

Simulating and Visualizing Annual Daylighting Performance

9.3.2014

Stephen Wasilewski

LOISOS + UBBELOHDE

ARCHITECTURE . ENERGY

1917 Clement Ave Building 10A
Alameda, CA 94501-1315

510 521 3800

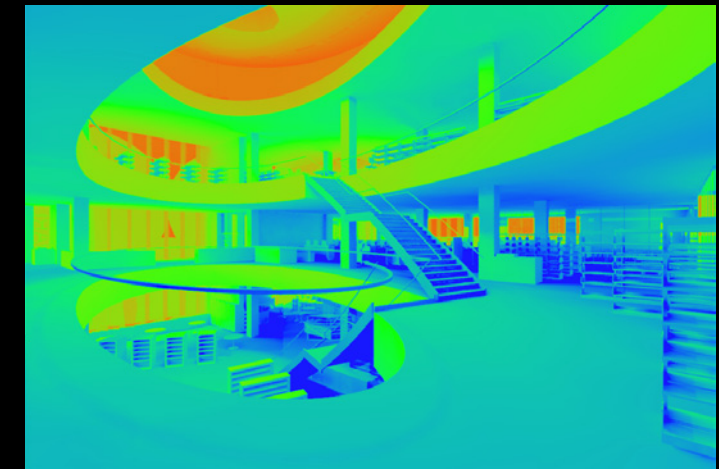
coolshadow.com

Annual Studies Mirror Typical Sky Studies

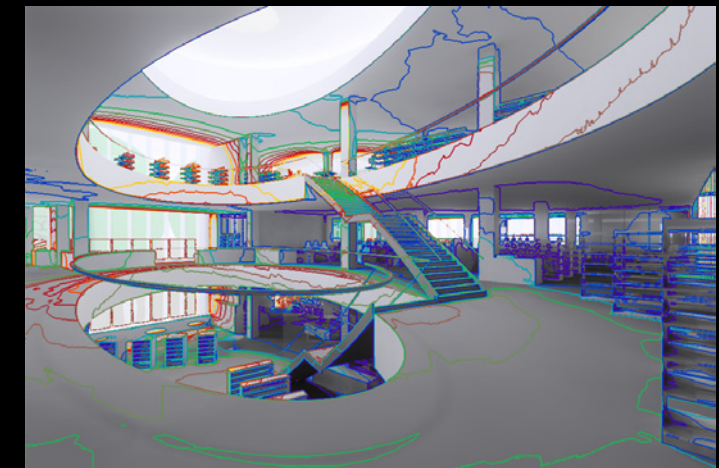
Perception



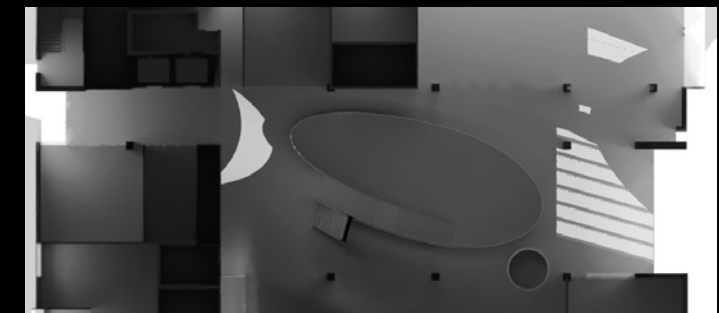
Visual Comfort



Illuminance



Direct Sun Penetration

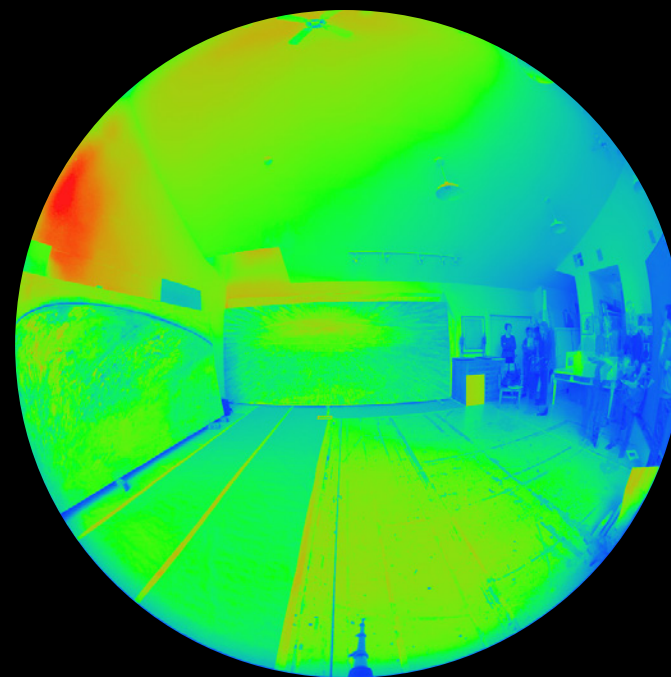




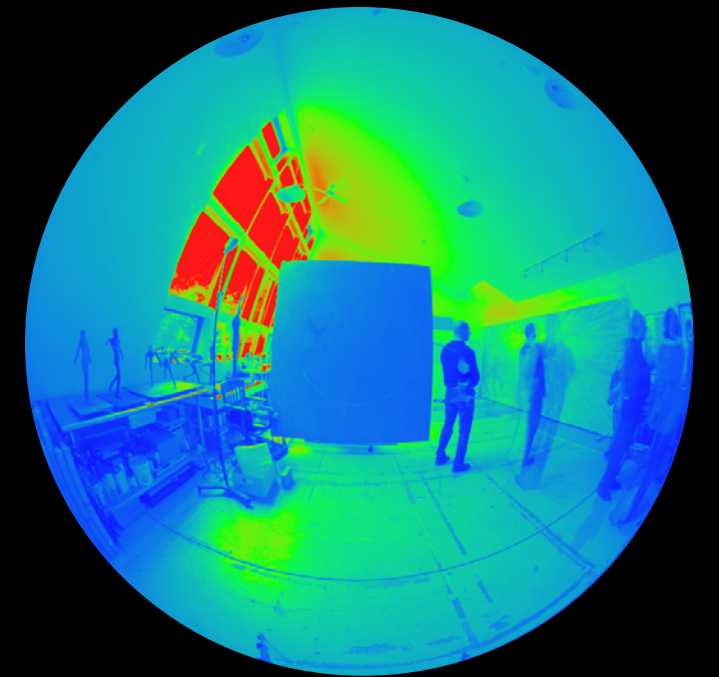
The Windhover 1A and 1B - Nathan Oliveira



nits
468.75
406.25
343.75
281.25
218.75
156.25
93.75
31.25

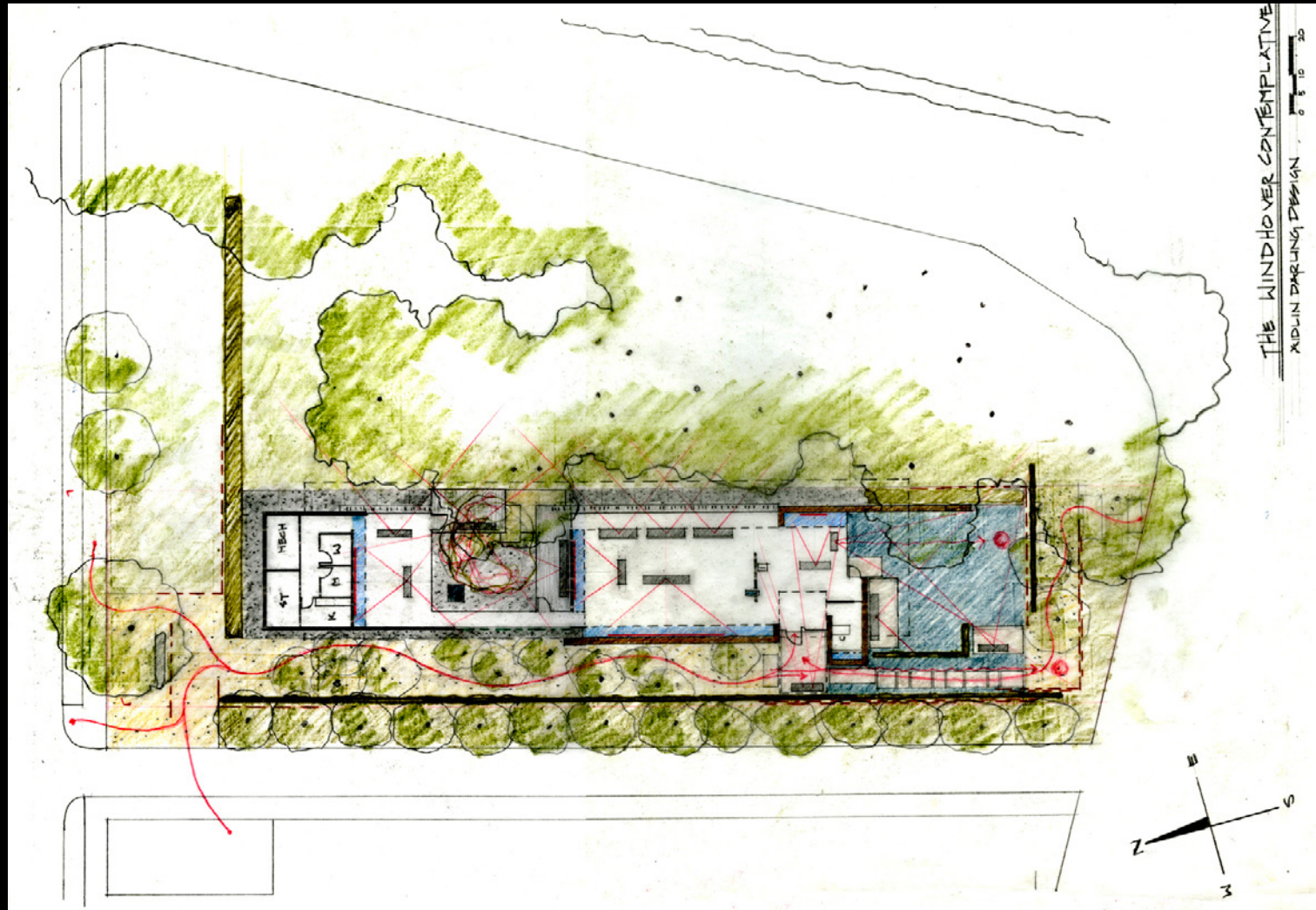


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468.75
406.25
343.75
281.25
218.75
156.25
93.75
31.25

