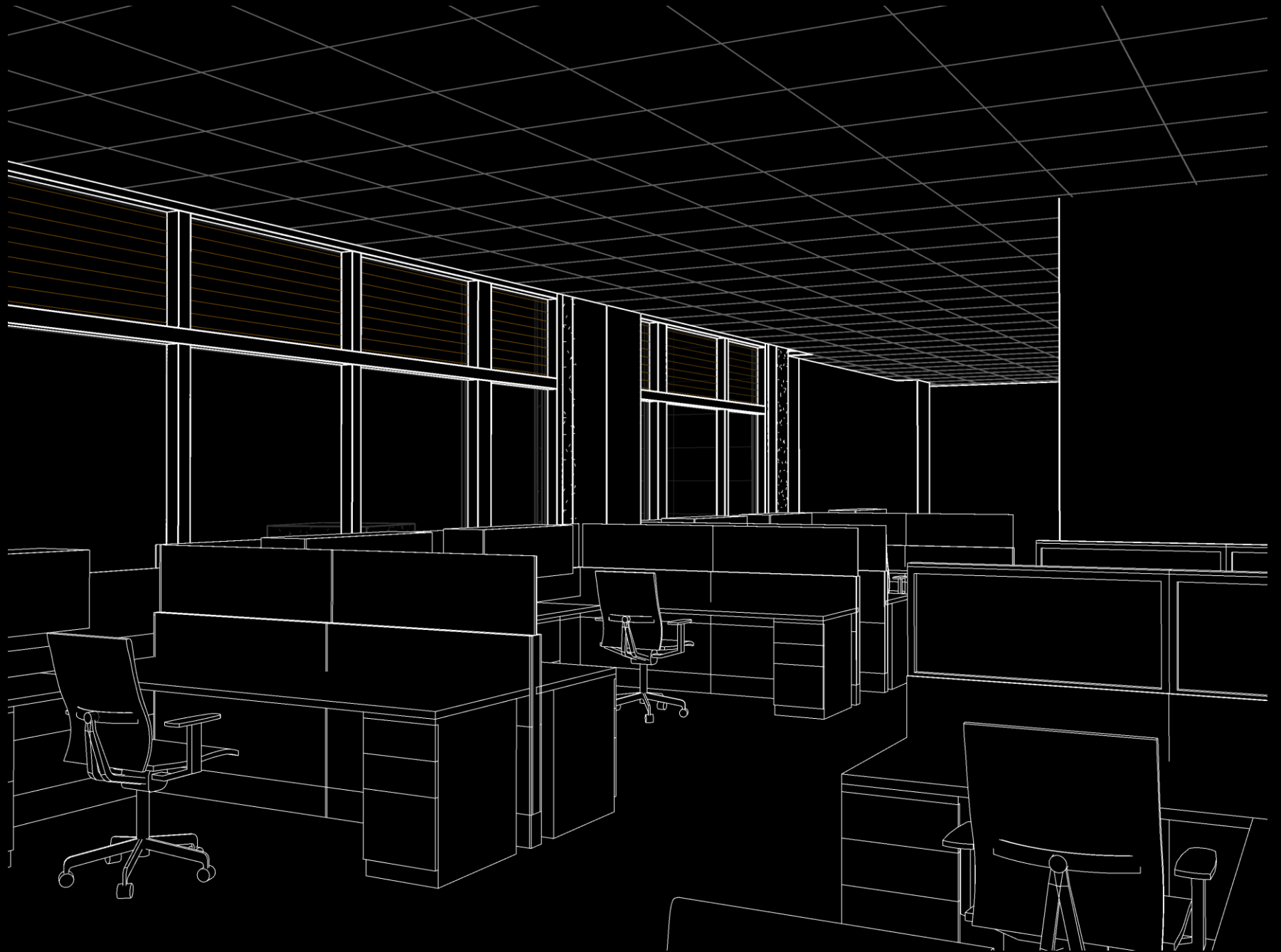
Life: long

Efficacy/Efficiency: 20% reduction from ASHRAE 90.1

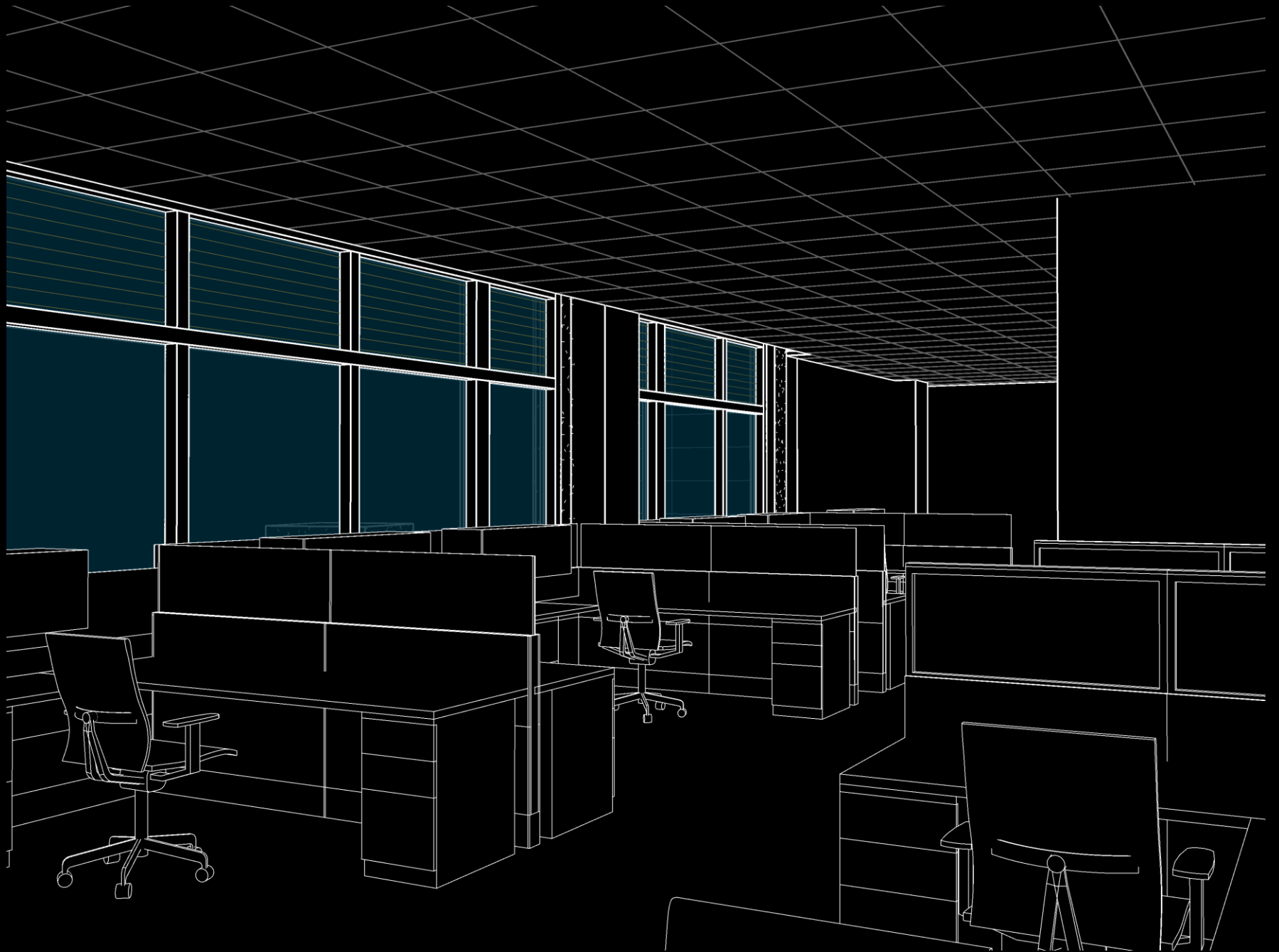
Open Office 2520



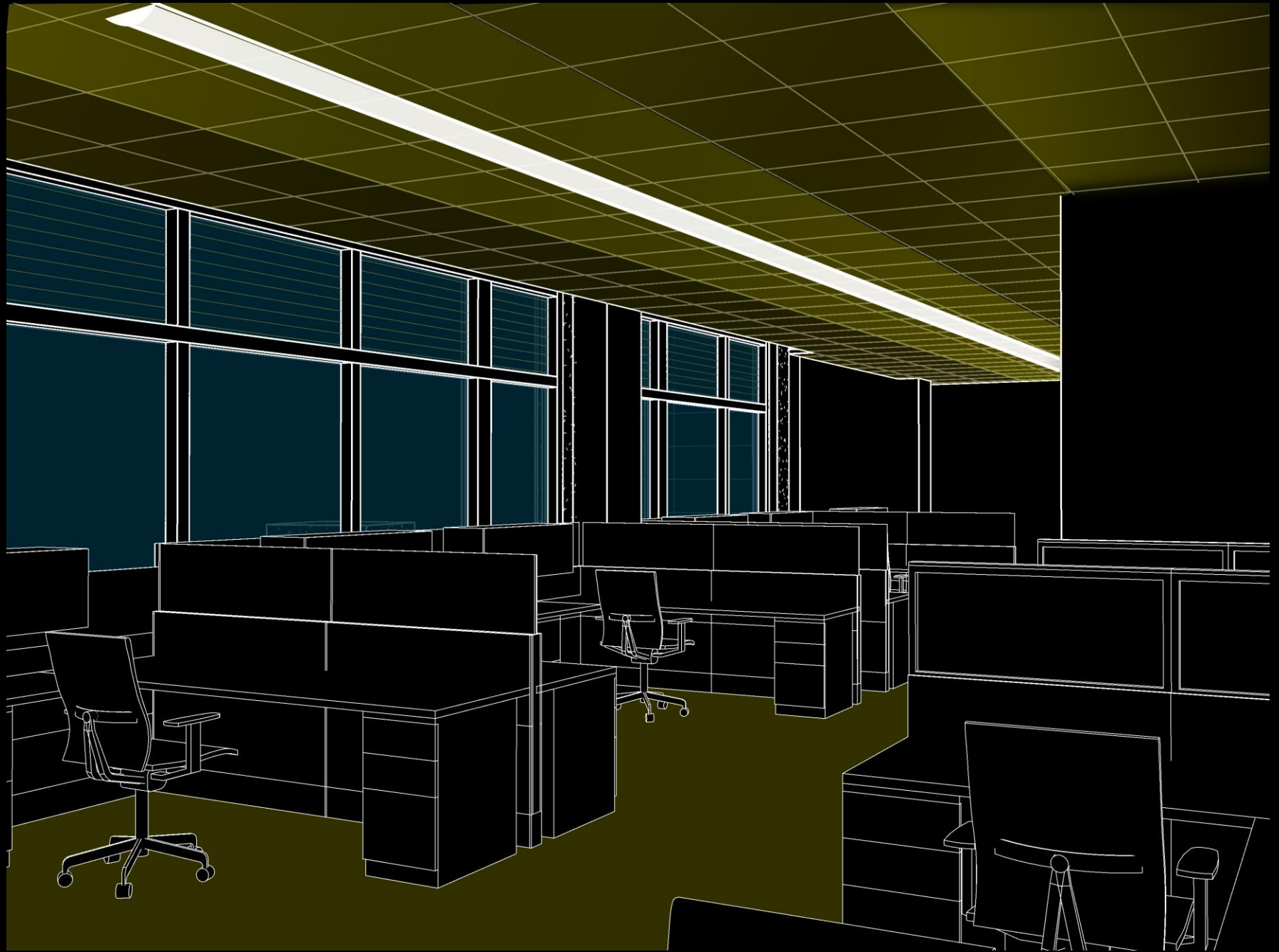
Open Office 2520



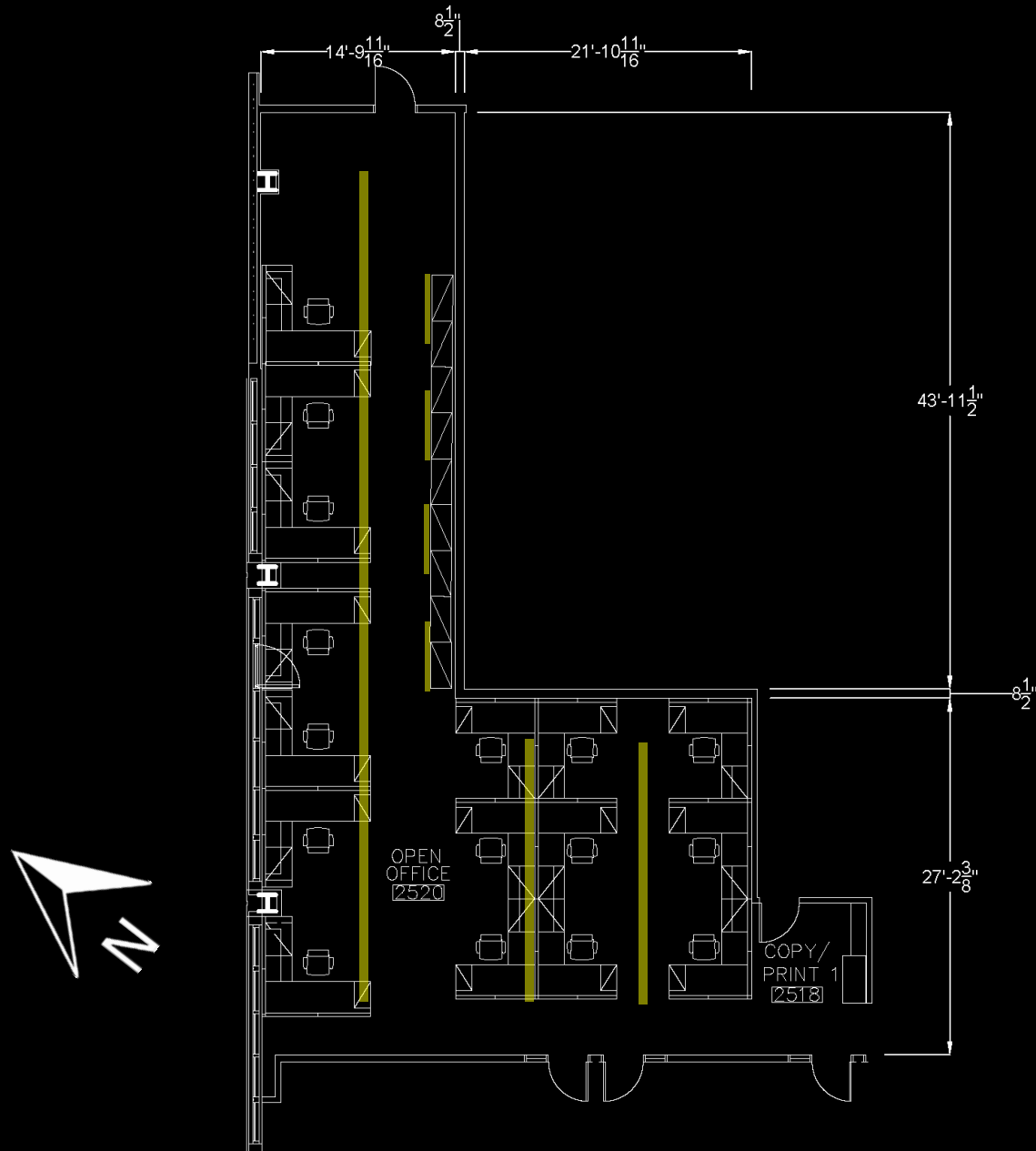
Open Office 2520



Open Office 2520



Open Office 2520



Equipment



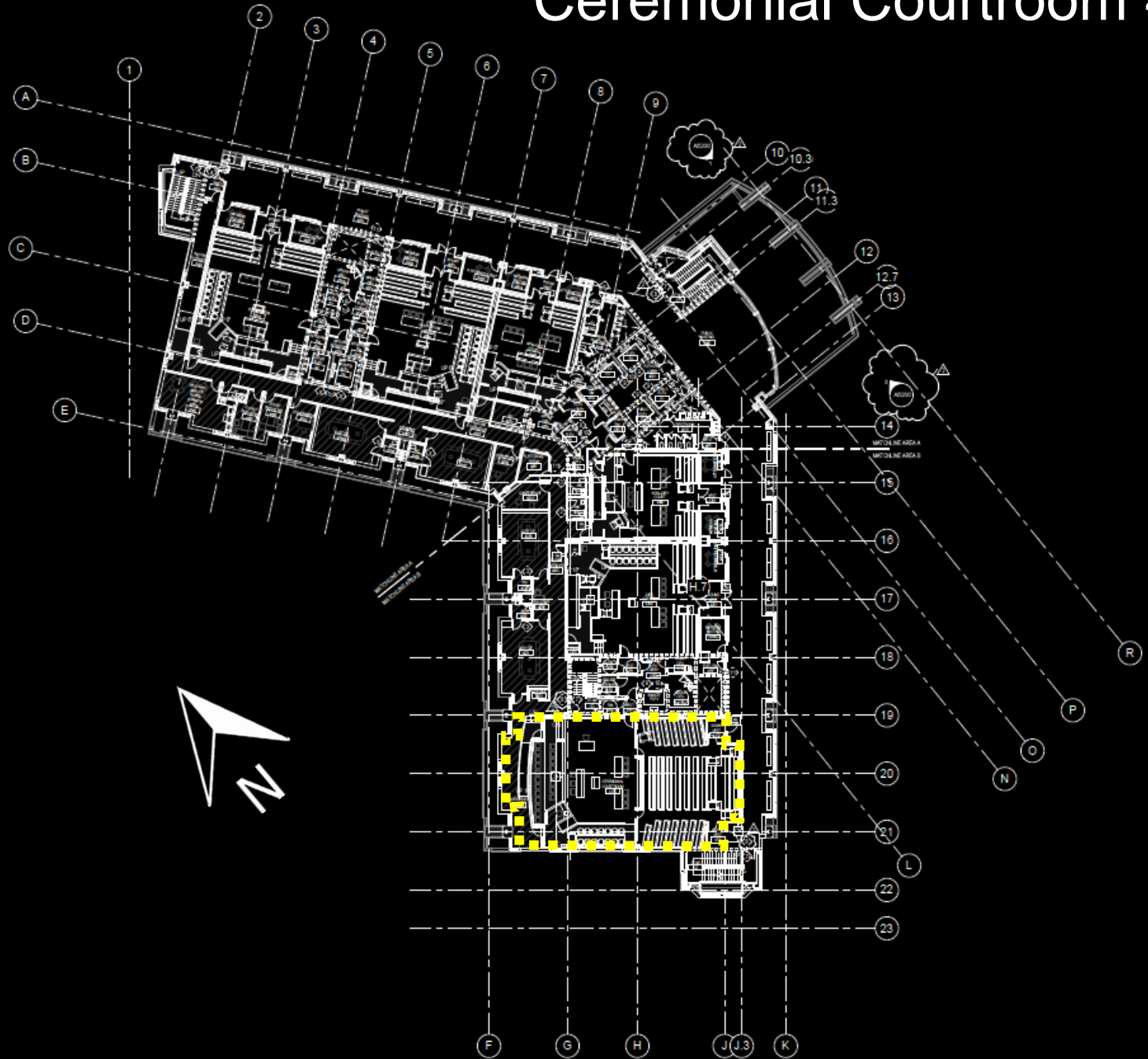
Emergency Power

Generator connected

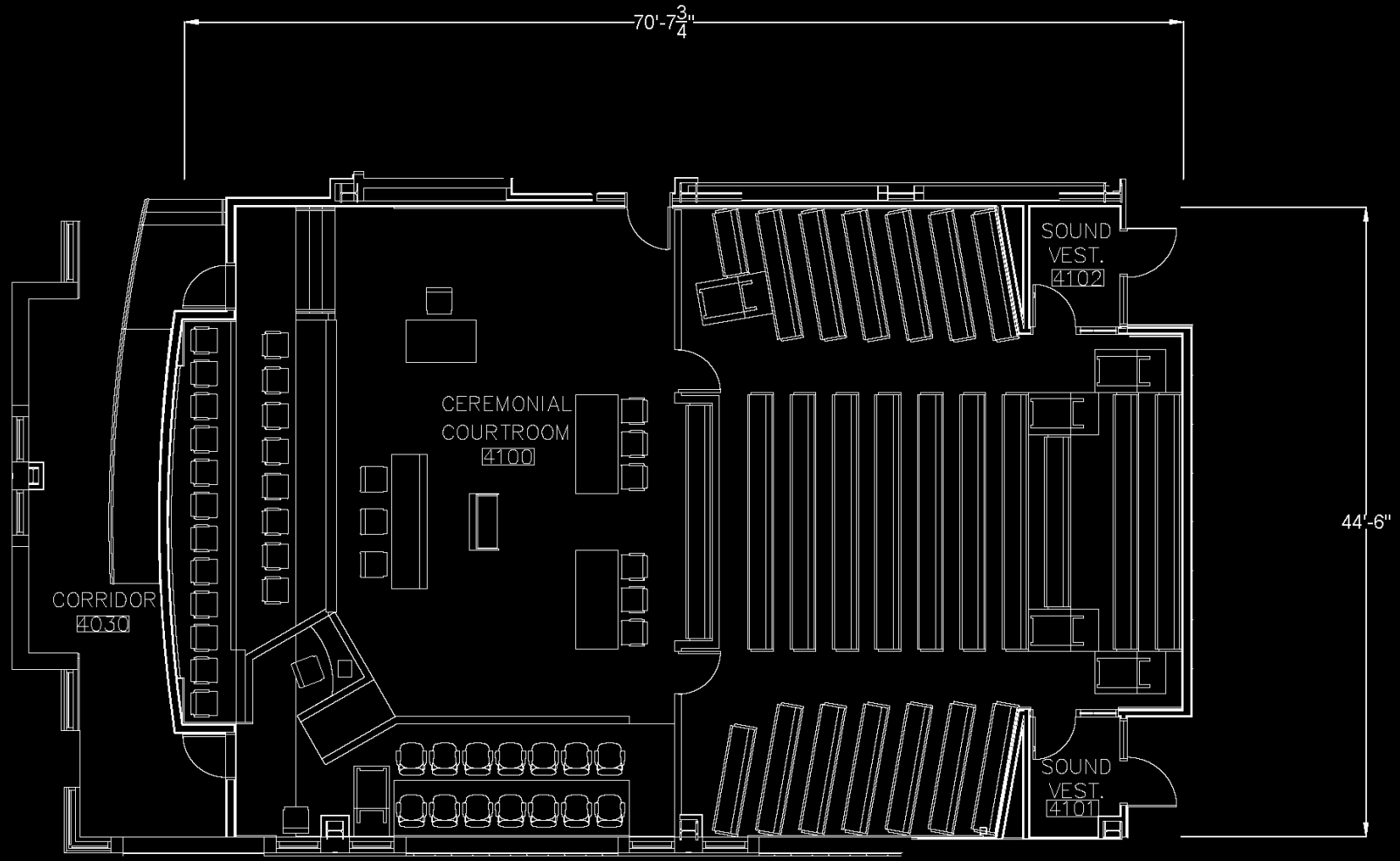
Exit signs

Basic egress lighting (~6 fixtures)

