

Daylight Analysis

8718 Sunnyvale City Hall, June 30, 2020

Report Summary

Atelier Ten conducted a daylight analysis of the Sunnyvale City Hall project to evaluate visual comfort and useful daylight levels across all floor plates. The model used for the analysis aligns closely with the 75% CD Design.

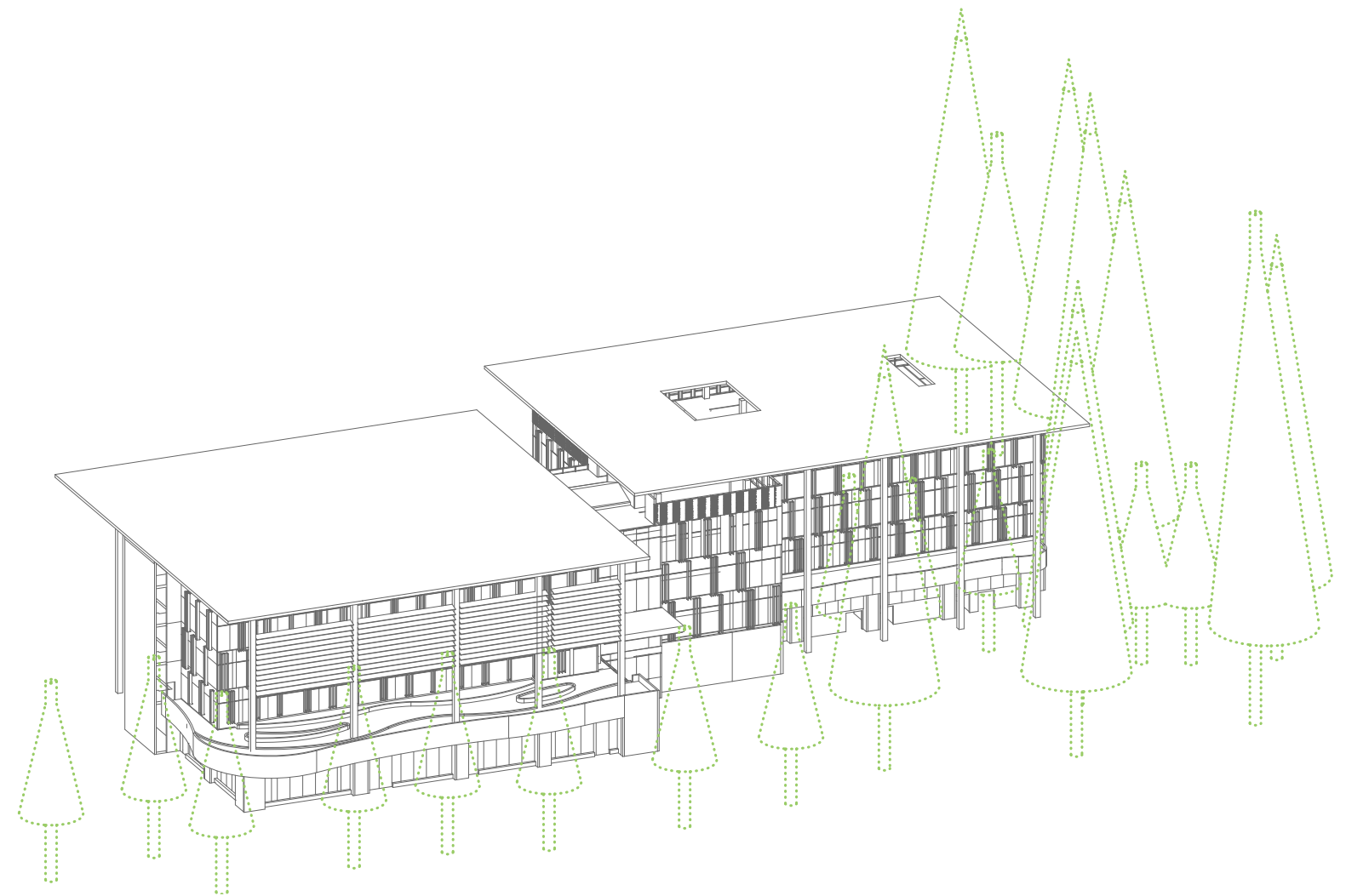
A primary goal for daylight design is to maximize floor area that receives useful daylight, that is, daylight at levels high enough to comfortably perform tasks without electric lighting, yet low enough to avoid glare for occupants.