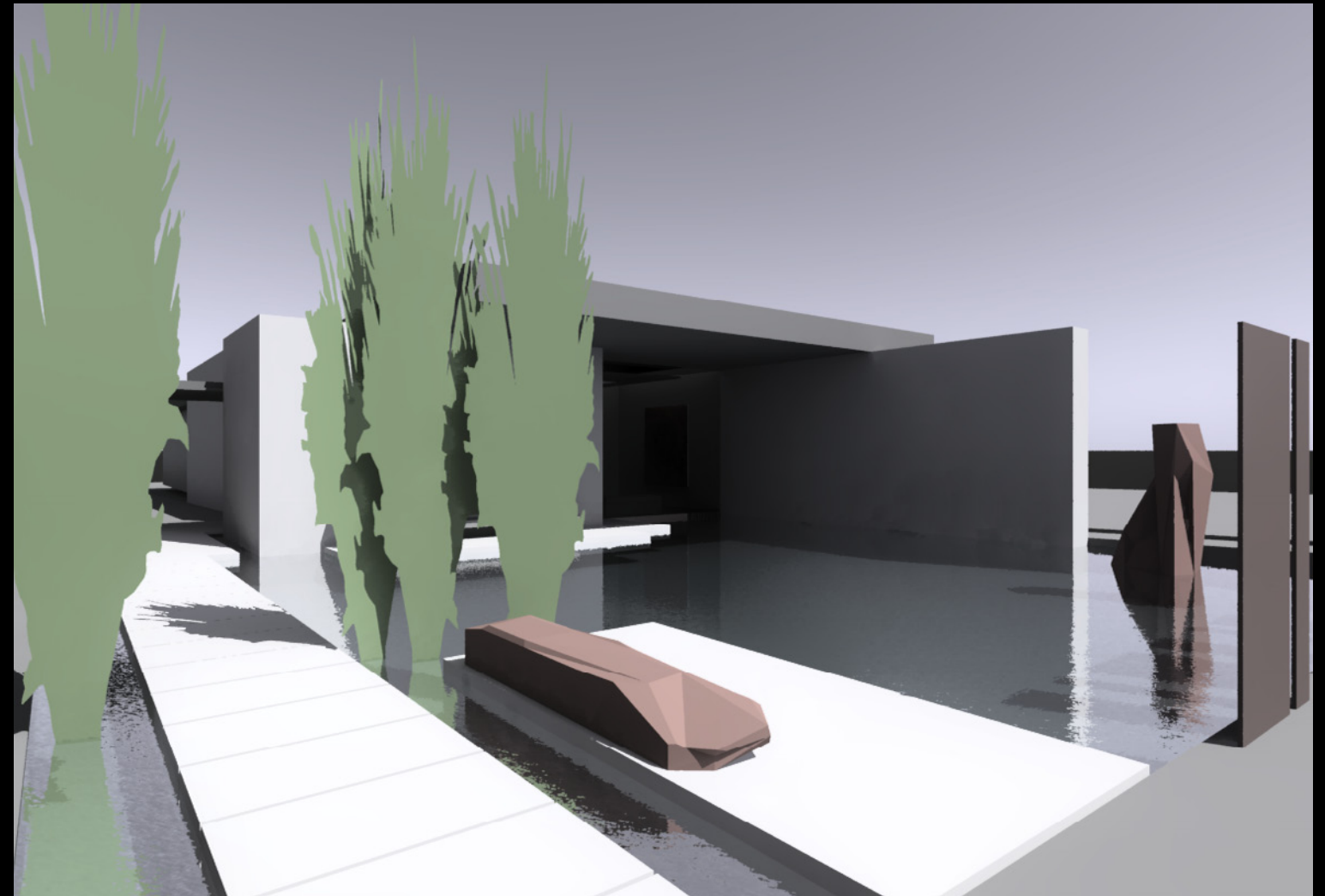


The Artist's Studio

Windhover Contemplative Center



Site Plan



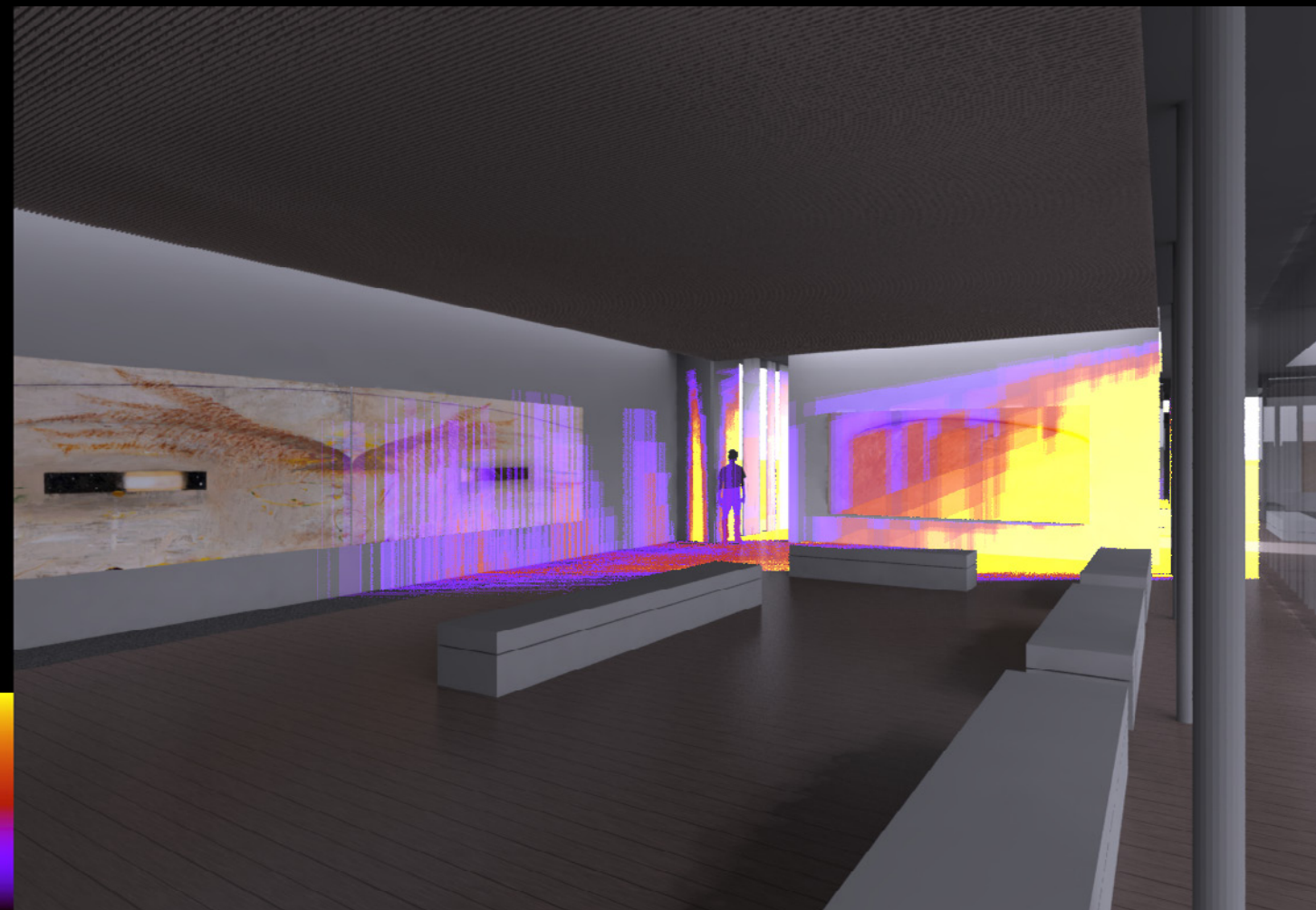
Entrance



Interior View



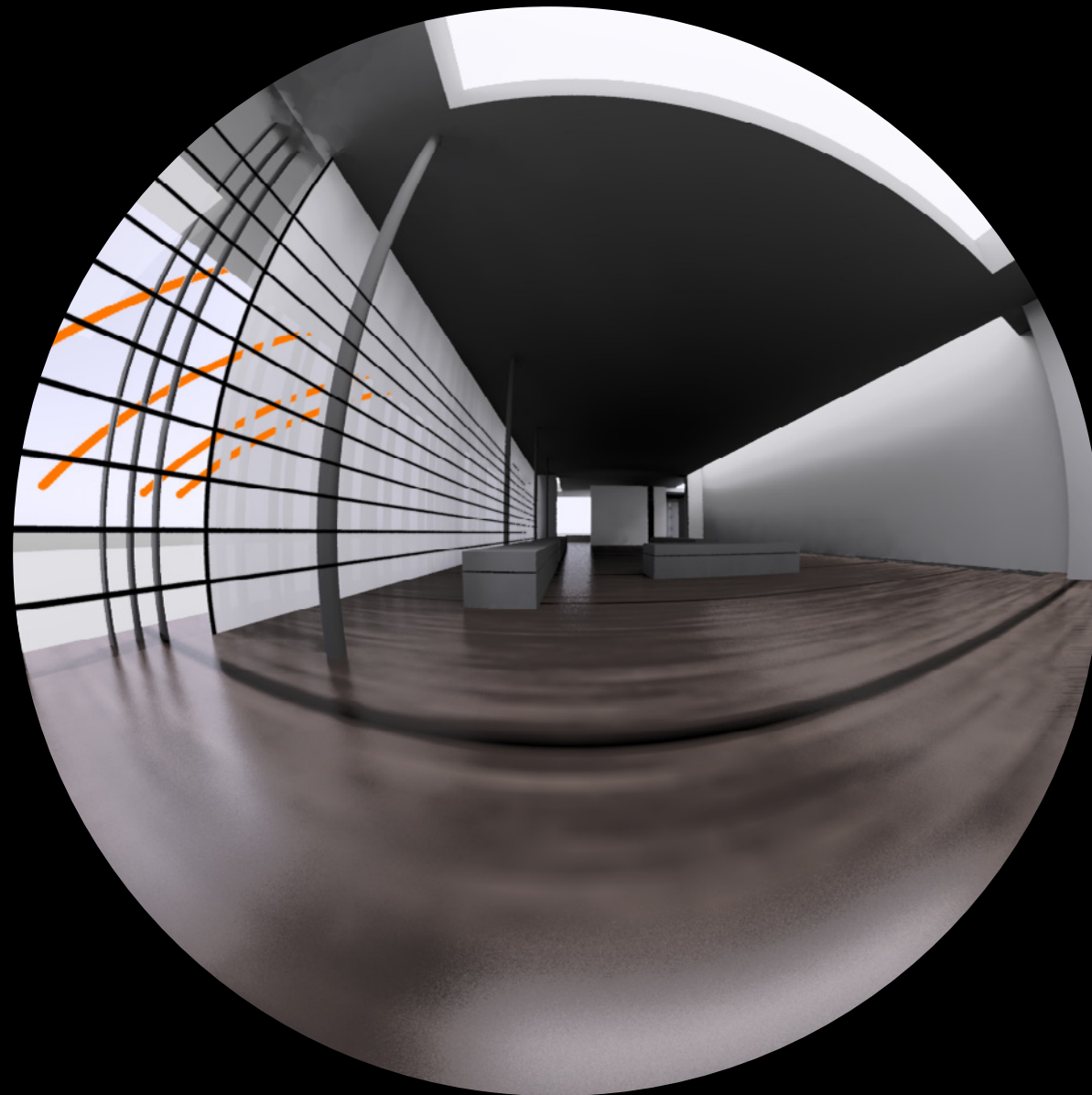
Interior View



hours/year of sunlight on paintings with gap in shades



Animation of Compiled Images



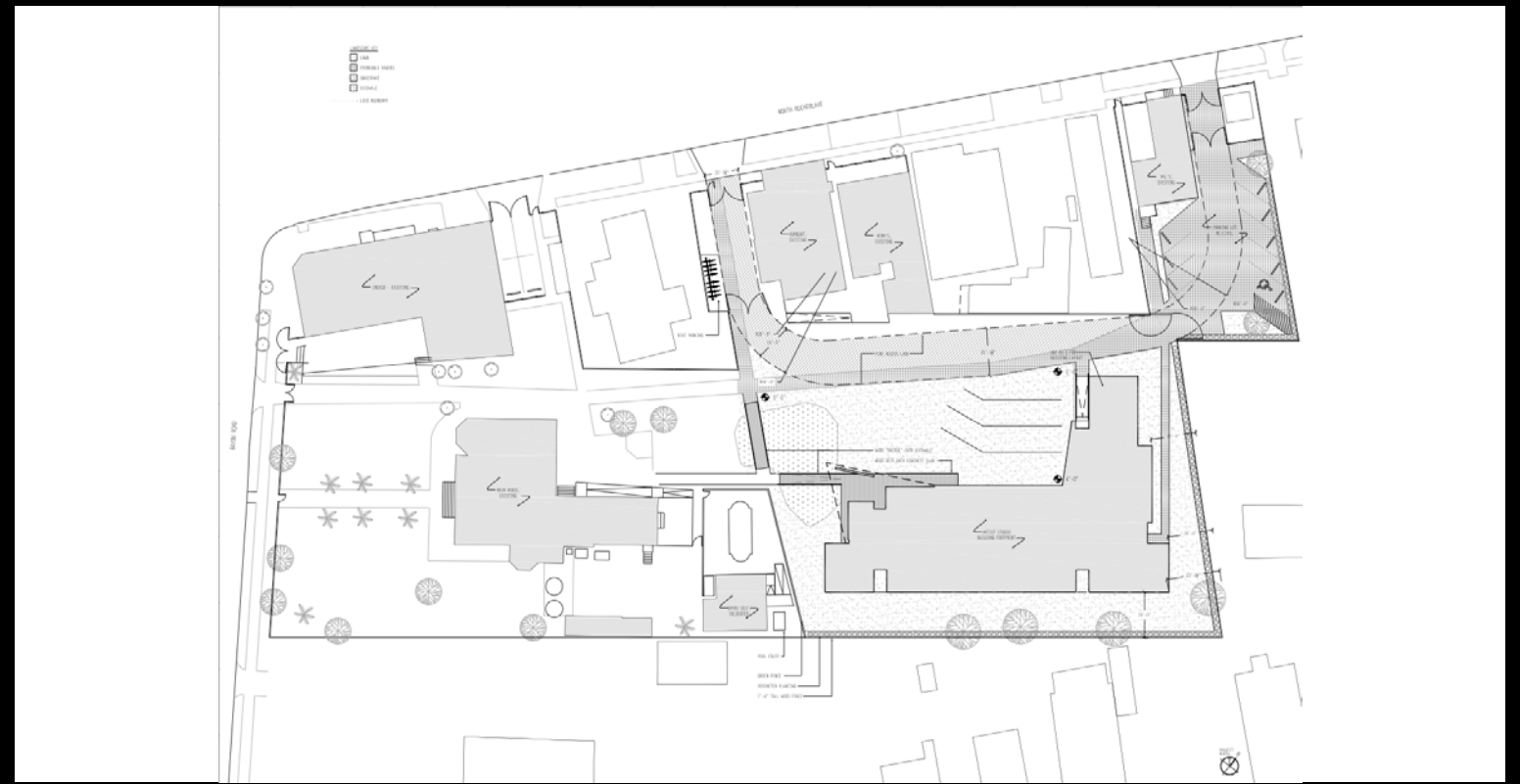
View from a controlling point on the painting

```
rcontrib -fo -l+ -h- -V+ -n 8 -ab 0 -dt 0 -ds 0 -dc 1 -lw
9e-19 -ab 0 -o suns_0_pos0.out -M mods_0.txt -w tmp/
suns_0_pos0.oct < painting1.pts
```

	times (mods) →			
sensors ↓	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
	0.000000e+00	0.000000e+00	0.000000e+00	0.000000e+00
	1.293662e-02	1.293662e-02	1.293662e-02	7.790543e-02
	1.293662e-02	1.293662e-02	1.293662e-02	7.790543e-02
	0.000000e+00	0.000000e+00	0.000000e+00	7.370646e-01
	1.293662e-02	1.293662e-02	1.293662e-02	7.790543e-02
	1.293662e-02	1.293662e-02	1.293662e-02	7.790543e-02
	0.000000e+00	0.000000e+00	0.000000e+00	7.370646e-01
	0.000000e+00	0.000000e+00	0.000000e+00	7.370646e-01
	5.316063e-01	5.316063e-01	5.316063e-01	9.625103e-02
	0.000000e+00	0.000000e+00	0.000000e+00	7.370646e-01
	0.000000e+00	0.000000e+00	0.000000e+00	7.370646e-01
	5.316063e-01	5.316063e-01	5.316063e-01	9.625103e-02
	5.316063e-01	5.316063e-01	5.316063e-01	9.625103e-02
	2.823577e-01	2.823577e-01	2.823577e-01	8.831100e-02

