

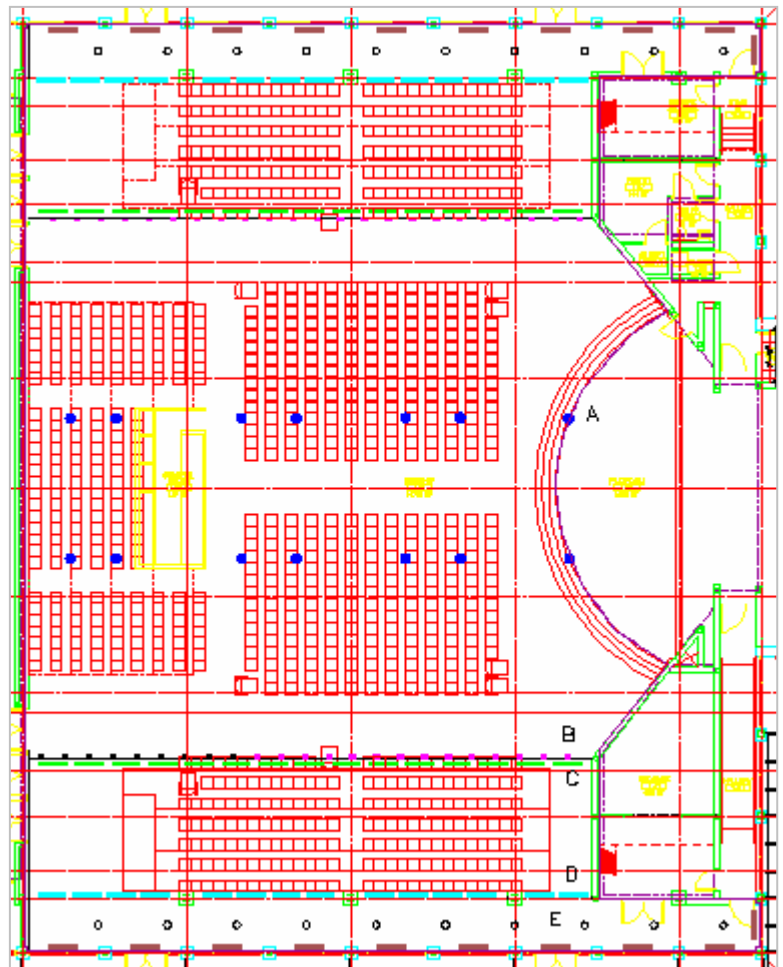
## Lighting the Worship Space

The original design for the worship space used the hanging acoustic panels to hold luminaries and the sloped ceilings to recess downlights. Thanks to the structural and acoustic redesign, the acoustic panels no longer exist and the sloped ceilings are occupied with recessed speakers. As a result, the design for the space needs to be drastically altered.

### Re-Design

The lighting re-design of the worship space involves constructing two coves and five different types of lamps in the space.

- A. Hang 14 Metal Halide pendants over the central seating area of the worship space. The pendants should drop 13'-3" from the ceiling to a height of 38' above the ground.
- B. Place 23 wallwashers just below the bottom of the ceiling pitch. Do this for both the left and right sides of the space.
- C and D. Build cove surfaces along the top and bottom portion of the sloped roof. Along the top of the roof (C), place 15 4'x7" T8 lamps. Along the bottom portion of the roof (D), place 14 4'x2" T5 lamps. Both of these lamps should be positioned to wash the ceiling surface. Repeat for the ceiling above both seating areas.
- E. Place 12 compact fluorescent downlights down each hallway outside of the worship space.



