

2019 International Radiance Workshop // NYC August 21-23

DEMANDS OF THE RADIANCE POWER IN A NON-ORTHOGONAL WORLD

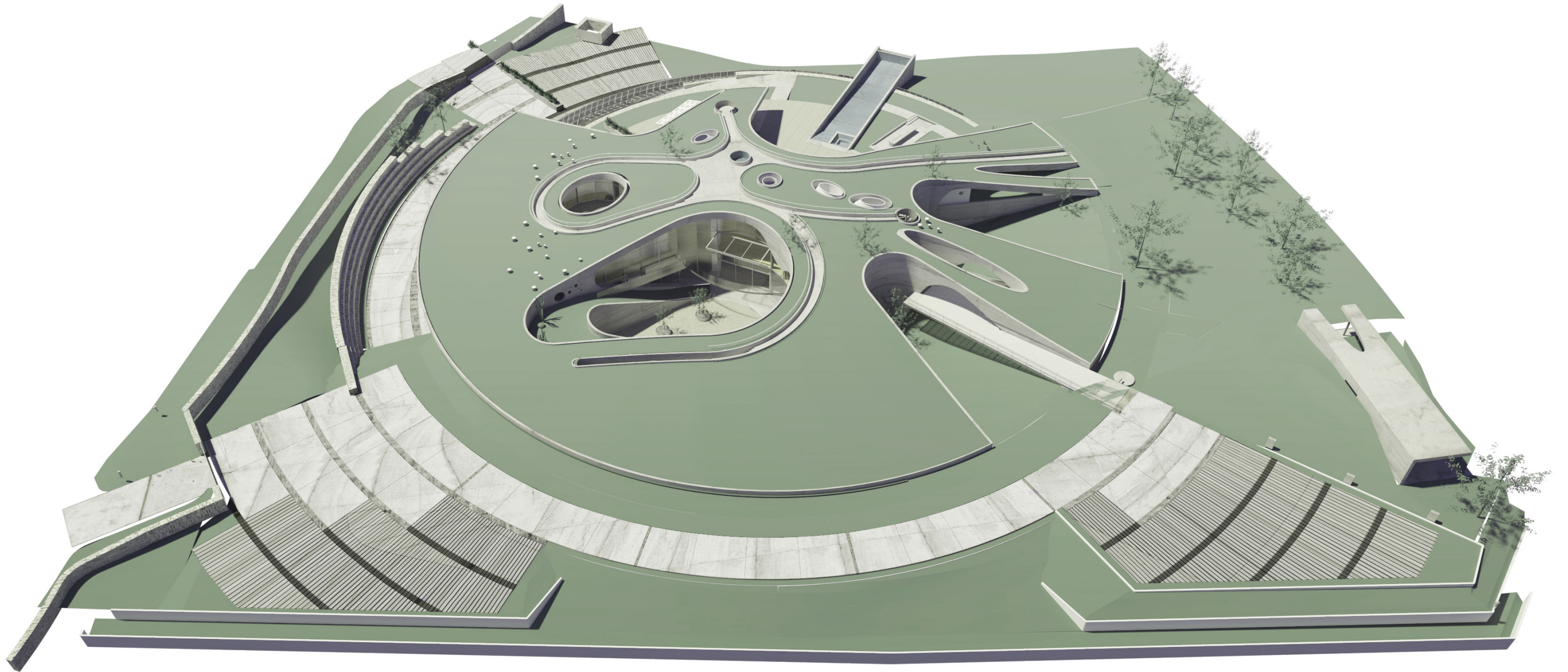
Eduardo Pintos

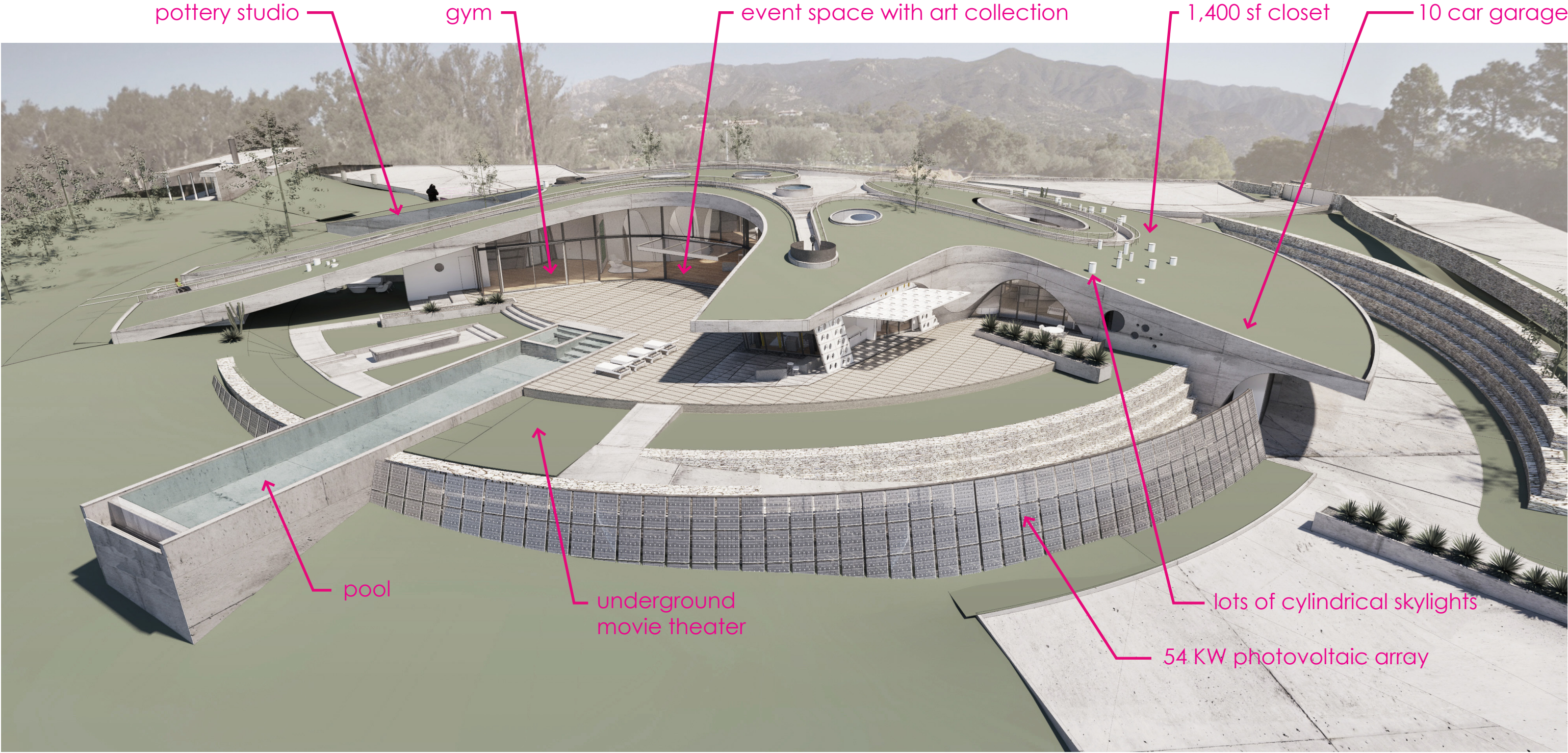
Project Team: George Loisos, Alan deMarche, Ibone Santiago, Abe Shameson

LOISOS + UBBELOHDE

ARCHITECTURE . ENERGY . LIGHT

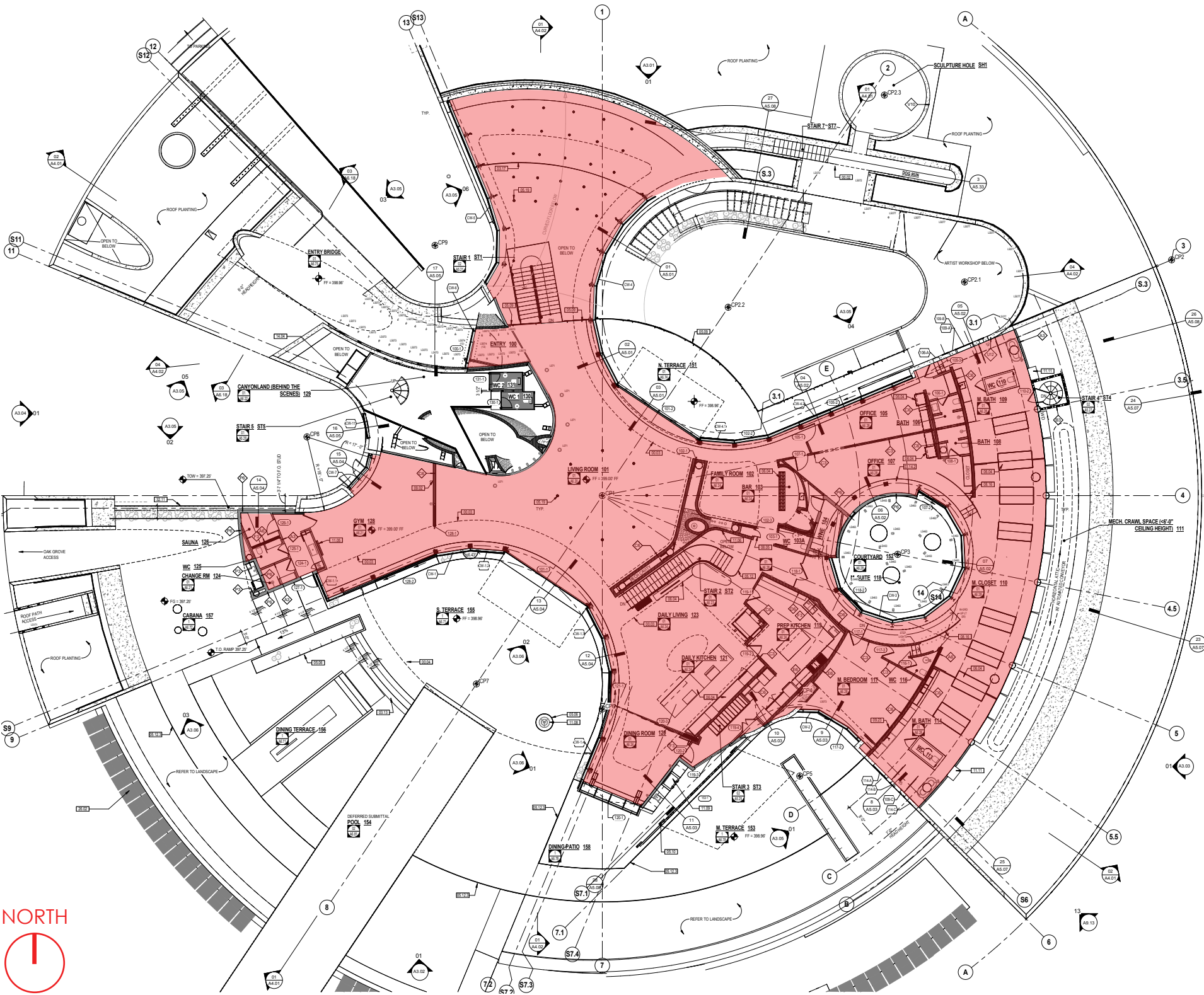
.....yes, this is a house, not a flying saucer.



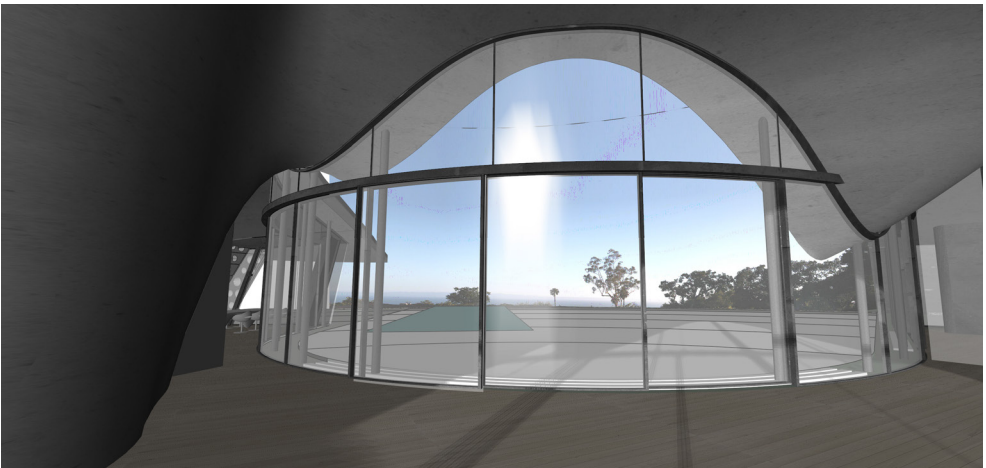
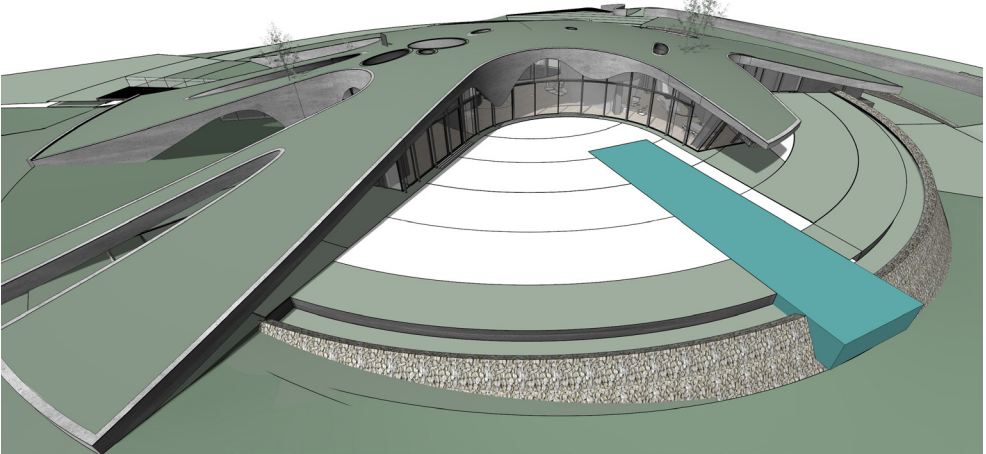
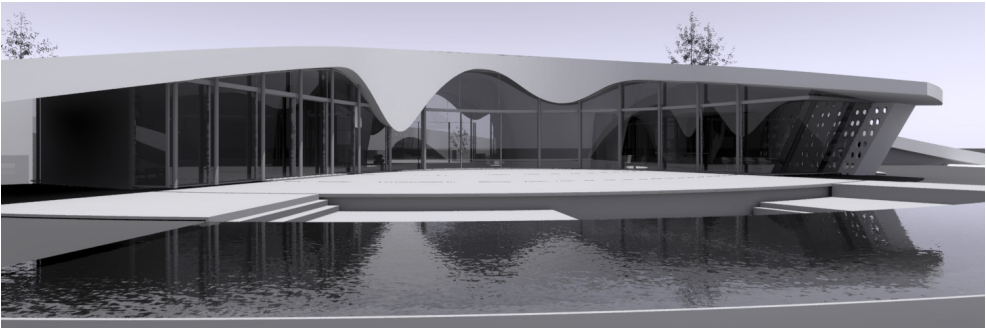
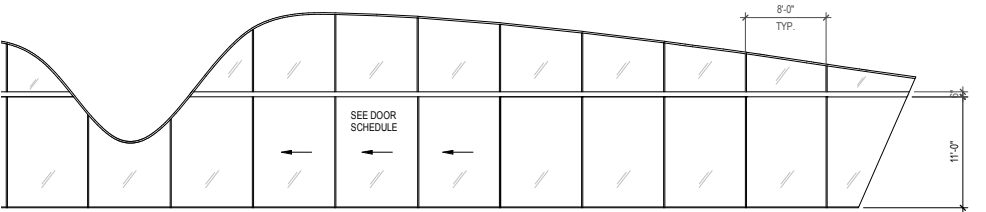


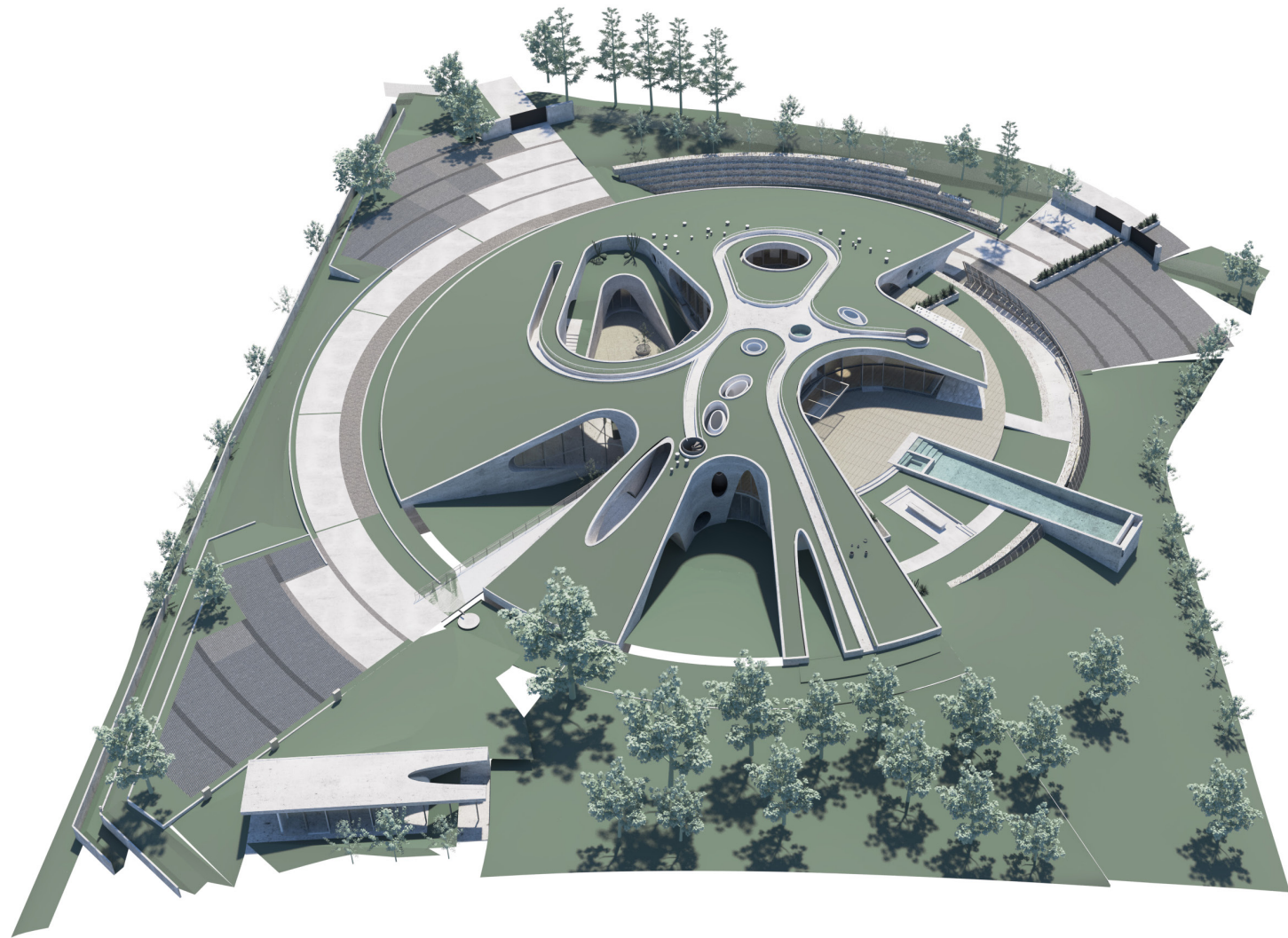
Aerial view rendering with site context

Main Level Plan



WWR: ~ 50%





VS.