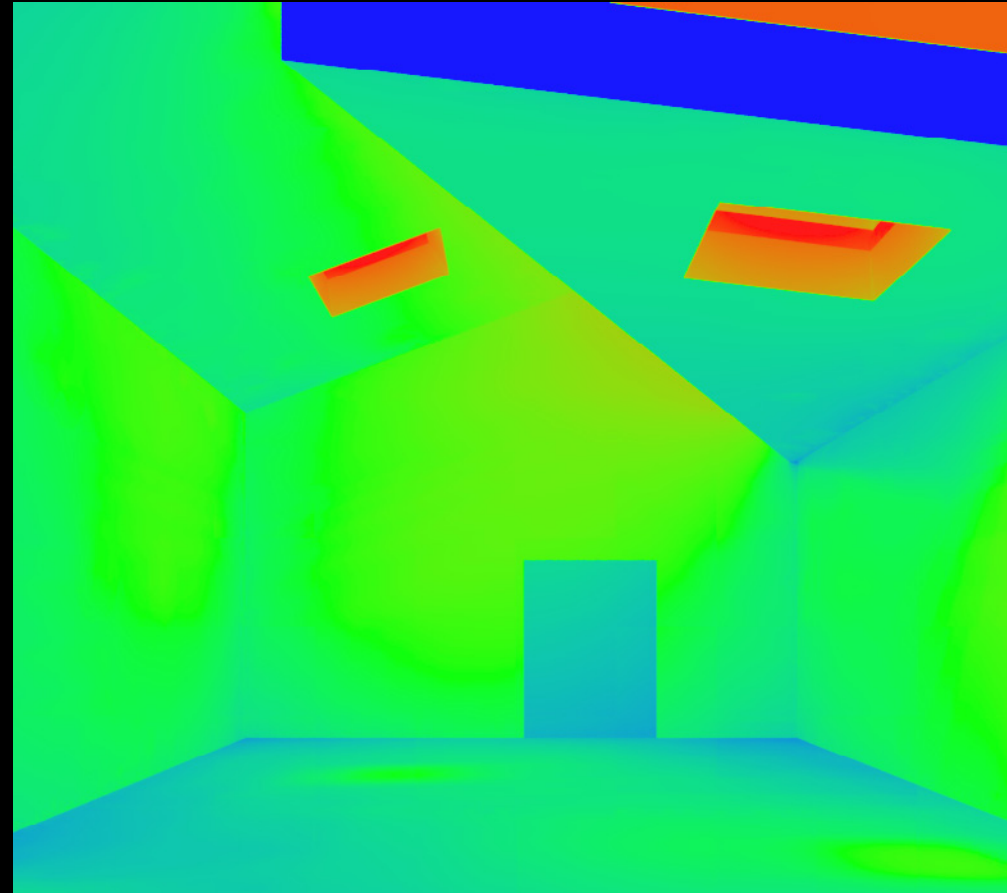
rcontrib Output

Joan Mitchell Center Artist Studios :: Lee Ledbetter & Associates

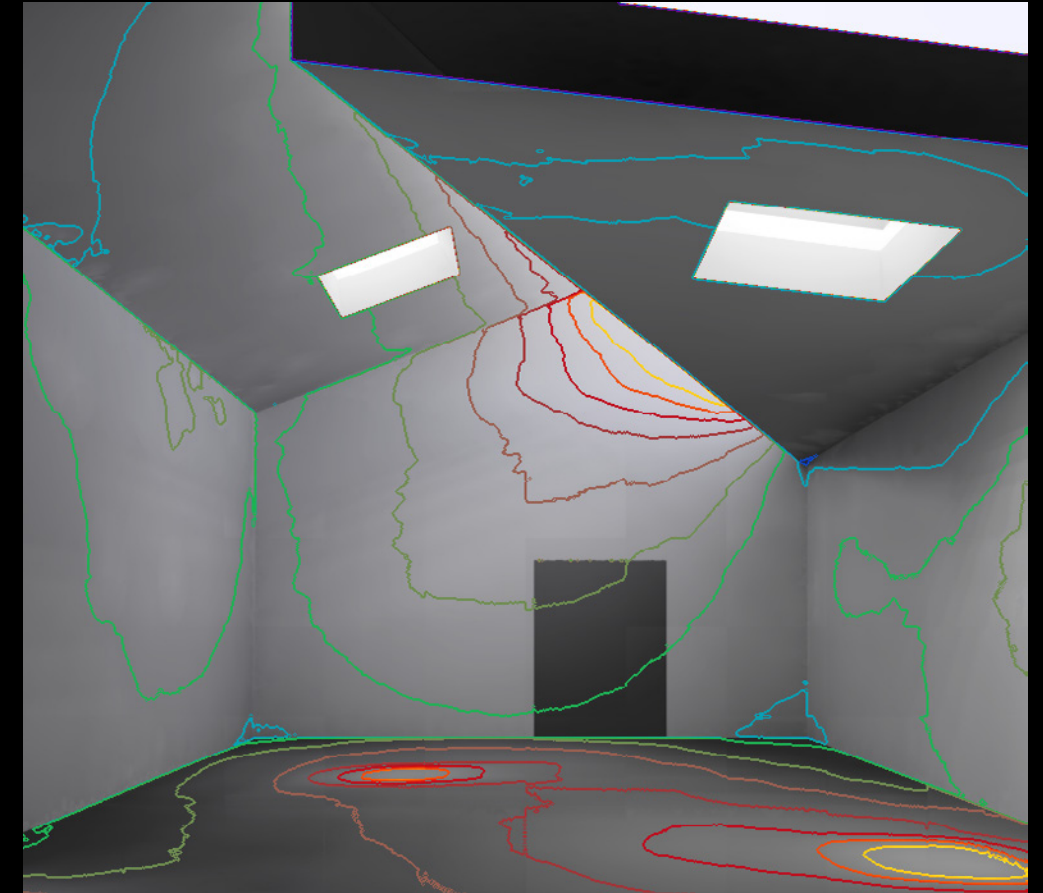




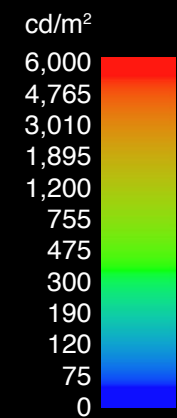
Section Perspective

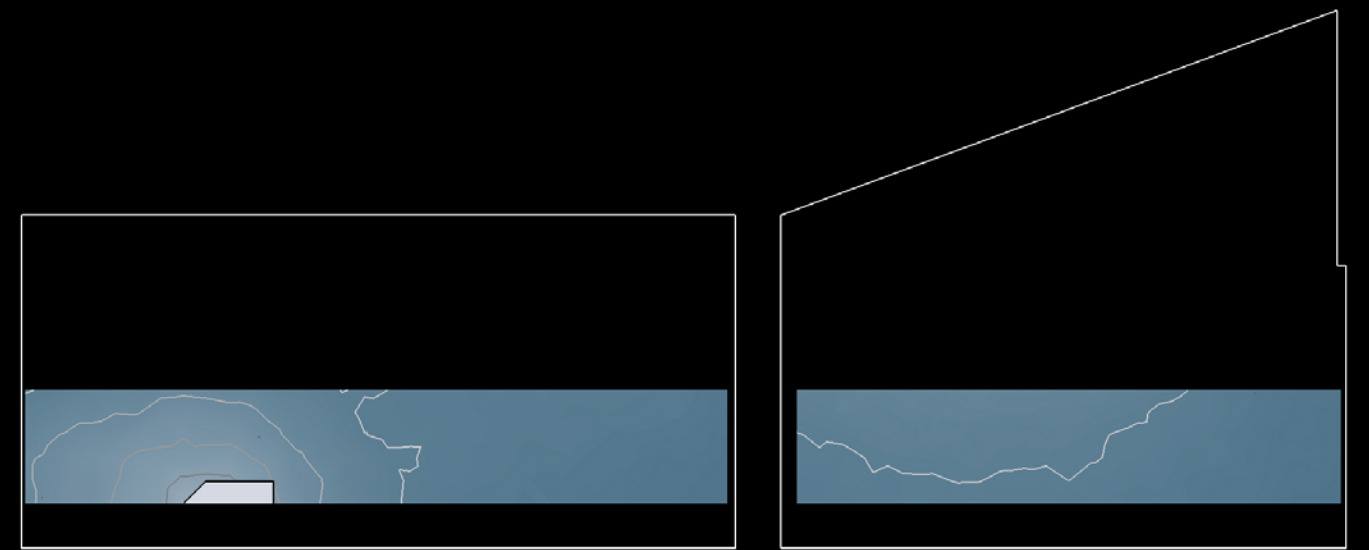
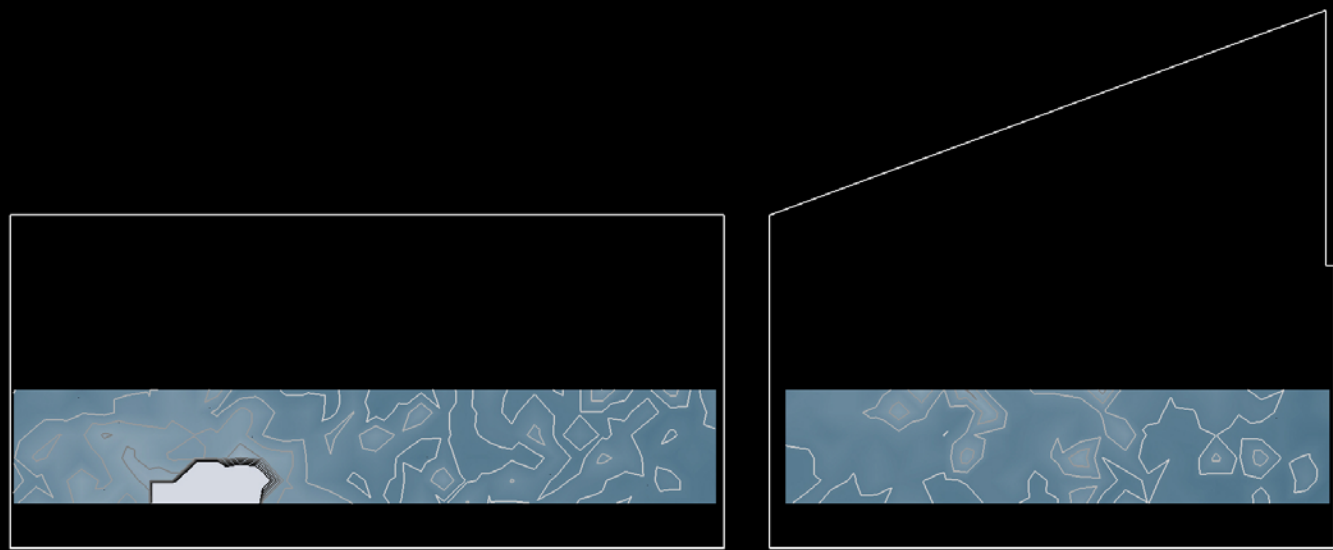
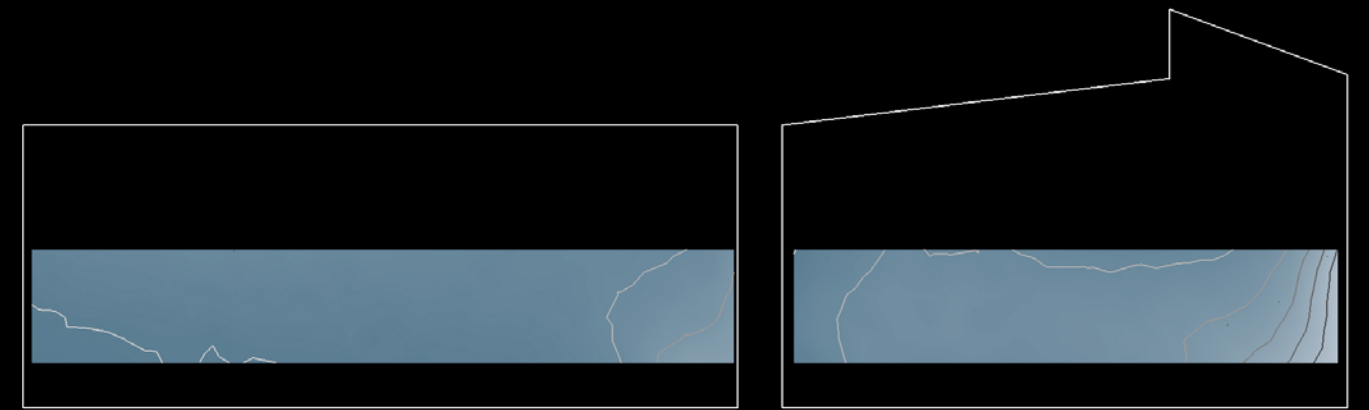
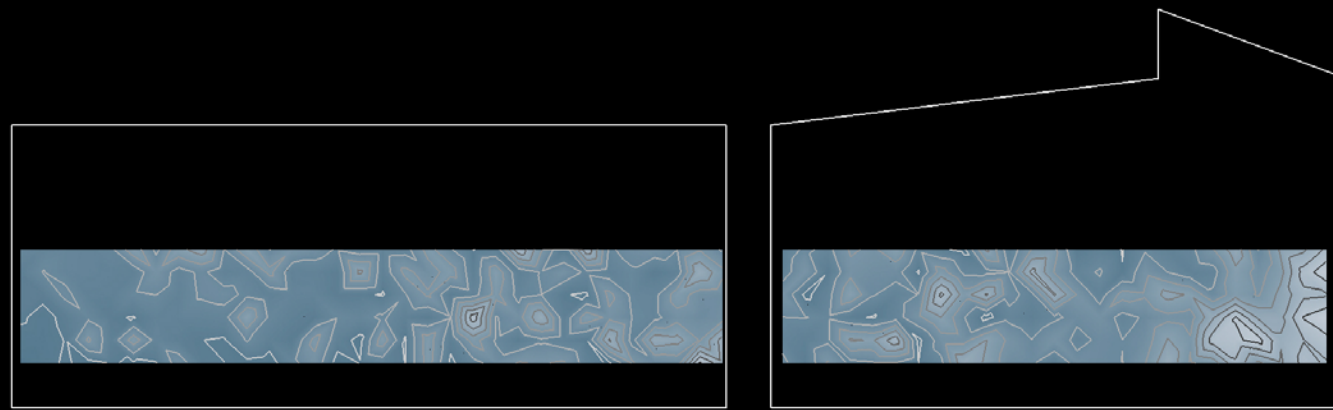


