

Designers Lighting Forum

Deciphering the Art & Science
of Backlighting

Charlene Song

March 7, 2023





Deciphering the Art and Science of Backlighting

Credit(s) earned on completion of this course will be reported to **AIA CES** for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

This course is registered with **AIA CES** for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



Learning Objectives

At the end of this course, participants will be able to:

1. Add an understanding of backlighting to your wheelhouse and expand your own library of lighting design options
2. Understand how the backlighting design process fits into the overall architectural design process
3. Examine real-life case studies demonstrating how to pick and choose backlighting products for specific applications
4. Get an overview of the necessary steps to consider when specifying backlighting design



01

LEARNING OBJECTIVE

Add an understanding of backlighting to your wheelhouse and expand your own library of lighting design options





Backlighting
Makes
Imagination
Possible



CEILING



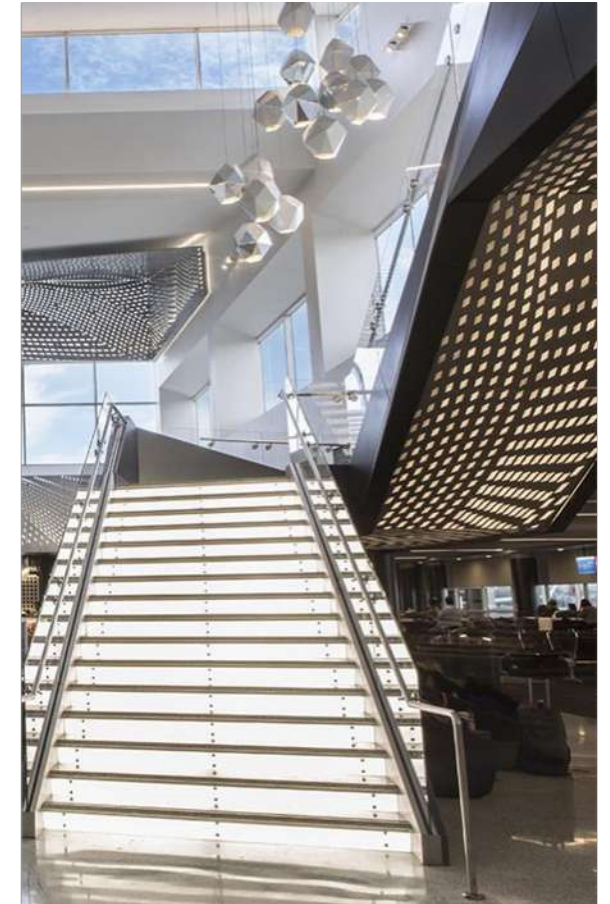
WALL



COUNTER



STAIRS



MOST COMMON INTERIOR APPLICATION TYPES



LED PANEL



FLEXIBLE LED ARRAY



RIGID LED ARRAY



LED LATTICE



LED SIDE LIGHTING



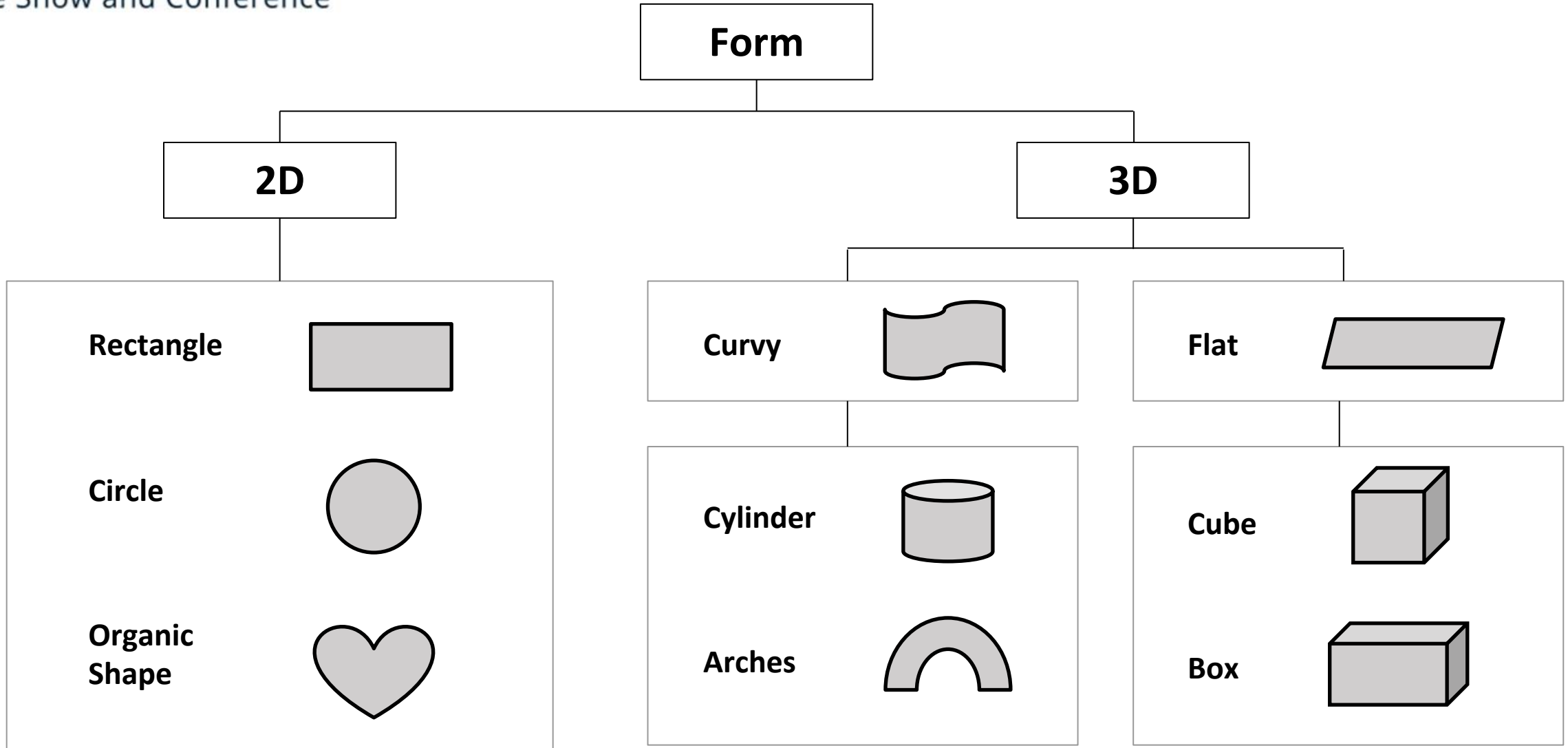
LED TAPE



AIR GAP / SET OFF DEPTH

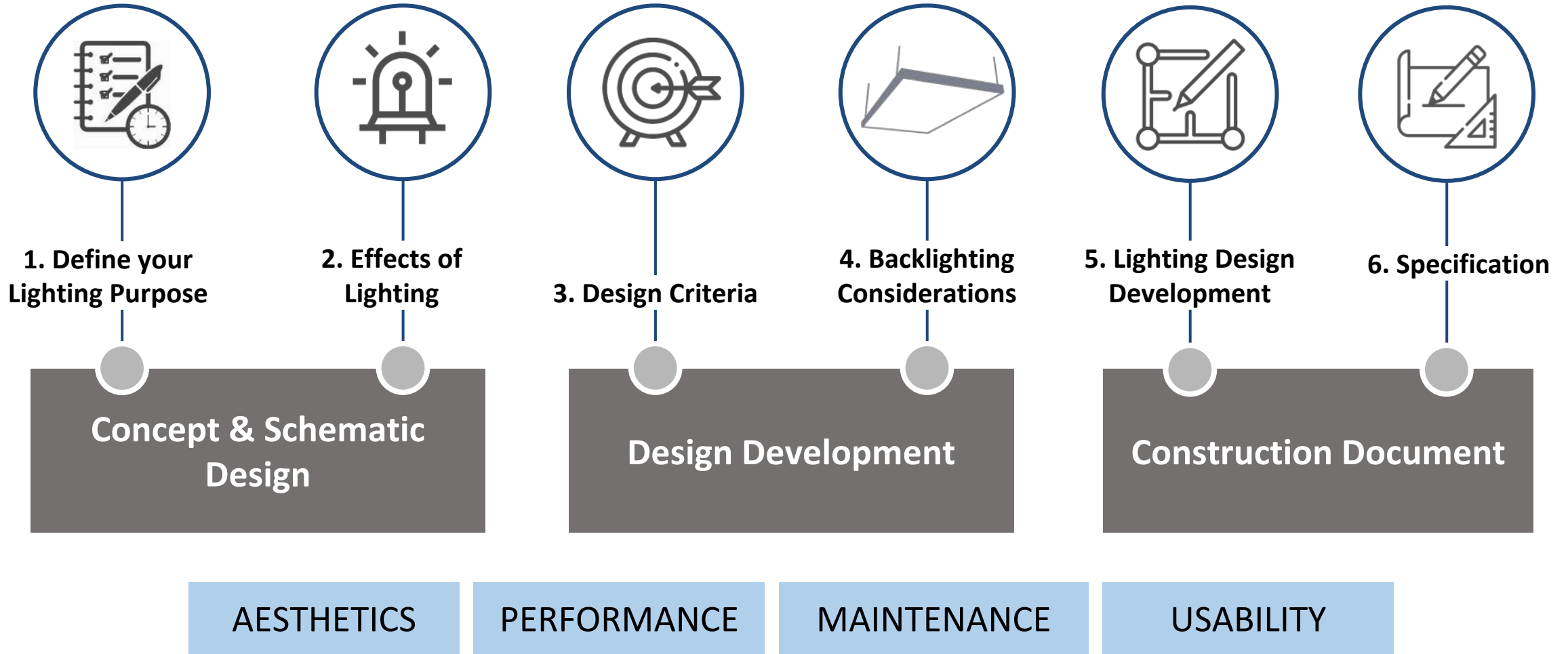
BUDGETARY PRICING

POPULAR APPLICATIONS



BACKLIGHTING: FORMS





BACKLIGHTING: THE DESIGN PROCESS



APPLICATION REQUIREMENTS



SHAPE



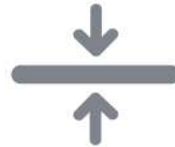
DIMENSIONS



SURFACE MATERIALS



SETOFF DISTANCE/ AIR GAP



MOUNTING



STRUCTURAL CONSIDERATIONS

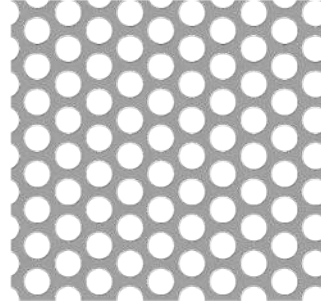




Stone



Stone



Metal



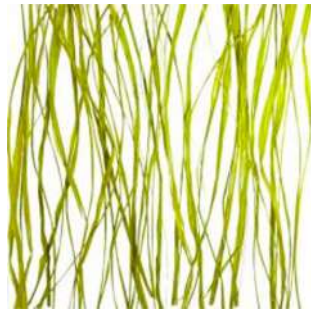
Onyx



Acrylic



Wood



Resin



Fabric



Glass



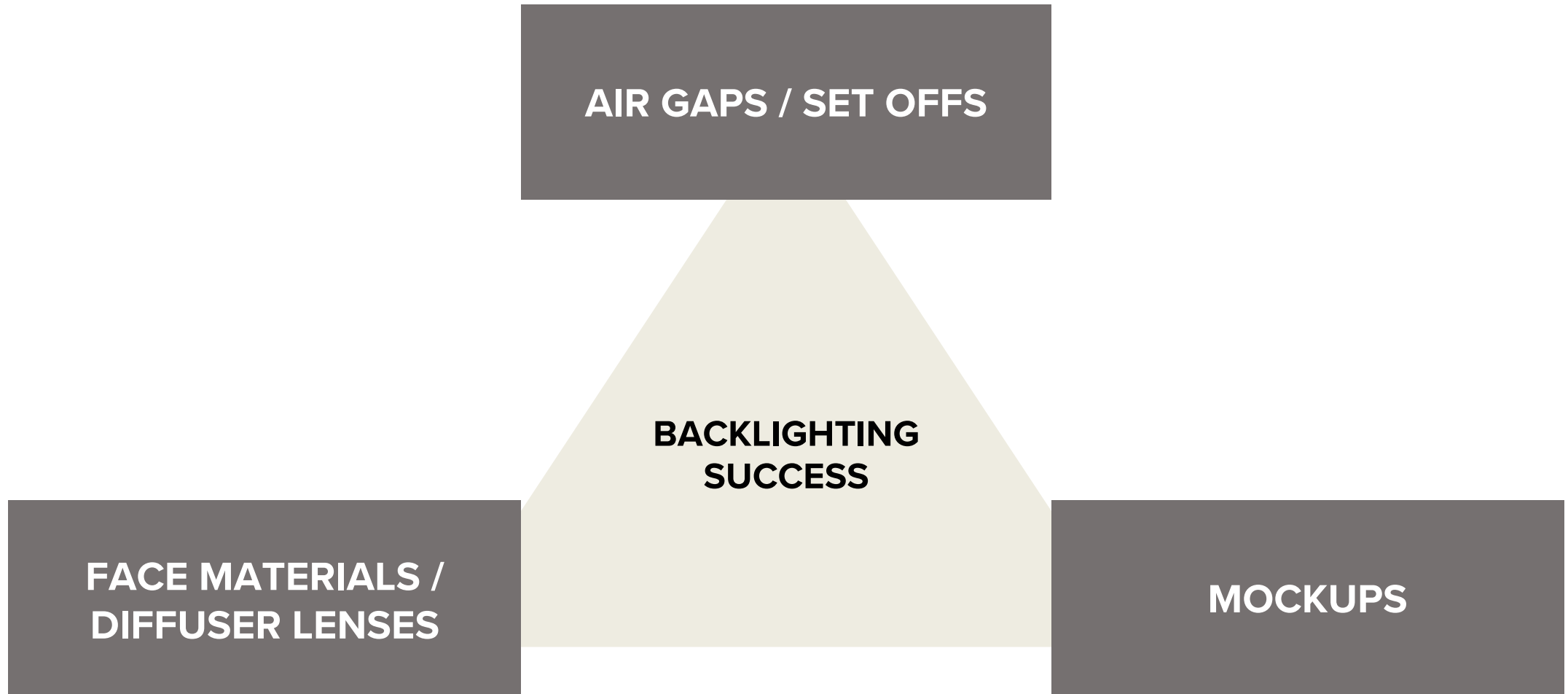
Glass



Glass

ENDLESS CREATIVITY: POPULAR SURFACE MATERIALS





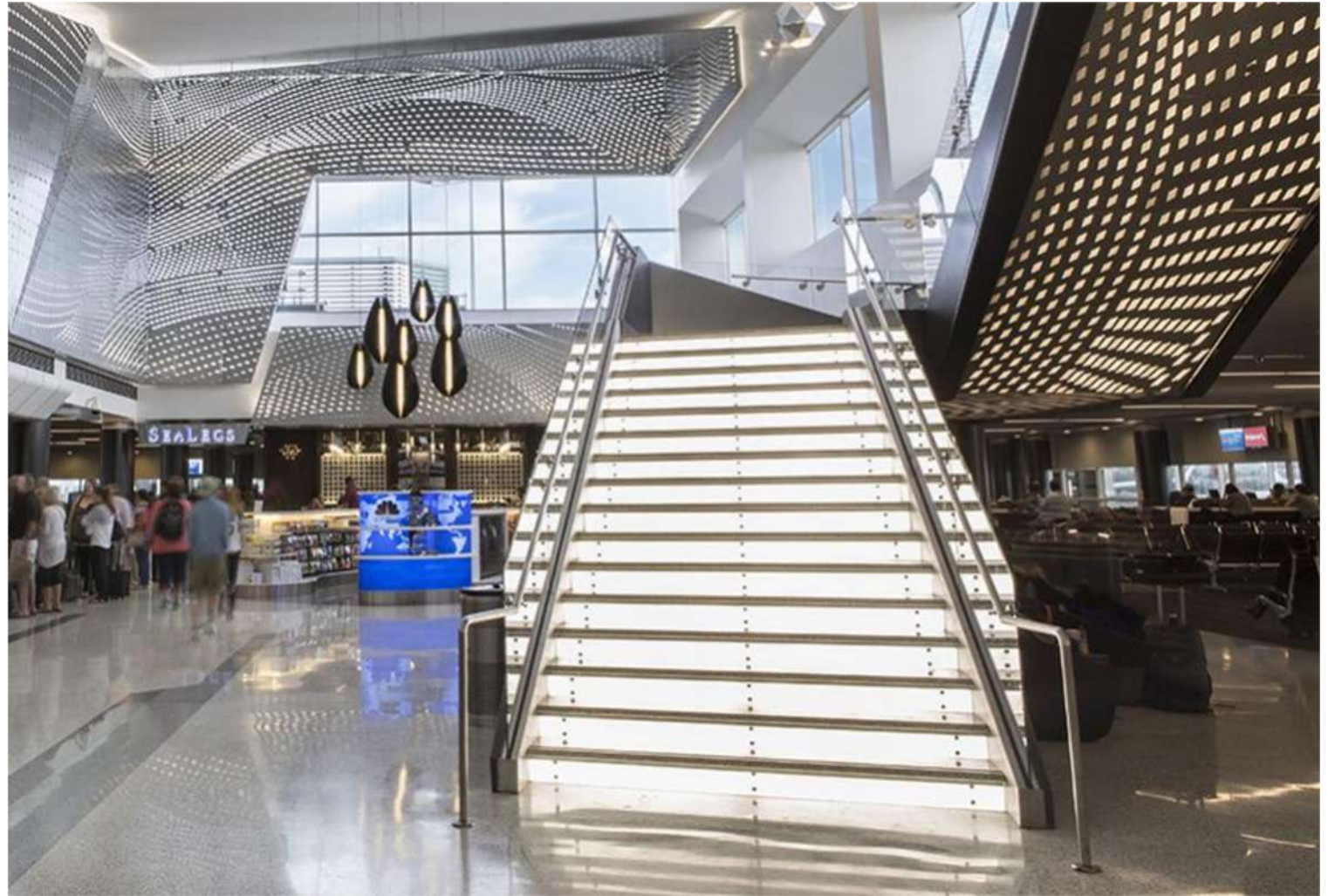
THE BACKLIGHTING SUCCESS TRINITY

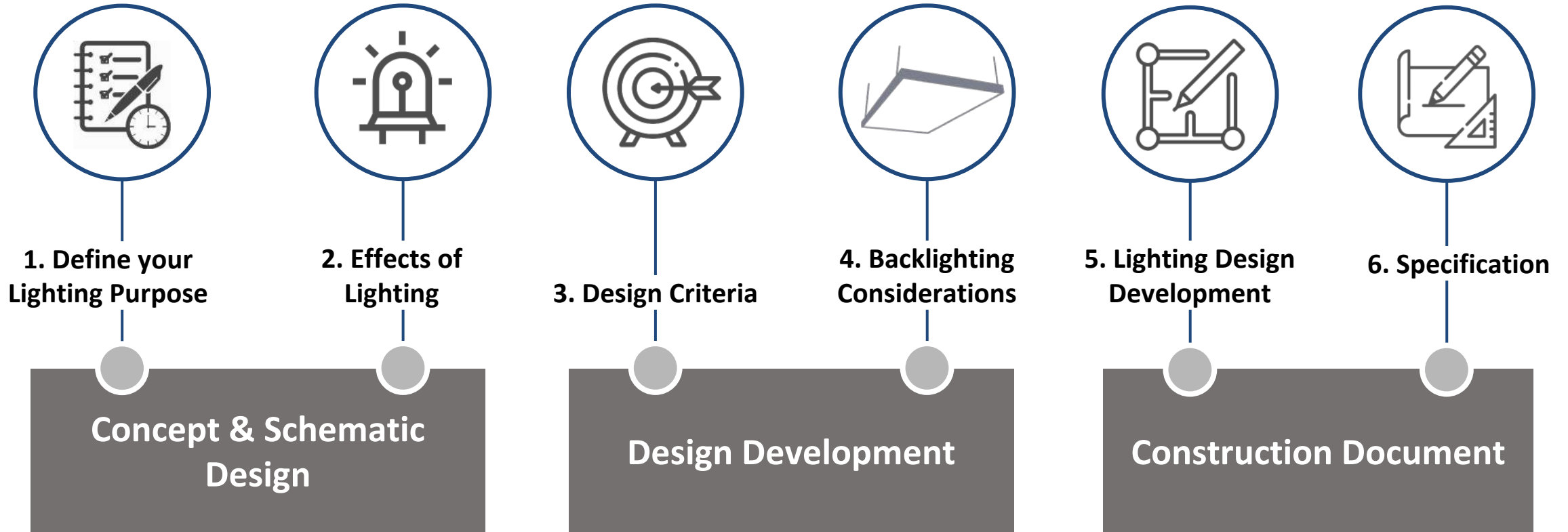


02

LEARNING OBJECTIVE

Understand how the
backlighting design process
fits into the overall
architectural design process