Ceremonial Courtroom 4100



Ceremonial Courtroom 4100



Qualitative

Respect

Dignity

Virtuous

Flexible

Quantitative
ASHRAE 90.1

Local control

Scheduled Shutoff

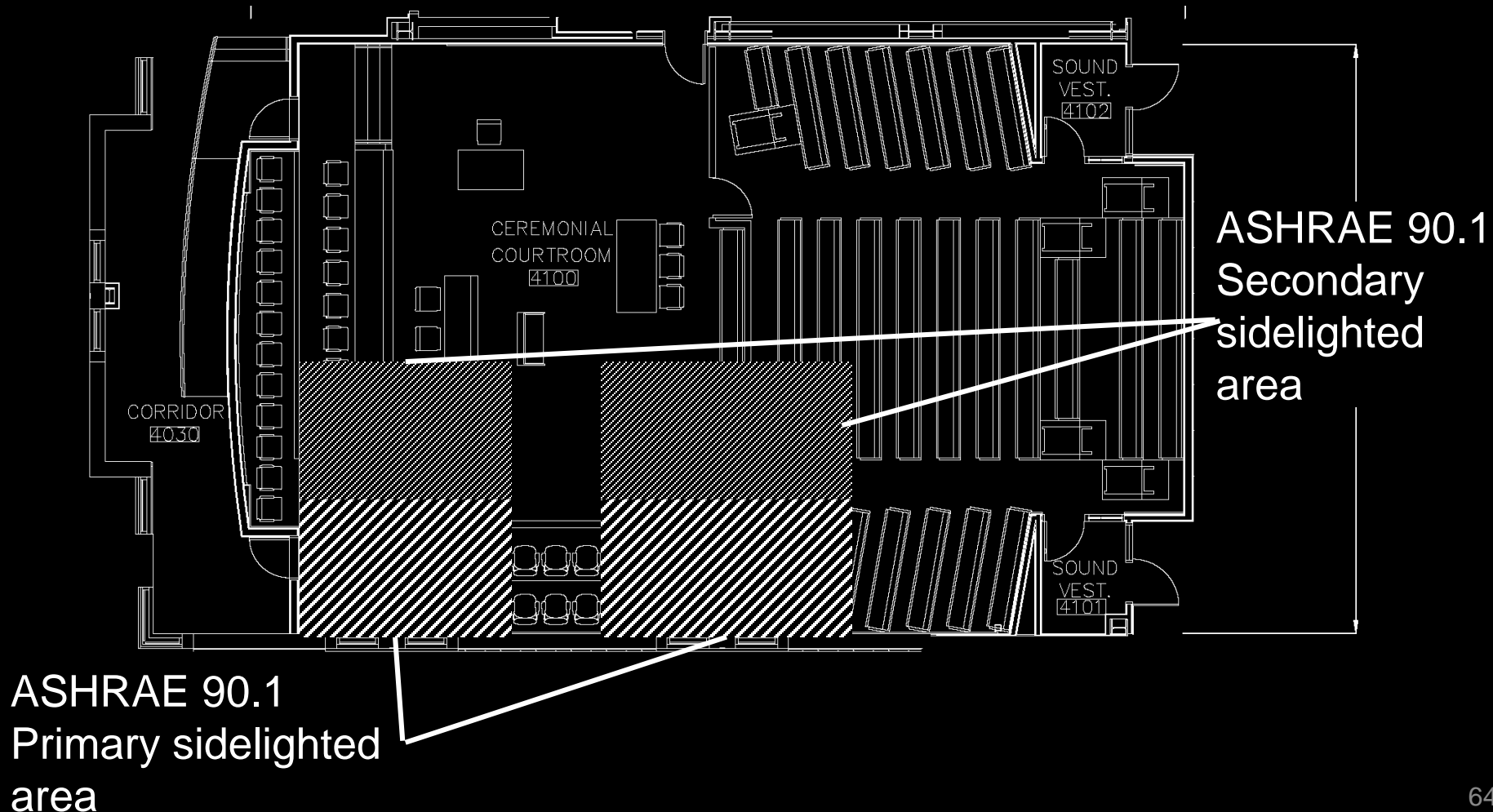
Allocated LPD: 1.72 W/SF

Automatic Daylight Responsive Controls for Sidelighting are required if either

1) The total of installed light in the sidelighted zone is ≥ 150 watts

or

2) The total of installed light in the primary and secondary sidelighted zone is ≥ 300 watts