Falsecolor Luminance



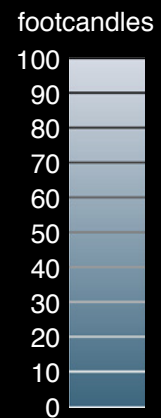
Contour Line Illuminance

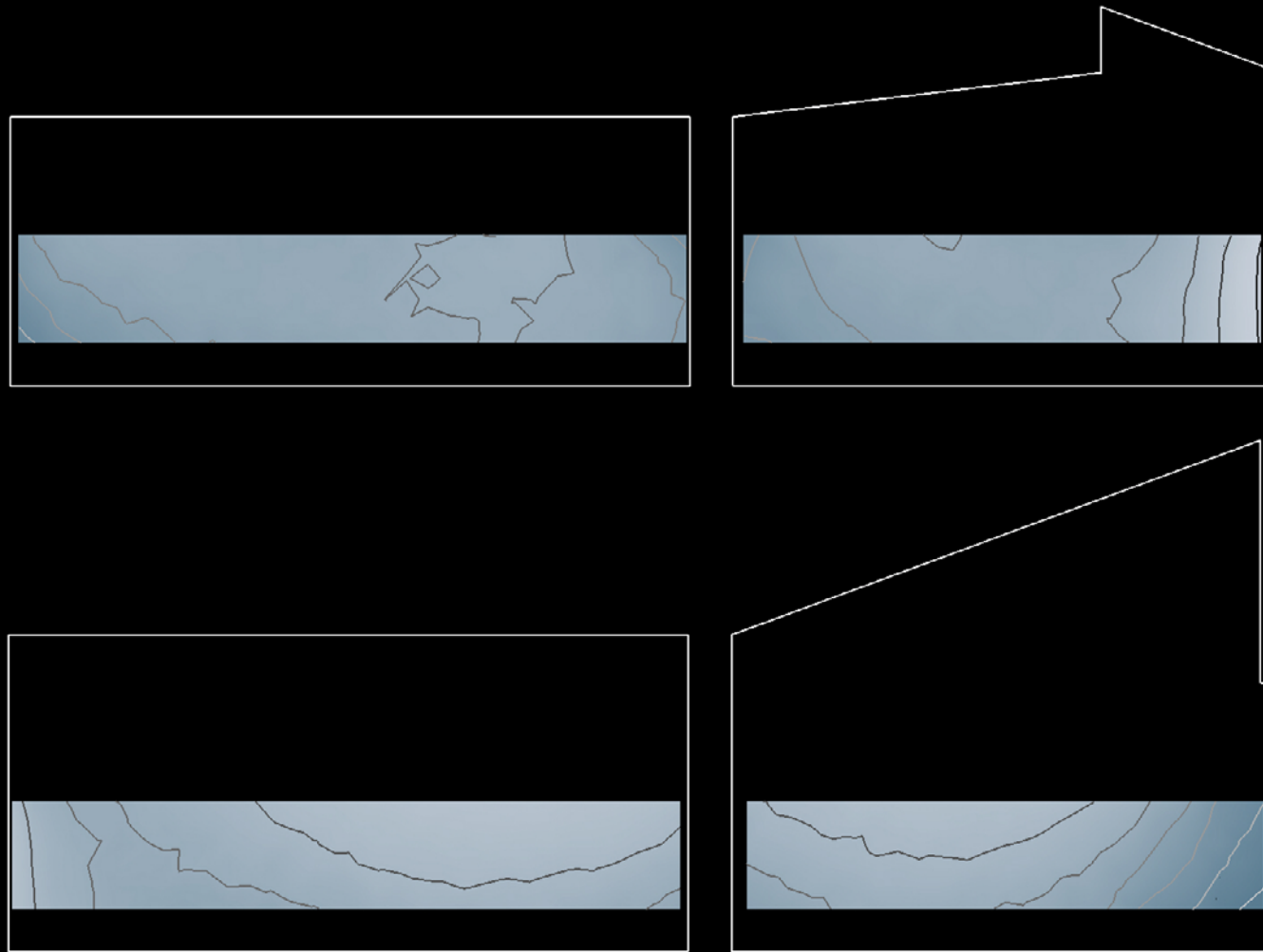




Sky Patch Sun

w/ Direct source





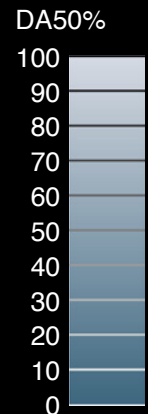
```
rcontrib -l+ -h- -V- -n 8 -ab 5 -ad 8000 -as 2000 -ar 600 -dt  
.05 -ds .1 -dc .17 -lw 9e-19 -e MF:4 -f reinhart.cal -b rbin  
-bn 2306 -o coef_glass_data/hayDUUD.txt -m sky_glow  
-w tmp/hay_DUUD.oct < points/all.pts
```

Direct Sun Point Calculation:

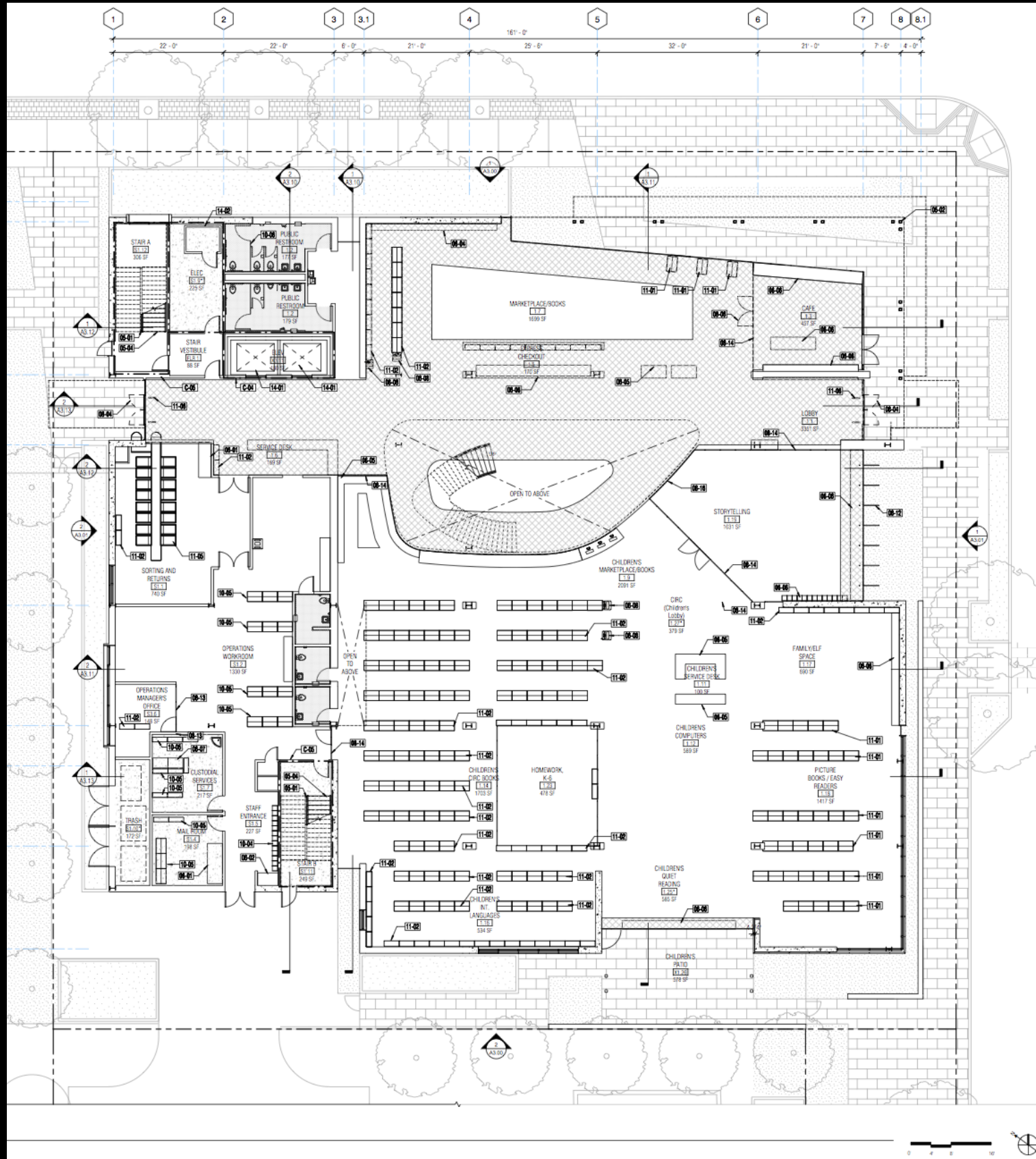
```
void light solarjan0212  
0  
0  
3 4.643e+06 4.643e+06 4.643e+06  
  
solarjan0212 source sun  
0  
0  
4 0.732294 -0.471547 0.491314 0.533000
```

```
rcontrib -l+ -h- -V+ -n 8 -ab 2 -ad 2000 -as 1000 -ar 600  
-dt .05 -ds .1 -dc .17 -lw 9e-19 -o coef_glass_data/d_  
jan_hayDADUUD.txt -M coef_glass_data/jan_mods.txt -w  
tmp/d_hayDA_DUUD.oct < points/all.pts
```

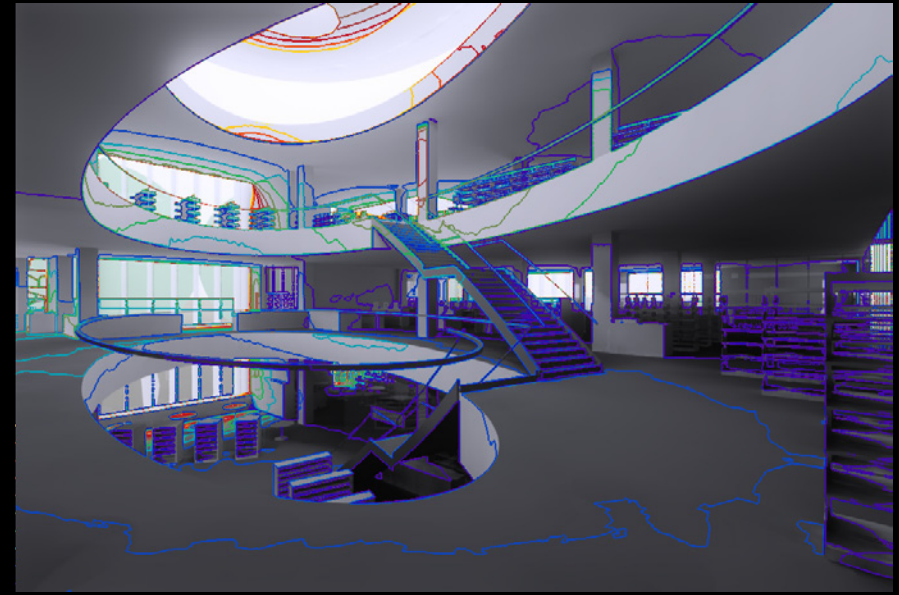
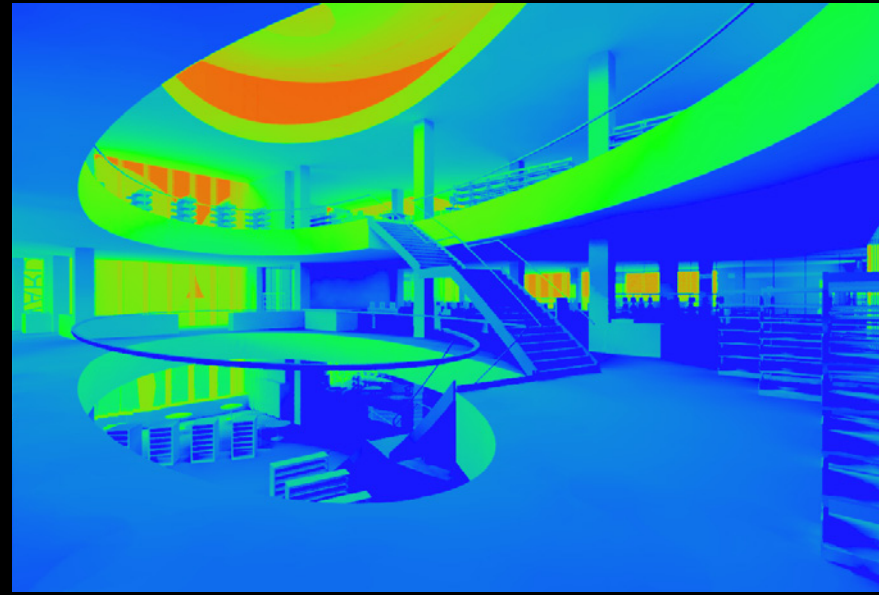
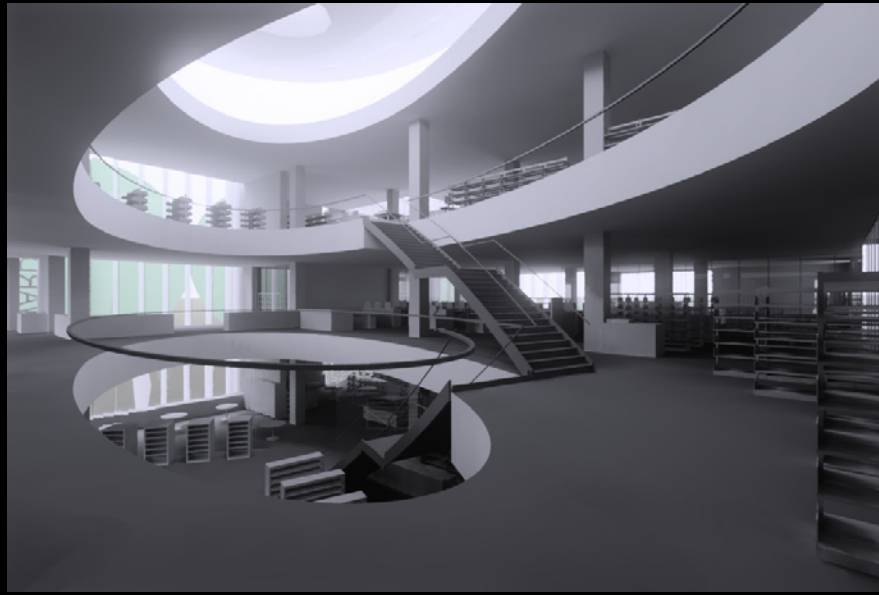
Daylight Autonomy 50fc