Just to name a few challenges:

- curved vertical glass facades facing southeast and southwest
- double curvature walls and ceilings
- daylight sensitive art collection
- large size round skylights with clear glass
- wide open site with no shading from context



SCHEMATIC DESIGN



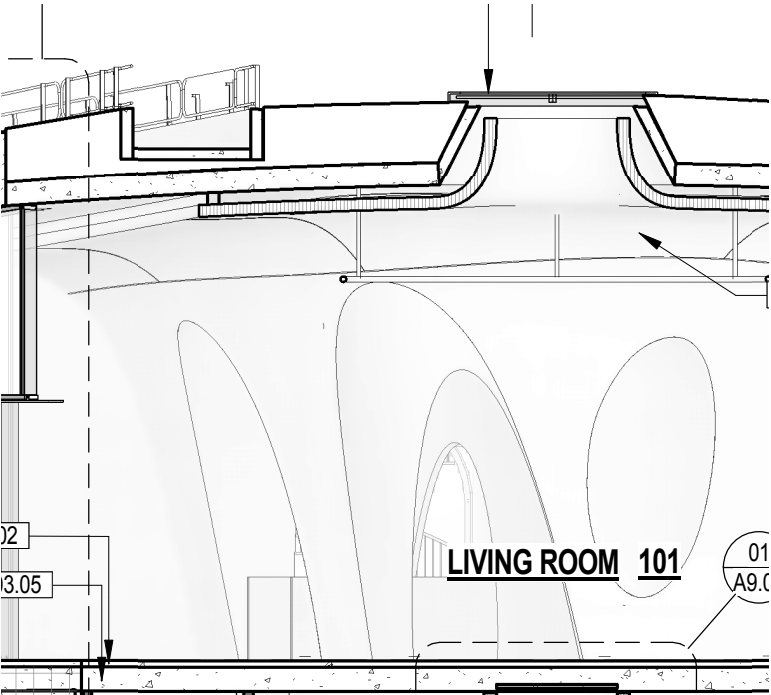
exterior rendering

DESIGN DEVELOPMENT

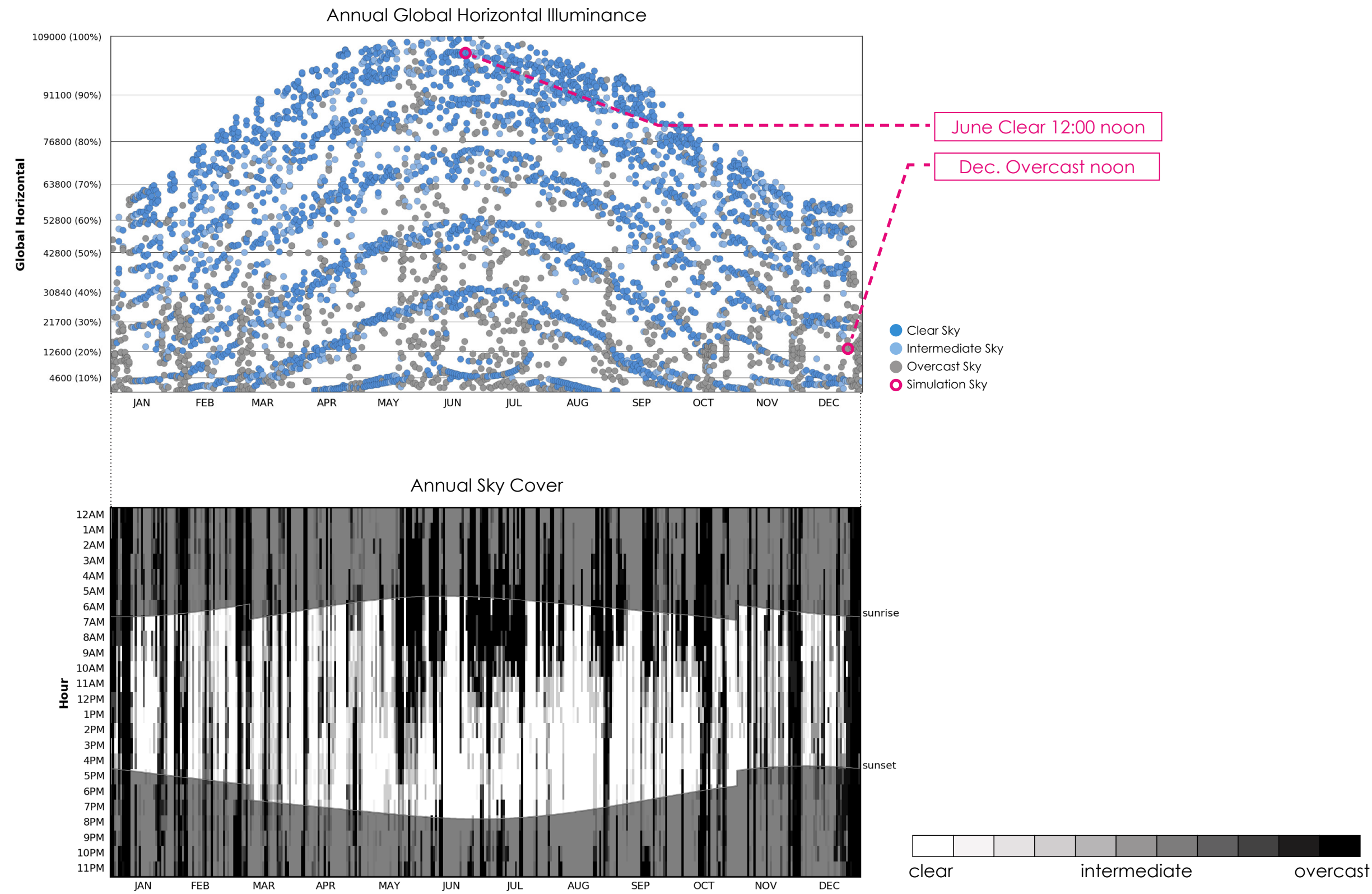


interior 180° rendering with finishes

CONSTRUCTION DOCUMENTS



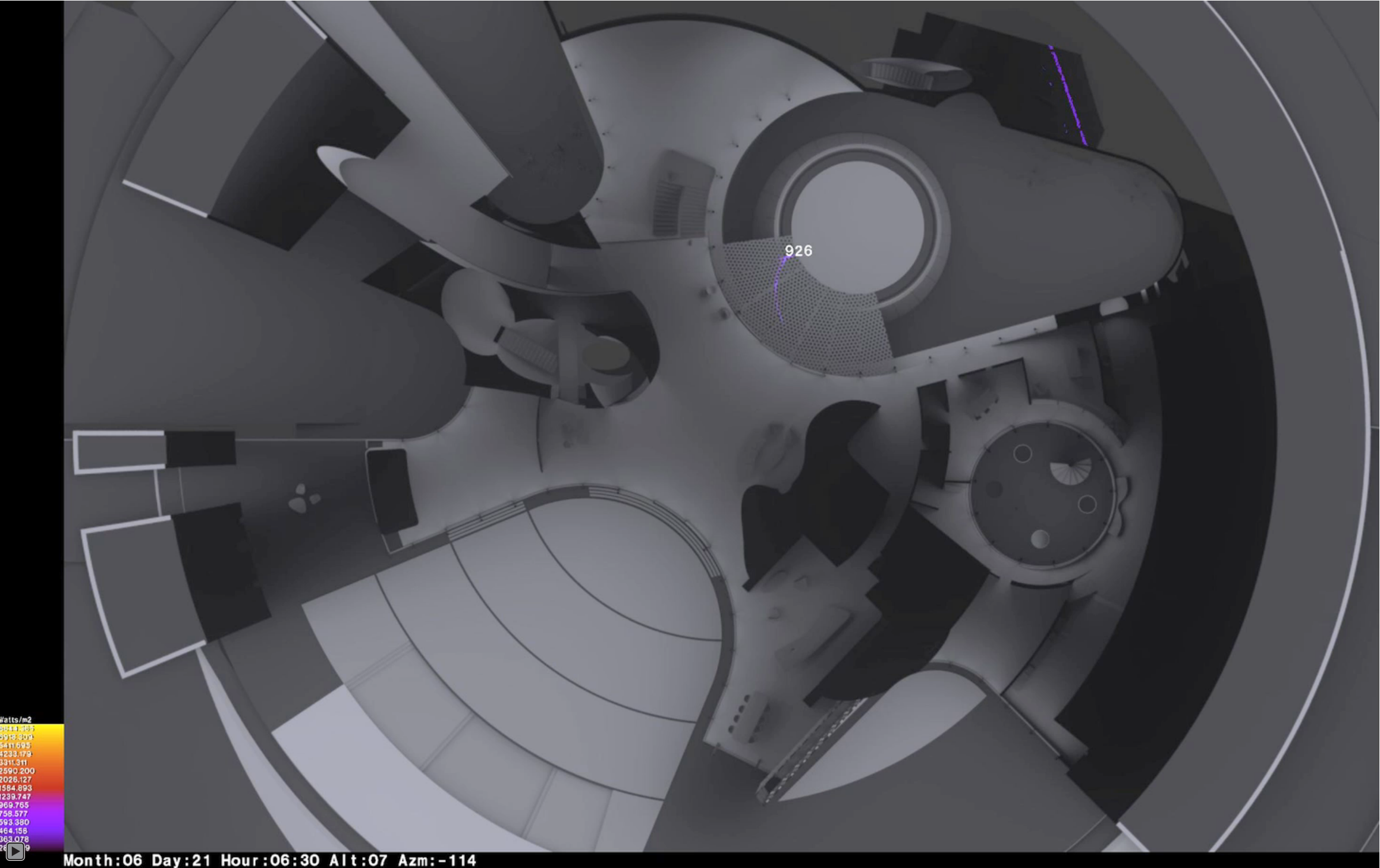
section drawing



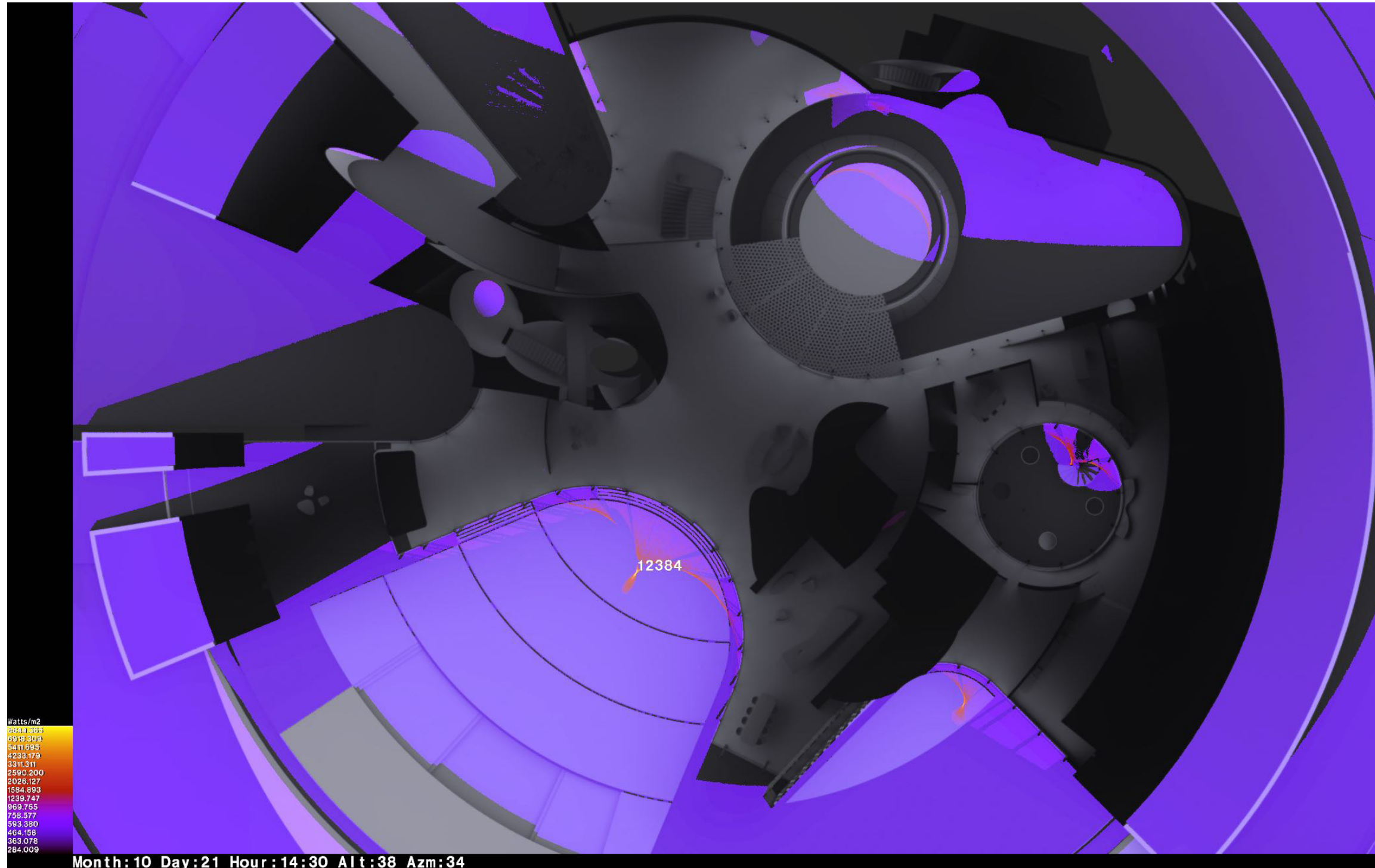




Solar Convergence Studies // animation



Solar Convergence Studies



“12,384 watts/m²” in a given horizontal spot of the outdoor patio.

Some references:

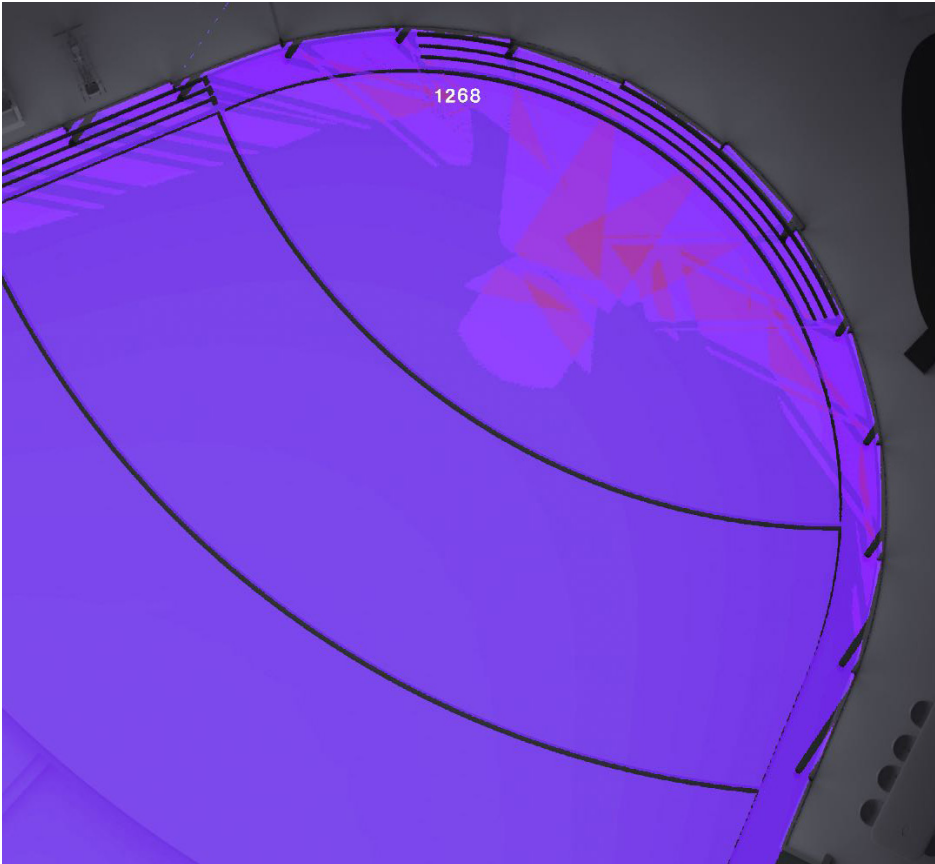
11,000w/m²: burst into flames

1,000 w/m²: clear sky_desert

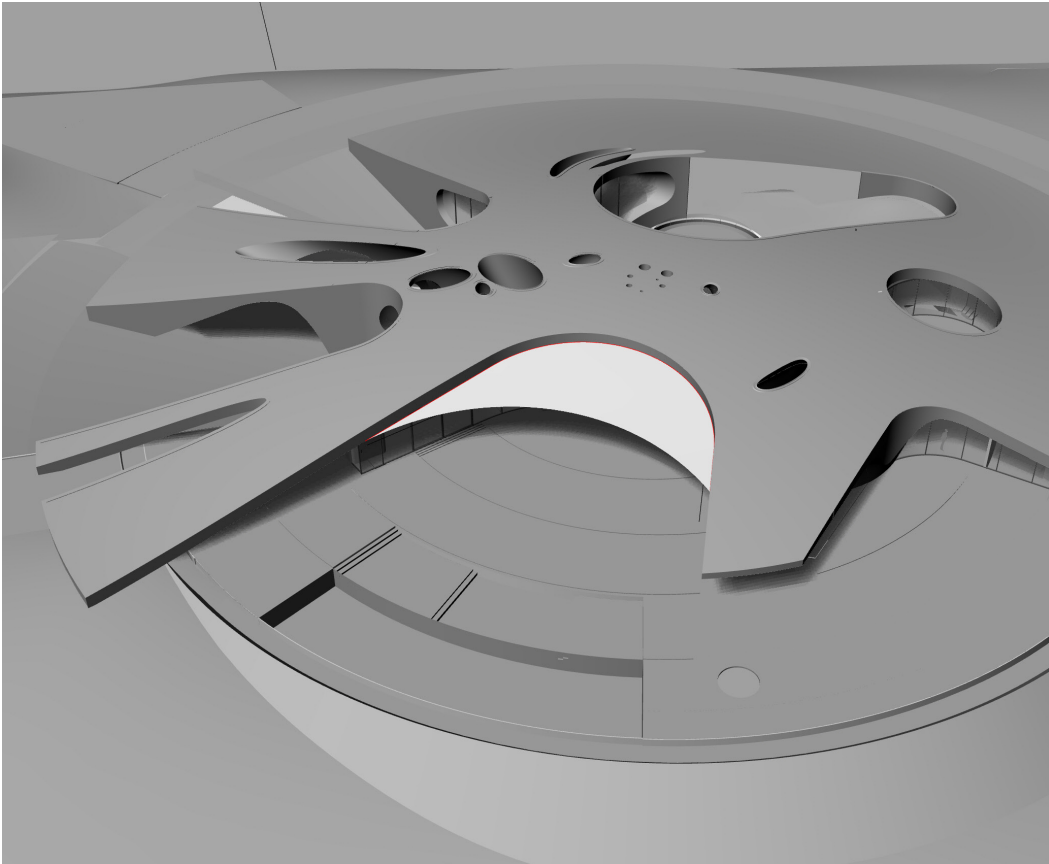
750 w/m²: clear sky_urban



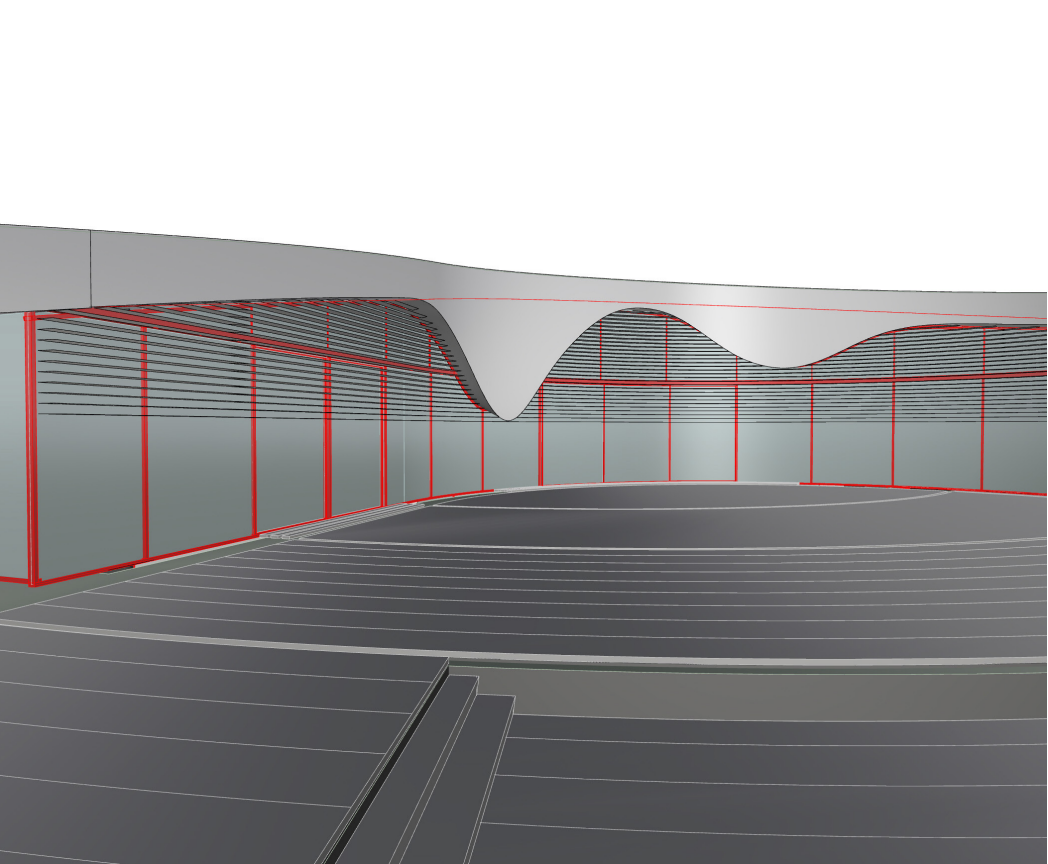
Proposed Solutions



Flat glass in segmented curve



Glass shading alternative 1

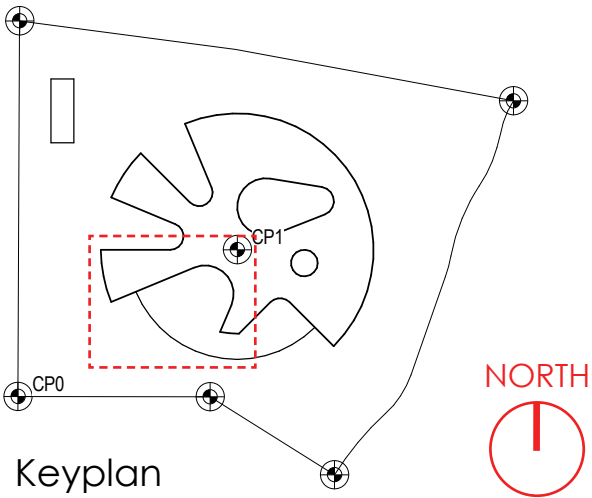


Glass shading alternative 2

Peak reduction:
From 12,384 to 1,268 watts/m2

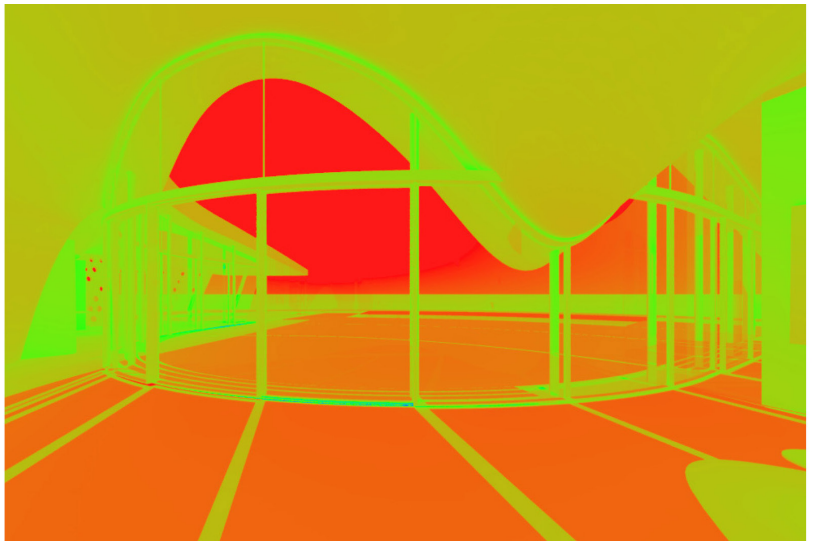
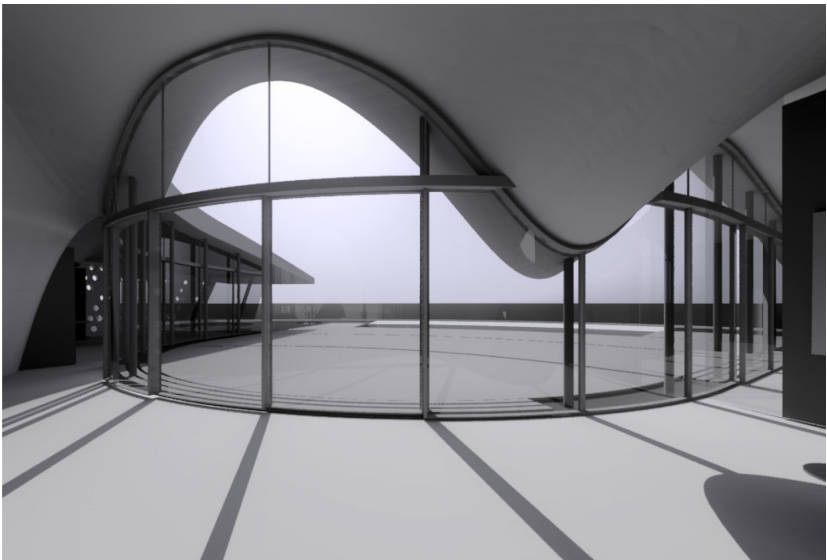
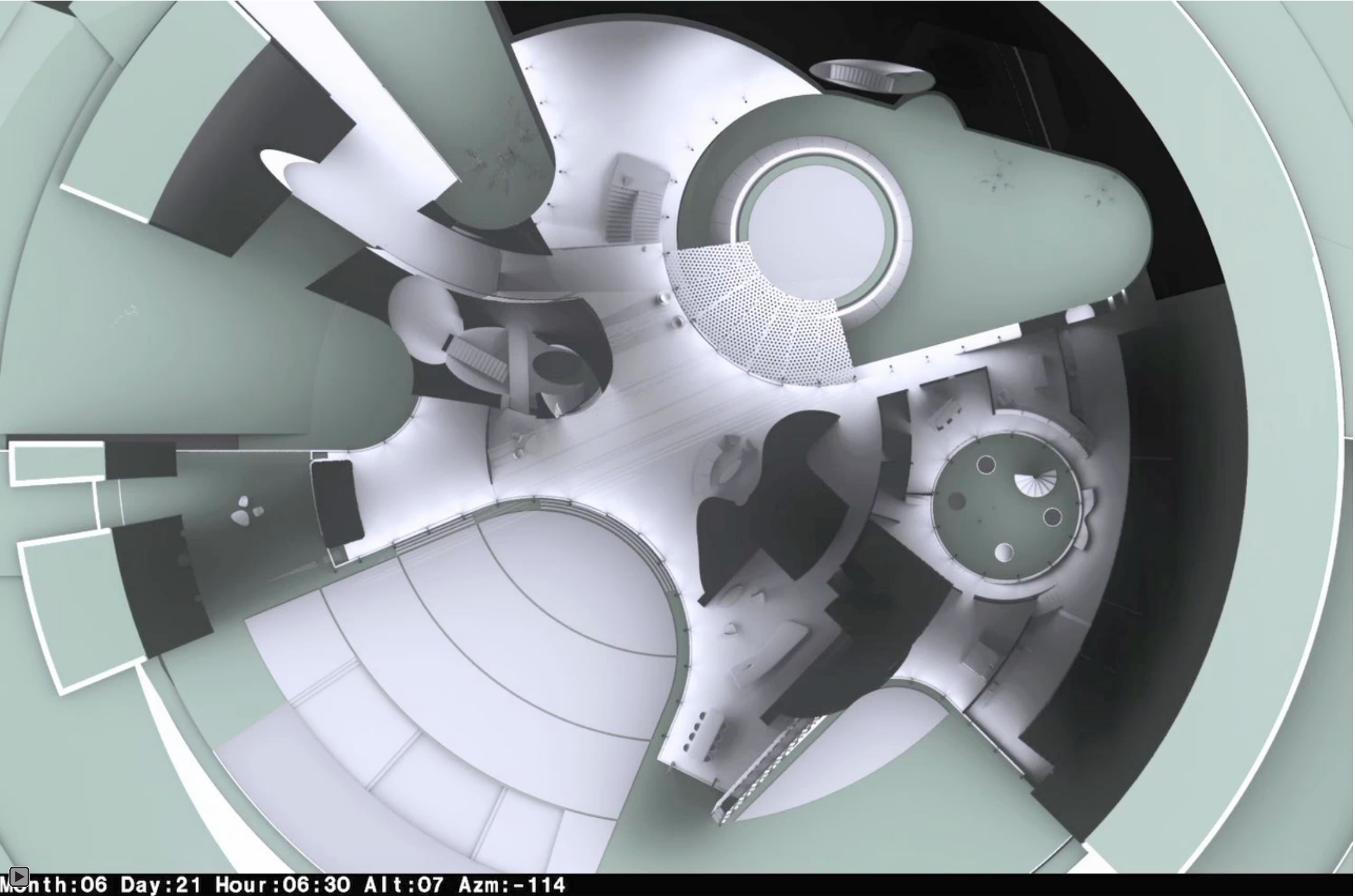
Glass Specifications: SunGuard SNX 60/28

Visible light				Solar energy			Solar factor (g) EN 410 [%]	U-value (EN 673)	
Trans-mission [%]	Reflection outside [%]	Reflection inside [%]	Colour rendering index	Direct trans-mission [%]	Reflection outside [%]	Absorp. [%]		Air* Krypton 90%** [W/m²K]	Argon 90% [W/m²K]
Double Glazing: 6-16-4, SunGuard® High Selective on #2									
60	12	14	93	26	40	34	28	1.3 *	1.0
Triple Glazing: 6-12-4-12-4, SunGuard® High Selective on #2 + ClimaGuard® Premium on #5									
53	14	17	92	22	41	37	26	0.5**	0.7