	Conceptual Design	Schematic Design	Design Development	Construction Documents	Construction Bidding	Construction Admin
--	-------------------	------------------	--------------------	------------------------	----------------------	--------------------

Architecture Building Phase	Conceptual Design	Schematic Design	Design Development	Construction Documents	Construction Bidding	Construction Admin
-----------------------------	-------------------	------------------	--------------------	------------------------	----------------------	--------------------

Key Focus for Lighting Designer	Define Your Lighting Purpose	Basis of Design	Lighting Design Development	Specification	Production Mock-Up Review	Commissioning
---------------------------------	------------------------------	-----------------	-----------------------------	---------------	---------------------------	---------------

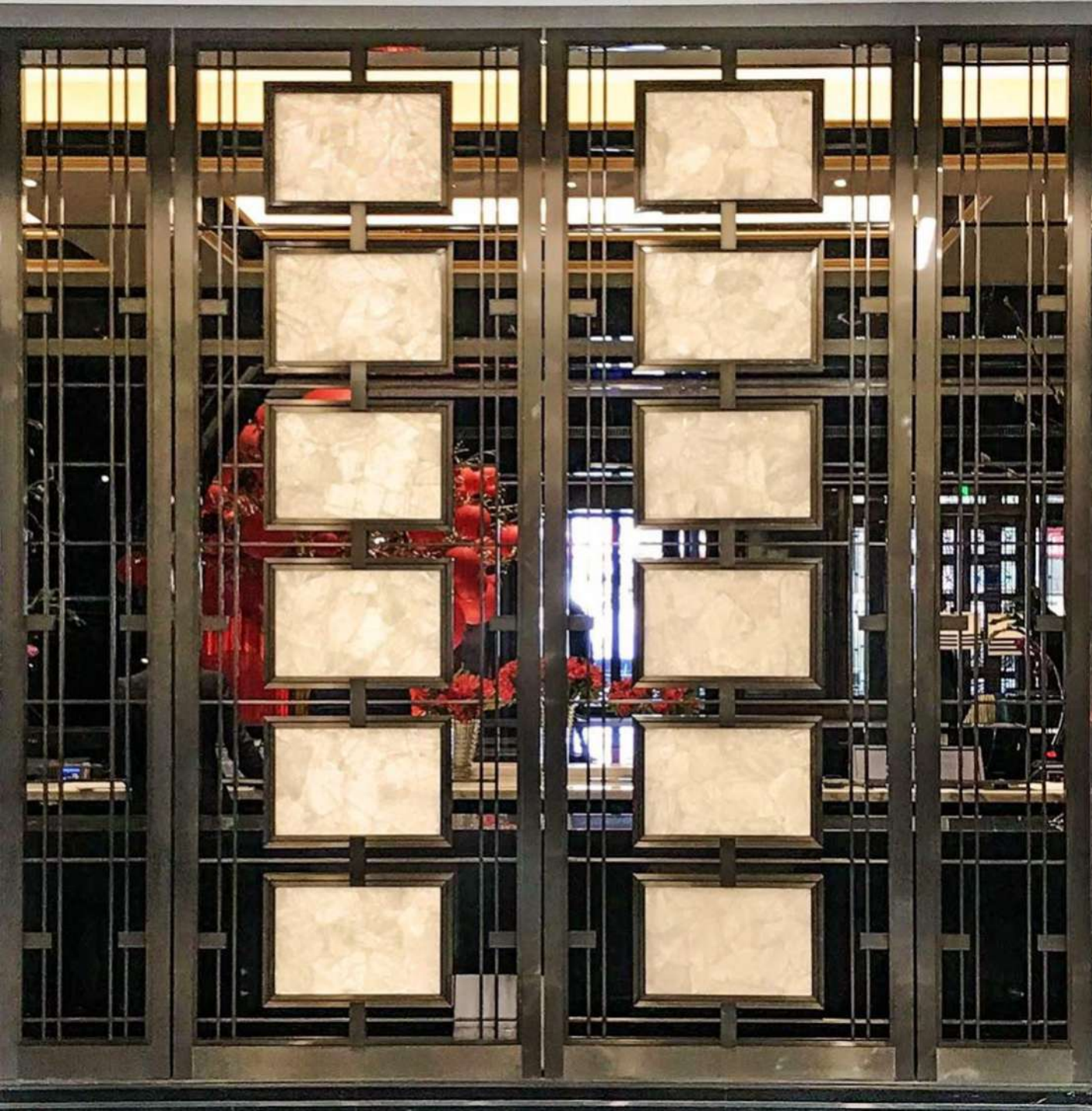
Key Focus for Manufacturer	Ideation & Feasibility	Solutions & Proof-of-concept	Detailing & Mock Up	Submittal: BOM & Structure	Bidding	Order Fulfillment & Support
----------------------------	------------------------	------------------------------	---------------------	----------------------------	---------	-----------------------------

03

LEARNING OBJECTIVE

Examine real-life case studies demonstrating how to pick and choose backlighting products for specific applications





Award-Winning Hotel Accent Illumination

BELLAGIO SHANGHAI

Bellagio Hotel | Shanghai, China



Lighting Designer: Lighting Design Alliance



leducation.org



PROJECT OVERVIEW



Best Product Fit -
LED LIGHT PANEL



Scope

Create a **intriguing, inviting lighting experience** for the **luxurious hotel**.

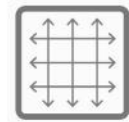
Challenge



Narrow/No
Air Gap



Bright
Illumination



Even
Illumination



Streamlined
Coordination



Project
Management



Double-Sided





CASE STUDY

Luxury Backlit Stone Table

ILLUMINATED DINING TABLE

924 BEL AIR | Los Angeles, CA

924 BEL AIR RD
BEL AIR · CALIFORNIA

UBERION



Architect: Uberion

Lighting Designer: Angeles Electric Lighting Design



leducation.org

PROJECT OVERVIEW



Best Product Fit -
LED LIGHT PANEL



Scope

Backlight a large illuminated stone table for a high-end residential space.