Quantitative Other Criteria

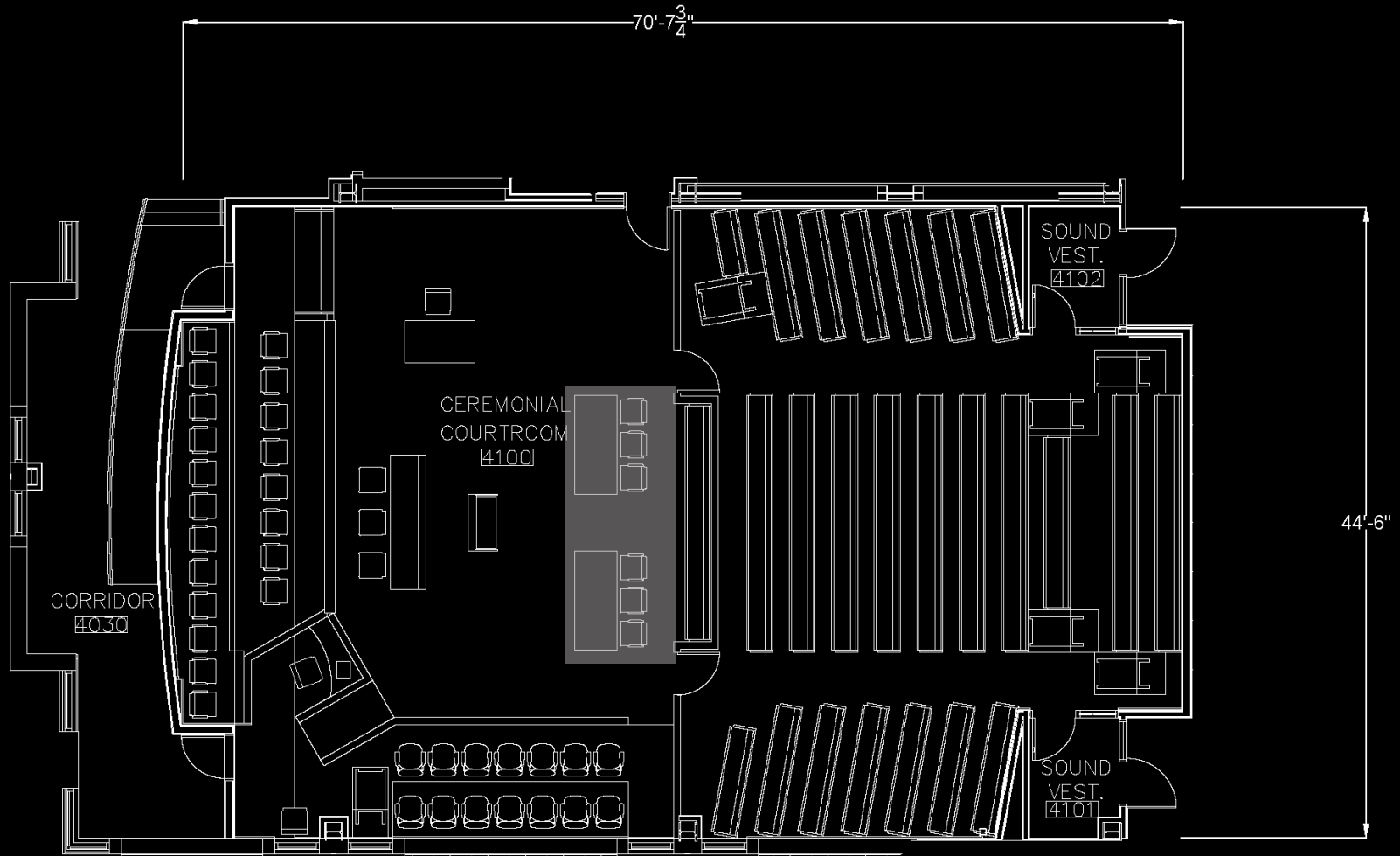
CCT: 3500K

CRI: ≥ 80

Life: long

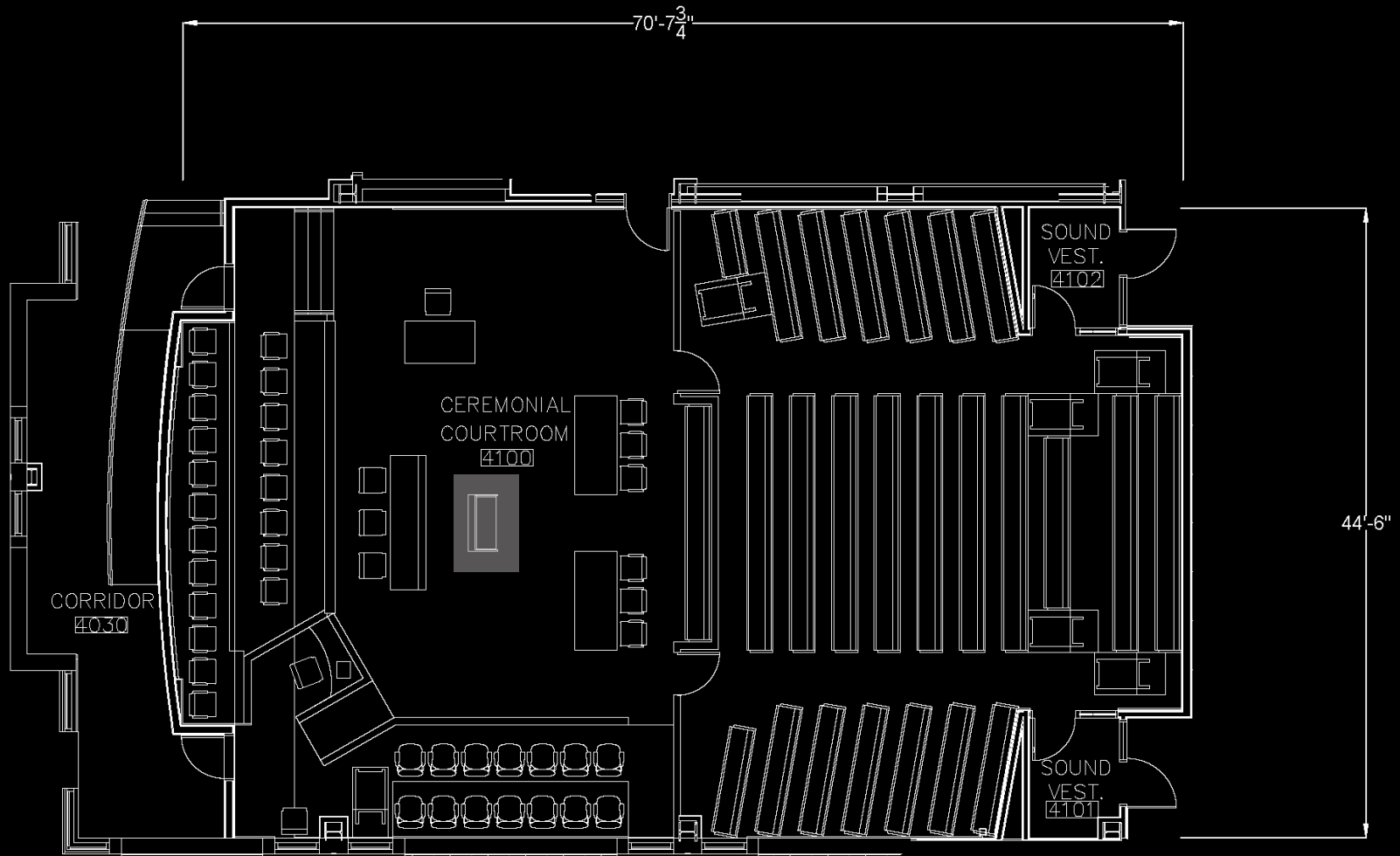
Efficacy/Efficiency: 20% reduction from ASHRAE 90.1