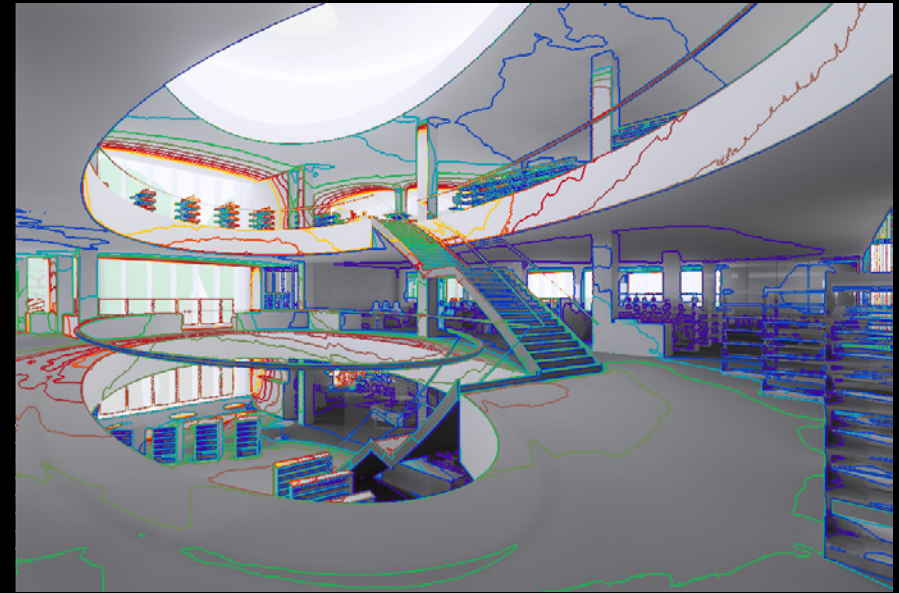
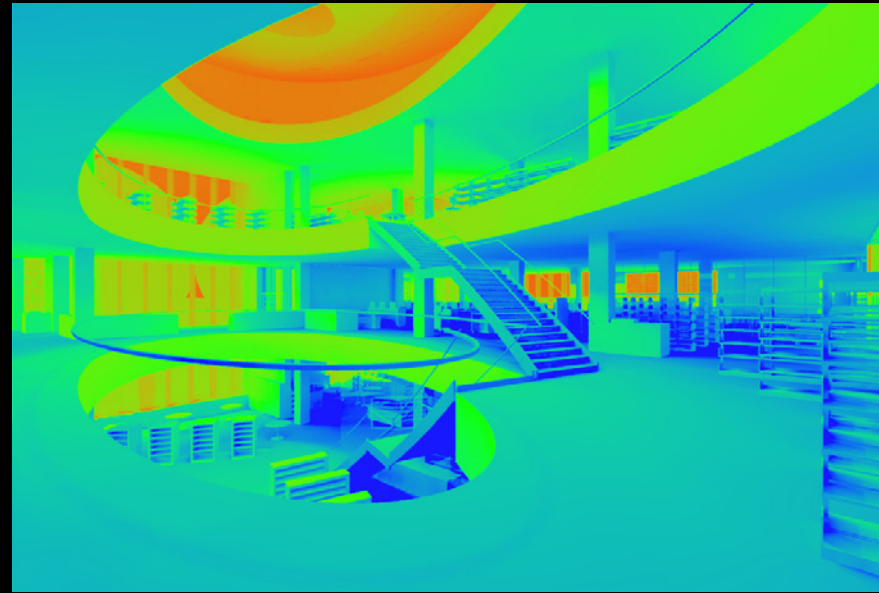
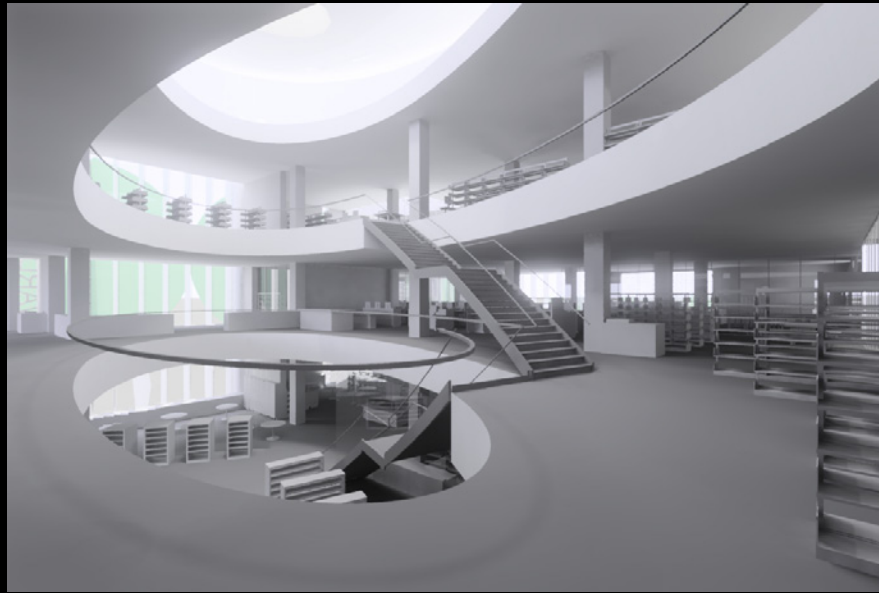
Hayward Library :: Noll and Tam Architects