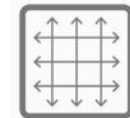
Challenge



Narrow/No
Air Gap



Seamless
Outlook



Even
Illumination

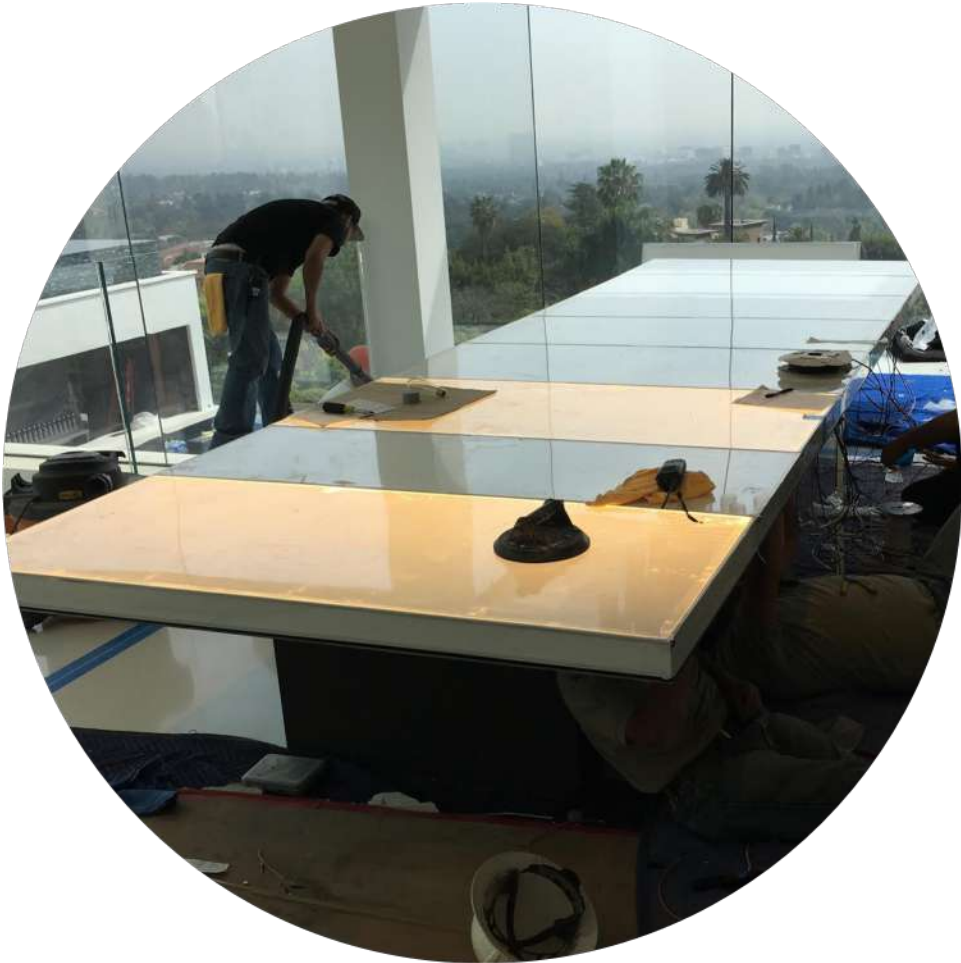


Heavy Surface
Material



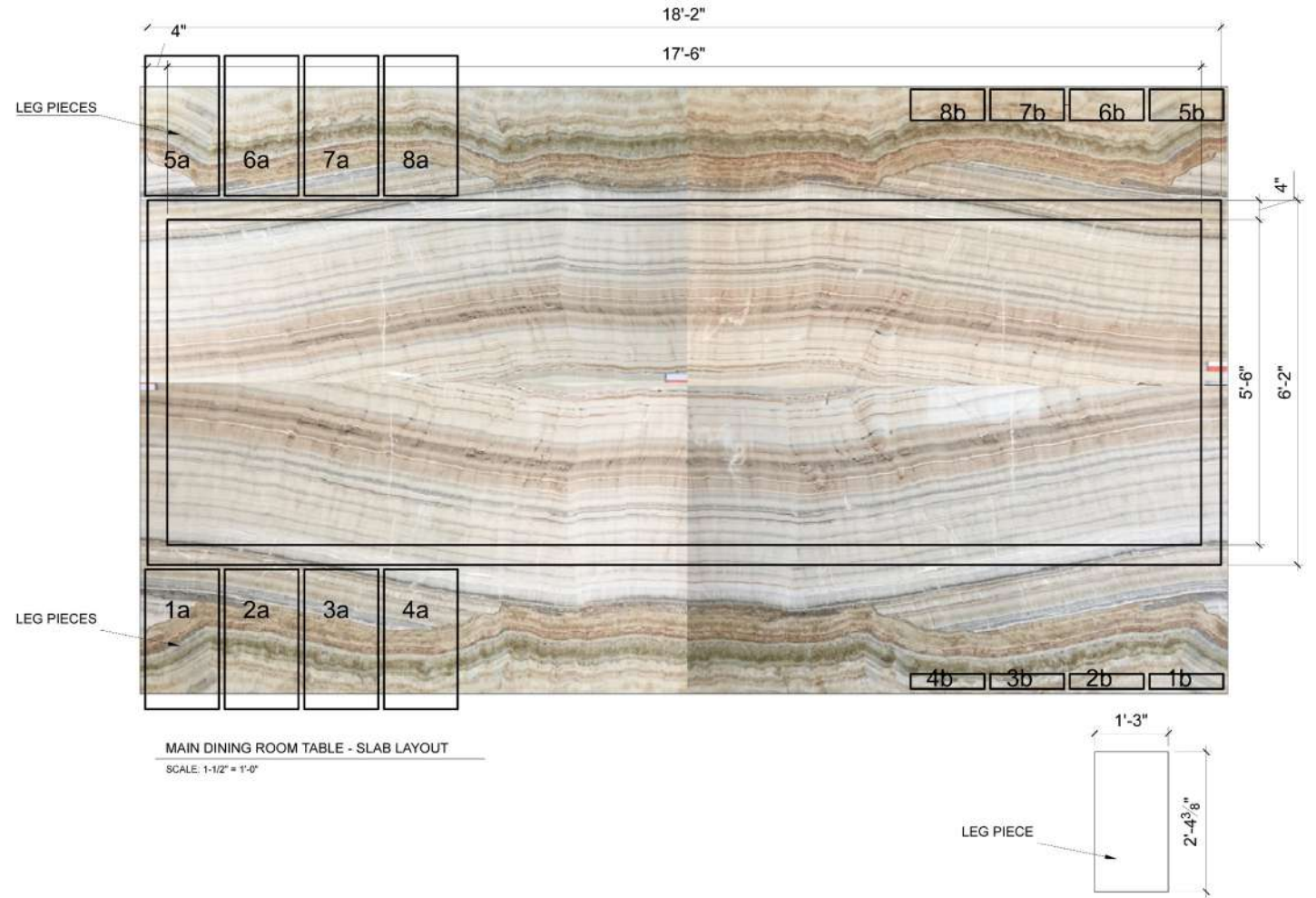
Short Lead

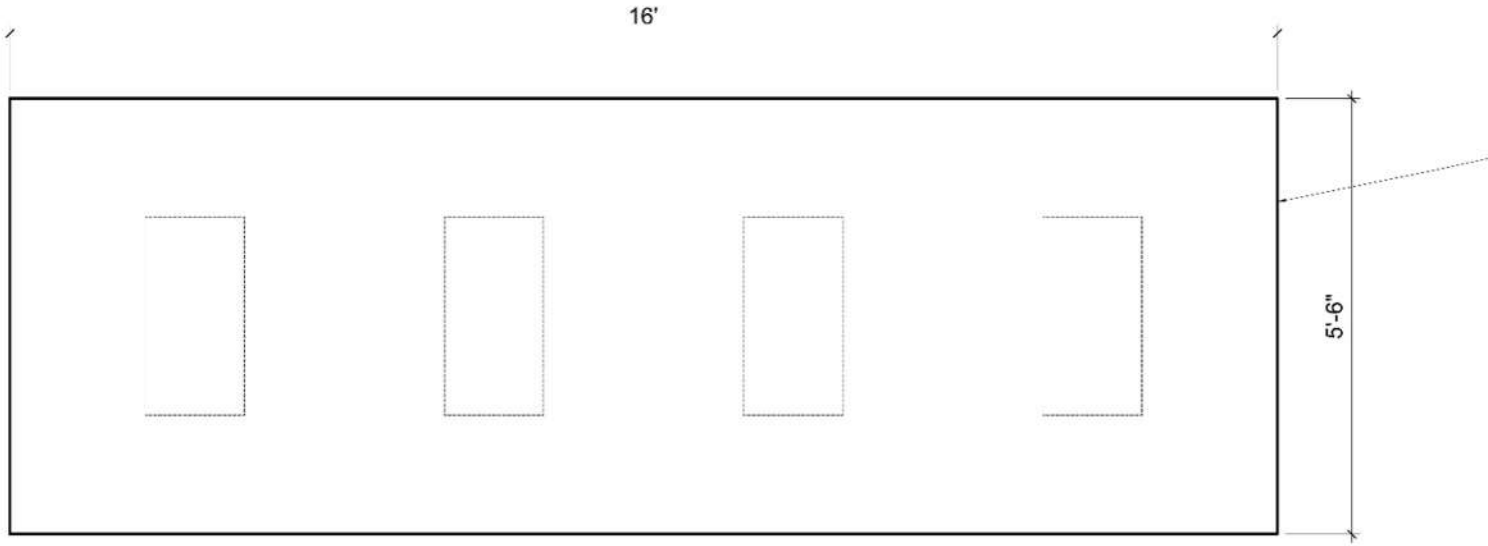




**LED LIGHT PANEL
Multipaneling Installation**

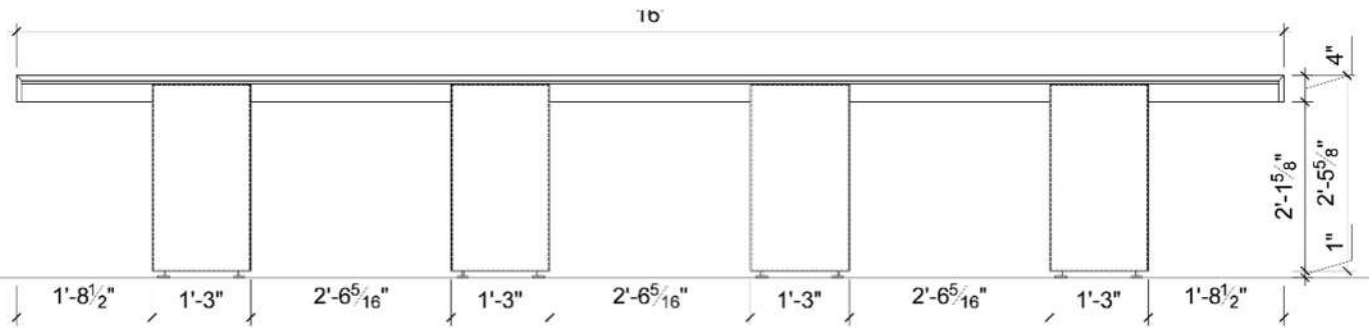
Table dimensions: 17' 6" (l) x 5' 6" (w) + 4" waterfall edges





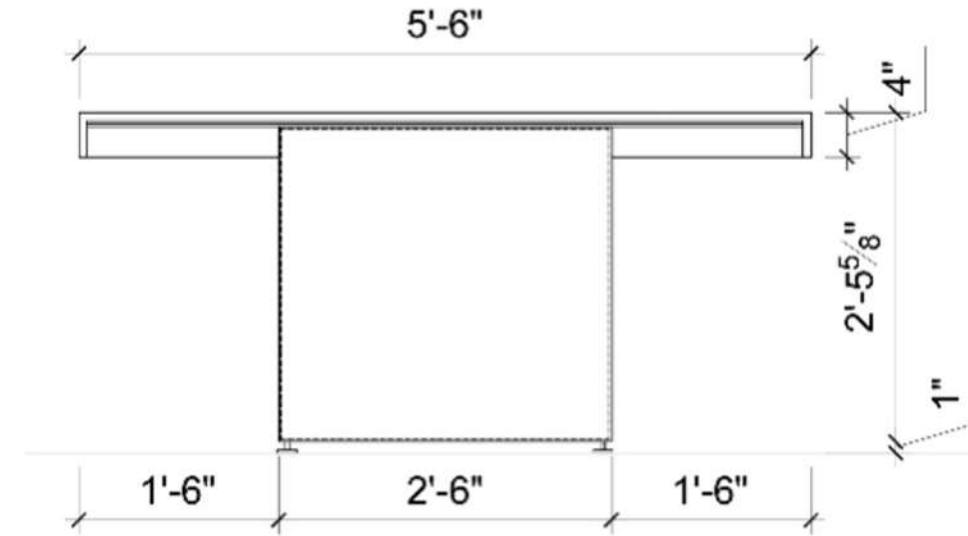
MAIN DINING ROOM TABLE - PLAN VIEW

SCALE: 1" = 1'-0"



MAIN DINING ROOM TABLE - SECTION 1

SCALE: 1" = 1'-0"



MAIN DINING ROOM TABLE - SECTION 2

SCALE: 1" = 1'-0"

CASE STUDY

Oversize Backlit Glass Lobby

SAND CANYON

Corporate Office | Irvine, CA



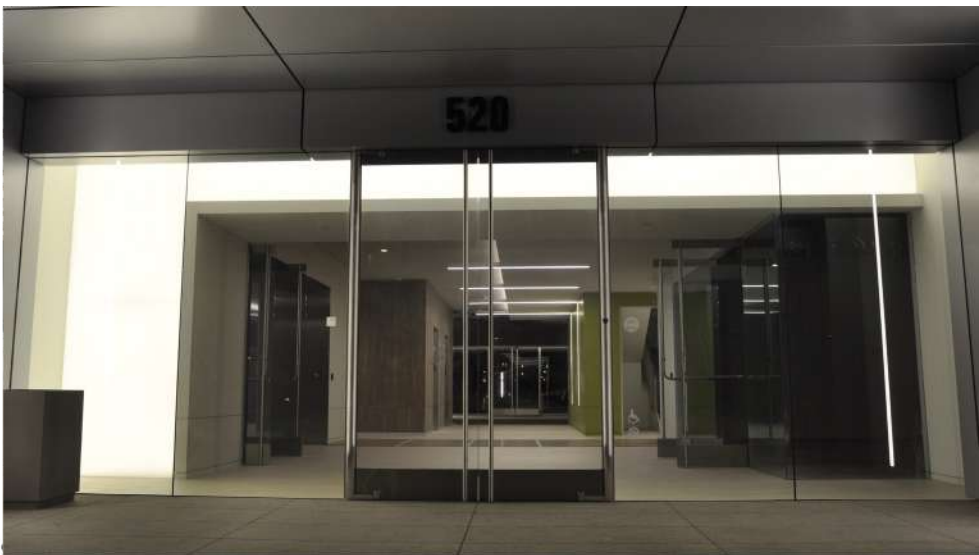
IRVINE COMPANY
OFFICE PROPERTIES

Architect: LPA

Lighting Designer: LPA



Irvine Company Development



PROJECT OVERVIEW



Best Product Fit -
LED LIGHT PANEL



Scope

Create an **intriguing, inviting lobby entrance** featuring a **clean aesthetic** achieved by illuminating a **pure white glass** installation.