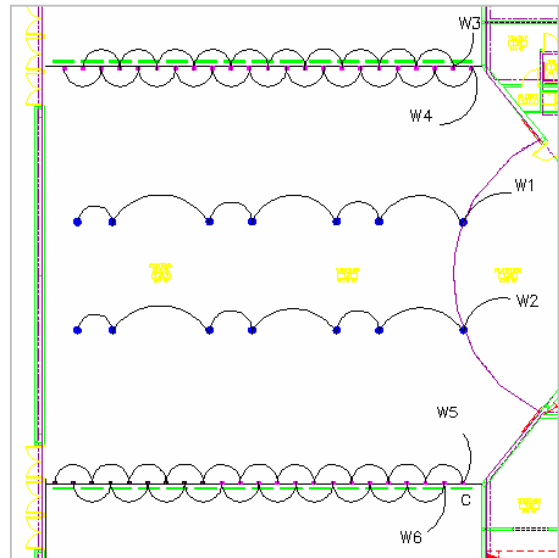
Re-Design Lighting Layout for the Worship Space

**Controls**

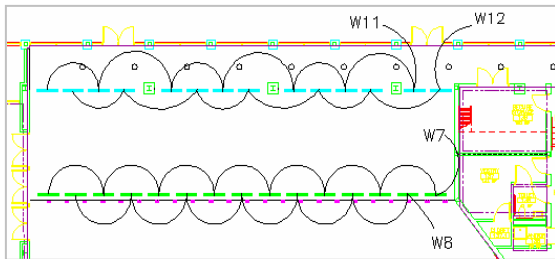
There are 18 lighting circuits created in the re-design of the worship space. Details of circuitry can be found in the five accompanying figures.

With the exception of the four CFL hallway circuits, all other circuits will be placed on an existing dimming panel. This dimming panel (dimmer #1 in the existing panel schedule) also controls the stage lighting in the worship space. By placing all of these circuits on the dimming panel, it becomes very simple to create lighting moods for specific functions.

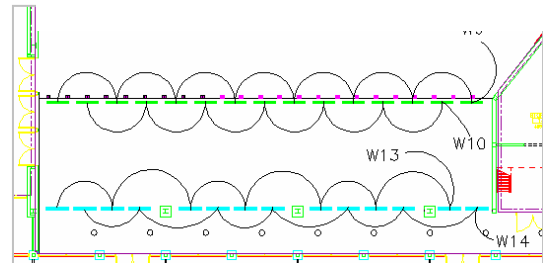
Circuits W1, W1, W15 and W17 will be on battery pack back-up.



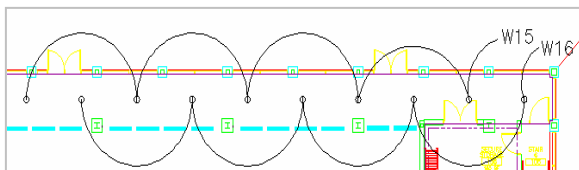
**Circuits in the center of the worship space.**



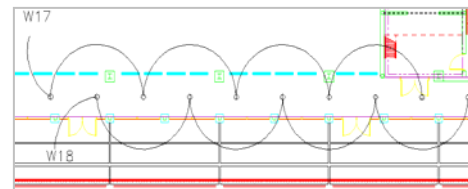
**Circuits in upper sloped seating section**



**Circuits in lower sloped seating section**



**Circuits in upper hallway**



**Circuits in lower hallway**

## Lighting Summary

According to the design needs, the goals of redesigning the worship space was to create a system flexible to the many possible functions for the space and to create a system that would show off the organic nature of the space, without being overbearing.

The new re-designed system is more than capable of handling the space's flexibility. With the pendants on 100%, over 30 footcandles are placed on the floor, more than enough for any dining, lecture, or small convention. With these pendants dimmed, the light levels from the other fixtures will still be effective enough for a presentation or church service to take place. The cove lights on both sloped ceilings are to be turned on when people are seated in those areas, but they can be dimmed or turned off otherwise. Finally, all fixtures are either high enough or hidden so that any athletic activities can take place in the space without worrying about breaking a lamp.



**Lightscape model of the redesigned Worship Space (seating not included)**

With the acoustic panels removed and the steel trusses switched to timber, it is clear that the space become much more organic and open that it was originally. The new lighting system is designed to continue this trend, as most light is used simply to wash surfaces in the space. With the exception of the pendants, all light is indirect and are fixtures are nearly invisible. By taking the fixtures out of the lighting, the occupant isn't confronted with how the space is lit, but rather with how the space looks.