Ceremonial Courtroom 4100



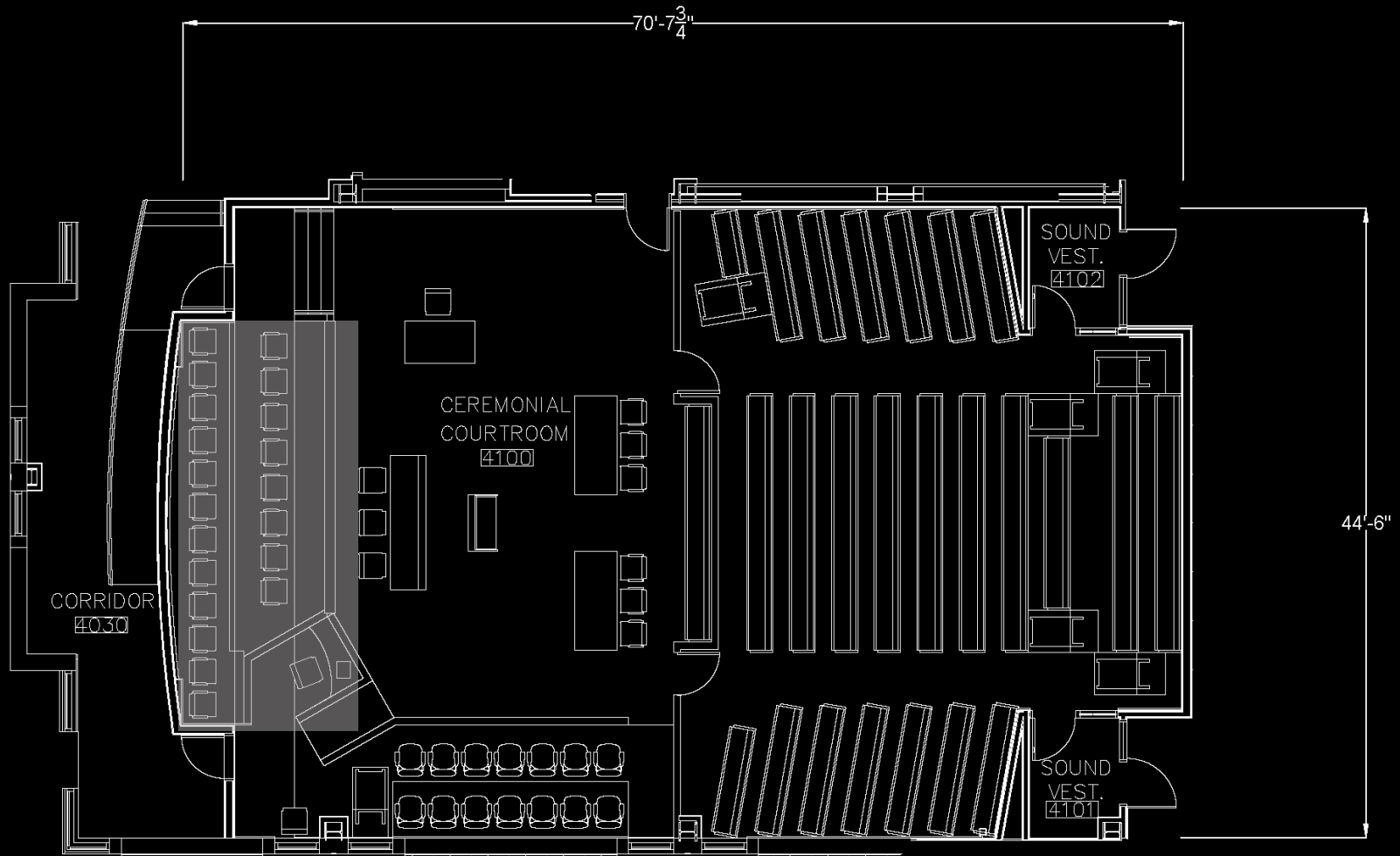
Attorneys' Tables
E_h = 500 Lux

Ceremonial Courtroom 4100



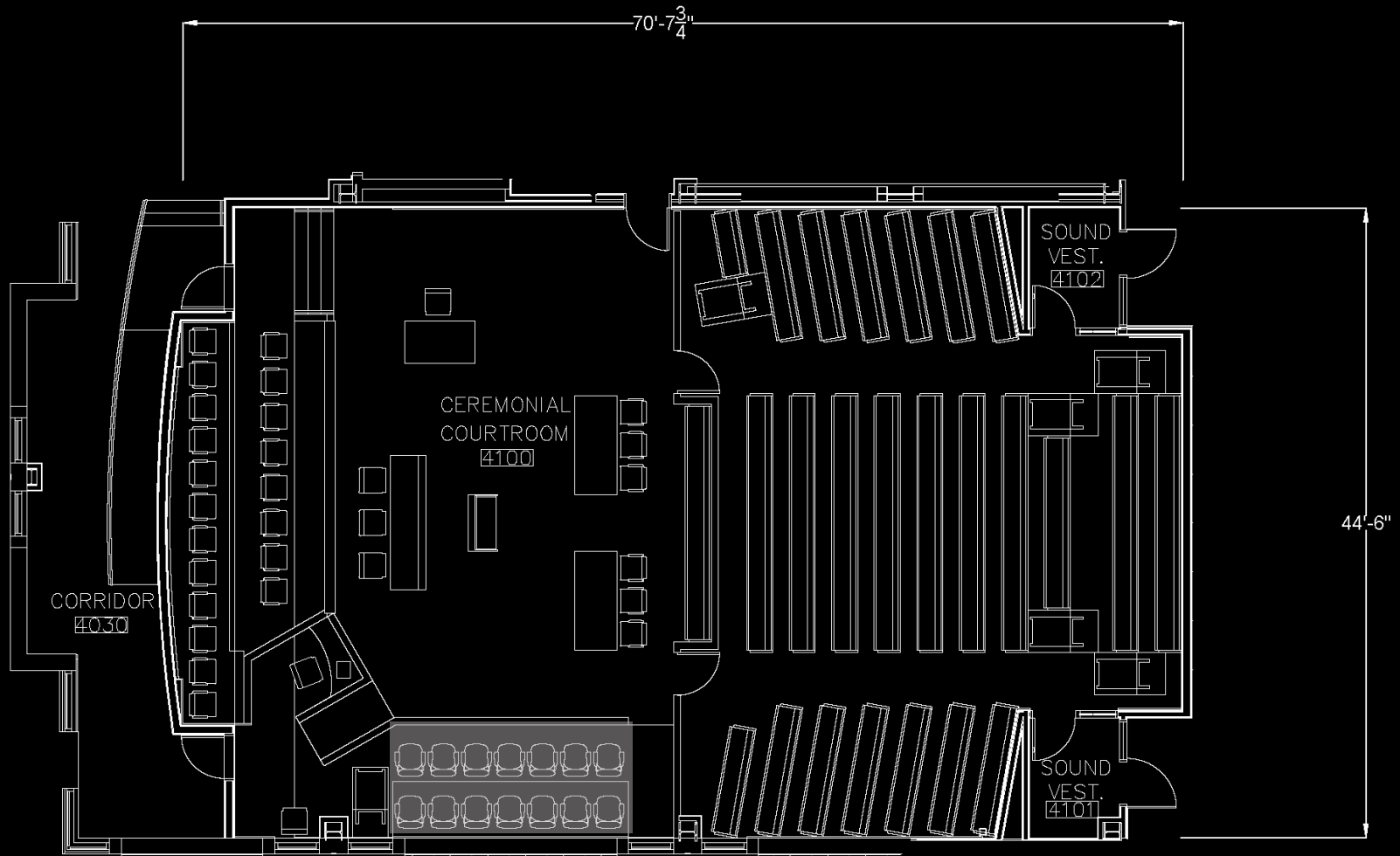
Evidence Table
Eh = 500 Lux

Ceremonial Courtroom 4100



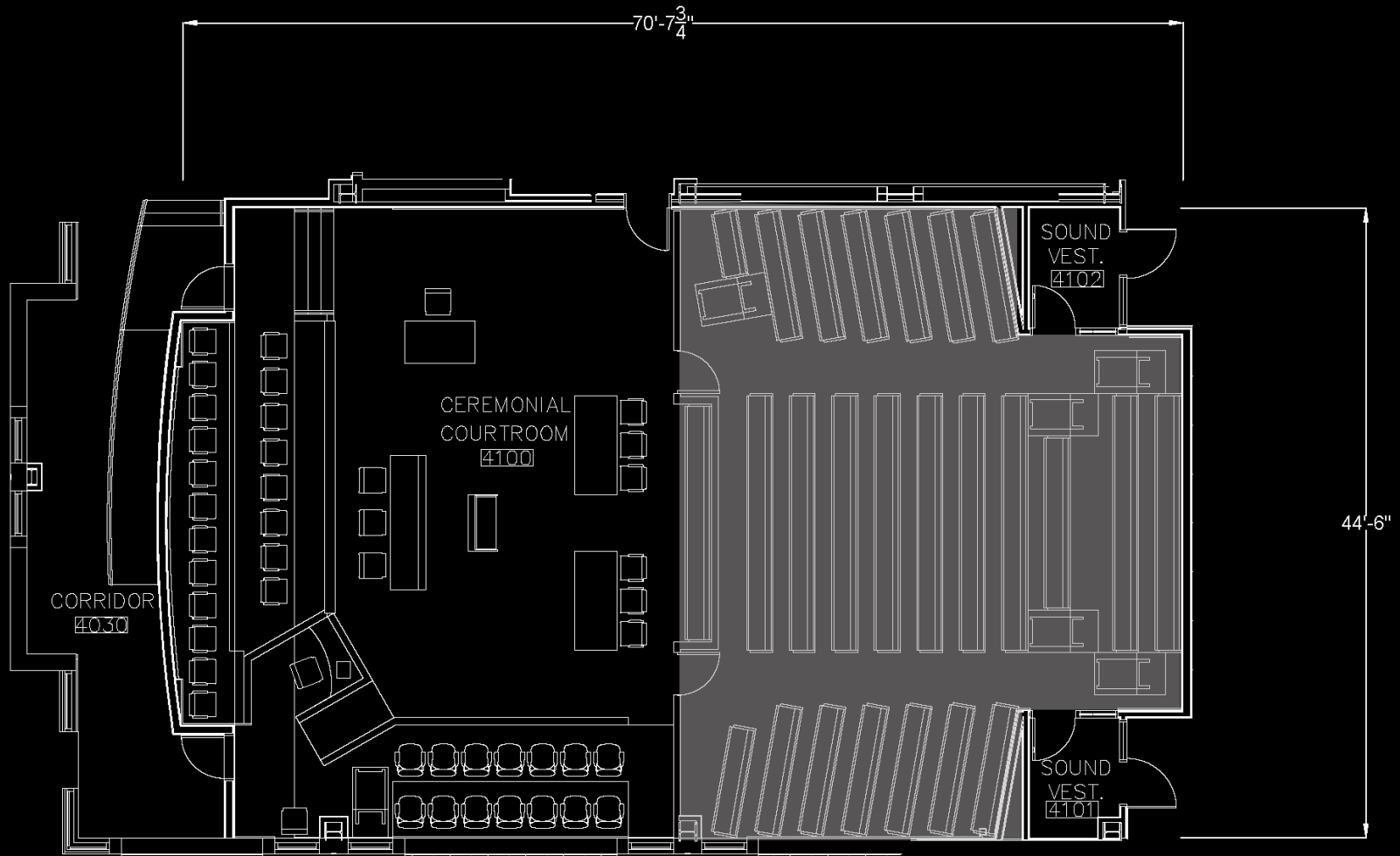
Bench and Clerks
Eh = 500 Lux

Ceremonial Courtroom 4100



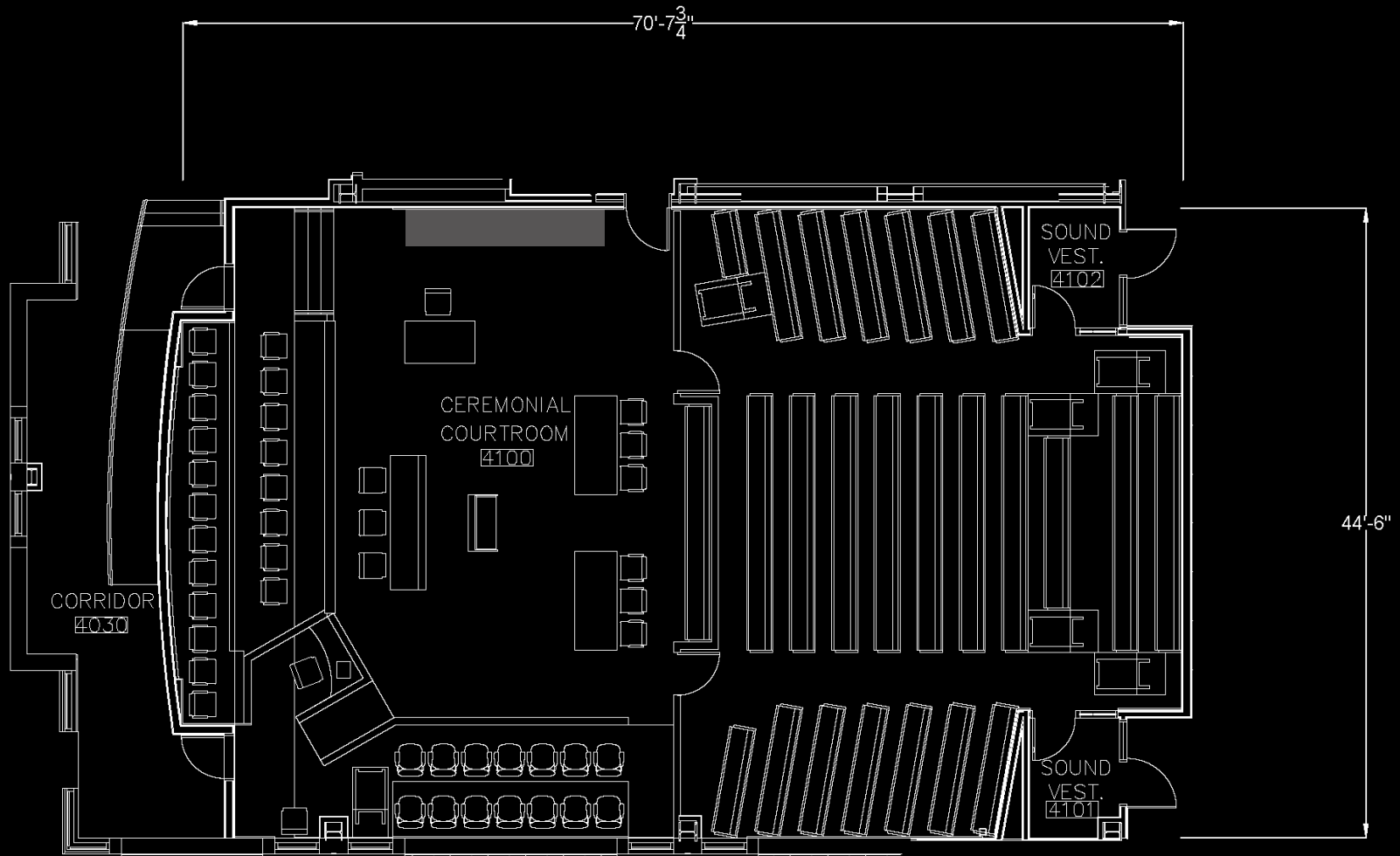
Jury Box
Eh = 300 Lux

Ceremonial Courtroom 4100



Public Seating
Eh = 300 Lux

Ceremonial Courtroom 4100

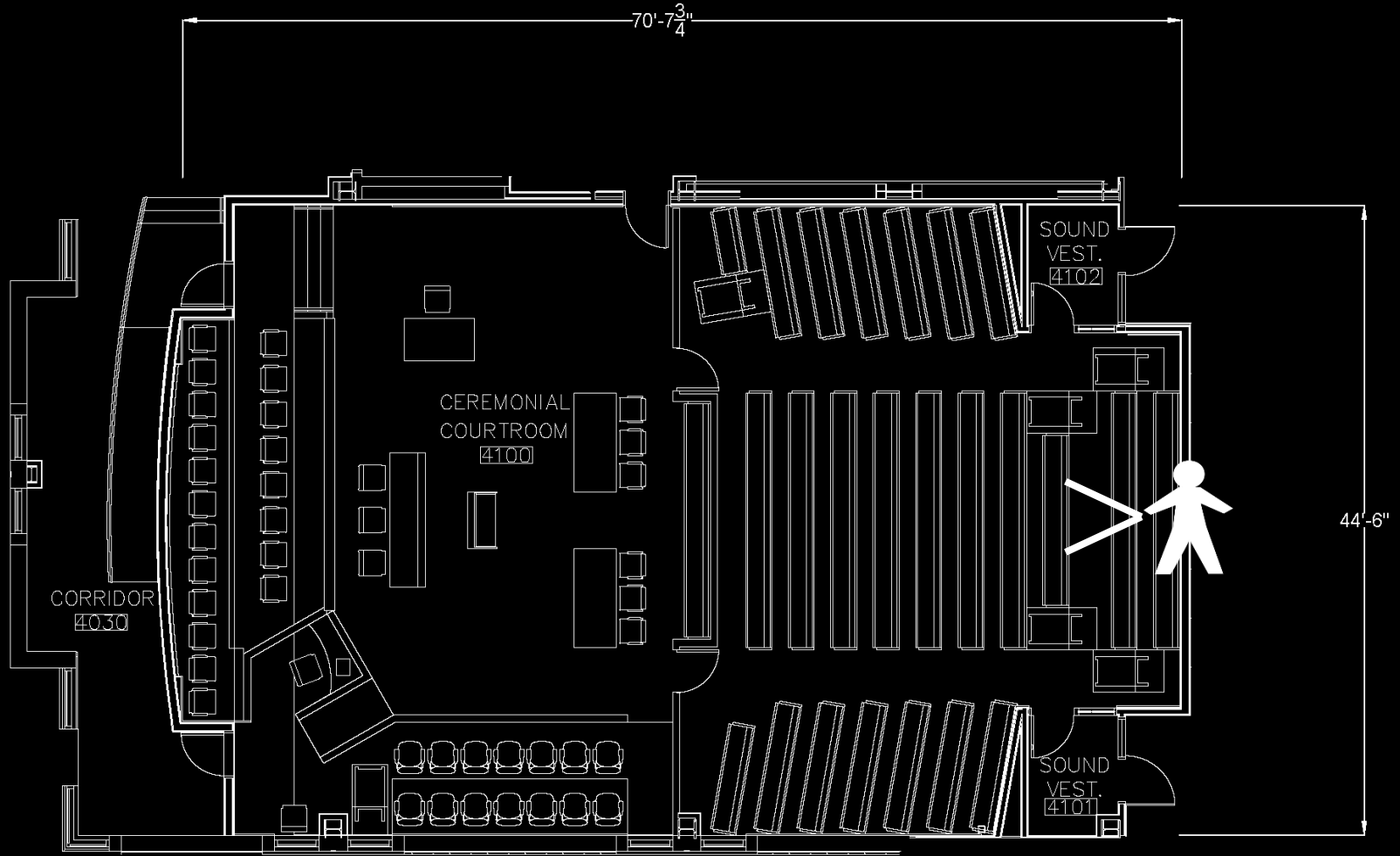


Projection Screen
Ev = 50 Lux

Quantitative IES Handbook

Location	E _h (lux)	Height E _h	E _v (lux)	Height E _v	Max:Avg	Avg:Min	Notes
Attorneys' Tables	500	2'-6"	200	4'-0"		2:1	
AV Presentation, General	75	2'-0"	30	4'-0"		2:1	Note taking intended
AV Presentation Screen			50		2:1		Max value
Evidence Table	500	2'-6"	200	4'-0"		2:1	
Jury Box	300	2'-6"	150	4'-0"		2:1	
Public Seating	100	2'-6"	50	4'-0"		2:1	
Witness Stand	300	2'-6"	150	4'-0"		2:1	
Bench and Clerks	500	2'-6"	200	4'-0"		2:1	
Faces for Video Conferencing	300	4'-0"	400	3'-5'		1.5:1	E _v should be in the direction of the camera