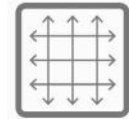
Challenge



Pure White
Illumination



Clean Glass
Illumination



Even
Illumination

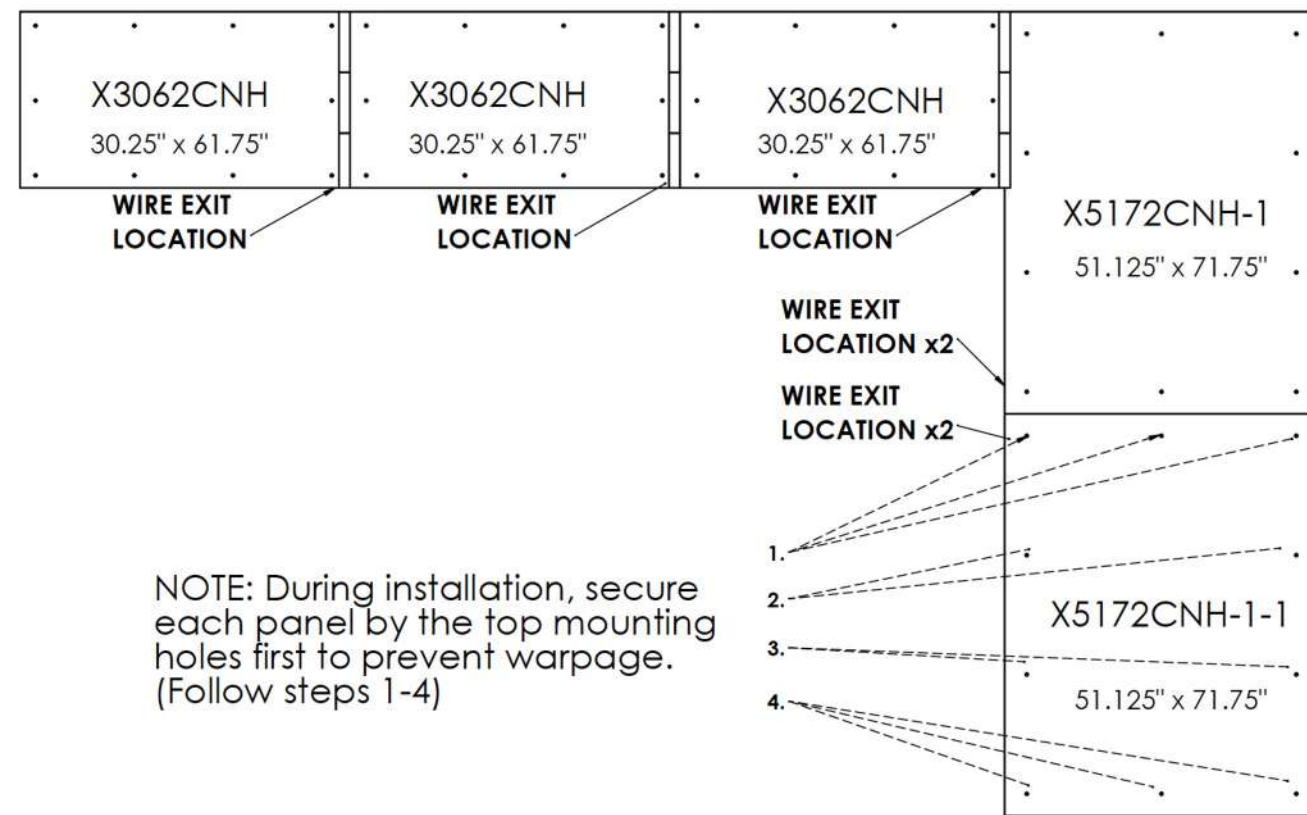
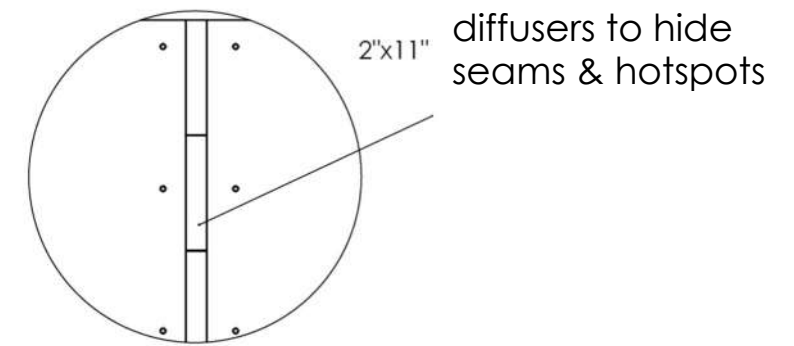


Streamlined
Coordination



Project
Management





NOTE: During installation, secure each panel by the top mounting holes first to prevent warpage. (Follow steps 1-4)

**LED LIGHT PANEL
Layout Drawing**



Oversize Backlit Fabric Oval Ceiling

OLDCASTLE, INC

Corporate Office | Atlanta, GA



Architect: HOK

Lighting Designer: HOK

PROJECT OVERVIEW



Best Product Fit -
FLEXIBLE LED SHEETS



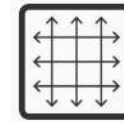
Scope

Oversize 17' circular textile ceiling installation

Challenges



Oversize
Circular Shape



Even
Illumination



Fitting into the
Existing Design



Project
Management



Spec Integrity



Custom Cut & Prelabeled

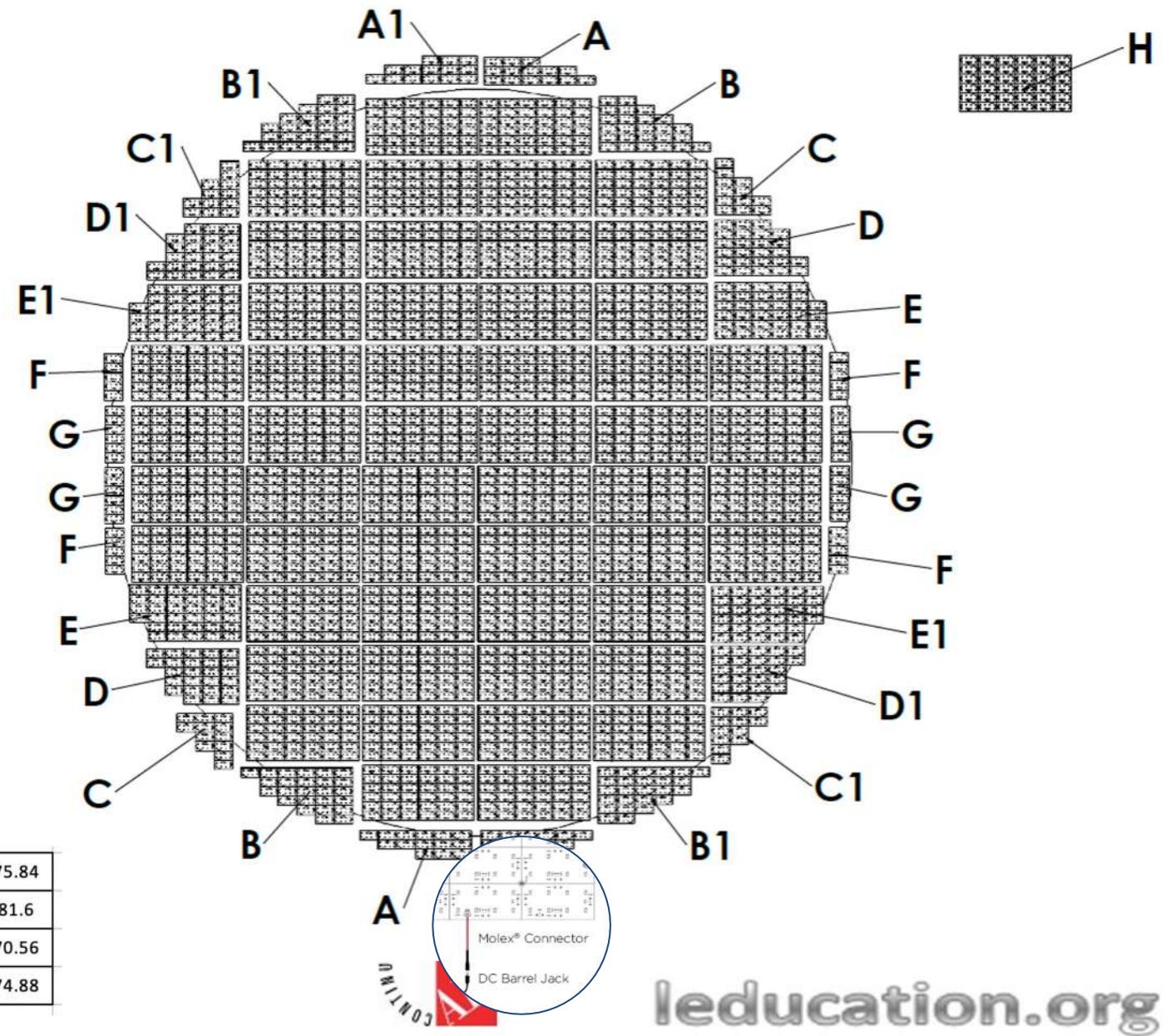
80 sheets total

- 28 precut
- 52 full sheets (1'x2')