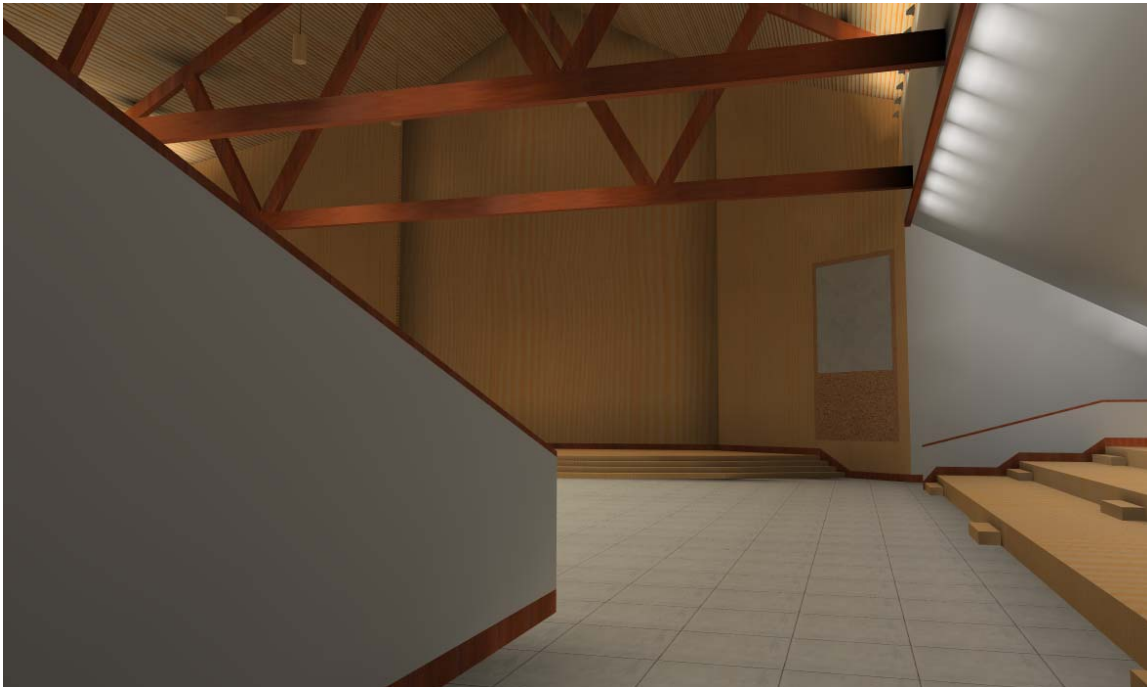
## Light Fixtures

The pendants are the only noticeable fixtures in the room so great care was made to ensure they would not be very intrusive. For starters, they were painted brown to match the ceiling. Also they are hung high enough so that while they can be seen by people in the room, they will not interfere with someone looking up at the truss. In fact, the light from the fixtures tend to show off the truss by creating warm spots on the wood surface.

The 46 ceiling wash fixtures are purely decorative. They were placed in the worship space to show off the natural wood texture of the ceiling. With the pendants off during worship services, the ceiling wash fixtures create a powerful effect, pulling worshippers' sight up to the massive ceiling in a symbolic gesture.

The coves at the top and bottom of the sloped ceiling are also used to show off the simple materials used in the space. Although the fixtures are hidden from sight in coves, the lights subliminally lead guests to peripheral seating spaces. Fortunately, the wash from the coves is not strong enough to pick up the recessed speakers in the ceiling, even though they do place enough light for reading in the seating area.