Ceremonial Courtroom 4100



Materials

Ceremonial Courtroom 4100

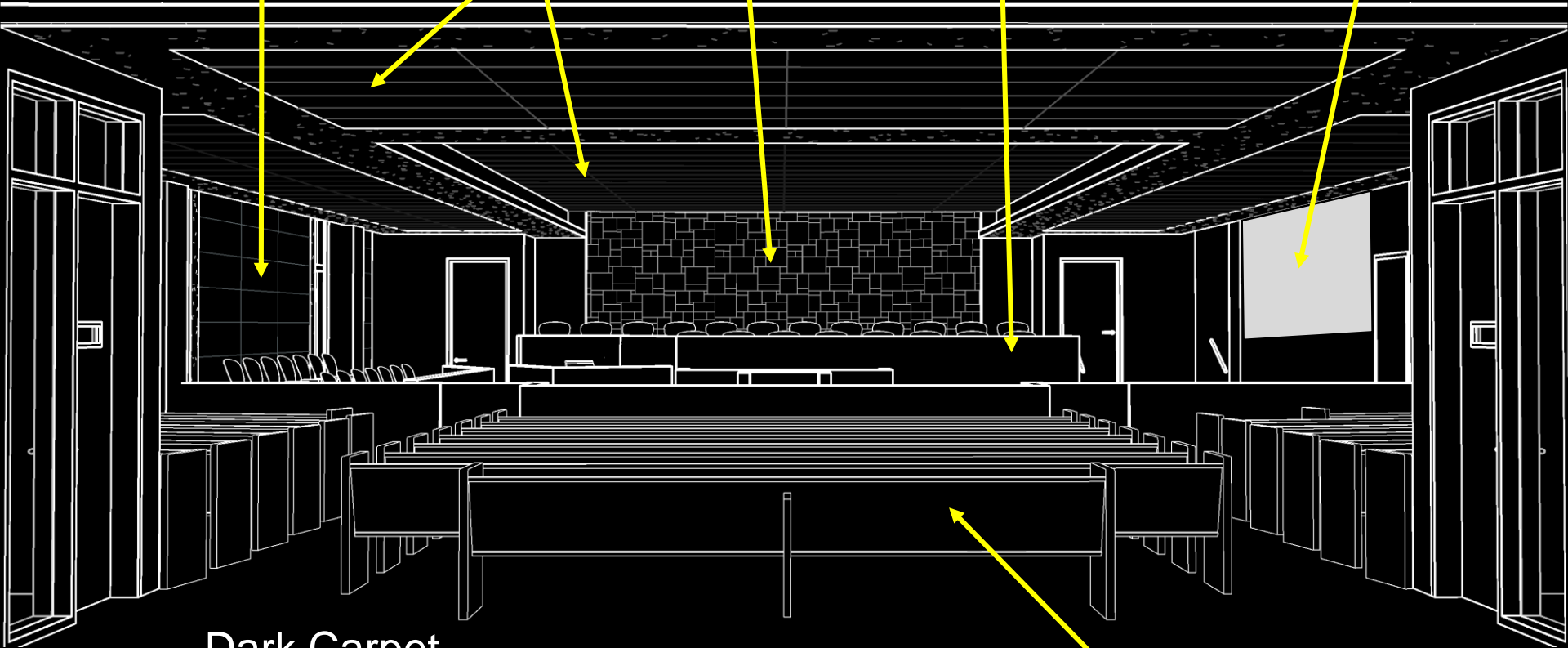
Fabric Wrapped Panels

Hardwood Panels

Acoustical Ceiling Panels

Handset Stone

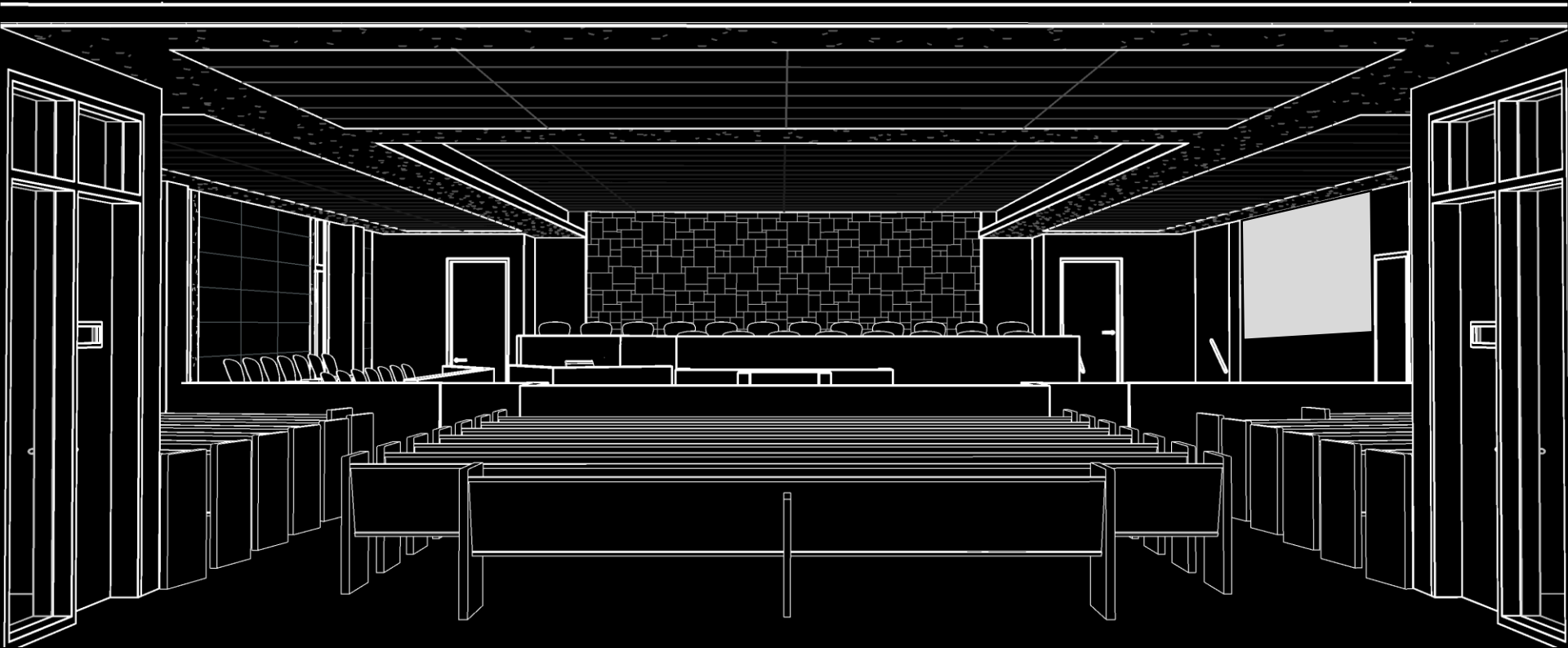
Projection Screen



Dark Carpet

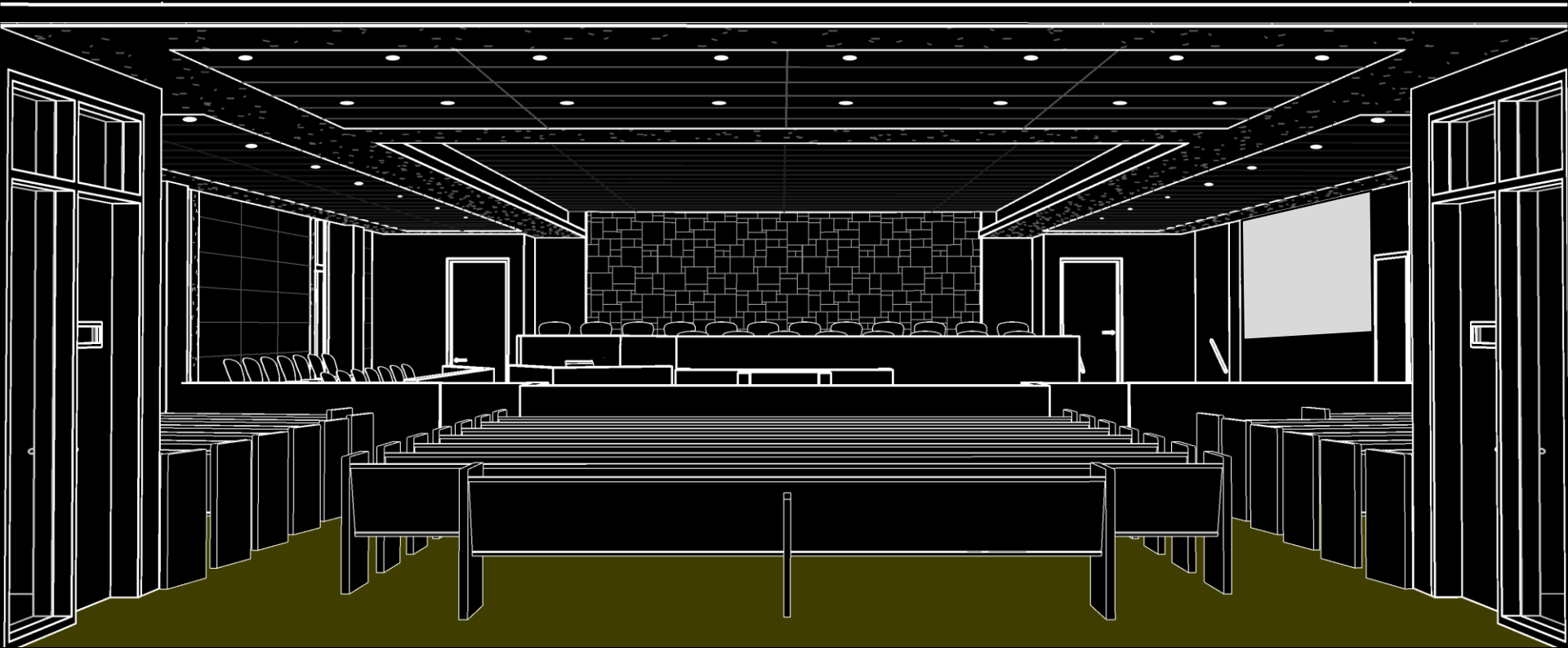
Hardwood

Ceremonial Courtroom 4100



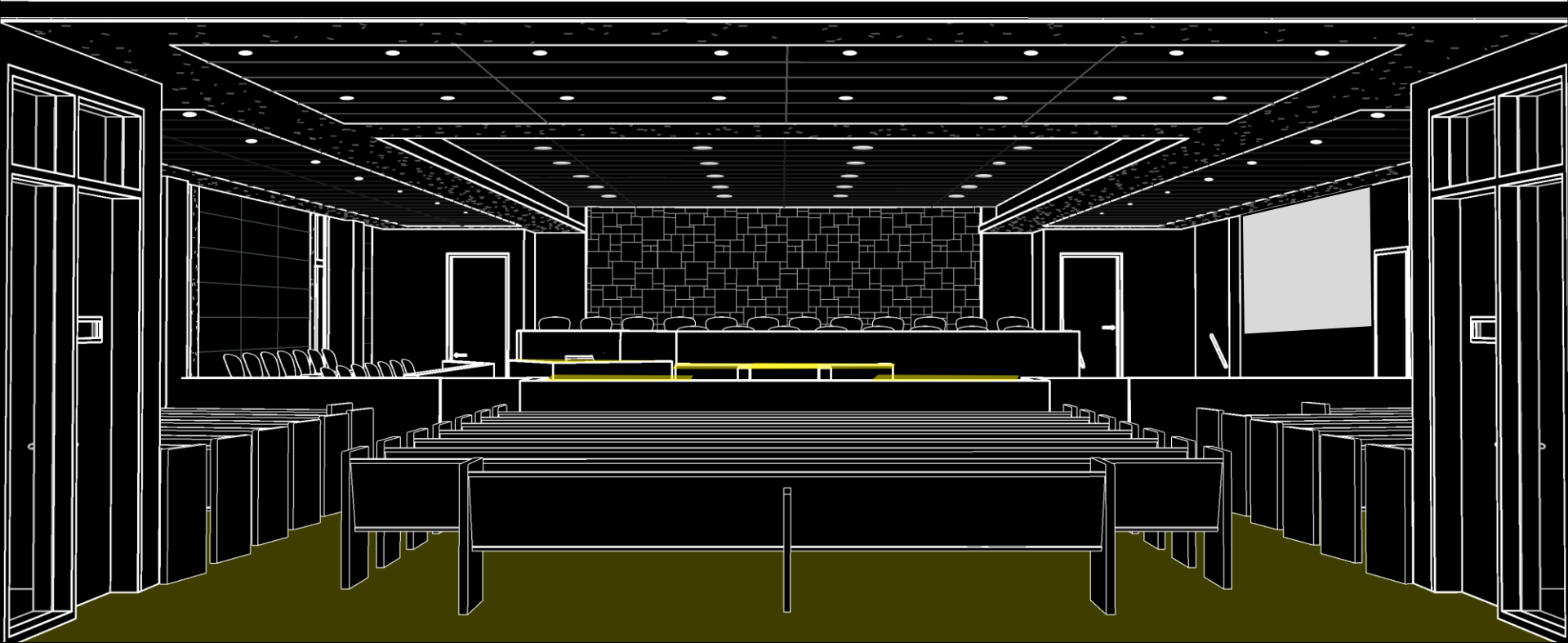
Concept 1

Ceremonial Courtroom 4100



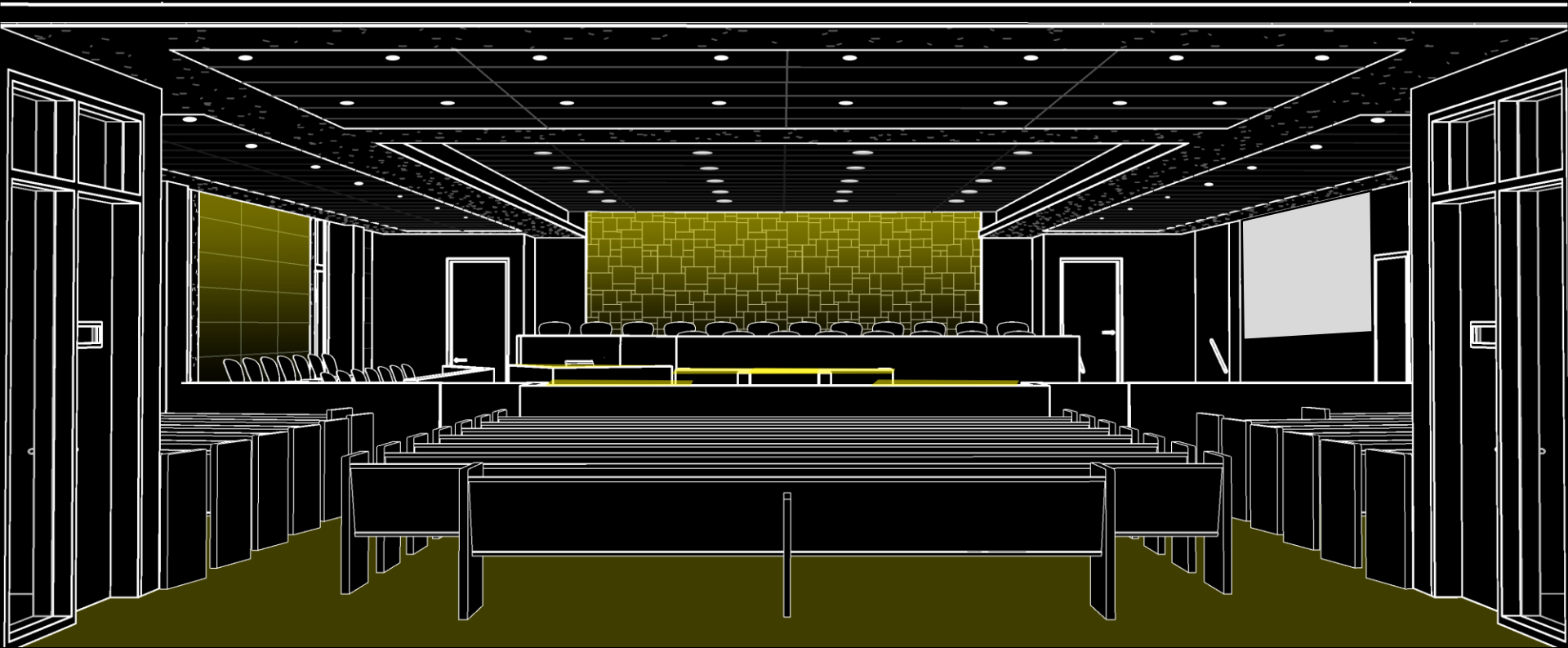
Concept 1