Power Consumption per sheet

			6.72	6.72			
		12	17.28	17.28	12		
	5.76	17.28	17.28	17.28	17.28	5.76	
	12	17.28	17.28	17.28	17.28	12	
	16.32	17.28	17.28	17.28	17.28	16.32	
2.4	17.28	17.28	17.28	17.28	17.28	17.28	2.4
2.88	17.28	17.28	17.28	17.28	17.28	17.28	2.88
2.88	17.28	17.28	17.28	17.28	17.28	17.28	2.88
2.4	17.28	17.28	17.28	17.28	17.28	17.28	2.4
	16.32	17.28	17.28	17.28	17.28	16.32	
	12	17.28	17.28	17.28	17.28	12	
	5.76	17.28	17.28	17.28	17.28	5.76	
		12	17.28	17.28	12		
			6.72	6.72			

		75.84
		81.6
		70.56
		74.88





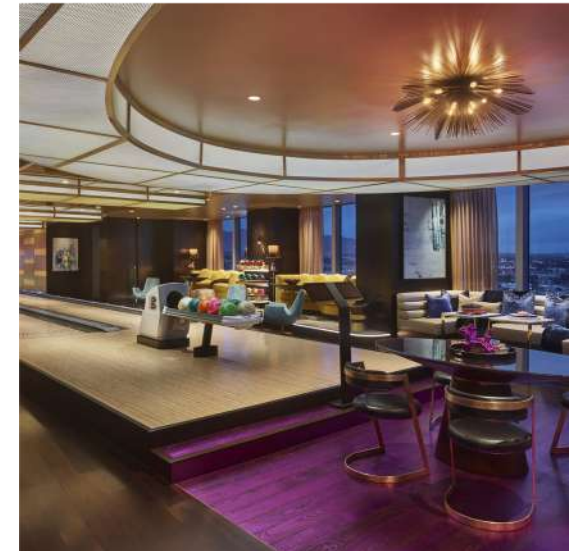
Glamorous Oversize Oval Ceiling

PALMS[®]
CASINO/RESORT/SPA

Lighting Designer: KGM Architectural Lighting



leducation.org



PROJECT OVERVIEW



Best Product Fit -
FLEXIBLE LED SHEETS



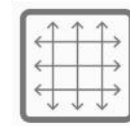
Scope

Create a **glamorous, luxurious and entertaining suite** for guests to indulge and enjoy themselves.

Challenges



Oversize Oval
Shape



Even
Illumination



Fitting into the
Existing Design



Streamlined
Coordination

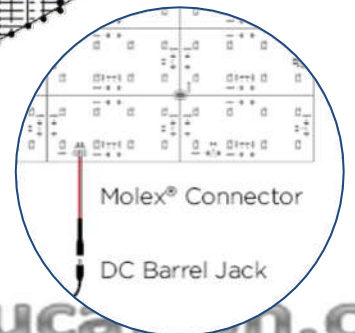
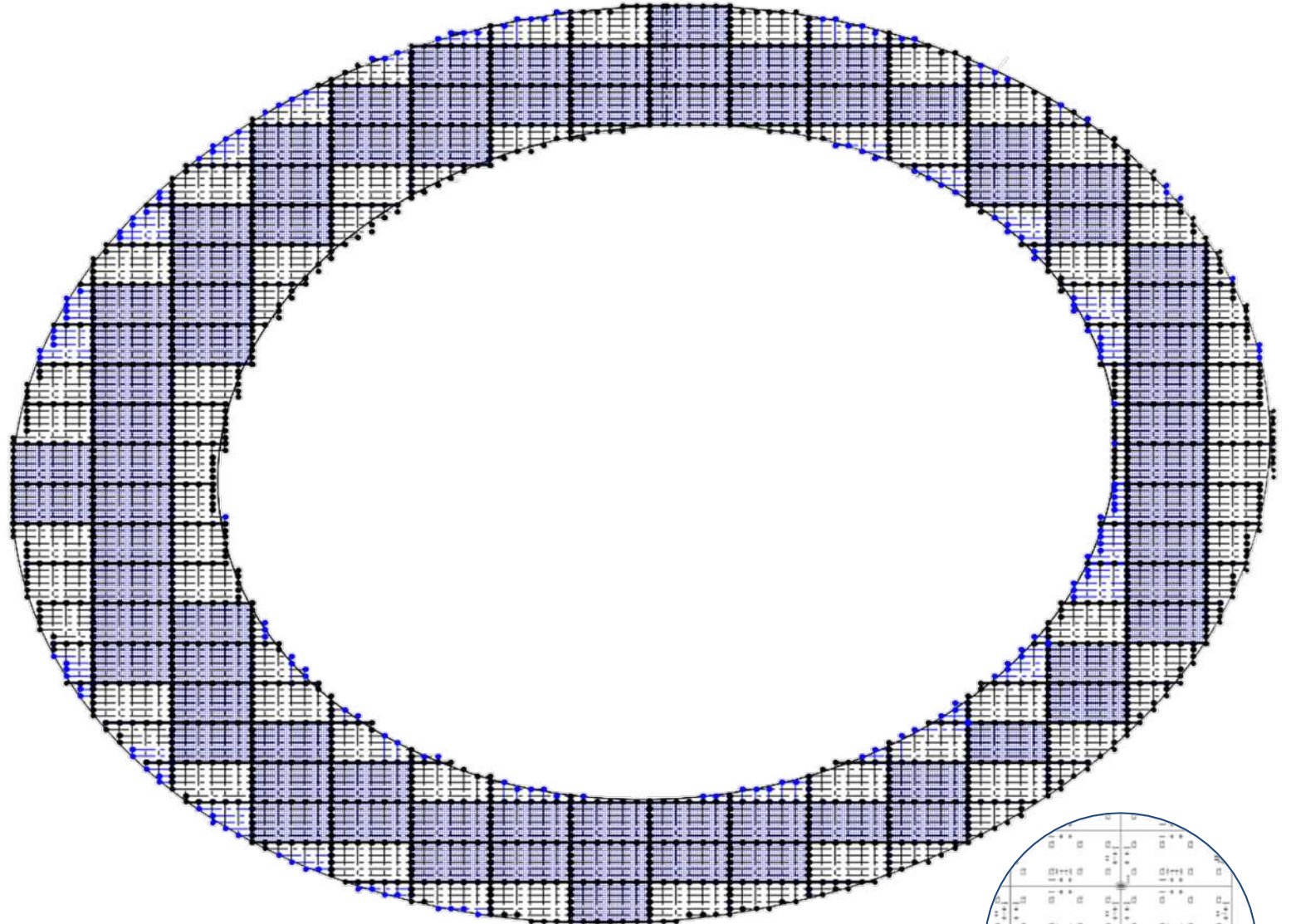