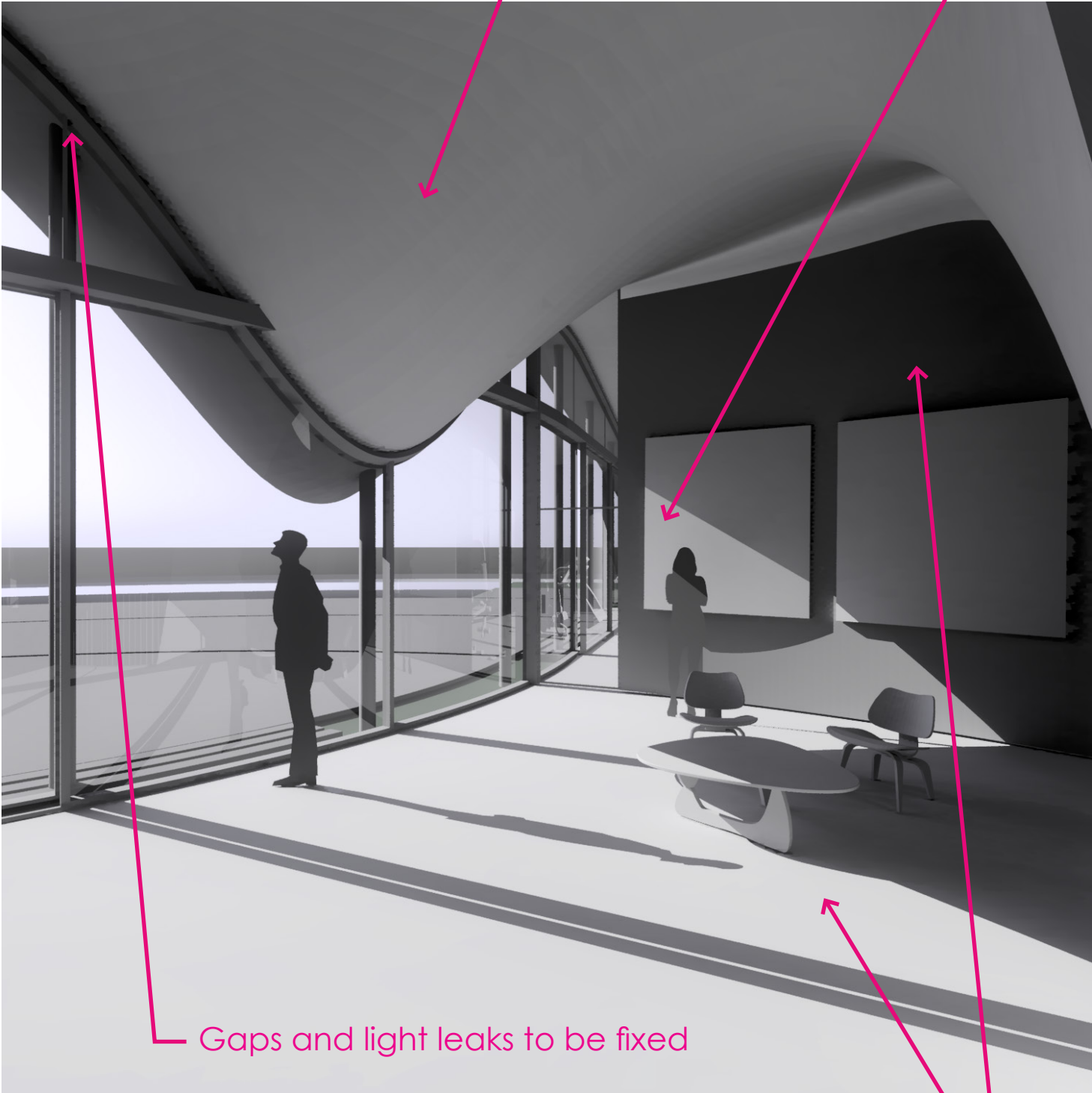
Direct Sun Penetration Animation



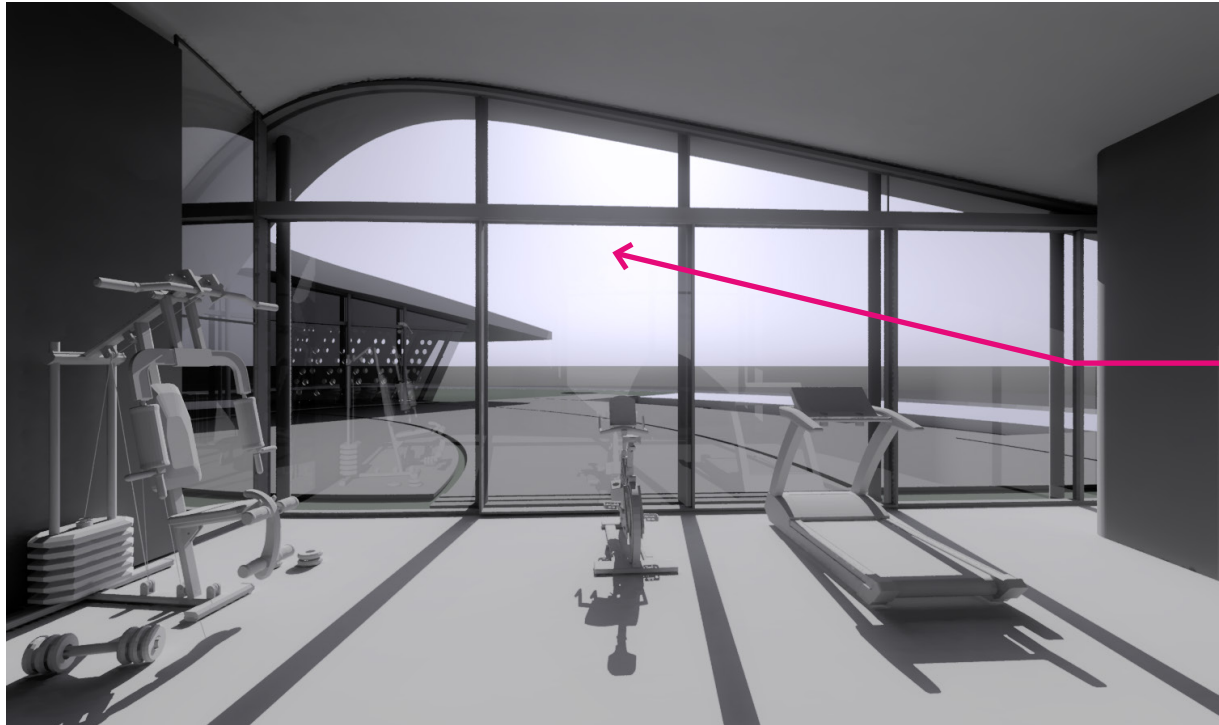
December 22nd, clear skies, 11:30am



Direct Sun Penetration

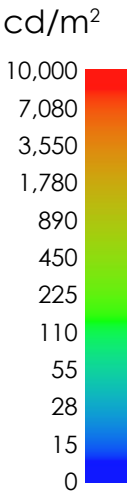
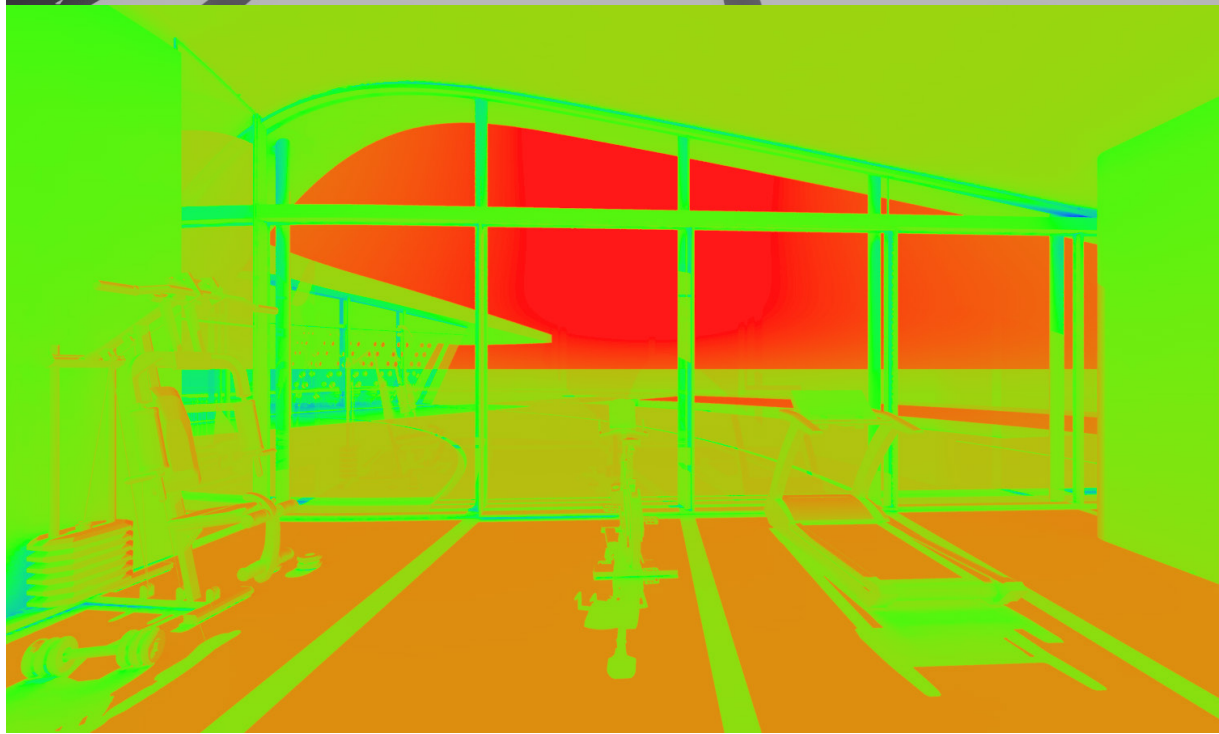


PROBLEM!
Direct sun on painting



December
Clear skies
12:00 noon

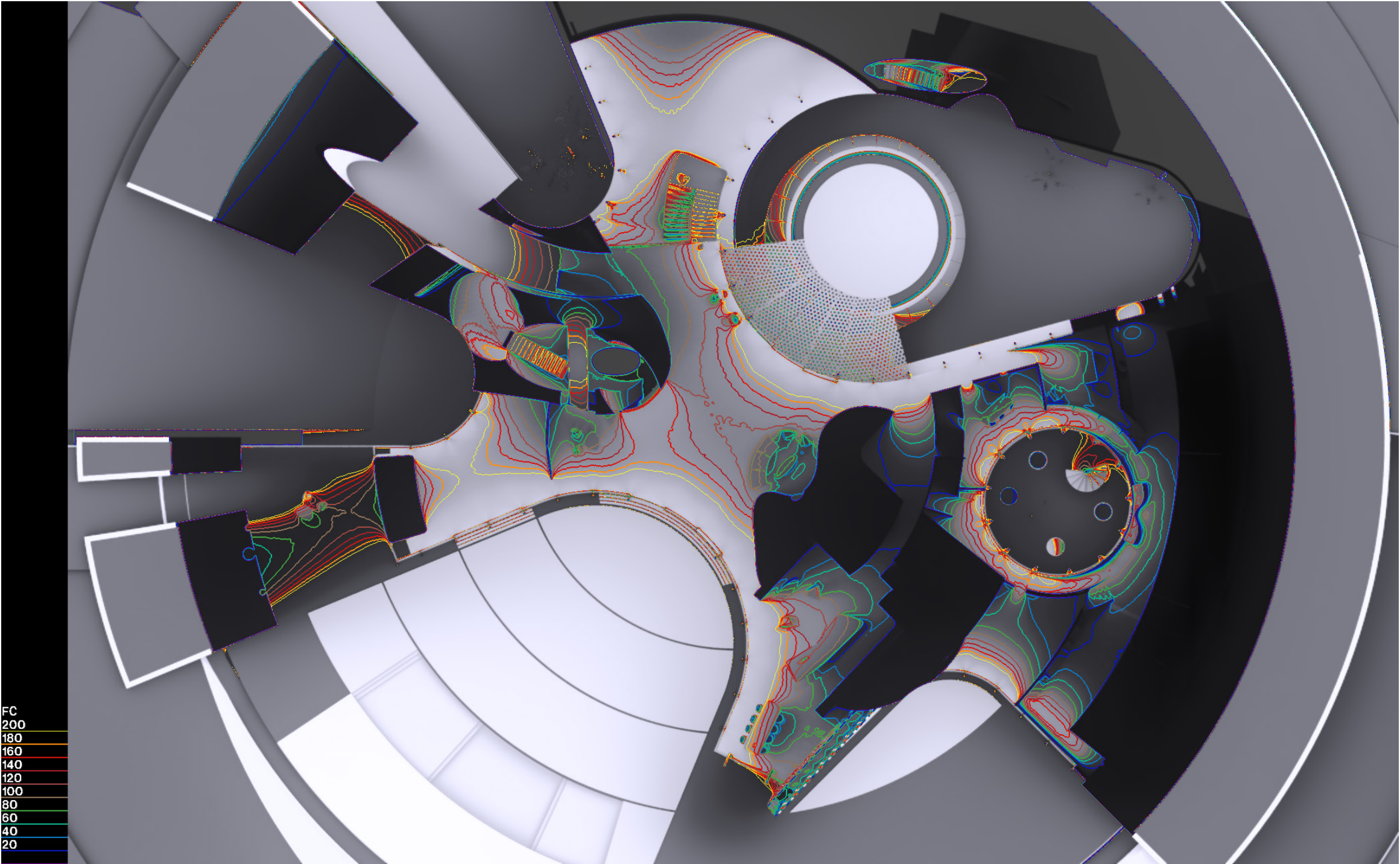
PROBLEM!
Getting blind
while using the
treadmill



Basic materials for early studies (final finishes still TBD)



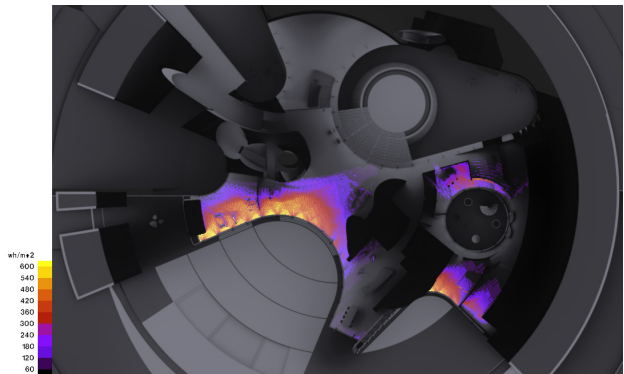
Daylight Availability



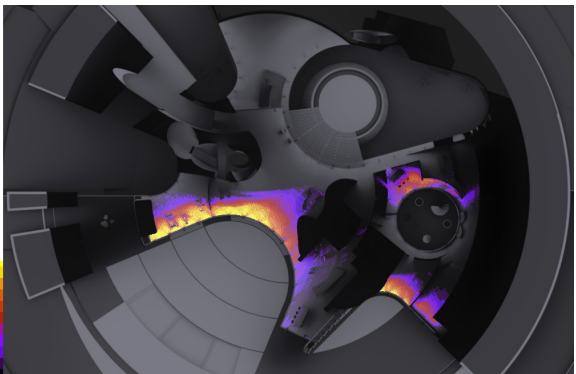




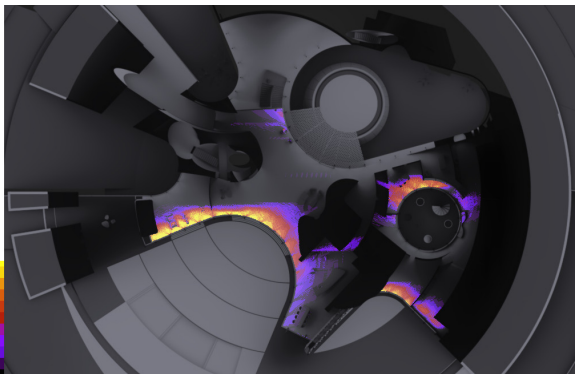
Monthly Summary // Cumulative Solar Radiation (over one day)