Ceremonial Courtroom 4100



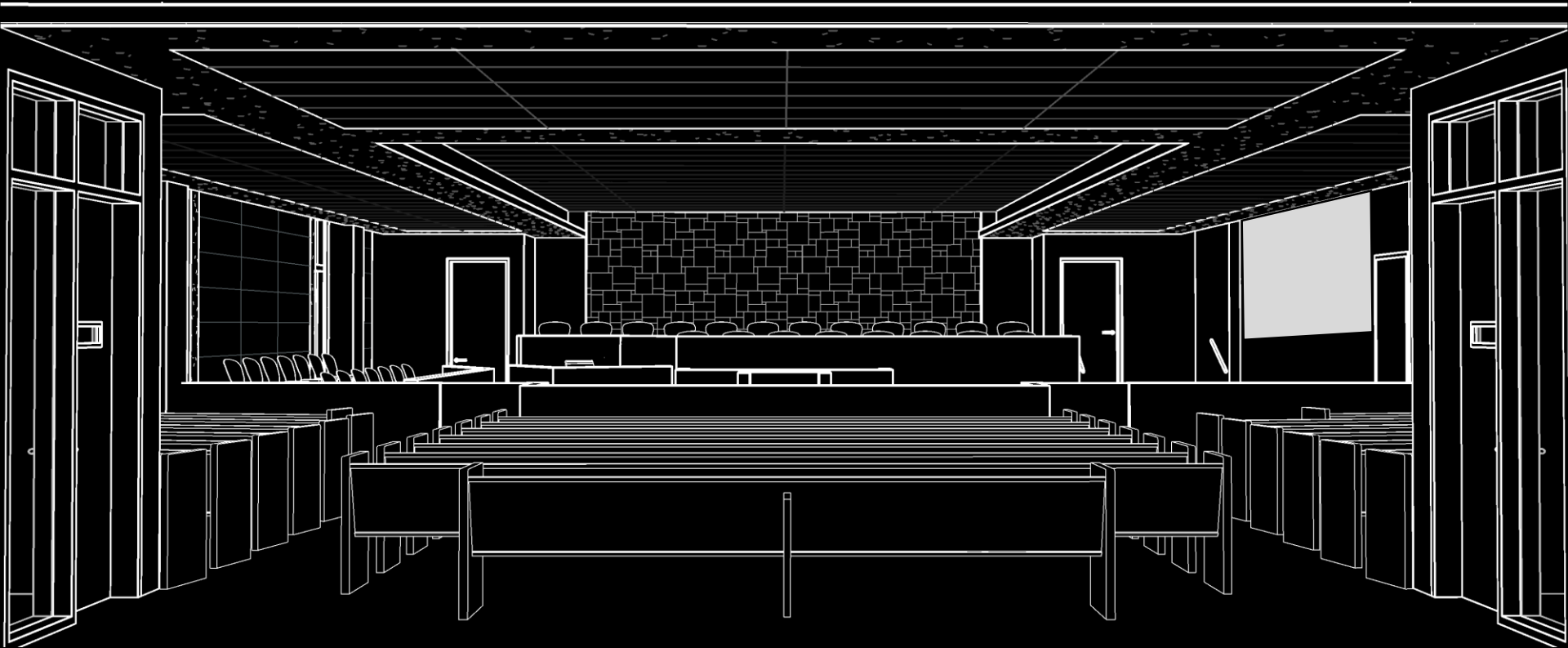
Concept 1

Ceremonial Courtroom 4100



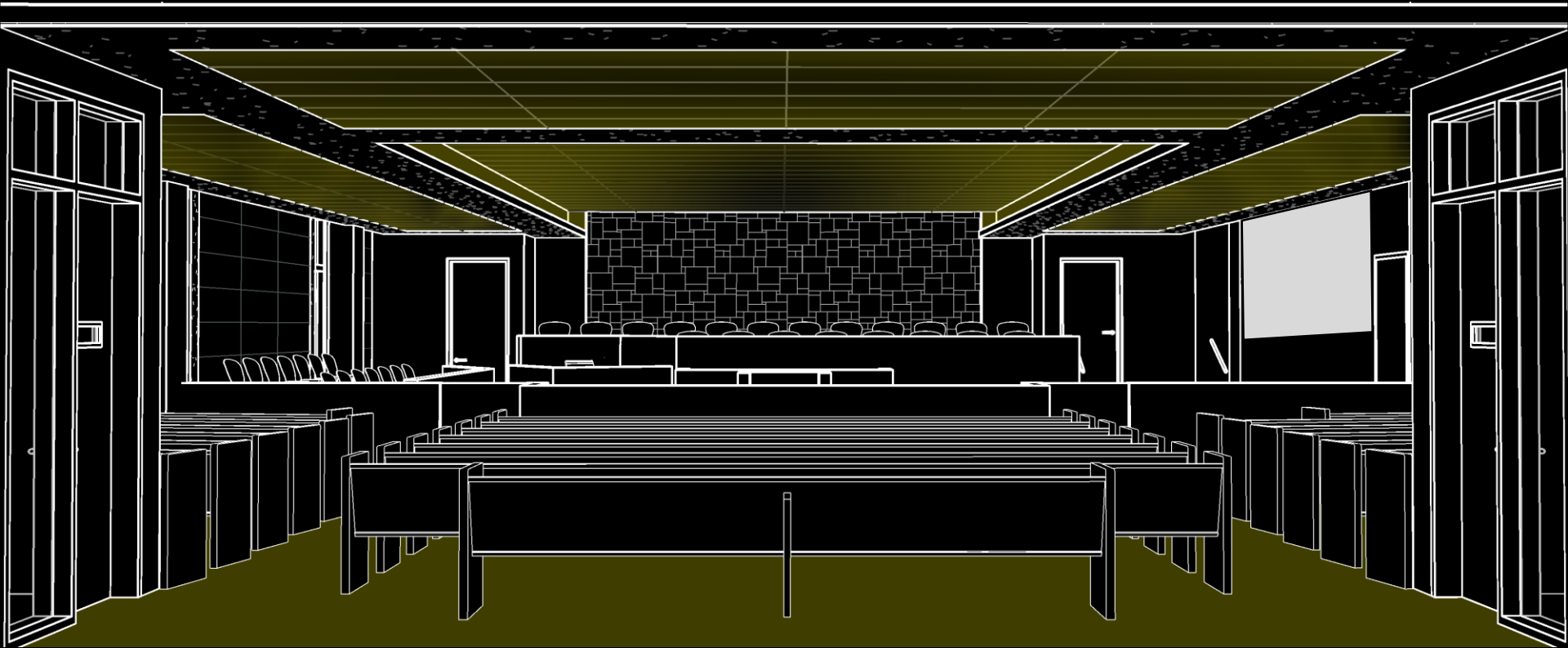
Concept 1

Ceremonial Courtroom 4100



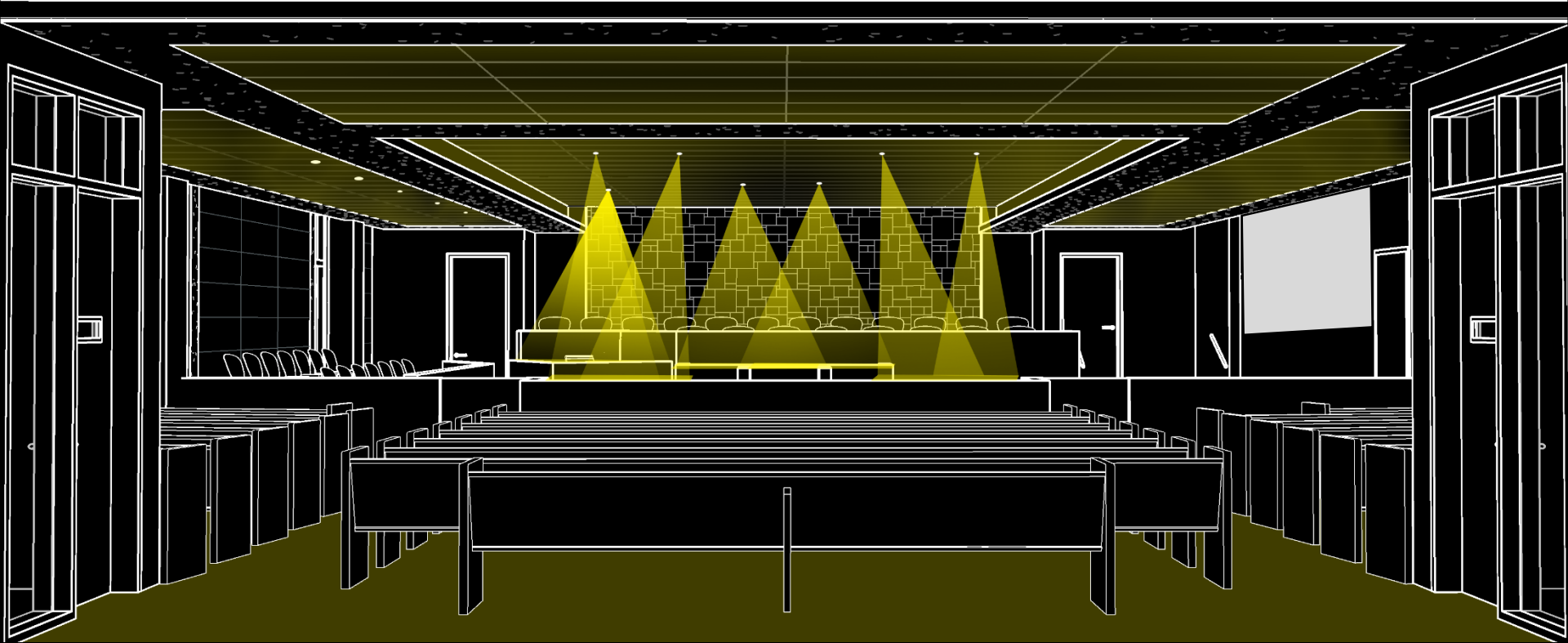
Concept 2

Ceremonial Courtroom 4100



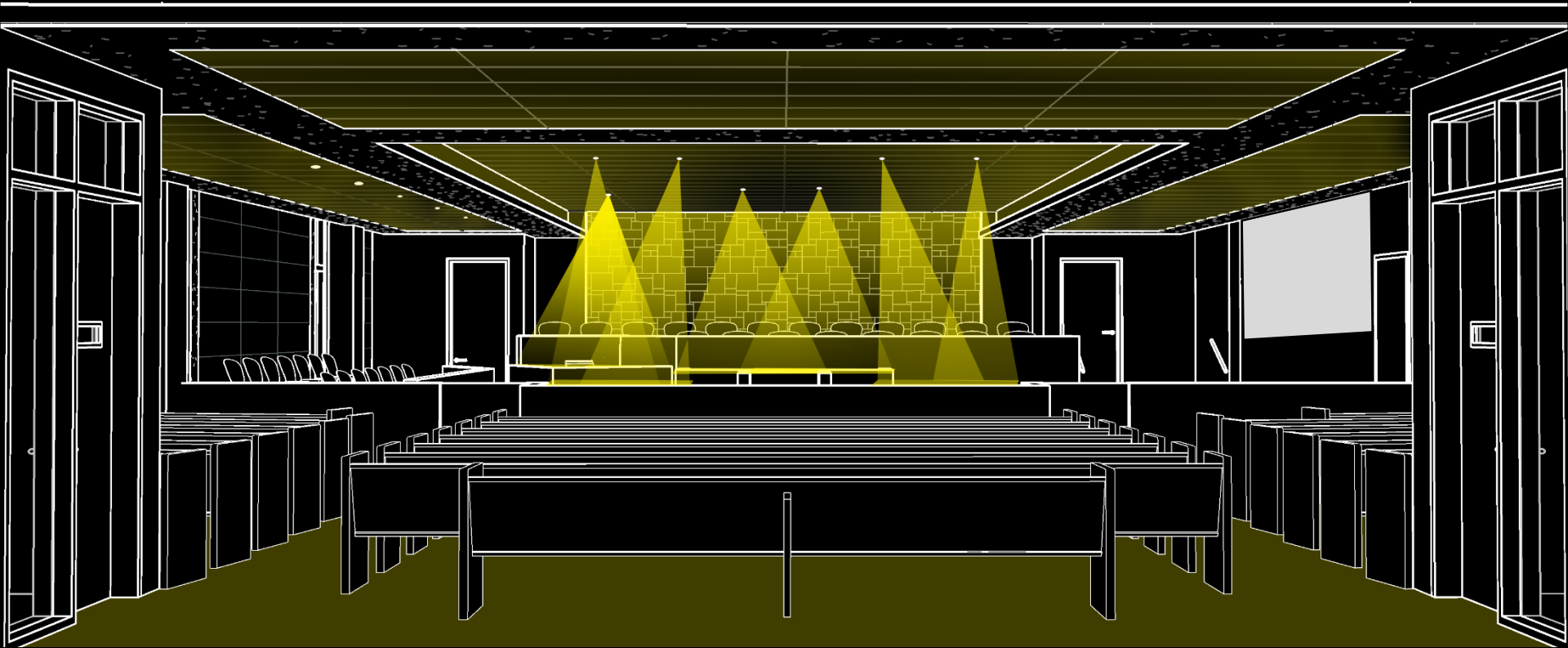
Concept 2

Ceremonial Courtroom 4100



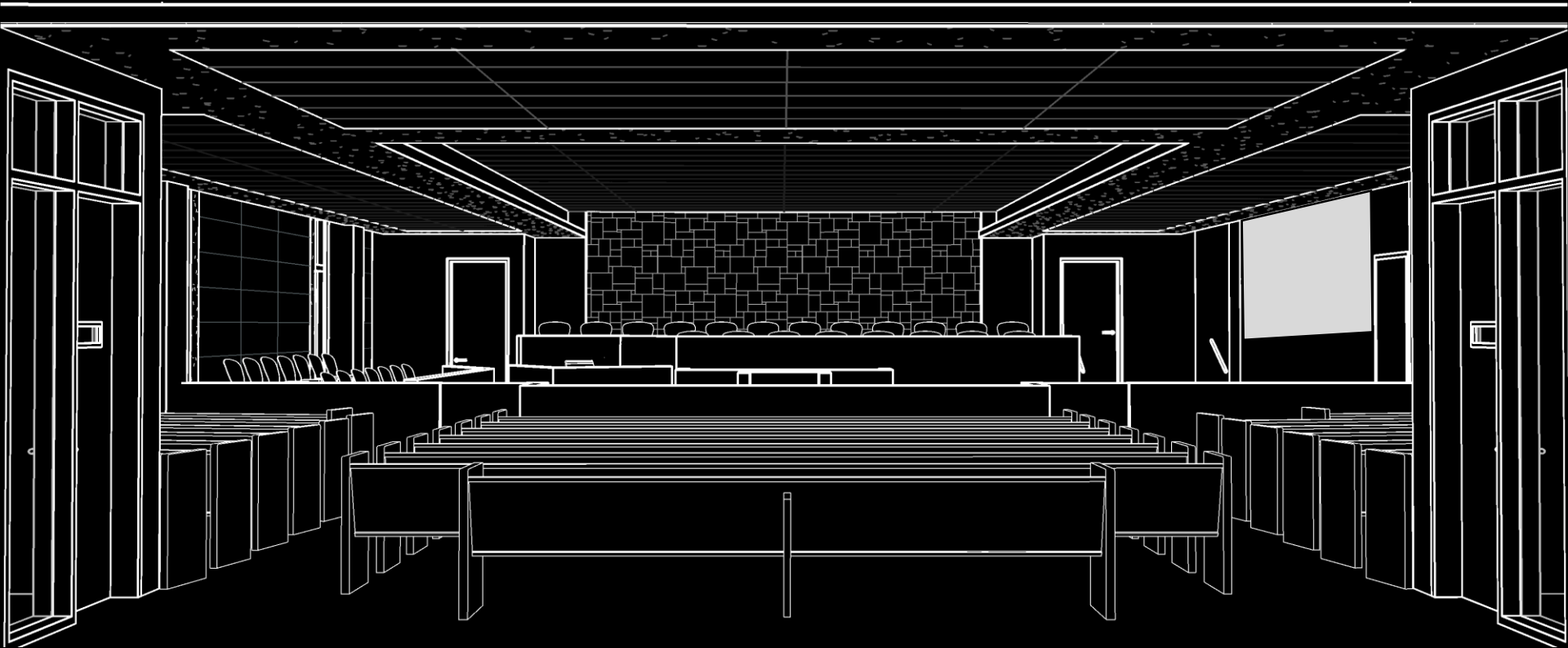
Concept 2

Ceremonial Courtroom 4100



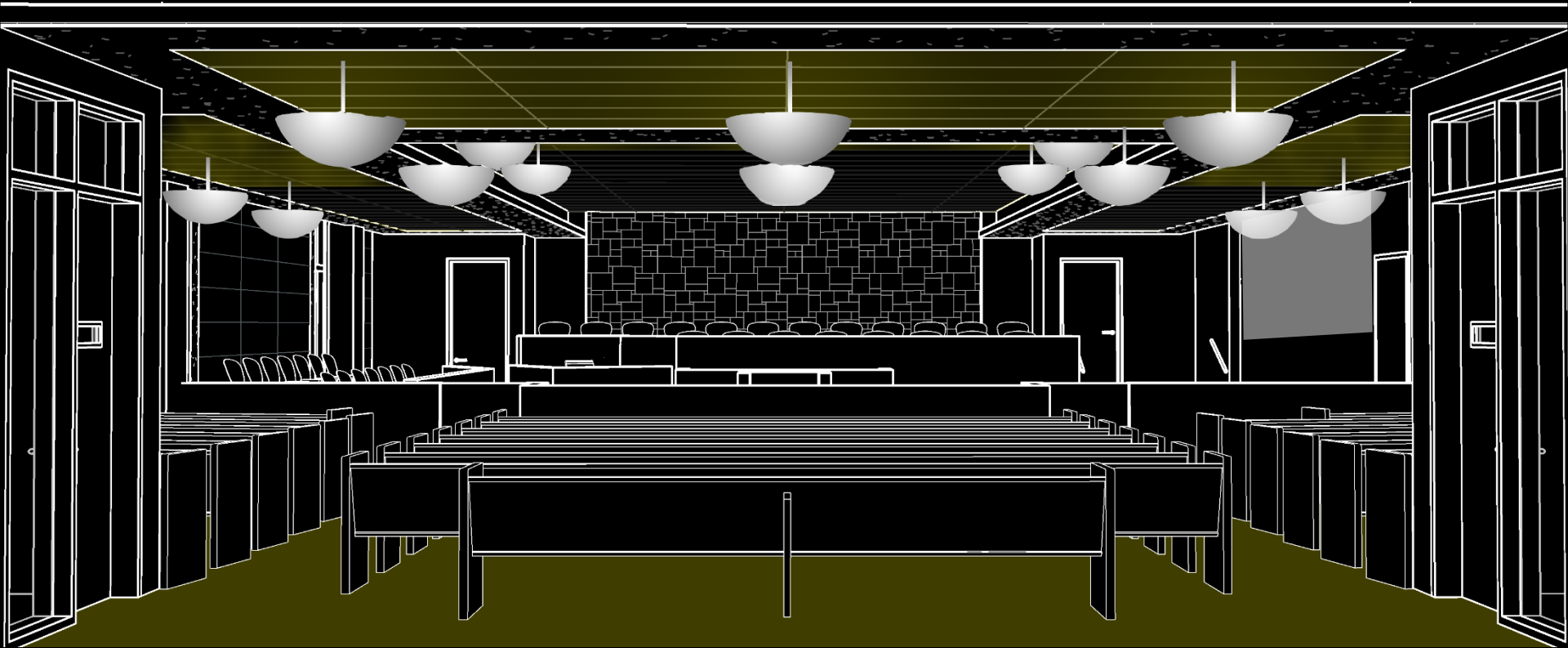
Concept 2