Dec



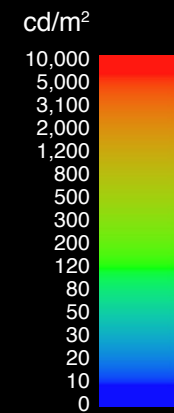
Jun



Section Perspective

Falsecolor Luminance

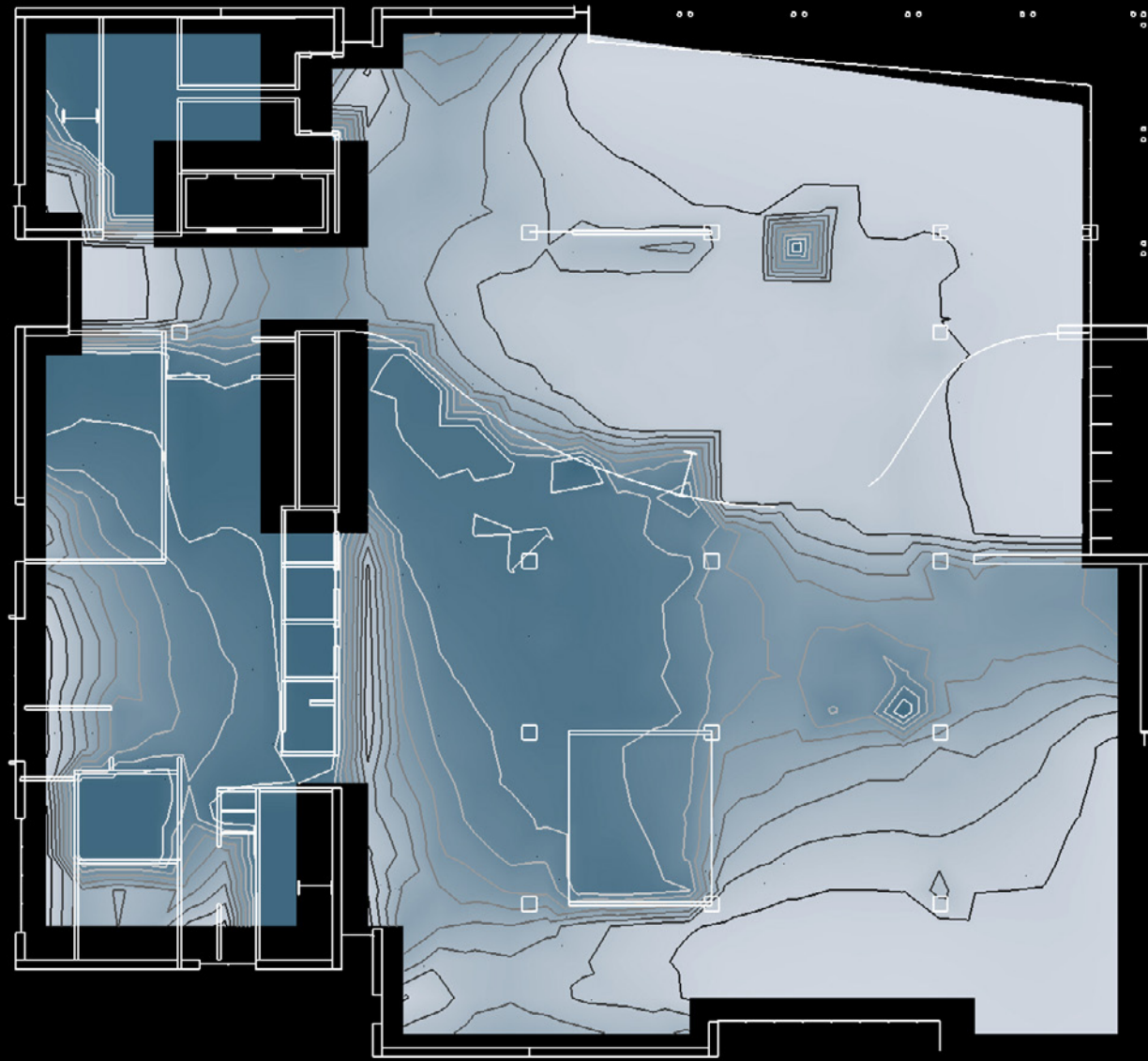
Contour Line Illuminance



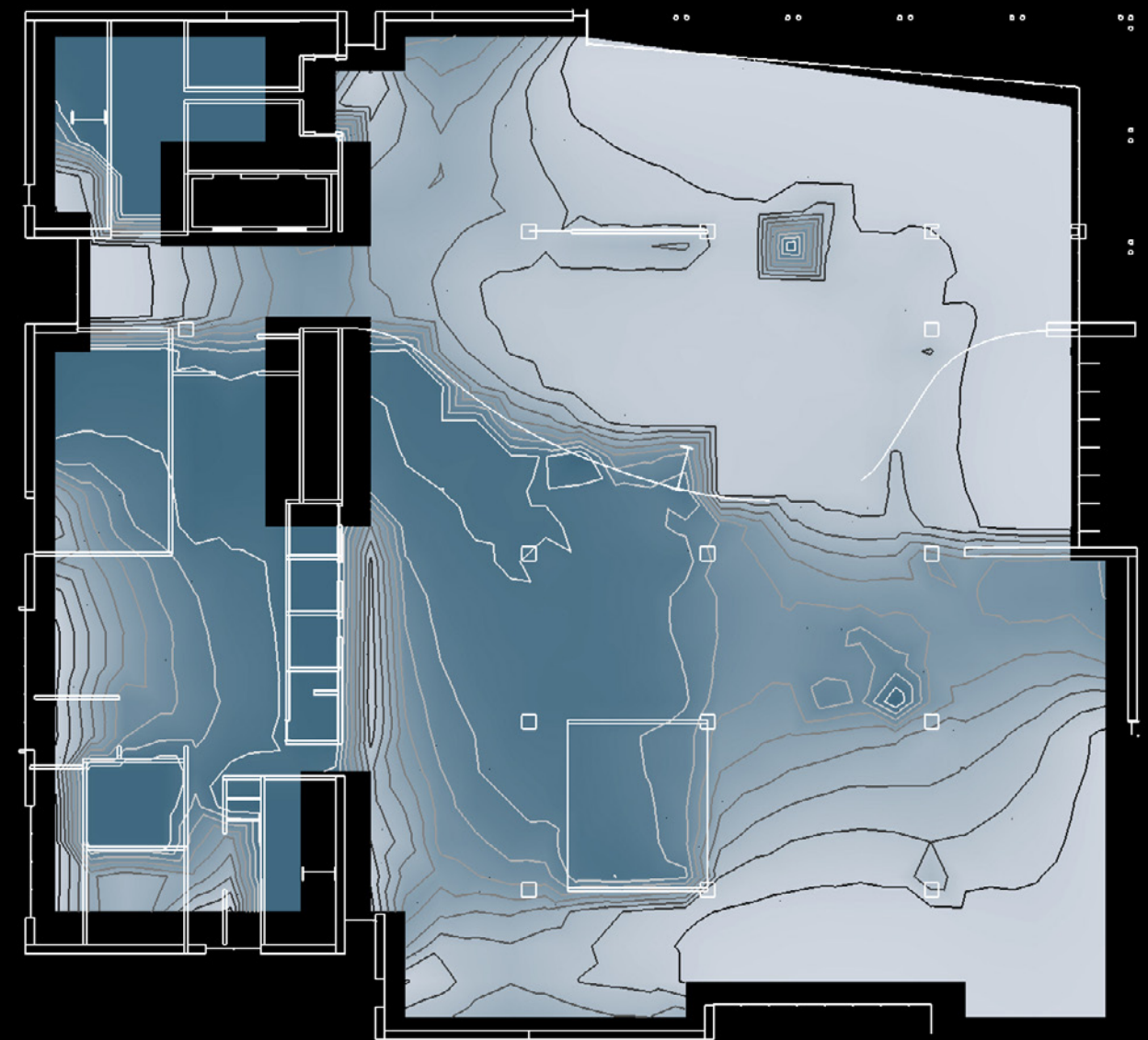
footcandles



Hayward Library :: Annual Illumination :: 1st Floor

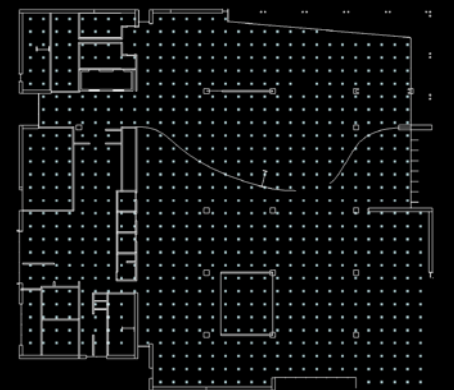
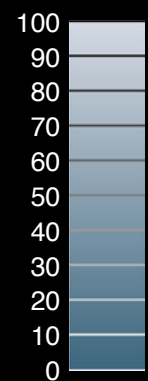


Sky Patch Sun

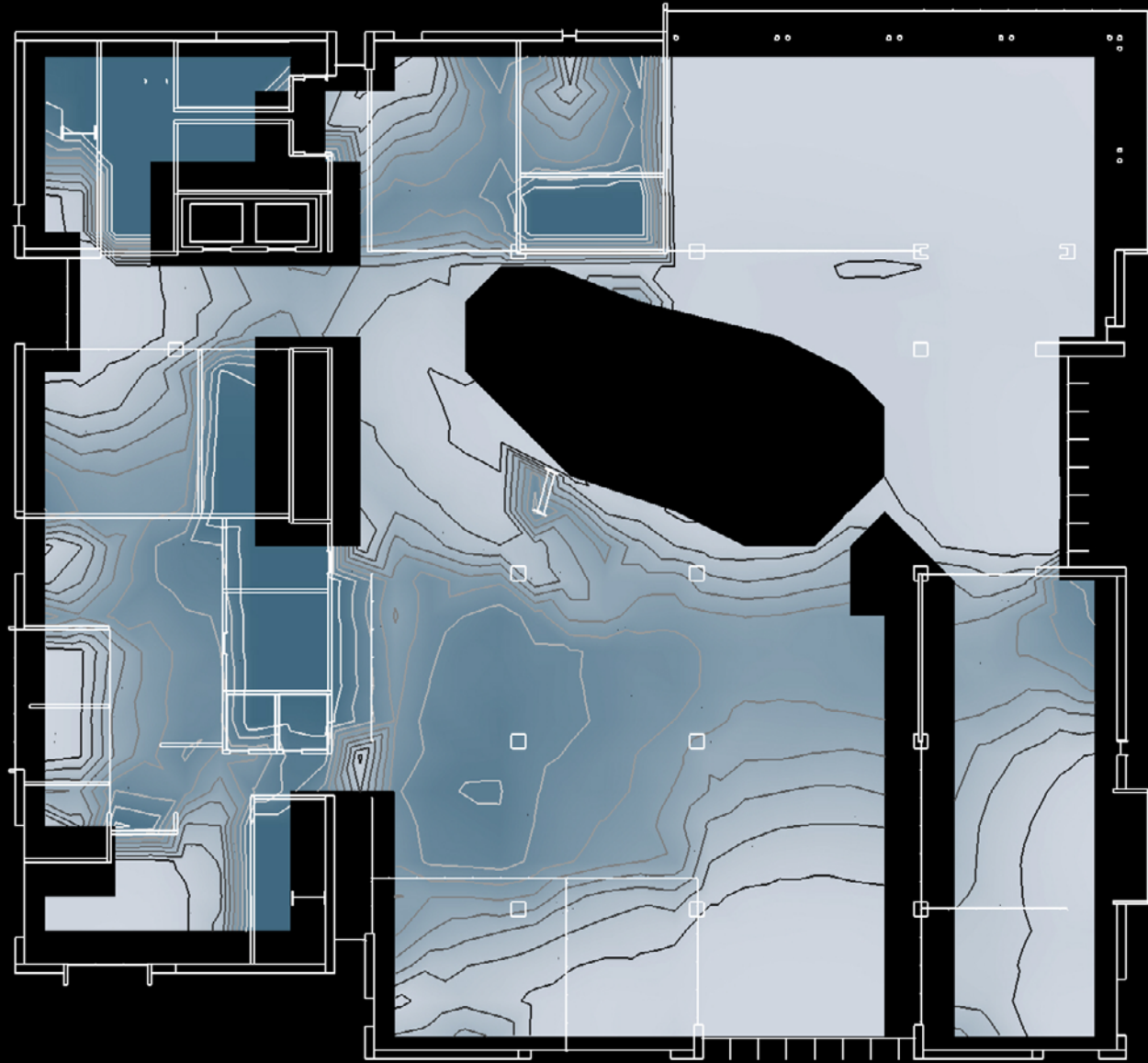


w/ Direct source

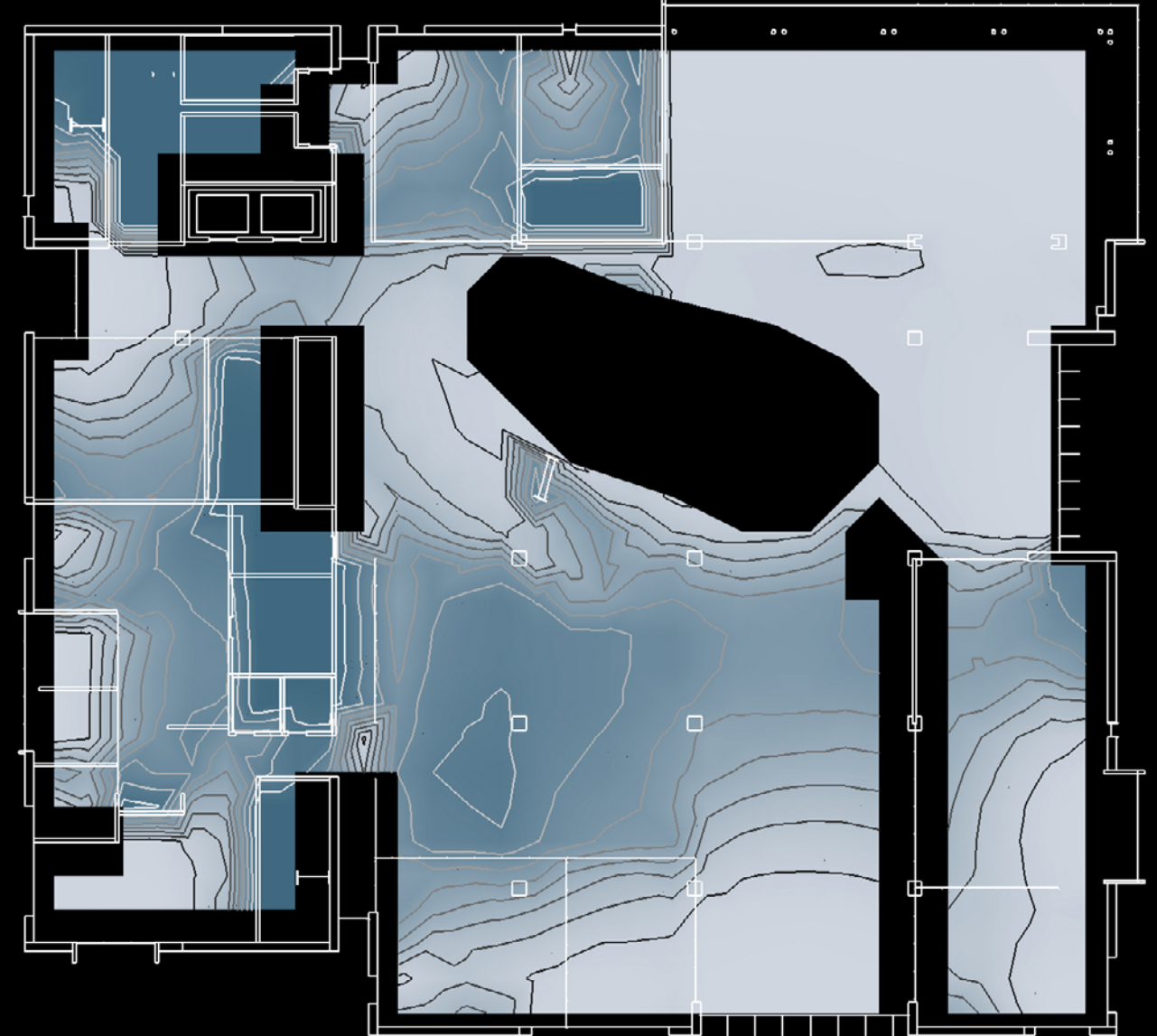
Available
Daylight 30FC



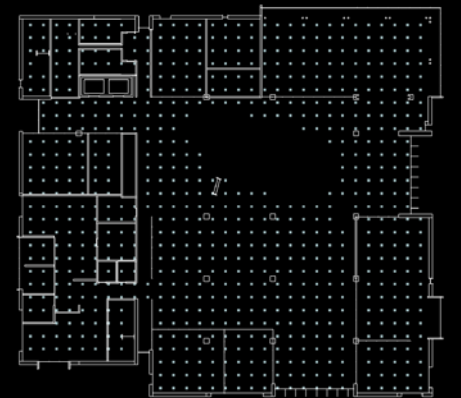
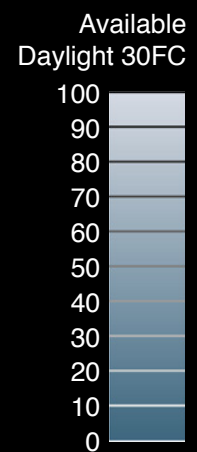
Hayward Library :: Annual Illumination :: 2nd Floor