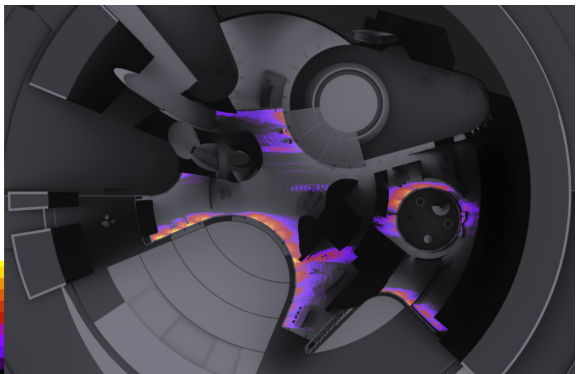
January 21st



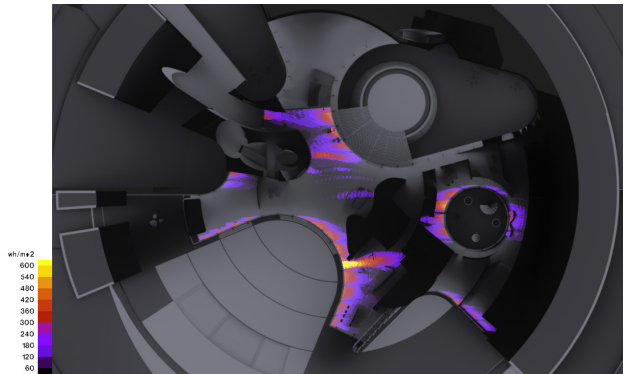
February 21st



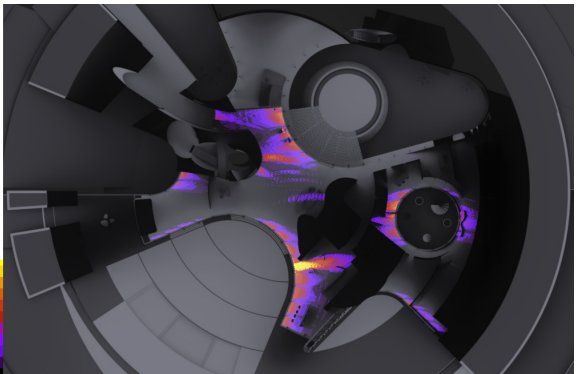
March 21st



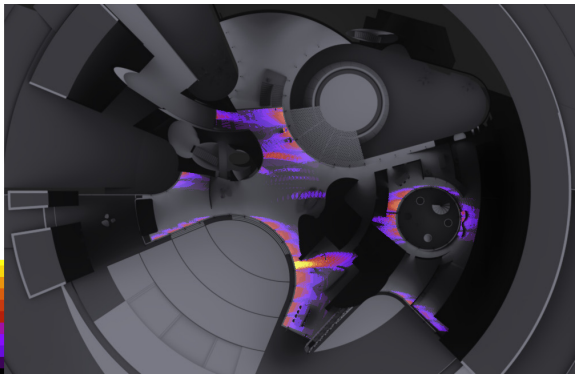
April 21st



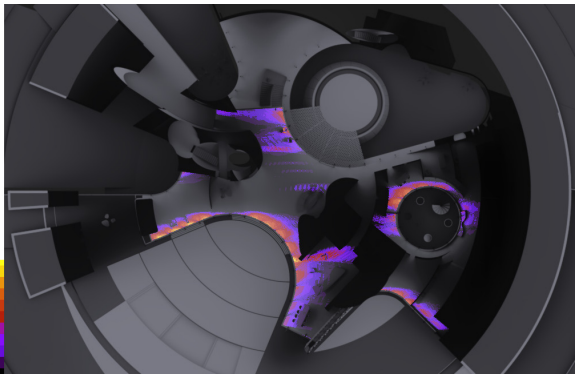
May 21st



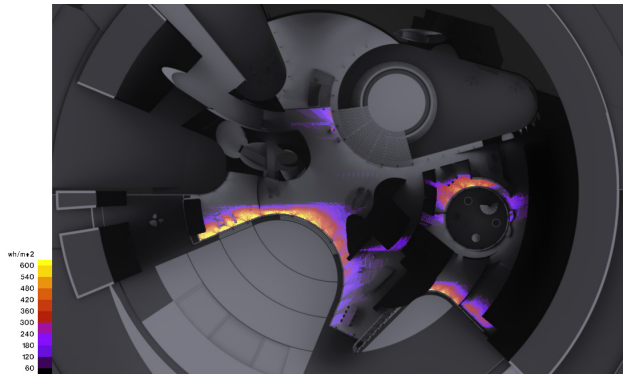
June 21st



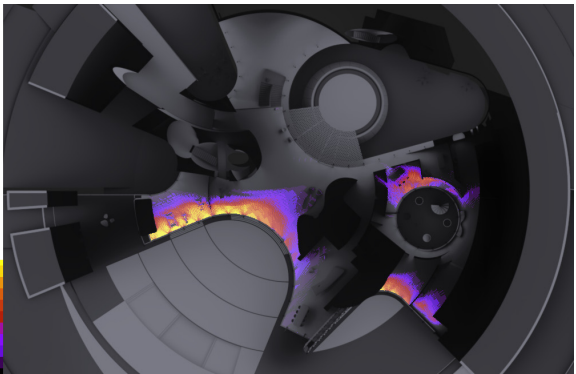
July 21st



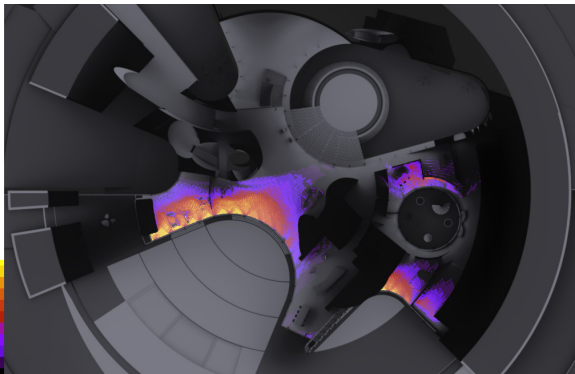
August 21st



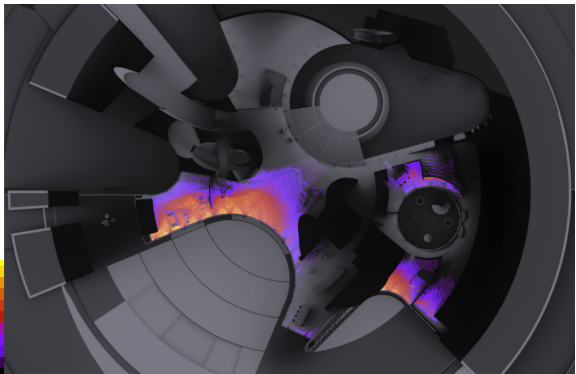
September 21st



October 21st



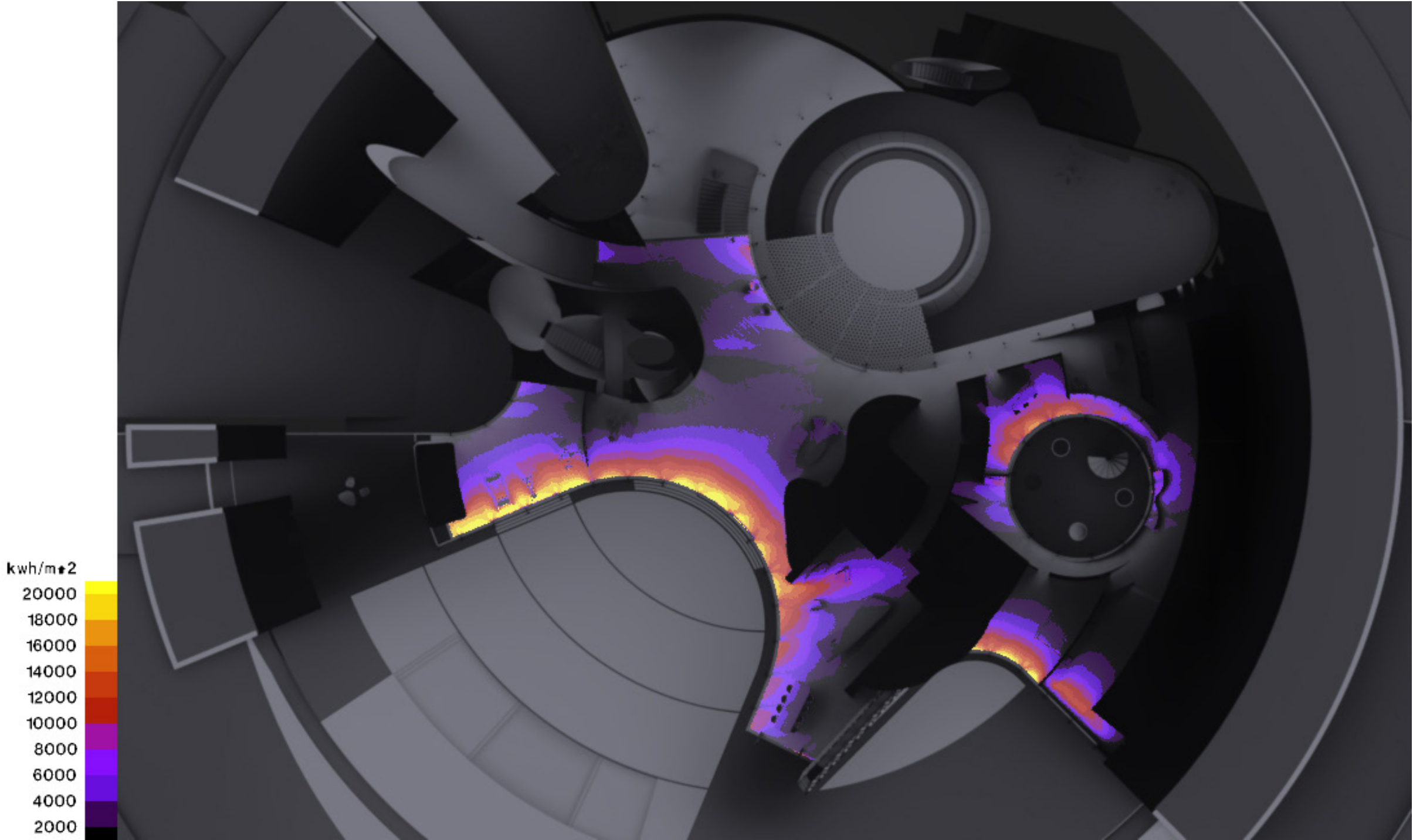
November 21st



December 21st



Cumulative Energy





Radiant System Zoning

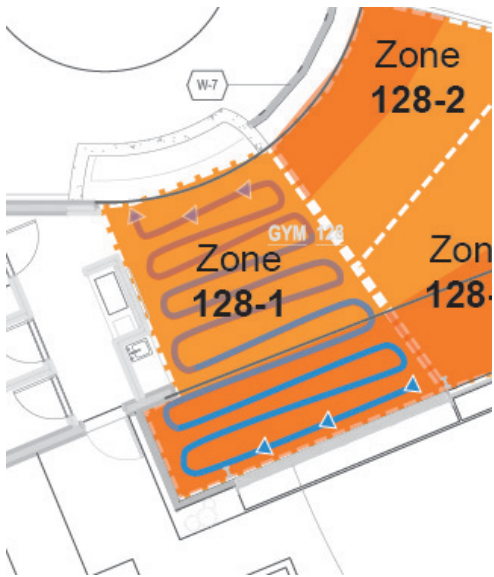
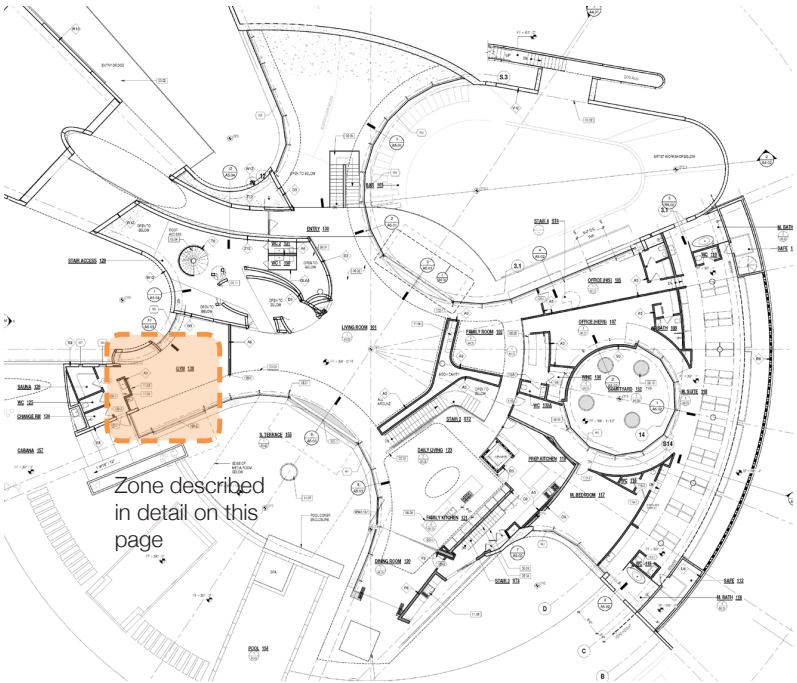


Diagram showing piping sequence through a typical zone (in this case, the gym) where the perimeter area, most likely to be affected by solar heat gain and heat loss, receives chilled water first.

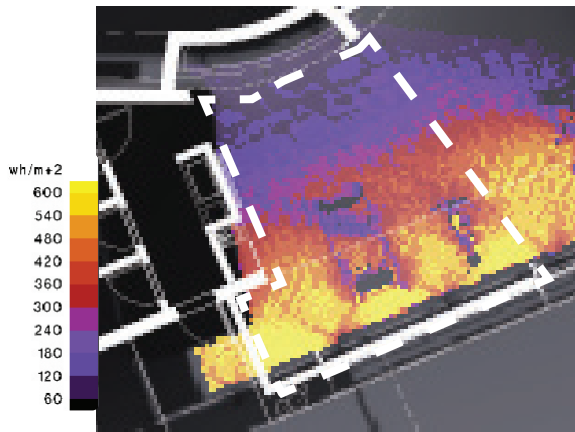
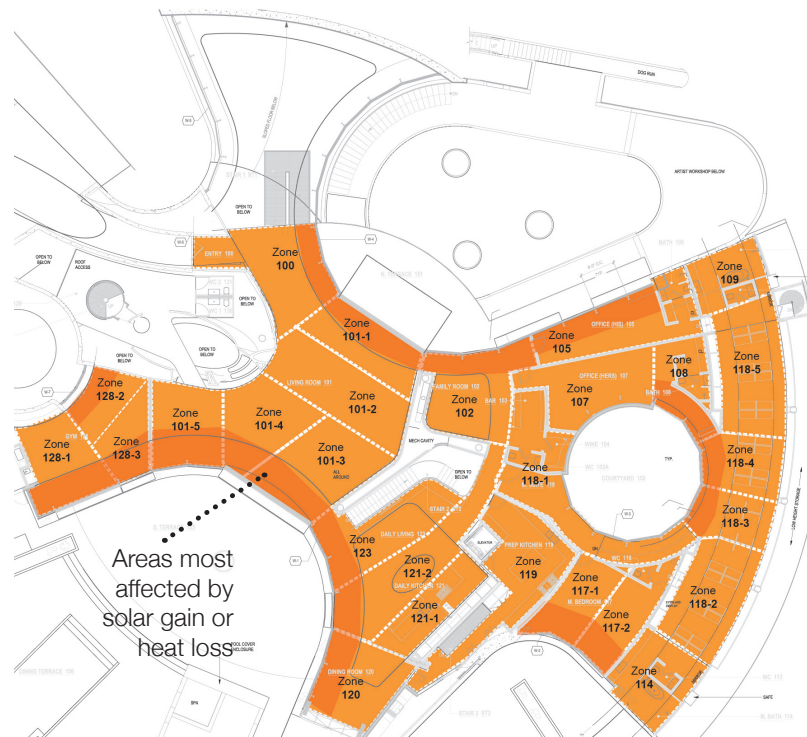


Image showing cumulative solar radiation (kWh/m2) in the zone shown above over a typical year.

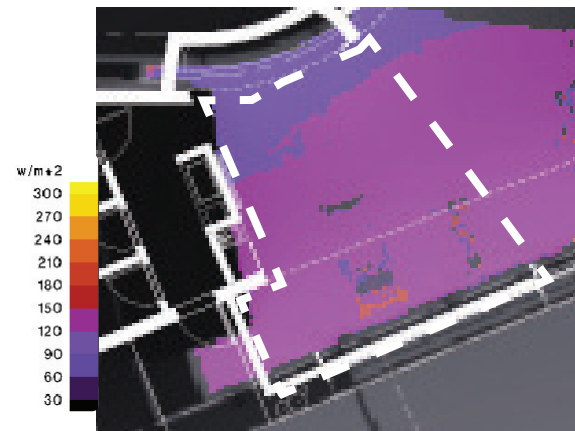


Image showing peak instantaneous solar radiation (W/m2) in the same zone on October 21st