Project
Management

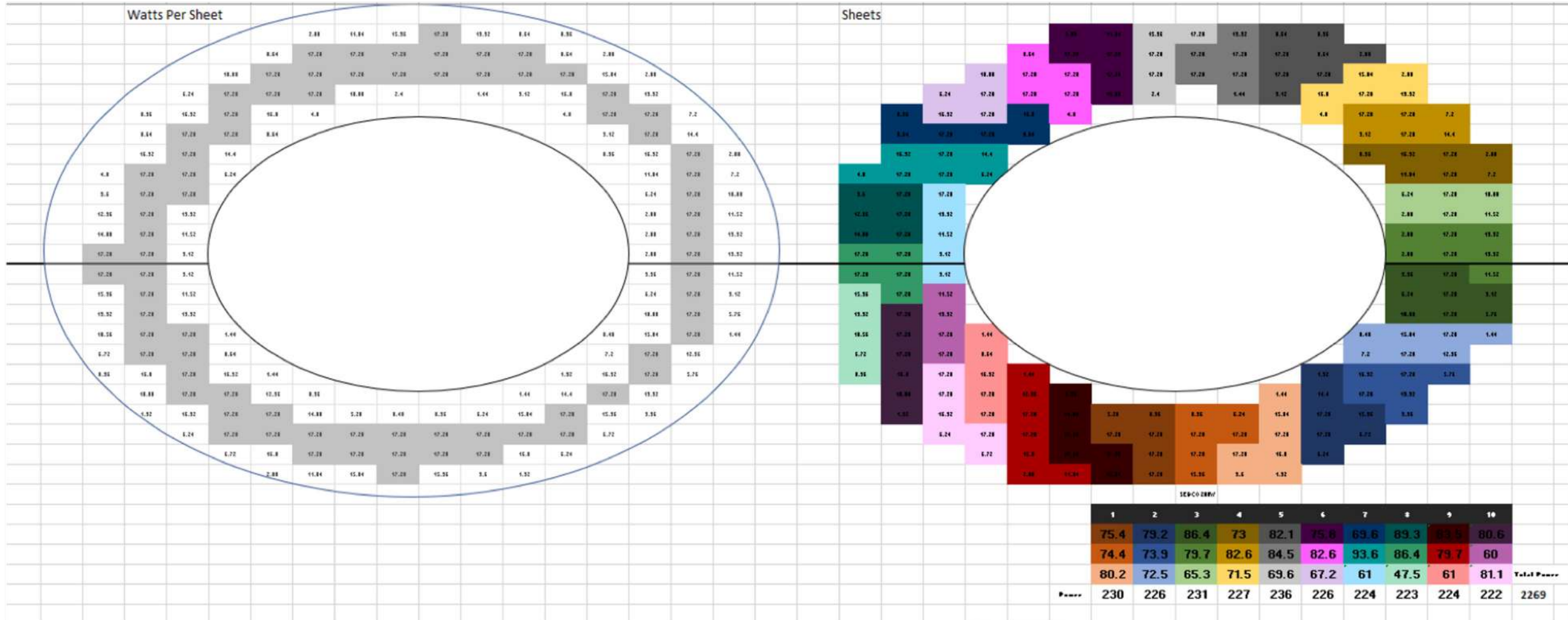


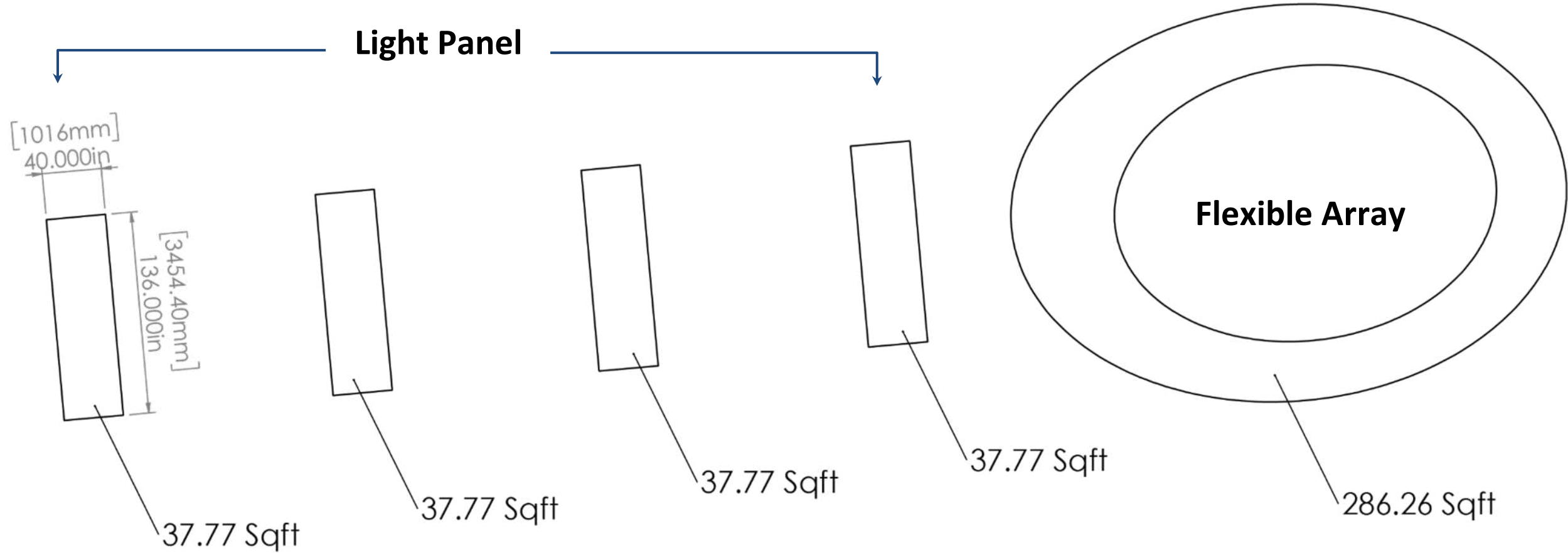
Custom Cut & Prelabeled

- 167 full sheets & precut pieces
- 10 Power Supplies



Strategic zoning of sheets & pieces: 1 color grouping = 1 power supply







CASE STUDY

Large Area Backlighting

CATALINA ISLAND CONSERVANCY

National Wildlife Exhibit | Catalina Island, CA

Architect: Krister Olmon, Inc.

PROJECT OVERVIEW



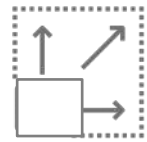
Best Product Fit -
LED LATTICE



Scope

Provide an economical, bright, and easy to install backlighting solution for a 31.5ft x 10.5ft map of Catalina Island and two clear etched acrylic wayfinding panels.

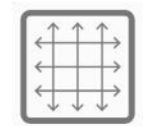
Challenge



Large Scale



Bright
Illumination



Even
Illumination



Streamlined
Coordination



Project
Management





Catalina Island Conservancy



Lattice mounted with screws at the top, middle, and base of the wall.

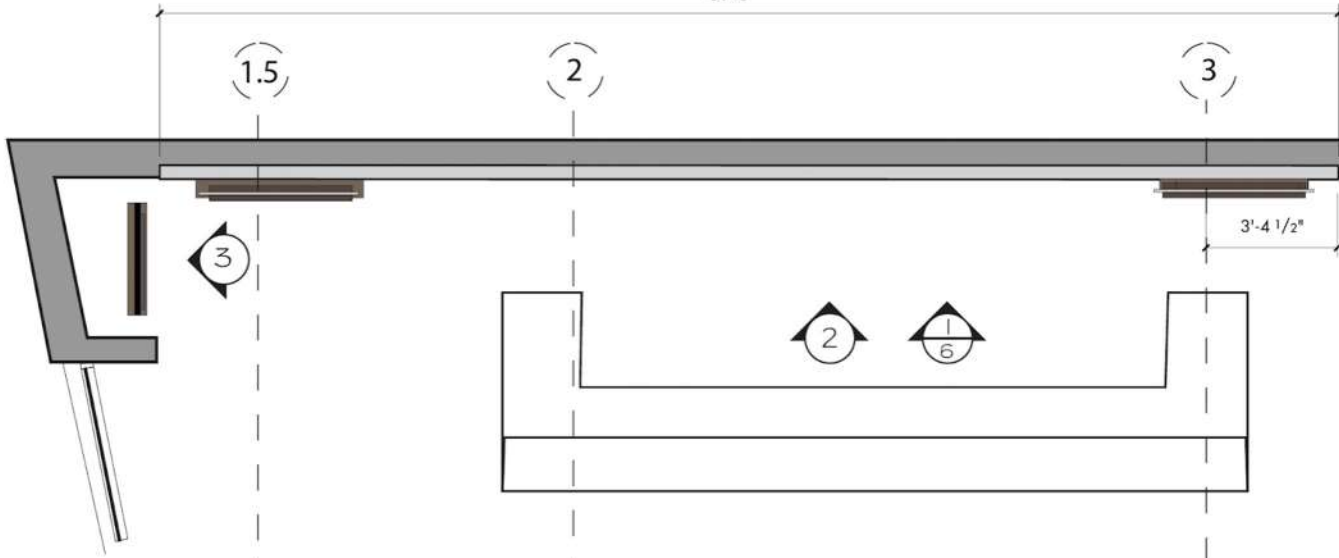


31'-6"

1.5

2

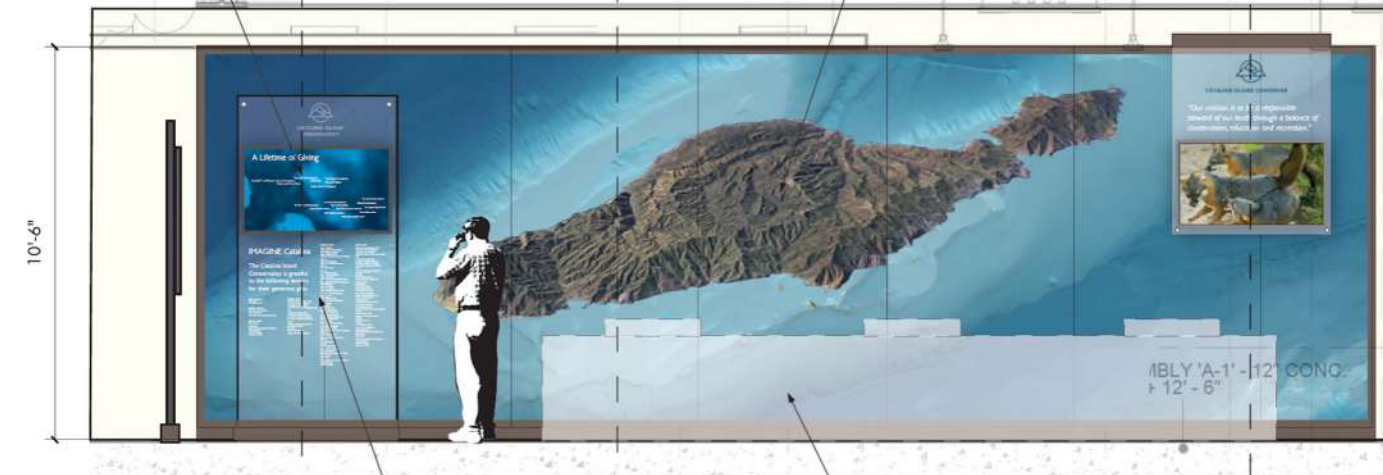
3



① EX 00: ATTRACT WALL PLAN
SCALE: 1/4"=1'-0"

LIFETIME GIVING MONITOR IN FRONT OF FROSTED GLASS
DESHOW IMAGERY SCROLLING NAMES

BACK-LIT ATTRACT WALL
1/2" GLASS WITH 5" DEEP CASE
LED LIGHTING

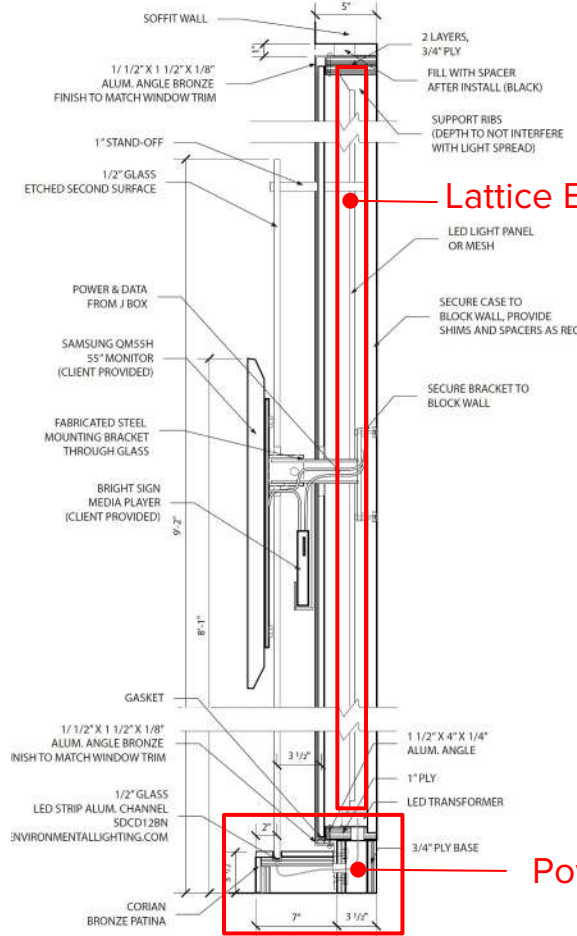


10'-6"

CAPITAL CAMPAIGN
ETCHED, EDGE LIT GLASS

DESK (N.I.C.)