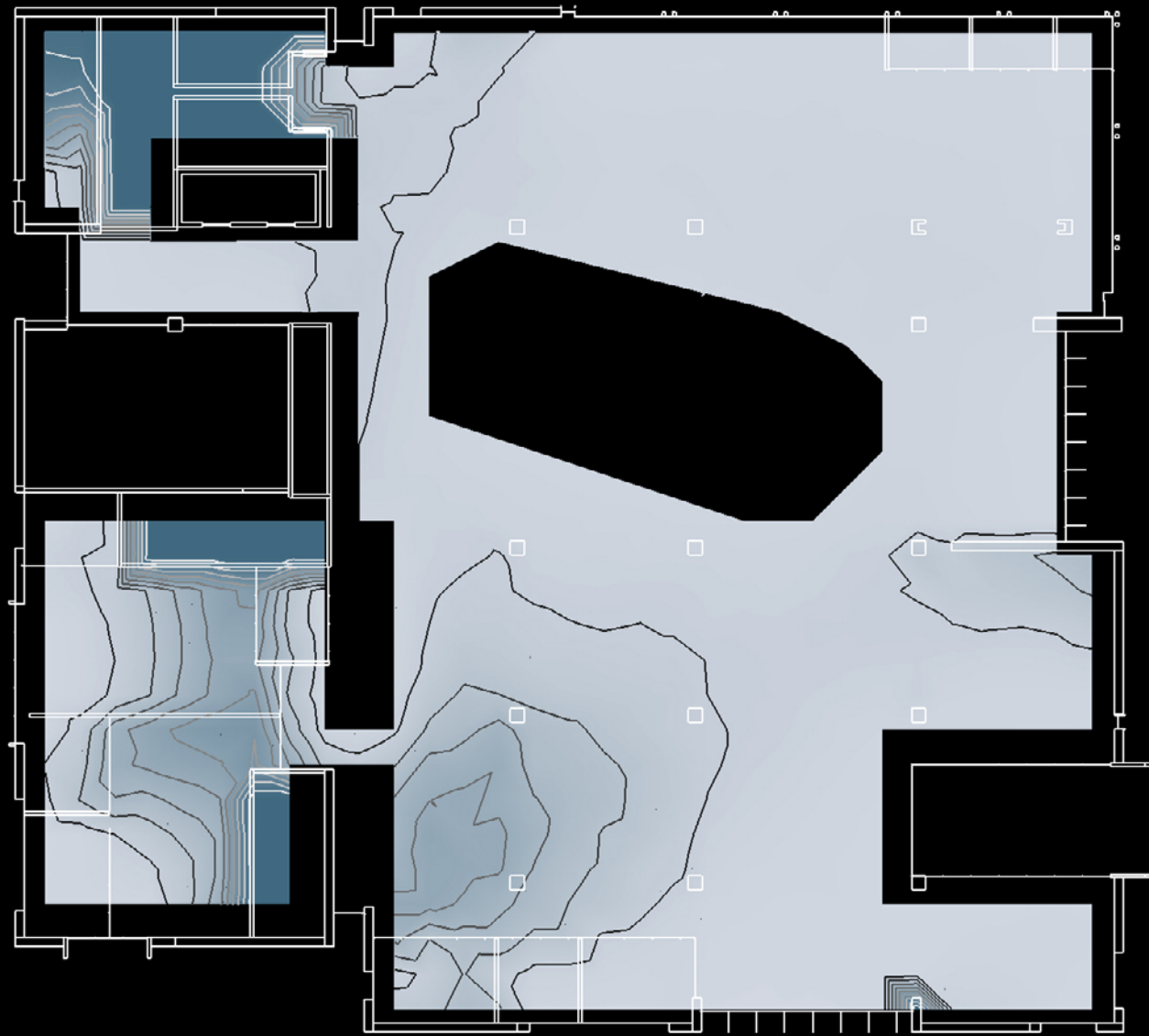
Sky Patch Sun



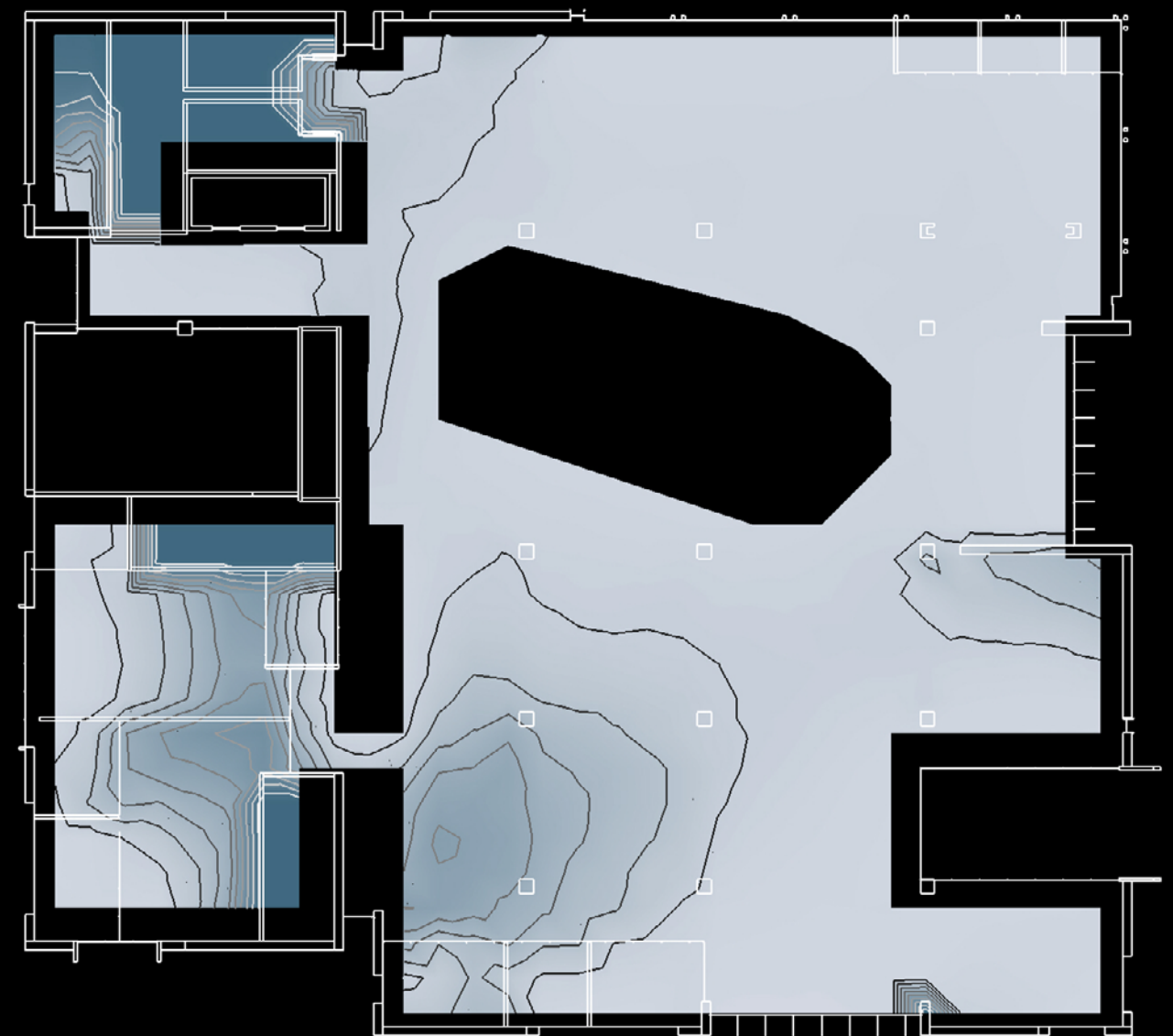
w/ Direct source



Hayward Library :: Annual Illumination :: 3rd Floor

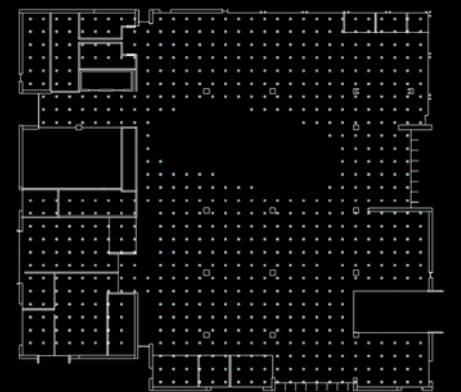
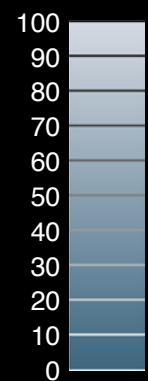


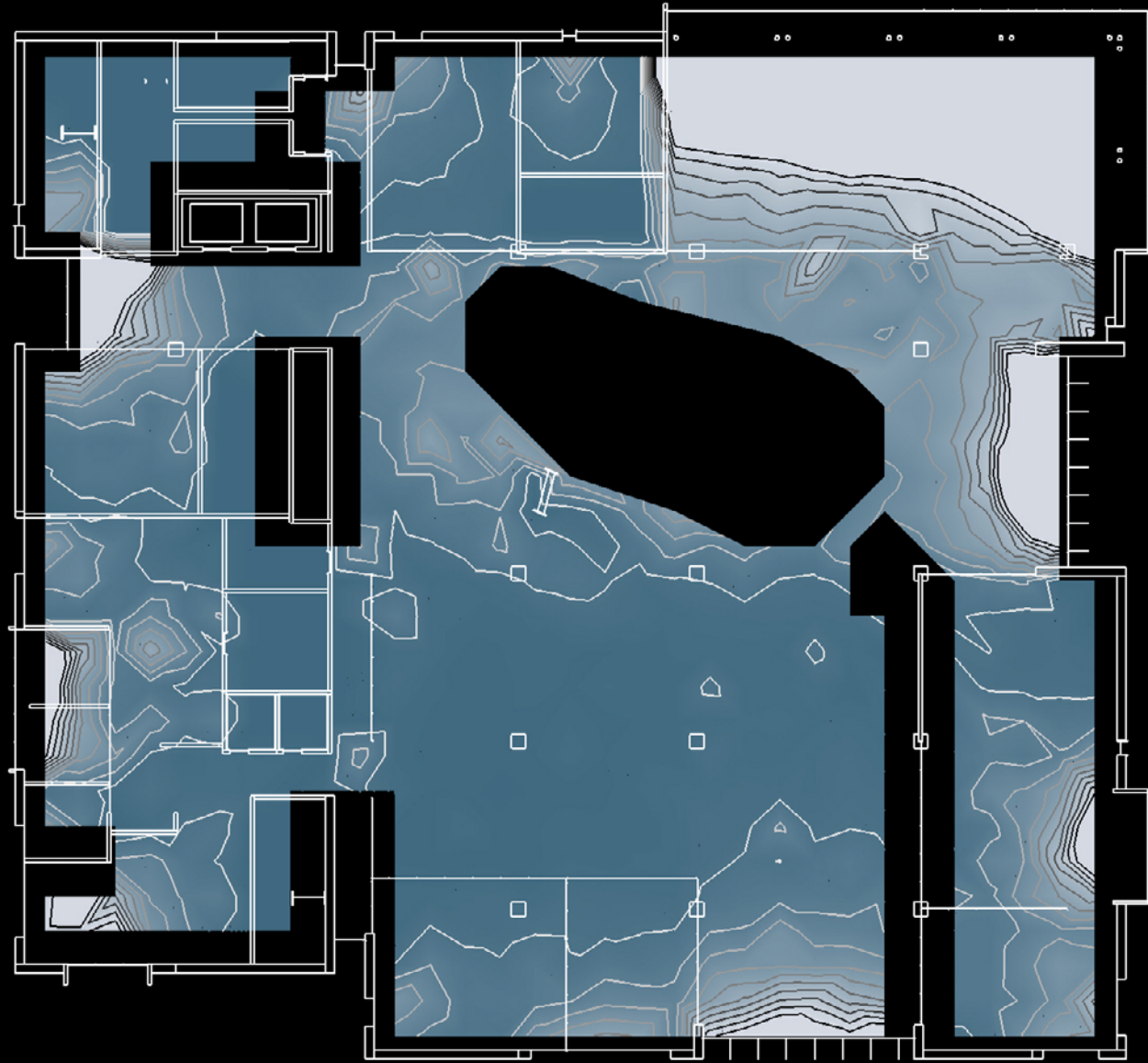
Sky Patch Sun



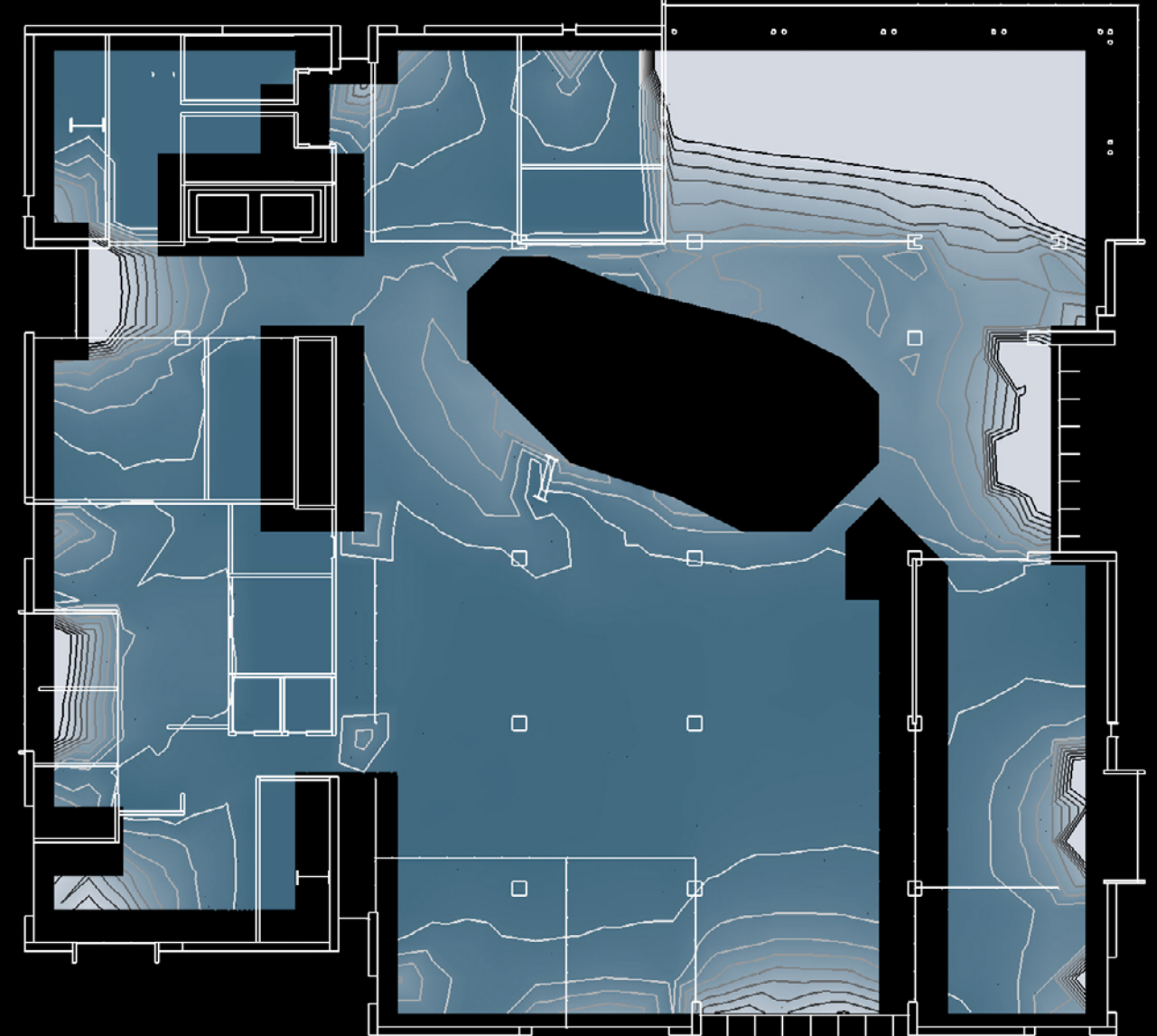
w/ Direct source

Available Daylight 30FC

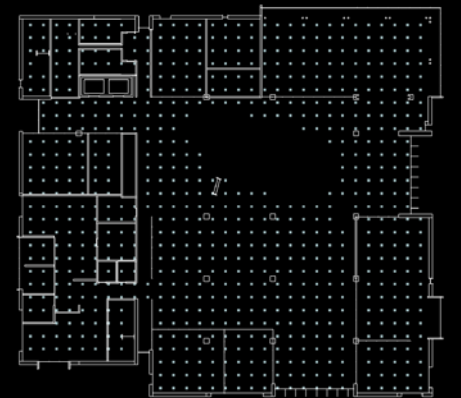
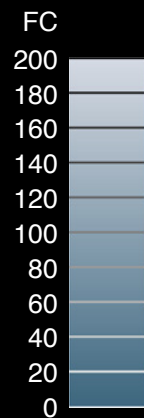