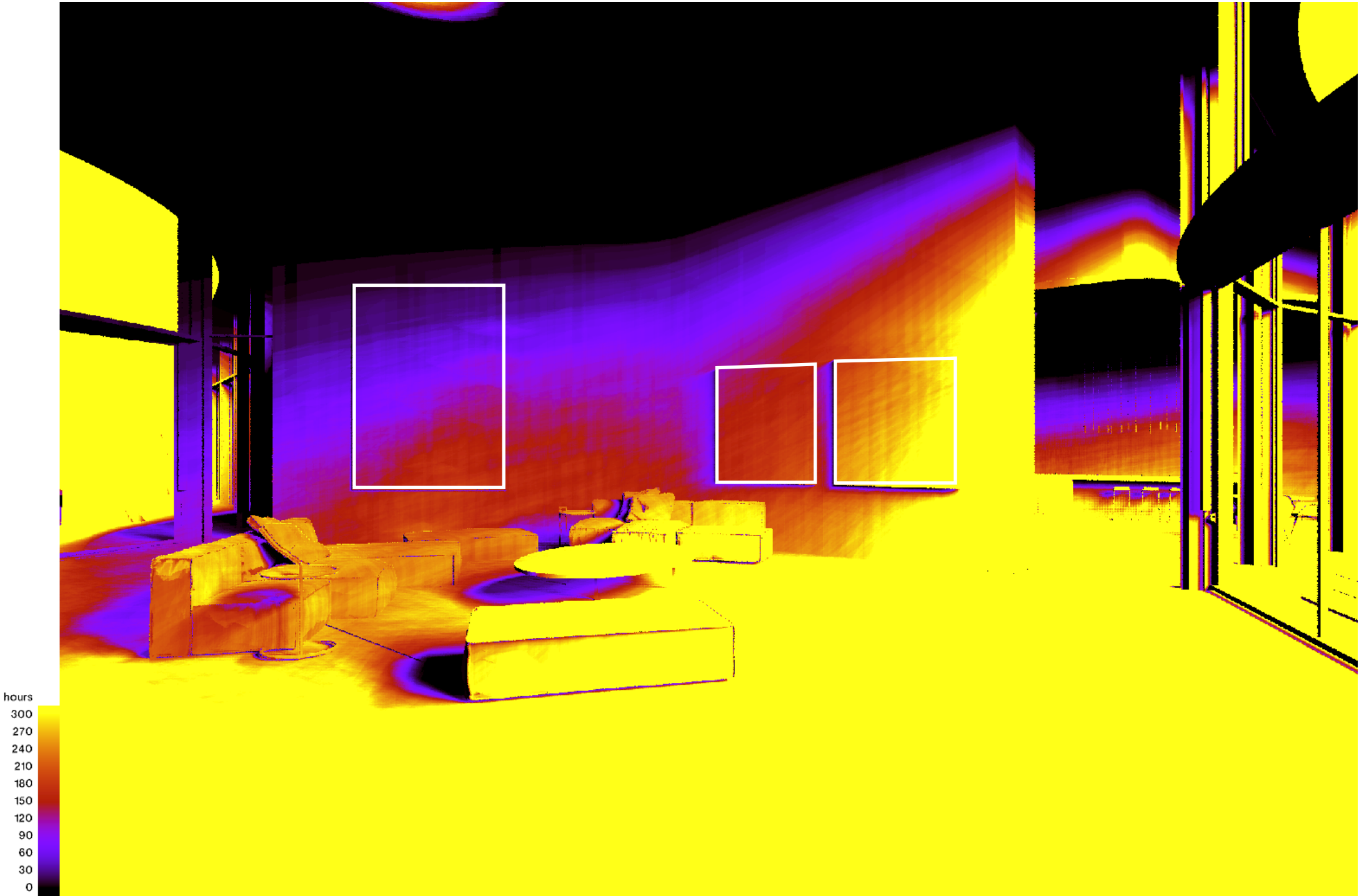


Curatorial Analysis





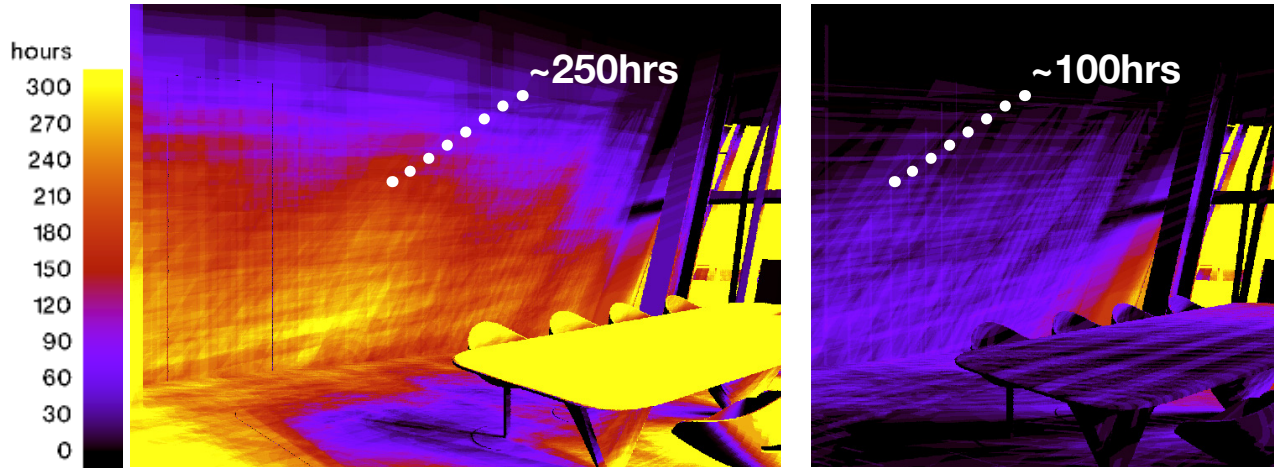
Annual Cumulative Hours of Direct Sun





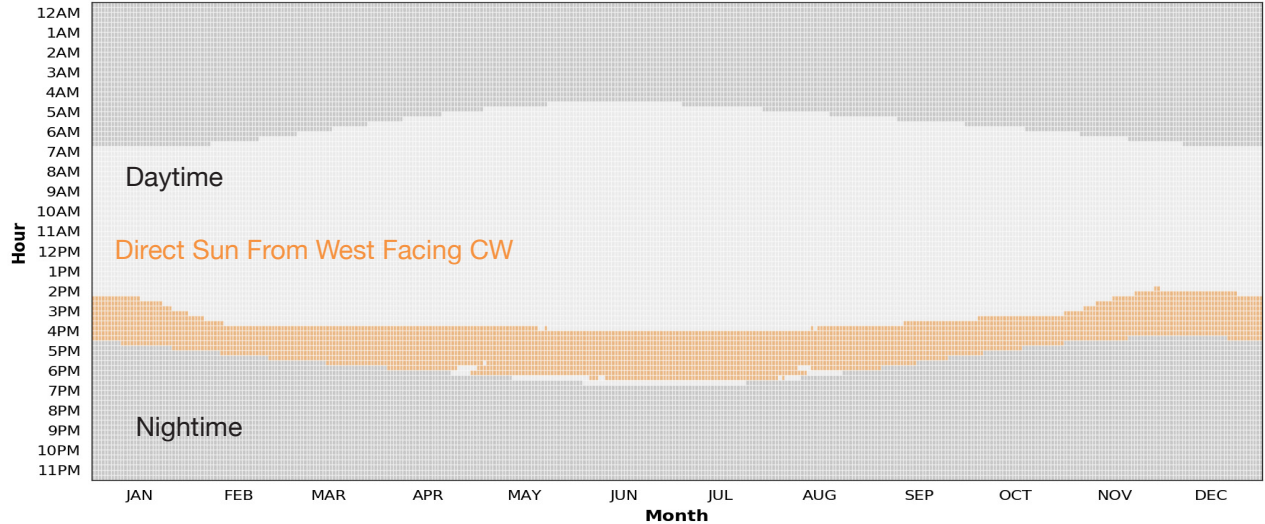
Curatorial Analysis

Hours of Direct Solar Radiation



Cumulative With No Shades

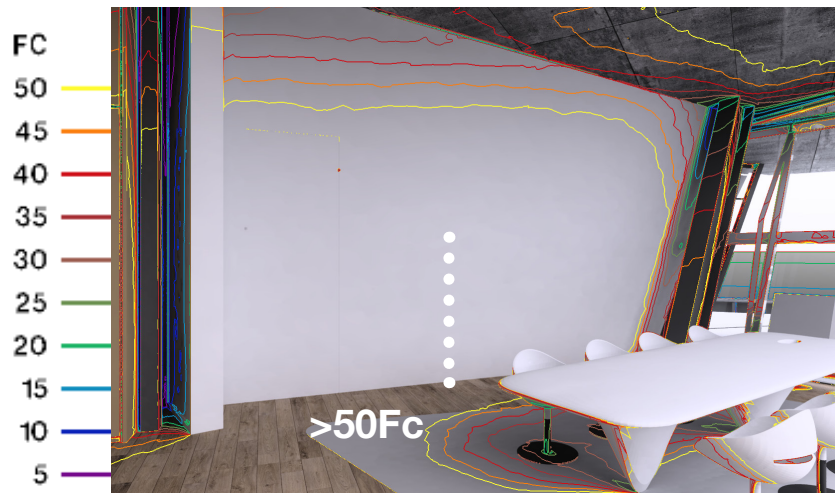
With Shades (Blackout)
only on West CW



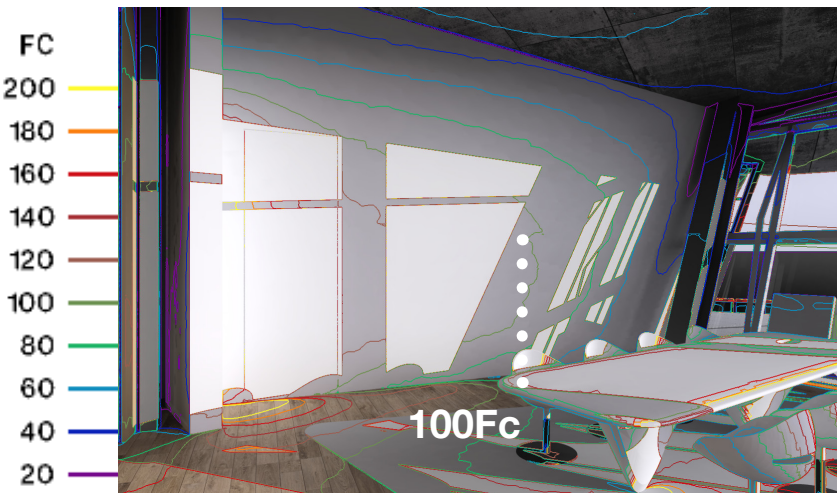
Observations:

Total of 250 hours per year of direct sun (over 400Fc), maximum of 775 hrs on the whole wall.
Sun comes from west facing curtain wall.
Direct sun from west facing curtain wall happens in the afternoon from 2pm to 4pm until sunset, during the whole year.

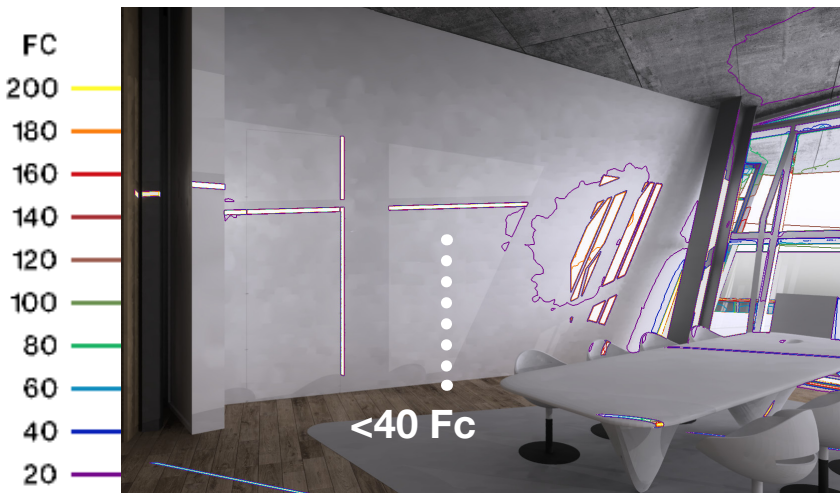
Instantaneous Light Levels



Overcast - No Shades



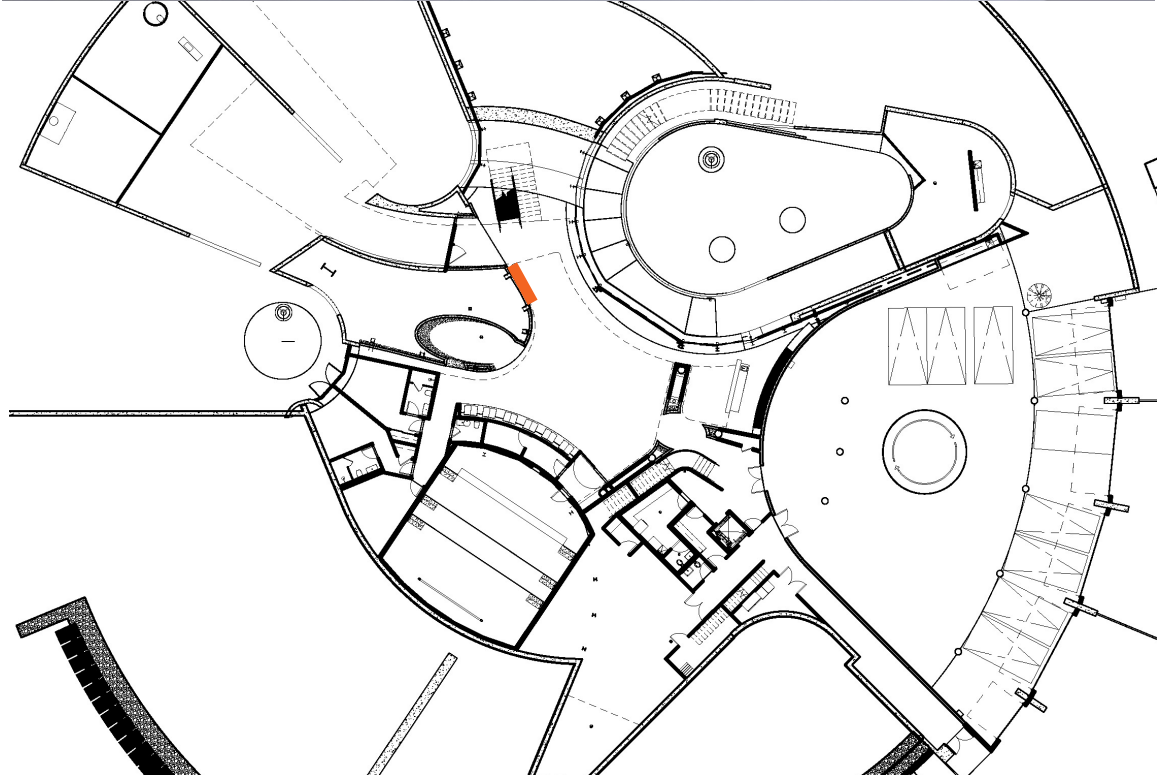
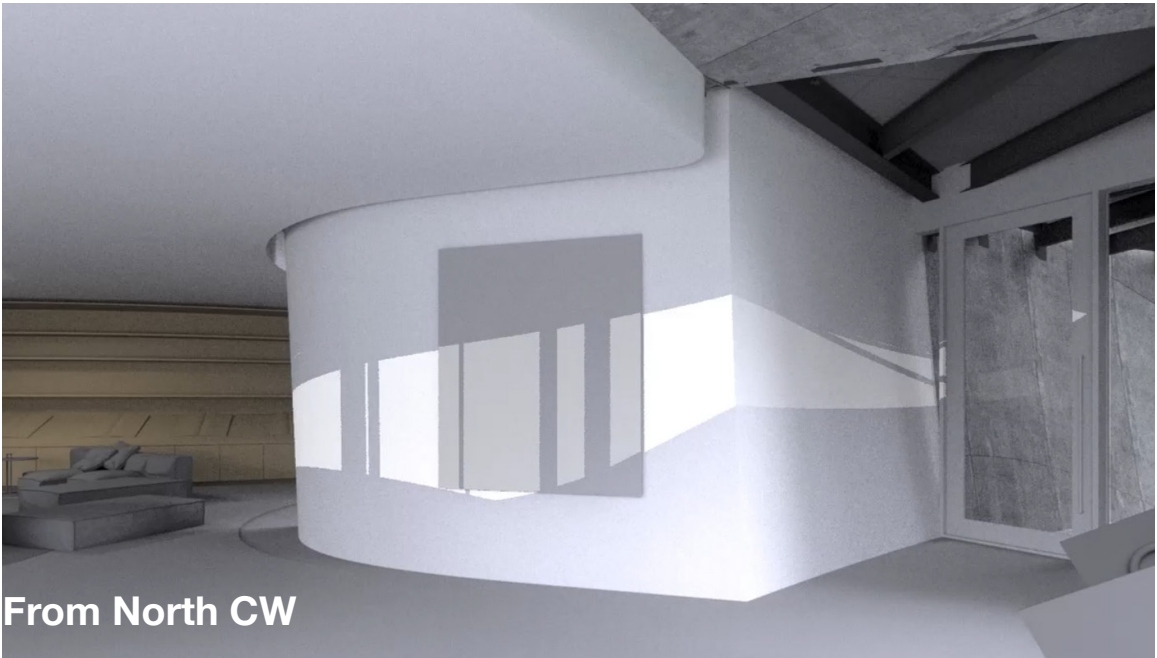
Clear Sky - No Shades



Clear Sky - Shades
(4% Openess on West CW)



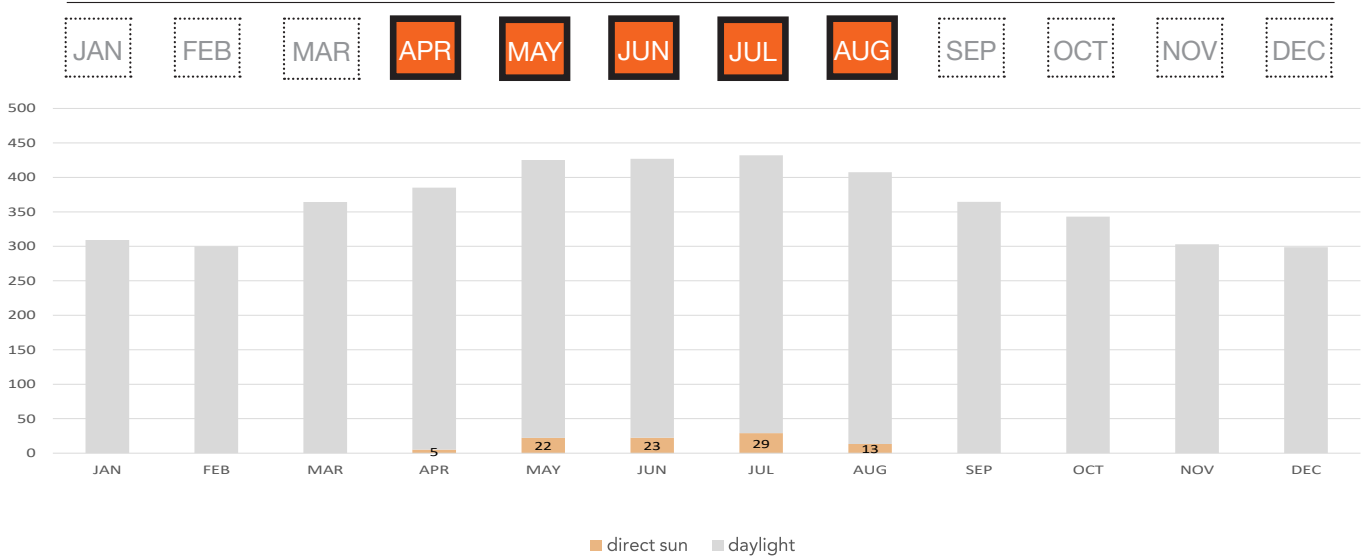
Curatorial Analysis



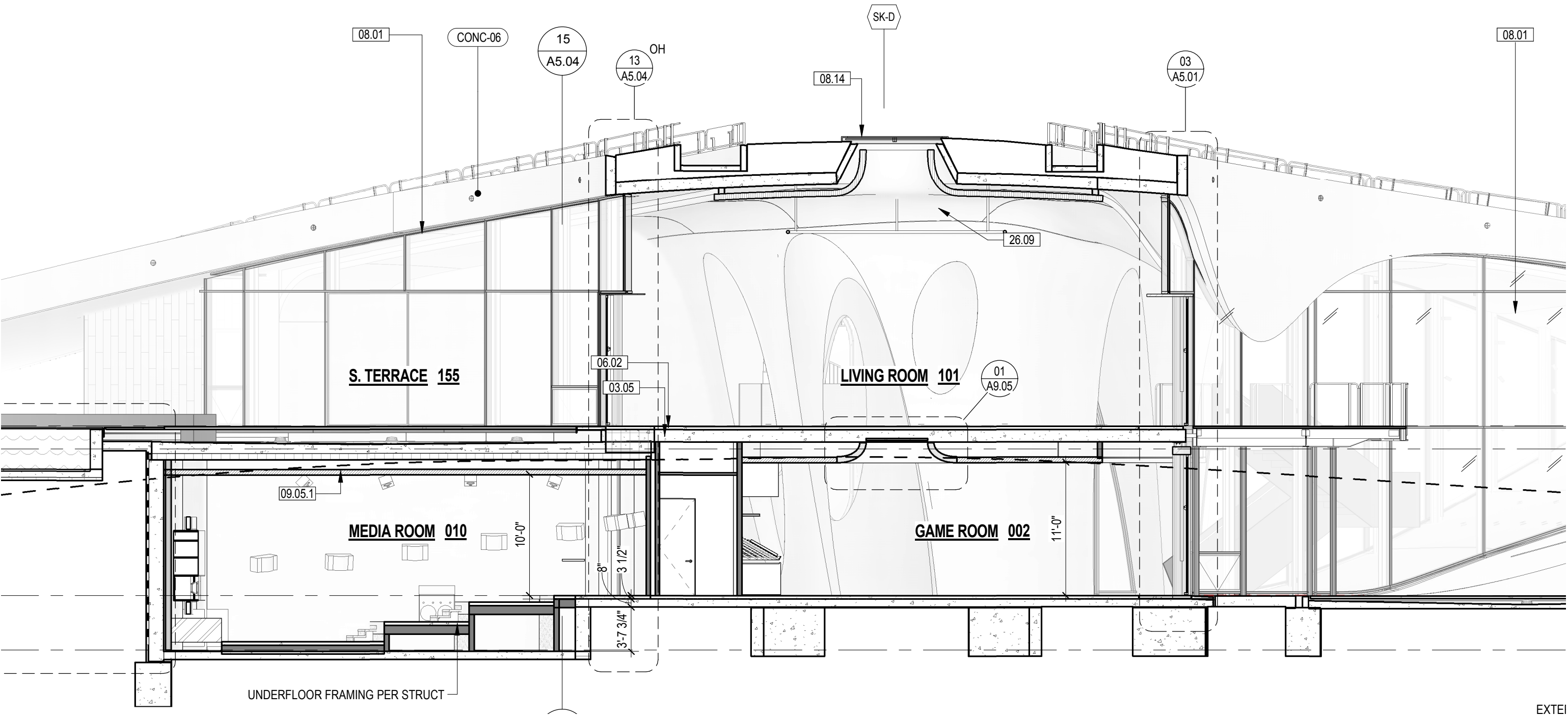
Recommendation:
It is possible to display the following colored materials:
ONLY if automated shades on north

<div>NO SENSITIVITY</div> <div>NO LIMIT</div> <div>Metals, stone, glass, most ceramics, enamel, most minerals.</div>	<div>* LOW SENSITIVITY</div> <div>LIMIT:: 60,000 Fc/hr (20Fc)</div> <div>Oil and tempera fresco, undid leather and wood, horn, lacquer, some plastics</div>	<div>MEDIUM SENSITIVITY</div> <div>LIMIT:: 5,000 Fc/hr (20Fc)</div> <div>Costumes, watercolors, pastels, prints, manuscripts, paintings in distemper media, wall paper gauche, wood, fur, leathers</div>	<div>HIGH SENSITIVITY</div> <div>LIMIT:: 1,500 Fc/hr (5Fc)</div> <div>Silk, newspaper, felt tip pen, fugitive dyes, pristine art never exposed to light.</div>
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Direct Solar Radiation