Ceremonial Courtroom 4100



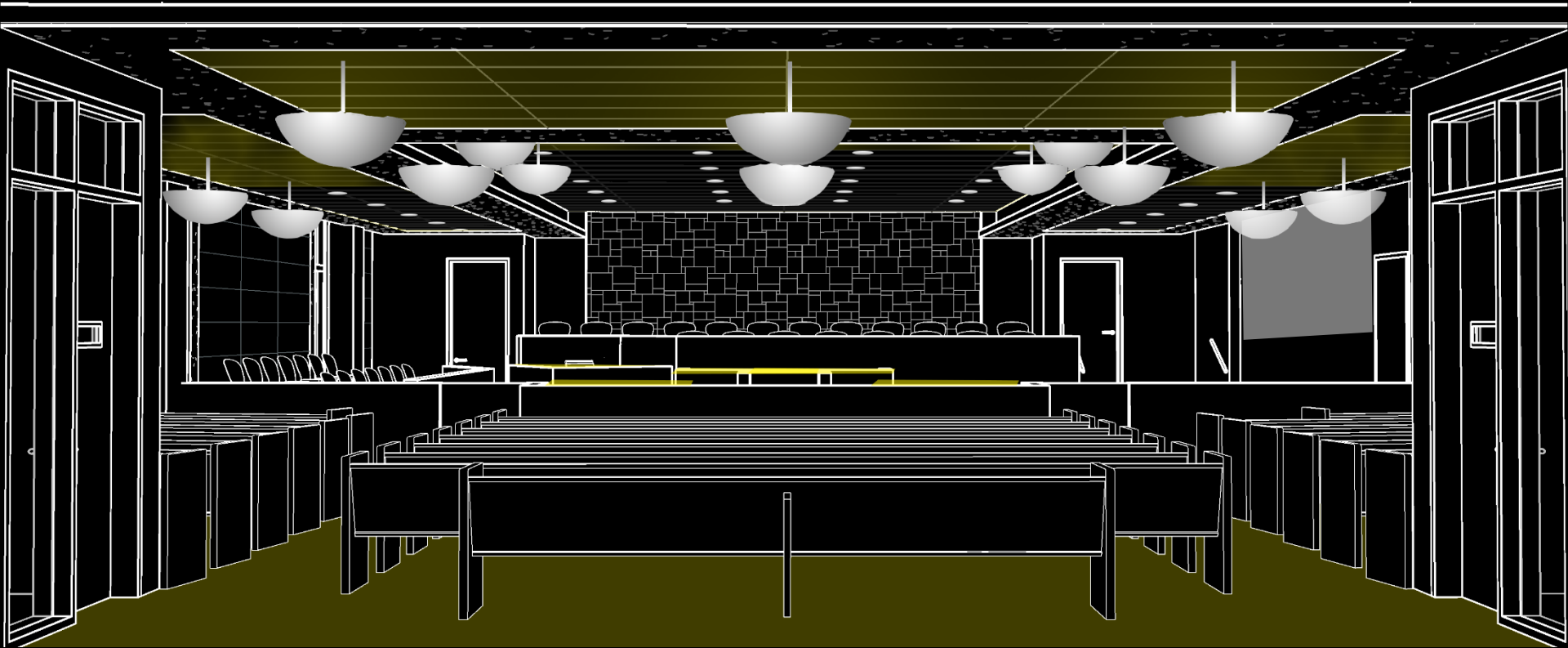
Concept 3

Ceremonial Courtroom 4100



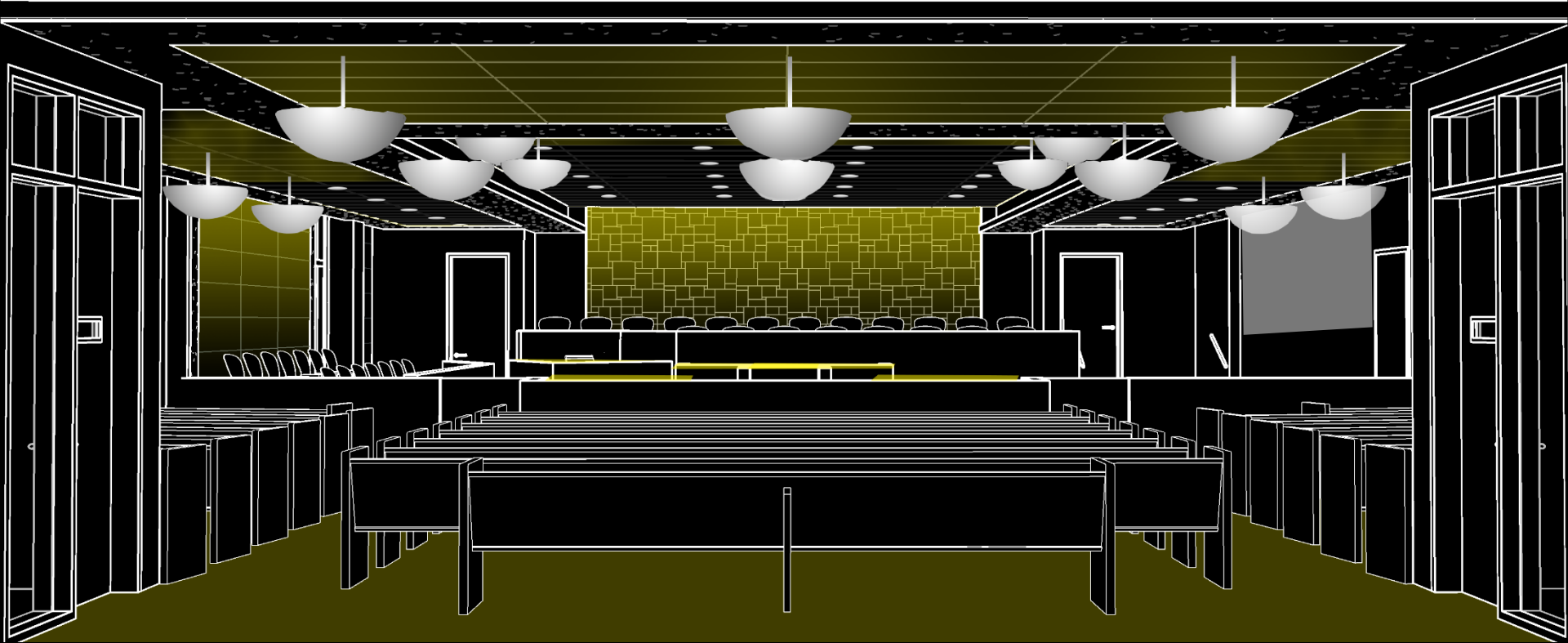
Concept 3

Ceremonial Courtroom 4100



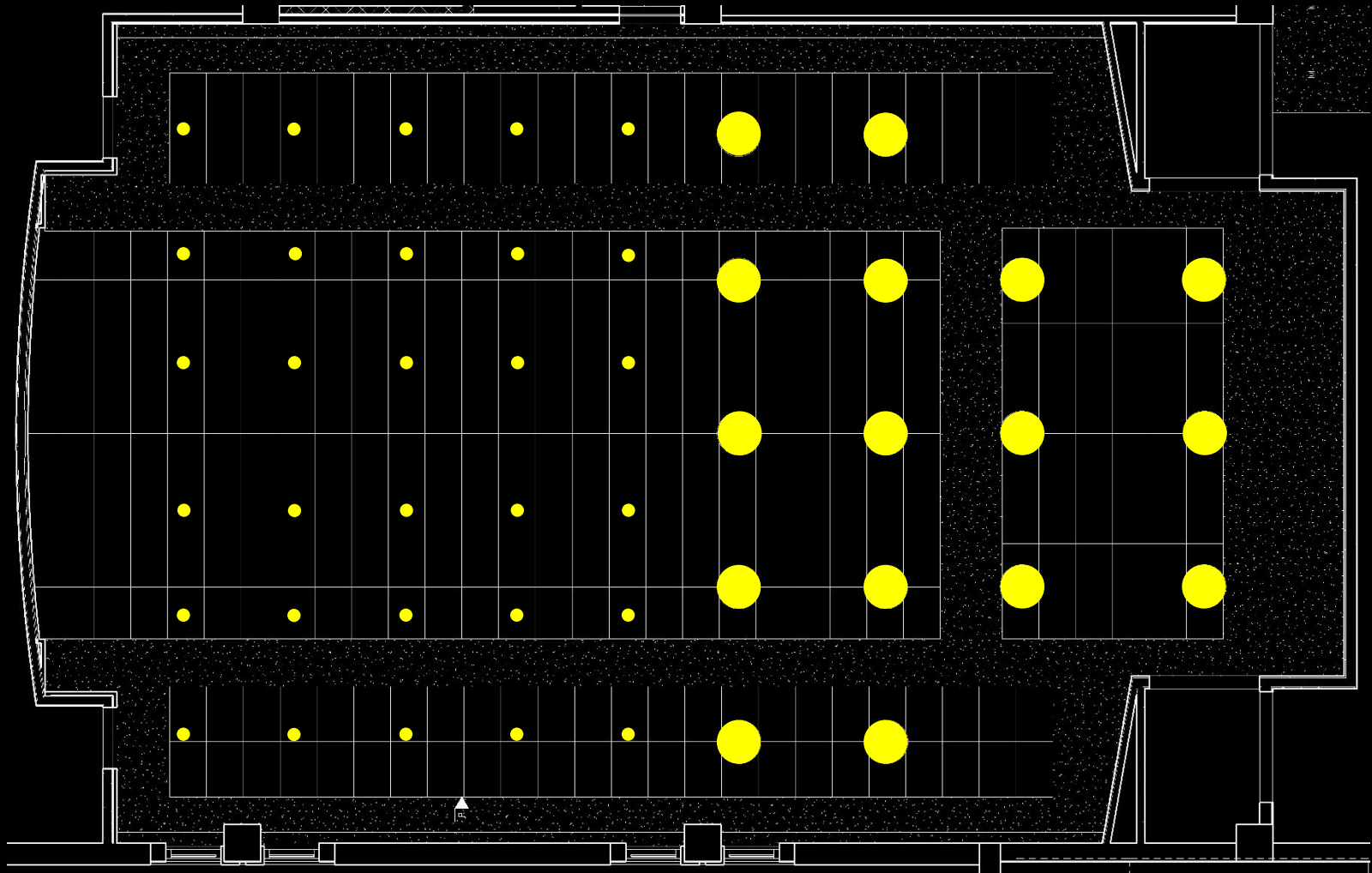
Concept 3

Ceremonial Courtroom 4100



Concept 3

Ceremonial Courtroom 4100



Concept 3

Equipment



Emergency Power

Generator connected

All exit signs

Exitways, corridors, stairways, etc.

General room illumination

References

ASHRAE. (2013). Standard 90.1-2013 Energy Standard for Buildings Except Low-Rise Residential Buildings.

DiLaura, D. L., Mistrick, R. G., Houser, K. W., & Steffy, G. R. (2011). Illuminating Engineering Society The Lighting Handbook: Reference and Application Tenth Edition. New York, NY: Illuminating Engineering Society of North America.

IDA-IES. (2011). Model Lighting Ordinance. Illuminating Engineering Society and International Dark Sky Association.

AE 481W
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