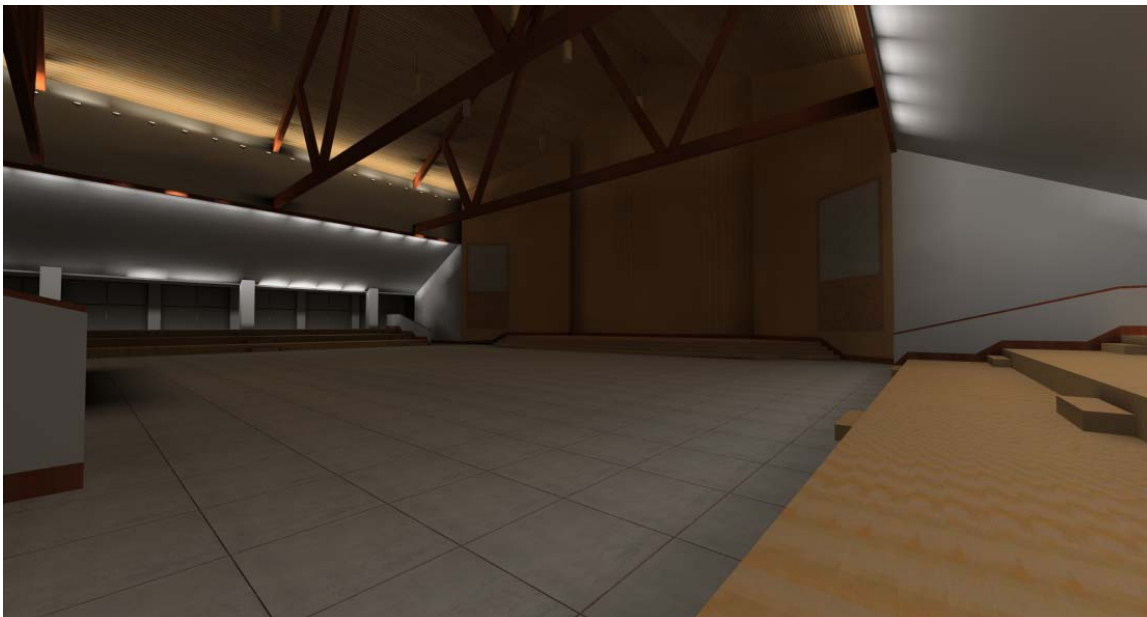
Finally, narrow direct downlights were placed in the hallways on both sides of the space so that there is no danger of light spilling over into the worship space itself.



View upon entering from the door at the back of the worship space. Note cove wash on sloped ceiling and warm spots on the truss (caused by metal halide pendants).



**View from the stage looking back into the space.**

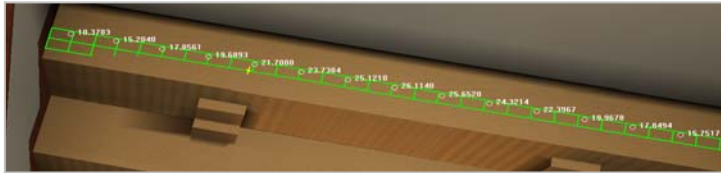


**“Watching the Pulpit” during a worship service. The rigging lights aren’t included in this rendering, thus the lack of light on the stage. The purpose of this model is to show how the character of the space changes when the pendants are dimmed to 5%.**



**Approximately 20 footcandles on side seating areas.**

**Illuminance Values (cont.)**



**Between 15 and 20 footcandles on Back Seating Area**



**Between 20 and 35 footcandles on the float with the pendants on 100%.**

**Lamp Schedule**

Fixture Type	Lamp Type	CCT	CRI	Number of Lamps	Distribution Type	Input Power	Ballast Type
A	12" MH	3200	70	1	Direct	100 W	Magnetic
B	5"x5" T4	2950	100	1	Direct	150 W	
C	4'x7" T8	3500	82	2	Direct	40 W	Electronic
D	4'x2" T5	3500	85	2	Direct	121 W	Electronic
E	8" CFL	3500	82	2	Direct	52 W	Electronic

**Power Density**

Fixture Type	Quantity	Number of Lamps	Watts / Lamp	Total Power
A (Pendant)	14	1	100	1400 W
B (Ceiling Wash)	46	1	150	6900 W
C (Cove)	30	2	40	2400 W
D (T5)	28	2	54	3024 W
E (Downlight)	24	2	26	1248 W

Total Power = 14972 W  
 Total Area = 12959 ft<sup>2</sup>

**Power Density = 1.155 W/ft<sup>2</sup>**

**Conclusions**

In the worship space redesign, the focus is on the light and the space itself, not the fixtures. With the exception of the hanging pendants (which are painted to match the ceiling), all fixtures in the worship space are essentially hidden from view. The light in the space can be used for multiple functions to create many different moods, from rowdy lectures to quiet worship services. Finally, from a power standpoint, the re-design is nearly one-half the power density used in the original design.

**See Appendix for Light Loss Factors, Ballast Information, Dimensioned Power Plan and Cut Sheets**