Anticipated Electric Lighting Effect
Wall wash, ceiling recessed





Refinement of daylighting and electric lighting design



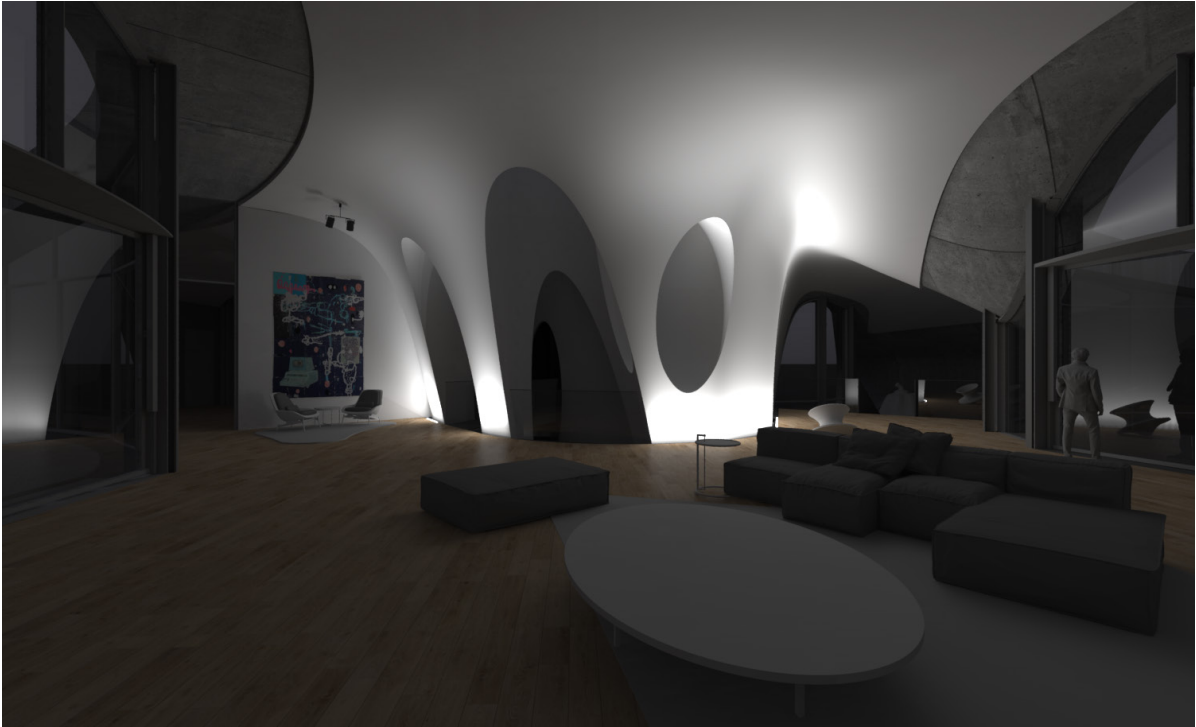
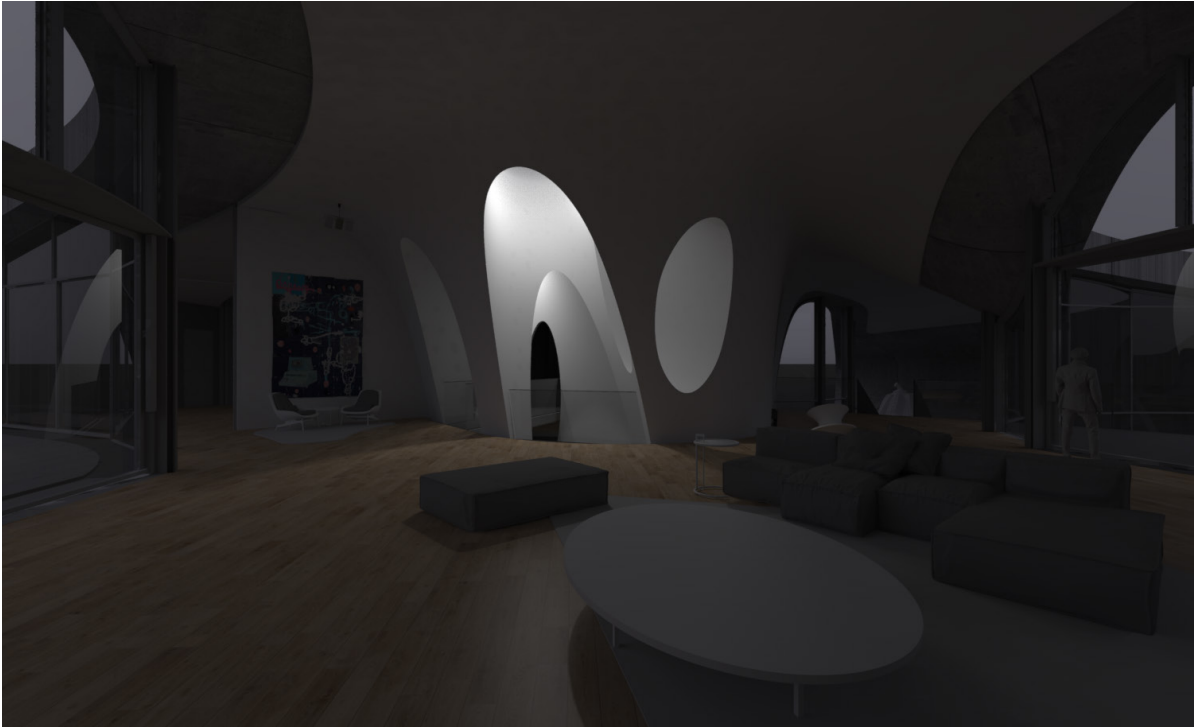


Lighting Design

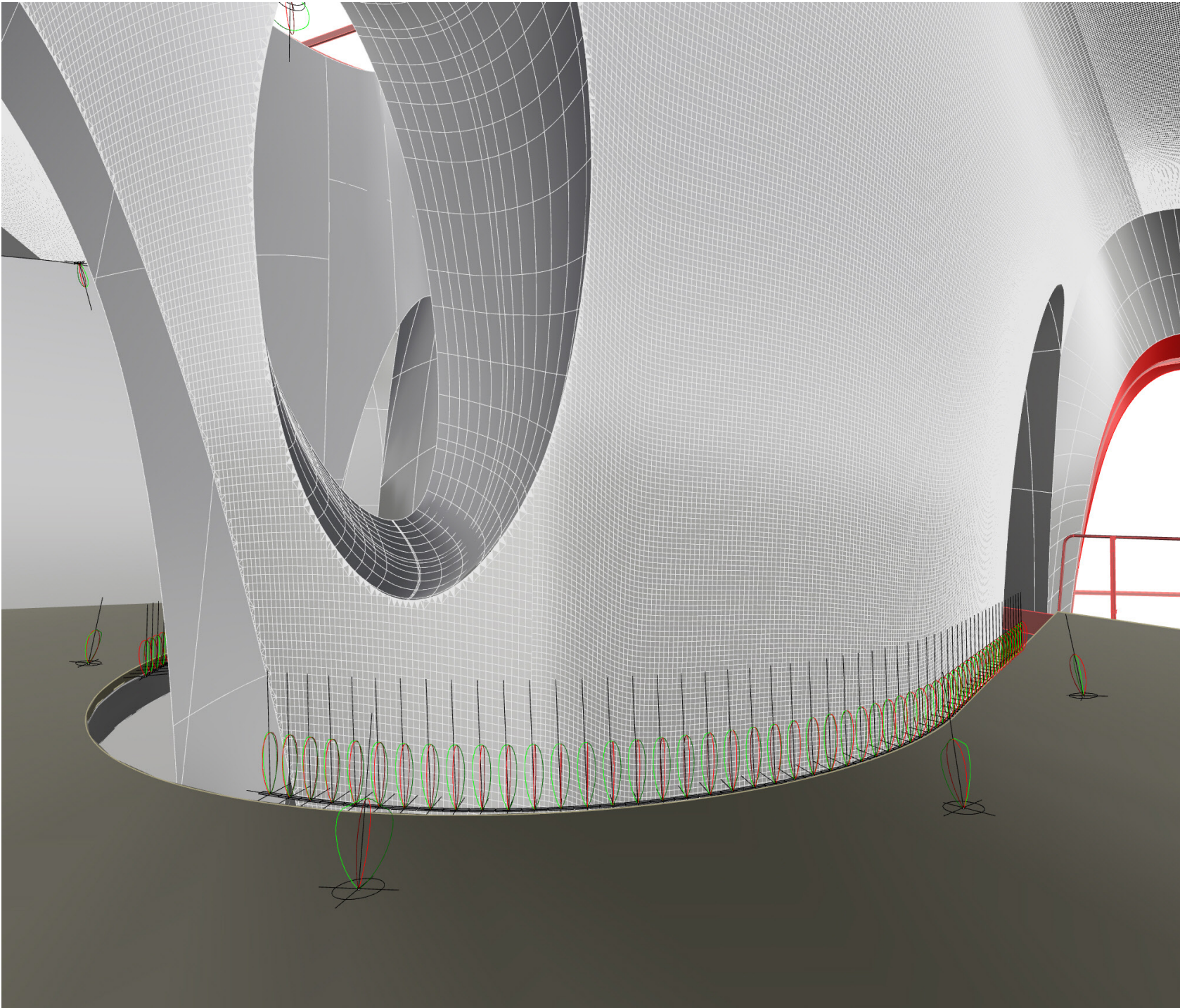




Layers Of Light



Lighting Design



Snake Deco Specifications



Ordering Information ¹ (Minimum order quantity 9pcs)							
F SND	5	H	30	FL	24	C1	SNC
Model	Length	Power	Color	Optics	Voltage	Options	Housing
F SND	5	H	30 35 40	SP FL	24	C1 C2 C3 CX	SNC

¹Specify remote power supply separately below. Max run from single feed 23 elements

Luminaire

- Sustainable design
- Radius, minimum 12.36" (314mm)
- Diffused line of light
- IP67, UL STD 1598, wet location, walkover rated 1000 lb
- Clear borosilicate glass 1.2" (30mm) thick
- Anti glare system
- Aluminum construction, with diffused tempered glass
- ABS Installation housing, direct concrete pour
- Snap in installation with no exposed hardware
- 3.3' (1m) feed cable standard

Size

- 5 = 5" (124mm) x 3.5" H (90mm)
- Power**
- H = 2.5W, 3000K, 225 lm

Color Temperature

- 30 = 3000K
- 35 = 3500K
- 40 = 4000K
- 2 Step MacAdam
- CRI: > 85

Optics

- SP = spot - 17°
- FL = flood - 31°

Voltage

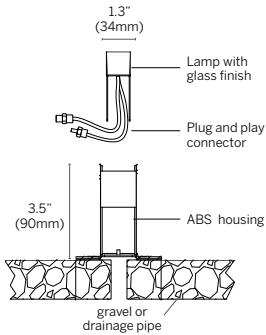
- 24 = 24VDC fixture voltage

Options

- C1 = 10' (3m) feed cable
- C2 = 20' (6m) feed cable
- C3 = 30' (9m) feed cable
- CX = specify length

Housing

- SNC = concrete



Power Supply² (Remote)

Non-Dim <input type="checkbox"/> D-520-24007: Osram 96W, 24VDC, 120-277VAC	<input type="checkbox"/> IL-JB-LED-24010-UNV-D3W: Lutron L3D 1% 3-wire dimming, 5-40W, 24VDC, 120-277VAC, Case K, dry location enclosure
Dim <input type="checkbox"/> D-520-24006: Osram 10% 0-10V dimming, 96W, 24VDC, 120-277VAC	<input type="checkbox"/> IL-JB-LED-24010-UNV-DES: Lutron L3D 1% EcoSystem dimming, 5-40W, 24VDC, 120-277VAC, Case K, supplied in a dry location enclosure
<input type="checkbox"/> IL-JB-LED-24003-120V-DFPN: Lutron LTE 1% Forward Phase (with neutral) dimming, 5-40W, 24VDC, 120VAC, Case K, dry location enclosure	

²See power supply pages for details. No enclosure, unless stated. Im80 values shown.

FILIX

410 381 1497 inter-lux.com answers@inter-lux.com
Inter-lux reserves the right to make technical changes without notice.