5" Airgap



Lattice Backlight

Power Supply Location

Wide airgap & complex wire management for 41 power supplies



leducation.org



ACOUSTIC BACKLIT CEILINGS



CIRCADIAN COMMERCIAL BACKLIGHTING IS A VIABLE OPTION!



OFFICE LIGHTING



RESIDENTIAL



04

LEARNING OBJECTIVE

Get an overview of the necessary steps to consider when specifying backlighting design













SPECIFICATION EXAMPLE

CLASSIC Dry & Damp Location Series

ULTRA SLIM & CUSTOMIZABLE

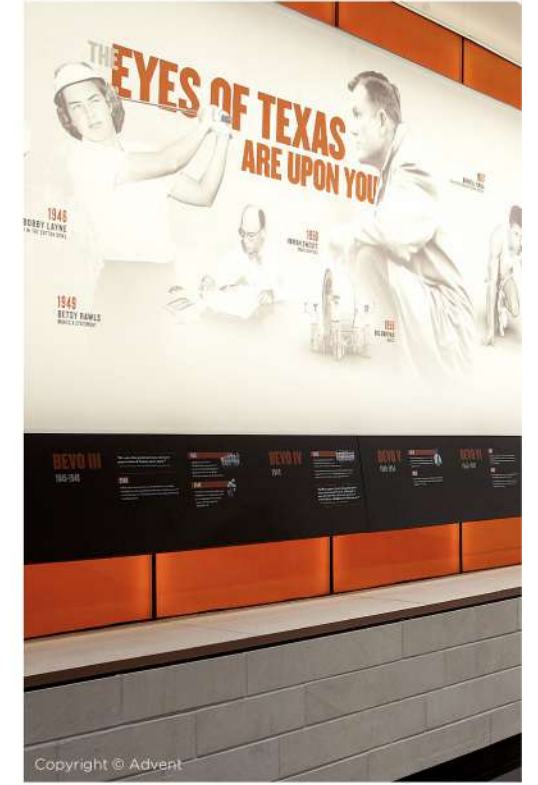
Slim in profile and providing bright and even illumination, frameless LED lighting products are a revolutionary edge-lit light panel technology designed for highly customized and embedded lighting applications, including accent lighting. Perfect for illuminating compact and narrow spaces, this light panel maintains an unassuming slim profile, measuring only 1/4"-3/8" thick. Panels utilize laser-etched dot-pattern technology, allowing face material to be positioned on top with little to no gap while maintaining even illumination.

KEY FEATURES

 STRONG COLOR RENDERING	 OUTSTANDING BRIGHTNESS	 FRAMELESS DESIGN	 EVEN LIGHTING NO DARK SPOTS
 CUSTOM & IRREGULAR SHAPES	 MULTI-PANEL ILLUMINATION BY TILING	 DAMP LOCATION AVAILABLE	 SLIM & THIN DESIGN
 CUSTOM SIZES	 CUSTOM COLOR TEMPS	 ILLUMINATED CEILINGS & WALLS	 ILLUMINATED SHELVES & FIXTURES

ASSURED QUALITY

 E477011	 100% QC	 LIMITED WARRANTY		 E341676
--	--	---	---	--



Backlit wall illumination featuring LED light panels.

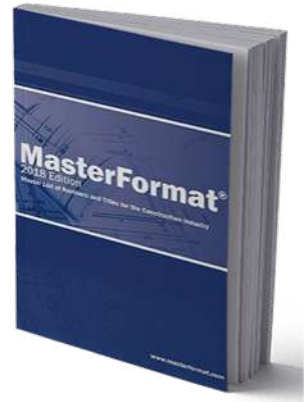
Manufacturer's specification will cover the following topics:

- Structural
- Electrical
- Photometric
- Standard product options
- Mounting and installation

SPECIFYING BACKLIGHTING

CSI DIVISION
26 50 00 Lighting
26 51 00 Interior Lighting
26 55 22 LED Lighting

*Construction Specification
Institute's Master Format*



Part 1 General
1.1 RELATED DOCUMENTS
1.2 SUMMARY
1.3 SUBMITTALS
1.4 QUALITY ASSURANCE
1.5 DELIVERY, STORAGE, AND HANDLING
1.6 PROJECT CONDITIONS
1.7 WARRANTY

Part 2 Products
2.1 MANUFACTURER
2.2 MATERIALS
2.3 MISCELLANEOUS MATERIALS

Part 3 Execution
3.1 EXAMINATION
3.2 INSTALLATION
3.3 CLEANING AND PROTECTION

SPECIFYING BACKLIGHTING



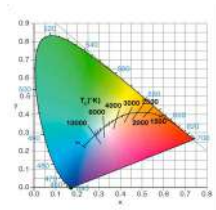
CRITERIA FOR QUALITY OF LEDS

REGULATIONS

IES FILE



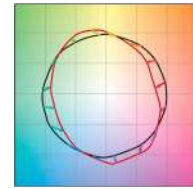
CCT
(Correlated Color
Temperature)



CRI



TM-30-15



UL/ cUL / RU / CSA



WARRANTY



LUMEN OUTPUT



BEAM
ANGLE



LM 80



Title 24



ELECTRICAL DATA PARAMETERS

VOLTAGE



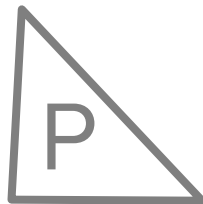
POWER



CONTROL
SYSTEM



POWER FACTOR



ENVIRONMENTAL PARAMETERS

AMBIENT
TEMPERATURE



IP RATING**



PREPARE FOR A RISK-FREE BACKLIGHTING PROJECT

Here is a quick overview of what to plan for to avoid common mistakes.

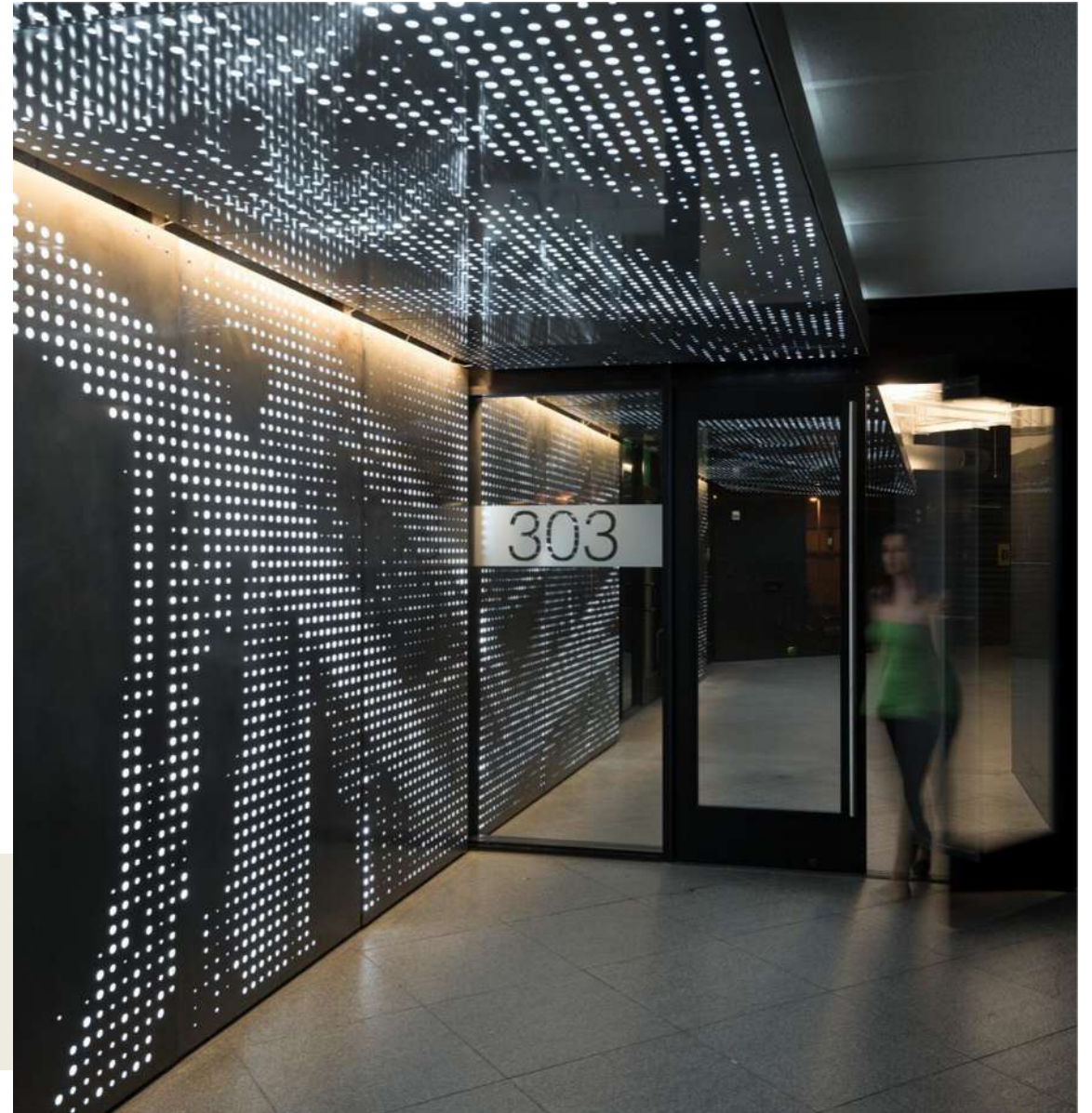
- Allow sufficient planning time
- Work with a **Lighting Designer** with custom lighting experiences
- Partner with **Manufacturers** early in design
- Prepare a stringent & thorough CSI specification
- Maintain transparency in communication & documentation
- Plan the **Mock-Up** Cost
 - Proof-of-concept Sample Mock-Up
 - Production Full-size Mock-Up
- Choose Products with Conditions in Mind
 - Mounting Options
 - Surface Material
 - **Air Gap**
- Respond to RFI promptly
- LED Quality
 - CCT
 - CRI
 - Warranty
 - Efficacy
 - Location of **LED Spots**
- Electrical Requirement
 - Voltage
 - Wattage Constraint
- Environmental Requirement
 - Ambient Temperature
 - IP Rating



CONCLUSION

With proper design details, specification, planning, and partners, the art & science of backlighting can be done well!

Who you work with matters!



This concludes The American Institute of Architects Continuing
Education Systems Course