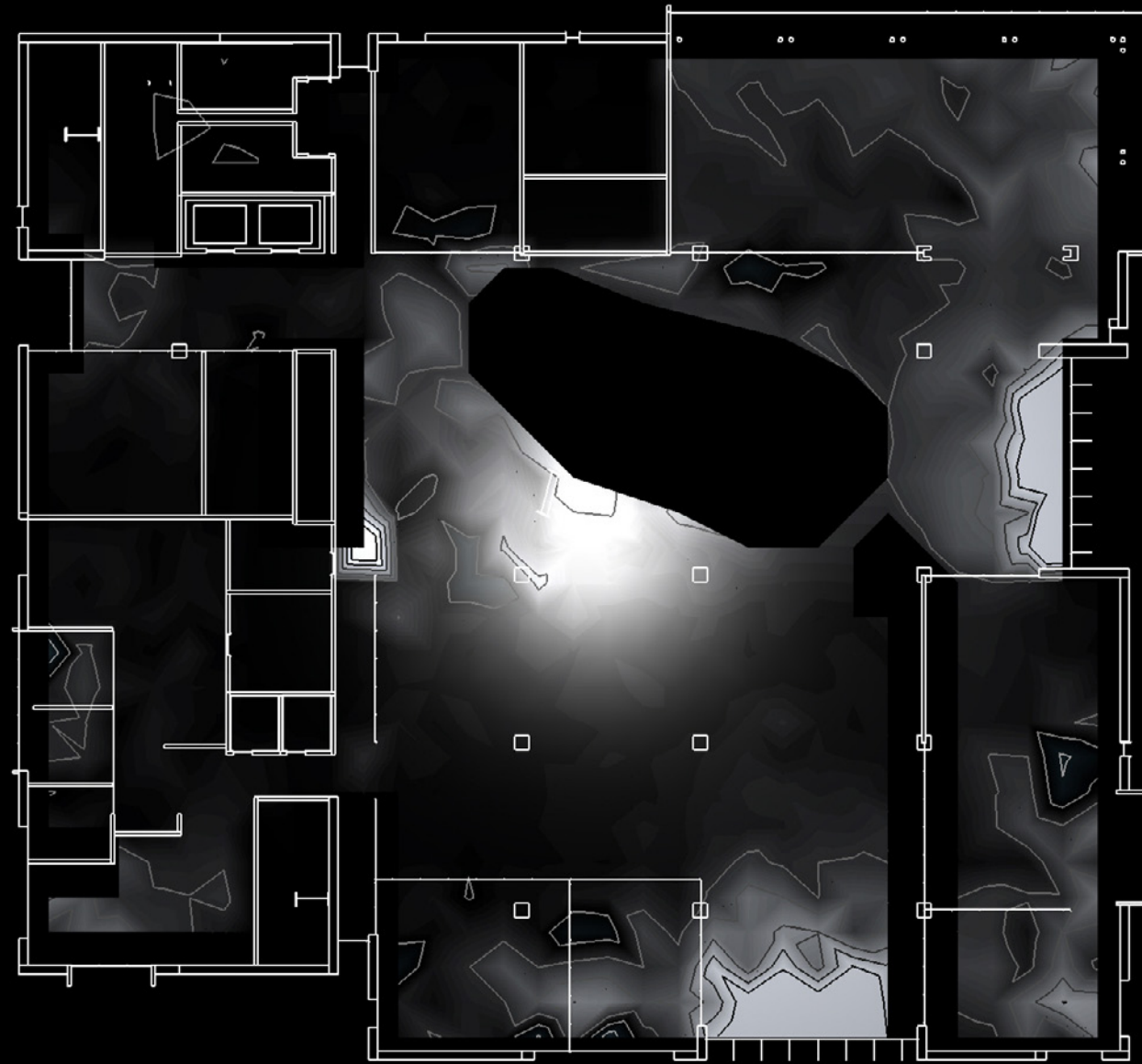


Sky Patch Sun

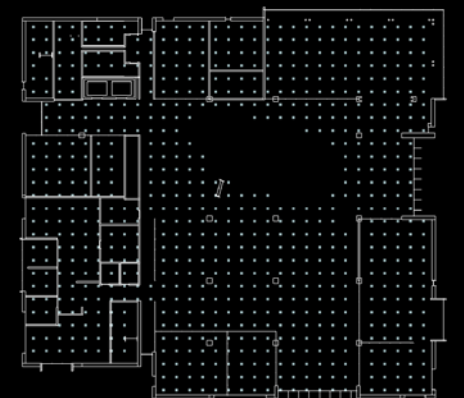


w/ Direct source

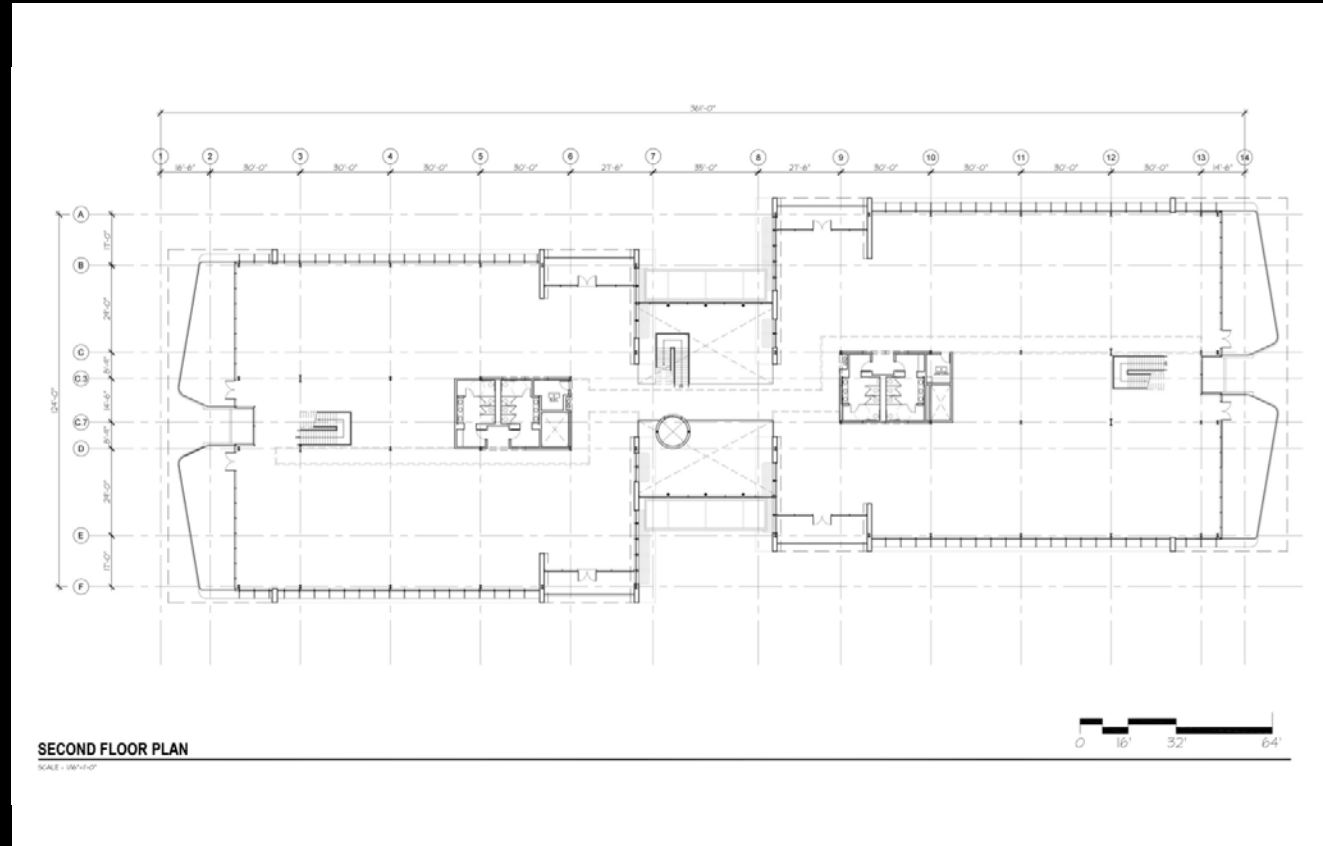




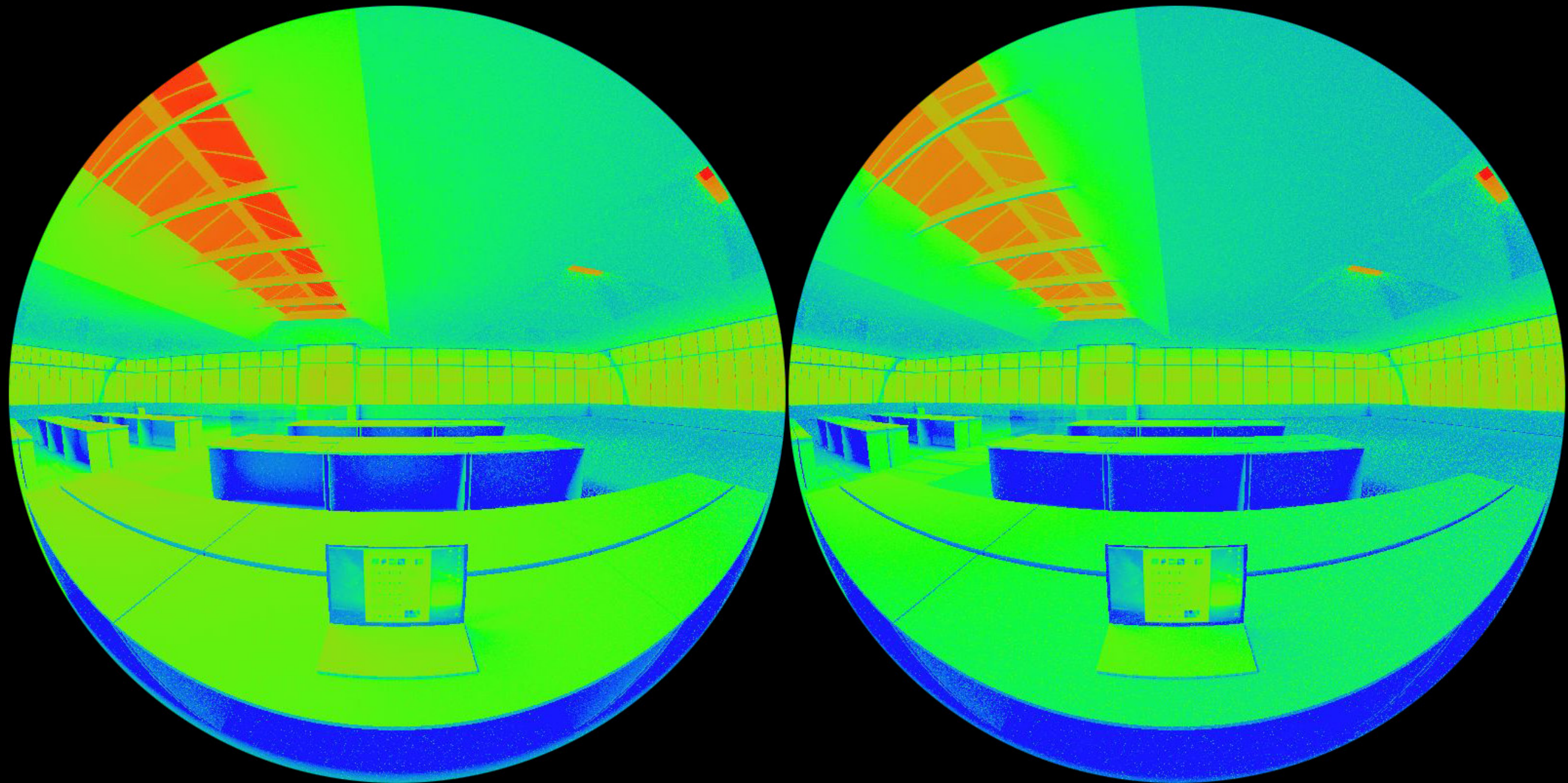
Sky Patch Sun Minus w/ Direct source



Core and Shell Office :: Form4 Architecture



Core and Shell Office :: Electrochromic Glass Visual Comfort Animation



Date: 6/20 15:00 Dir Normal: 731 dgp0: 0.25 vltE: 40 vltW: 20 dgp1: 0.21