ETL CE IP67
(rev2) 1

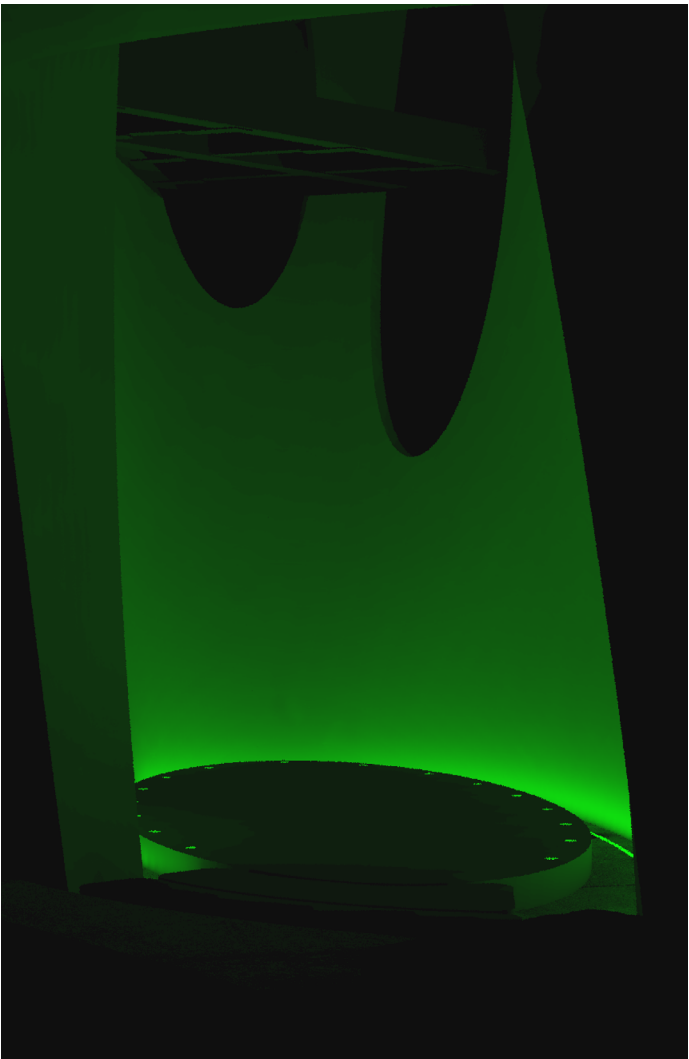


Lighting Design



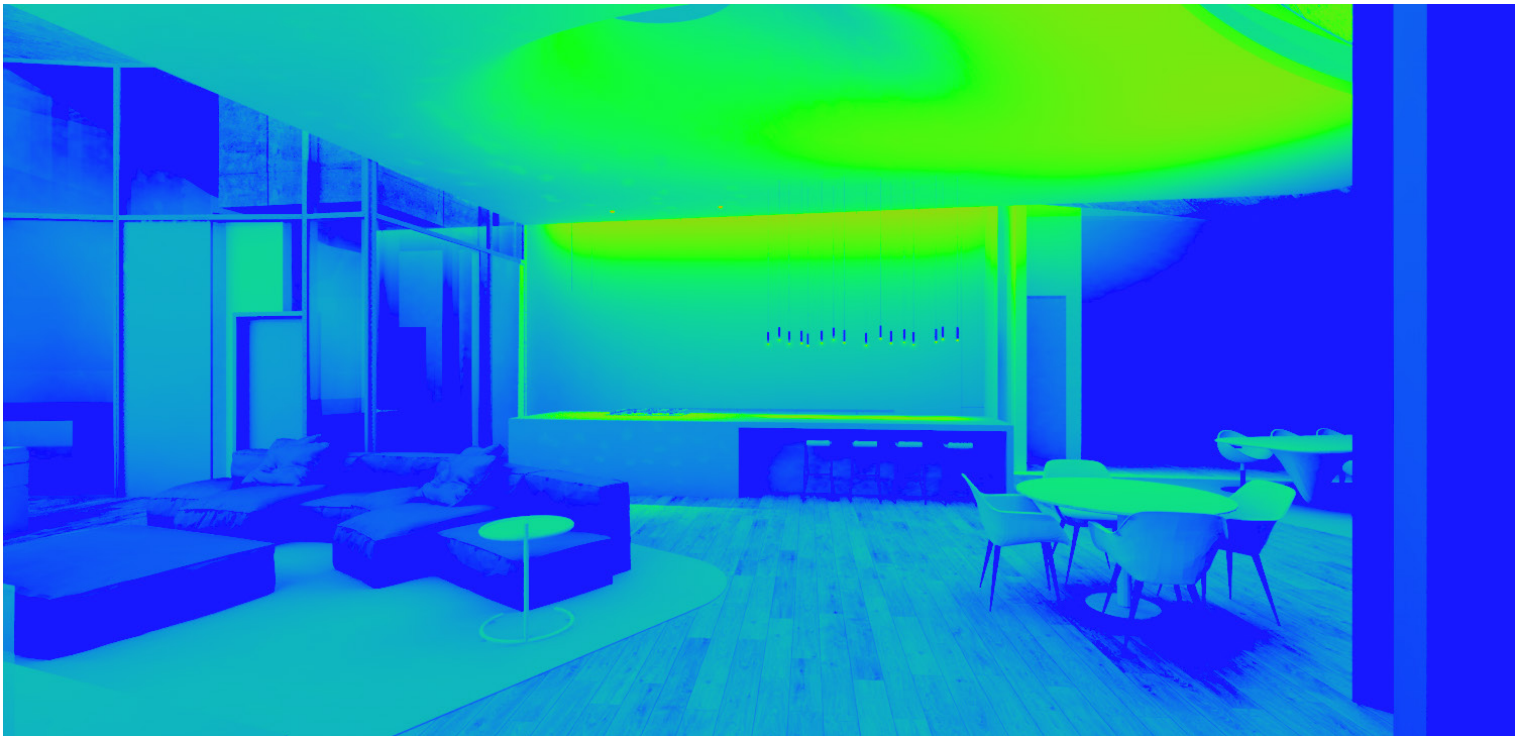
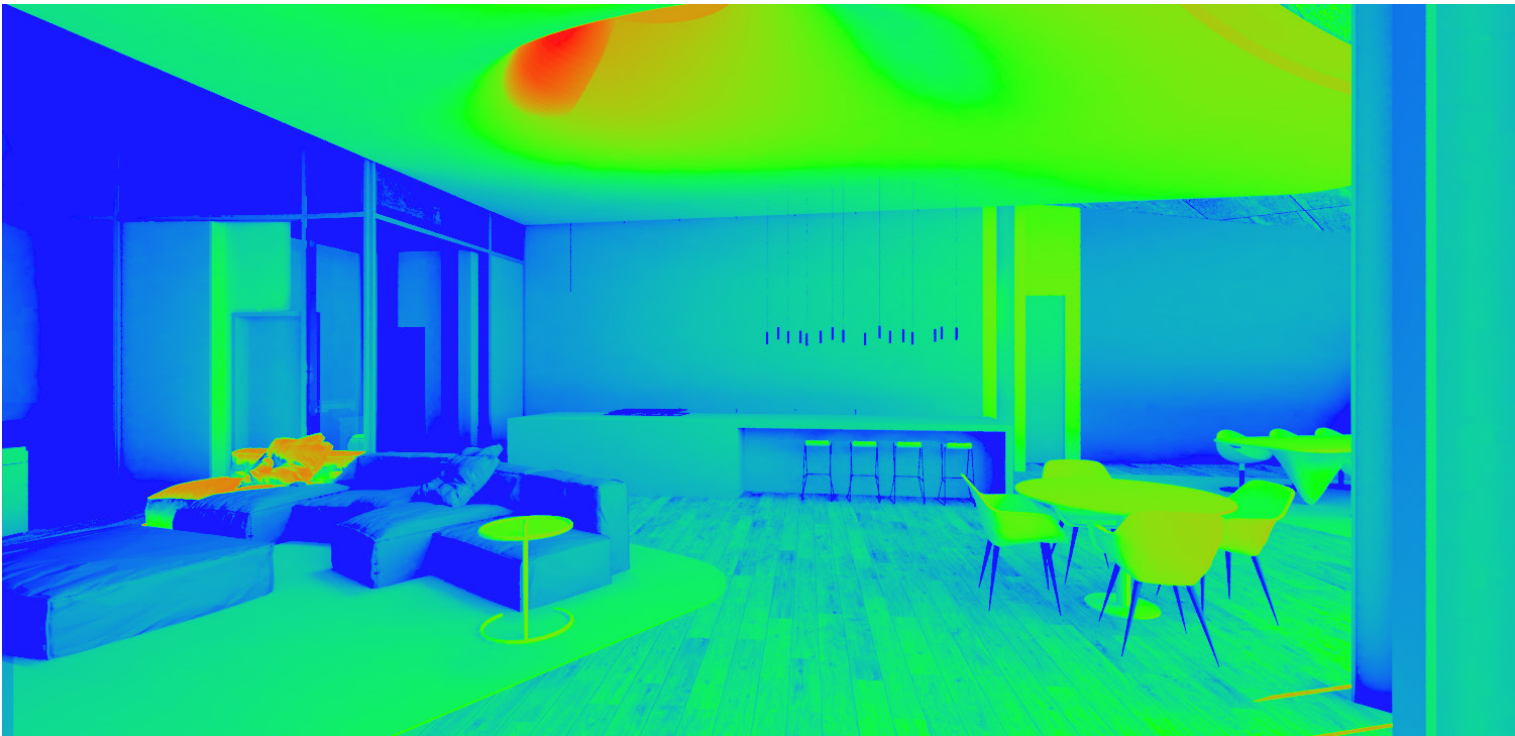


Lighting Design



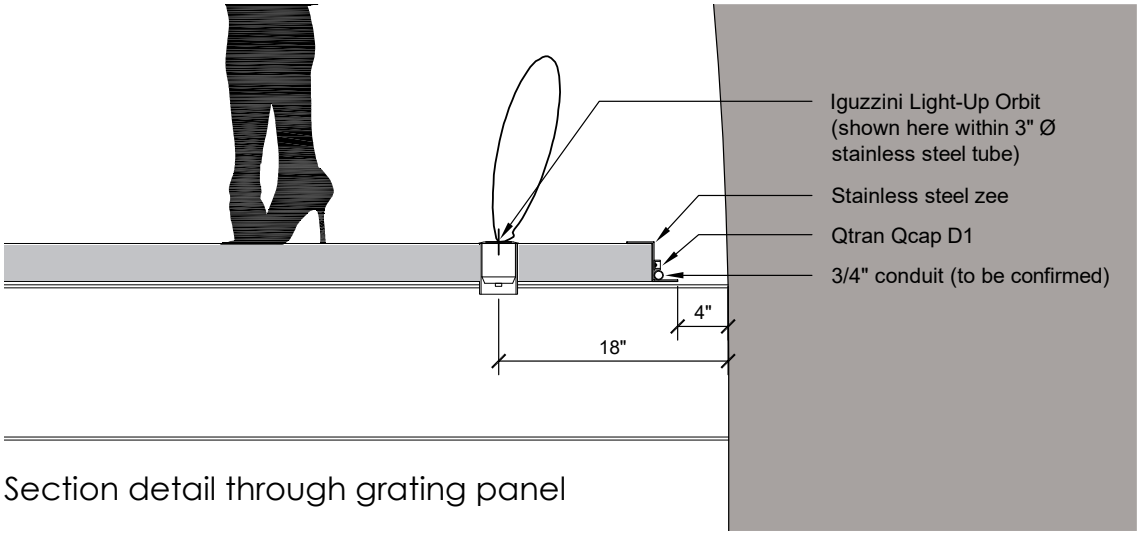
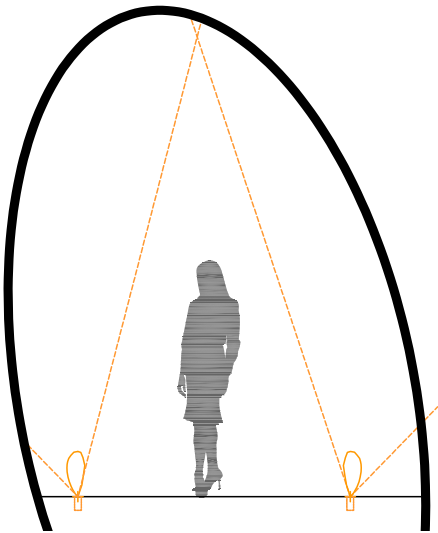
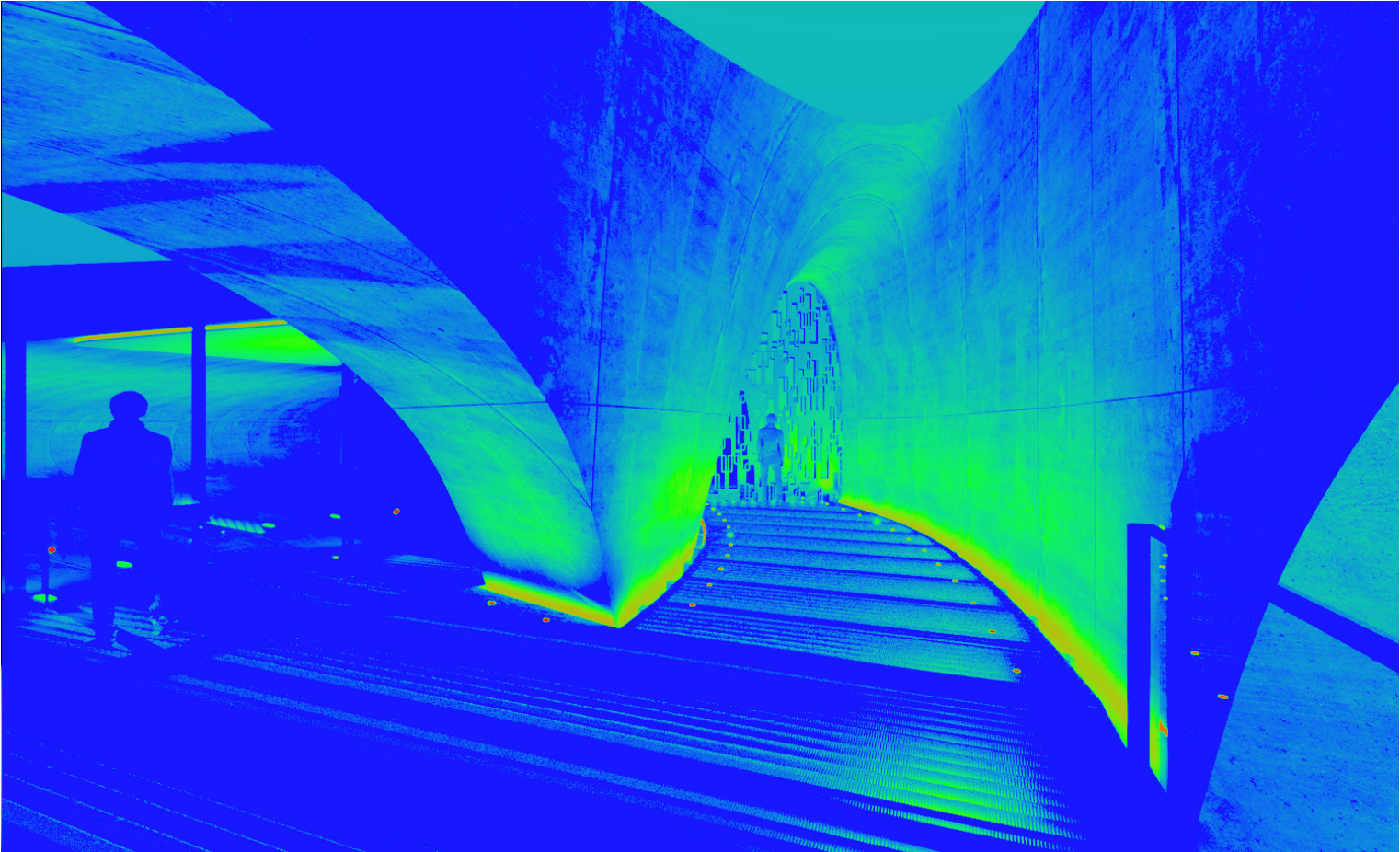


Day-Night Transition





Lighting Design





Lighting Design



Lighting Design

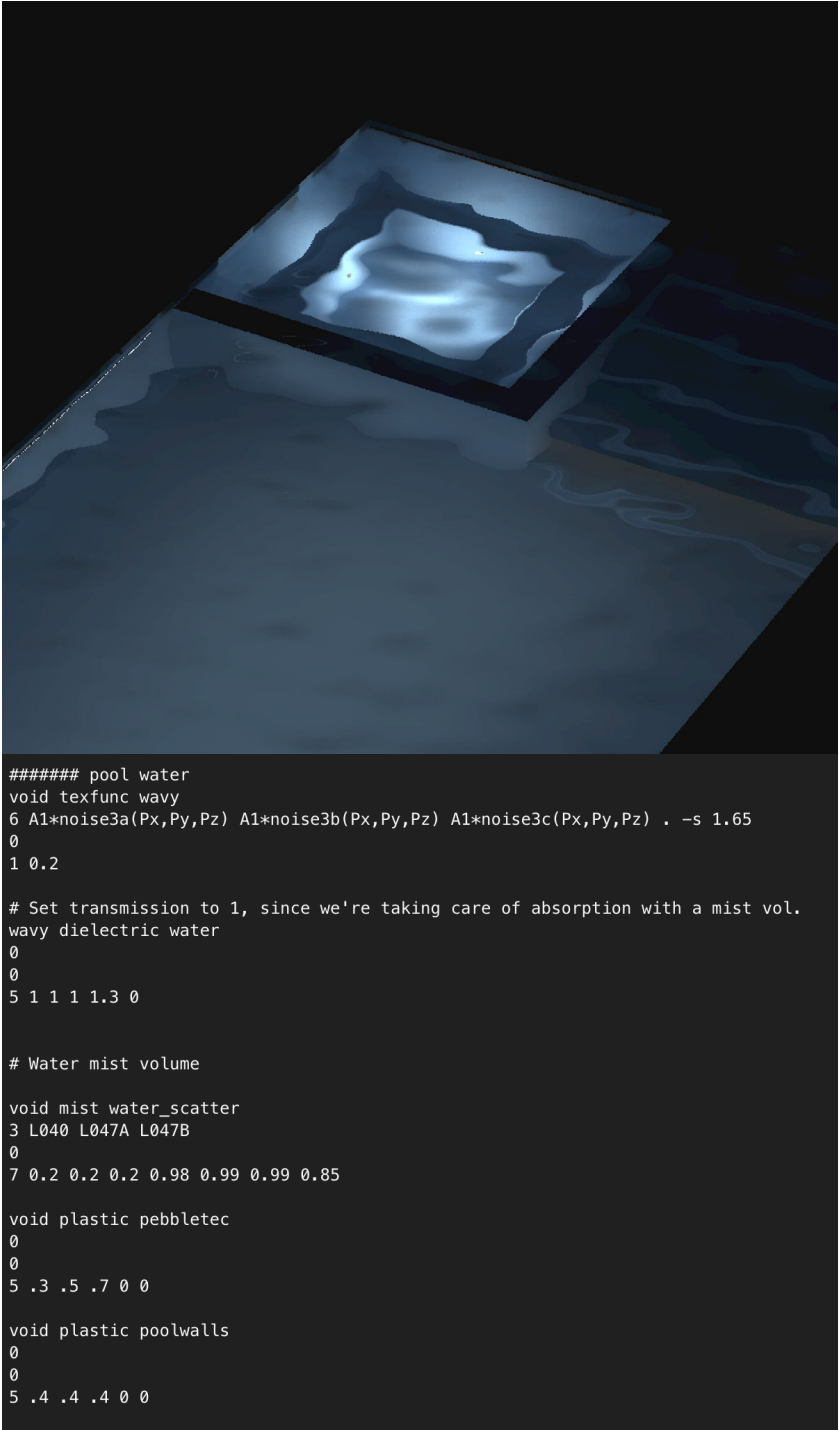
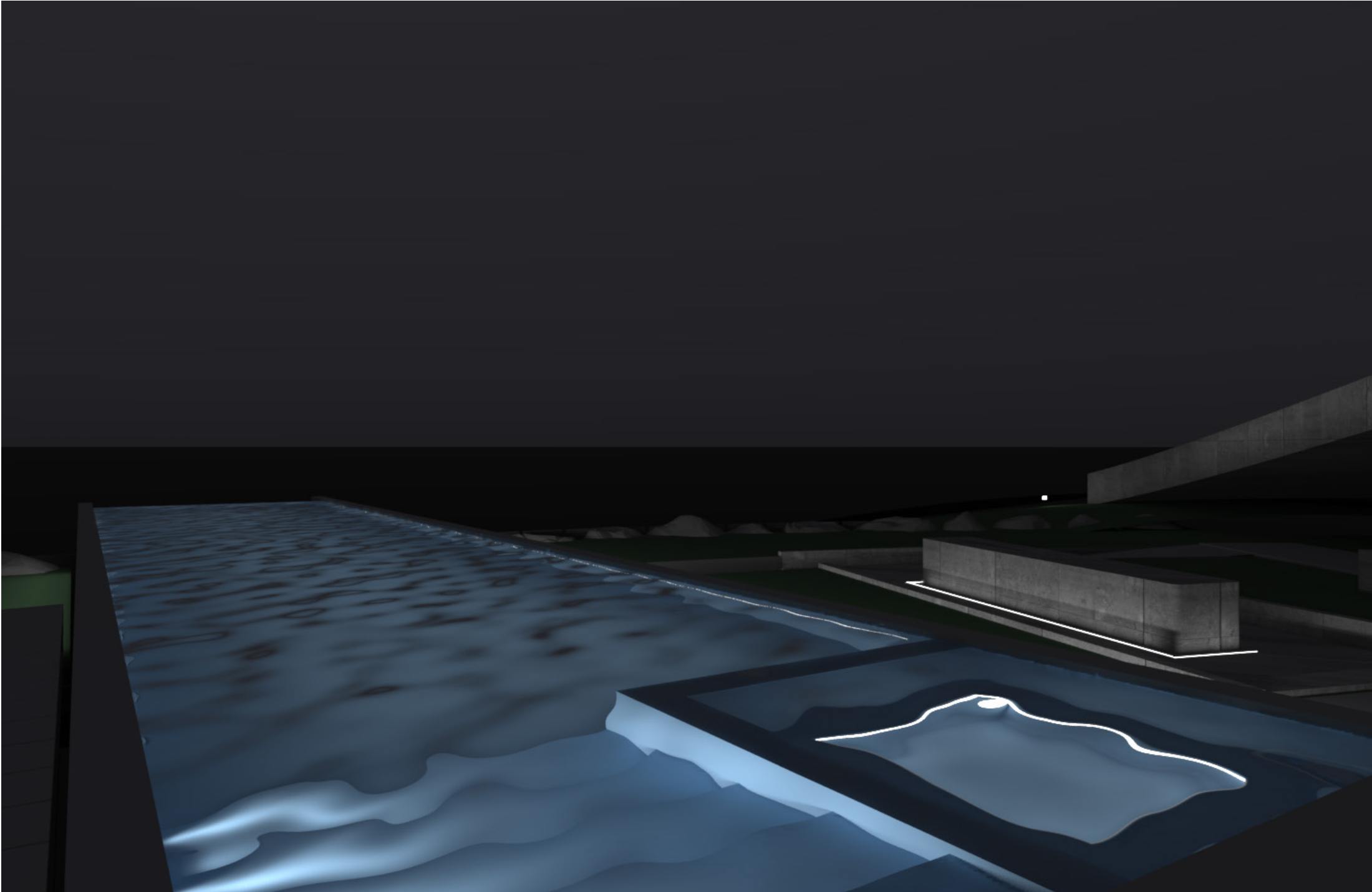


Lighting Design





Lighting Design



thanks Greg!