Metrics

Useful Daylight Illuminance (UDI), Spatial Daylight Autonomy (sDA), and Annual Solar Exposure (ASE) were all studied for this analysis.

Useful Daylight Illuminance (UDI) was used to compare the four design scenarios. This metric explicitly shows areas that are overlit and underlit on an annual basis.

Spatial Daylight Autonomy (sDA) and **Annual Solar Exposure (ASE)** were tested to evaluate LEED credits. The project is targeting an sDA threshold of 55%.



Annual Daylight Analysis - LEED Compliance (sDA & ASE) - Regularly Occupied Spaces

8718 Sunnyvale City Hall, June 30, 2020

Metrics

Spatial Daylight Autonomy (sDA) is a metric describing the annual ambient daylight levels inside a building. In this analysis it is represented by the percentage of floor area that meets the minimum illuminance level, 300 lux, for at least half of the operating hours.

Annual Sunlight Exposure (ASE) describes the potential visual comfort of a space and is defined as the percentage of floor area that exceeds 1000 lux for more than 250 hours per year.

For the LEED 4.1 Daylight credit, the average ASE is 13%, a minimum 7% is the target to avoid blind deployment. The average sDA is 57%, exceeding the 55% target threshold to achieve 2 LEED points.

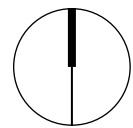
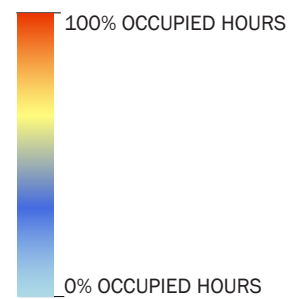
Results per Level:

- Level 1
 - sDA: 49.7%; ASE: 15%
- Level 2
 - sDA: 56.5%; ASE: 14.7%
- Level 3
 - sDA: 68.9%, ASE: 13%
- Level 4
 - sDA: 58.2%, ASE: 12.7%

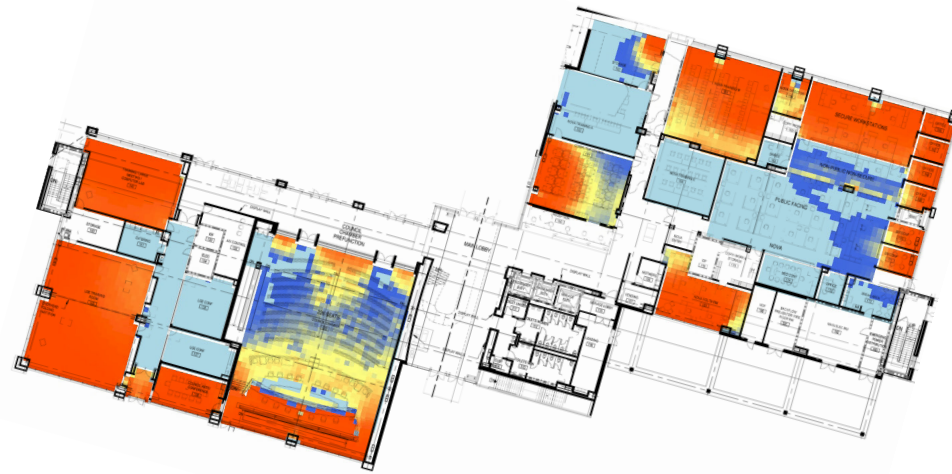
Avg. sDA: 57%
Avg. ASE: 14%

Spatial Daylight Autonomy

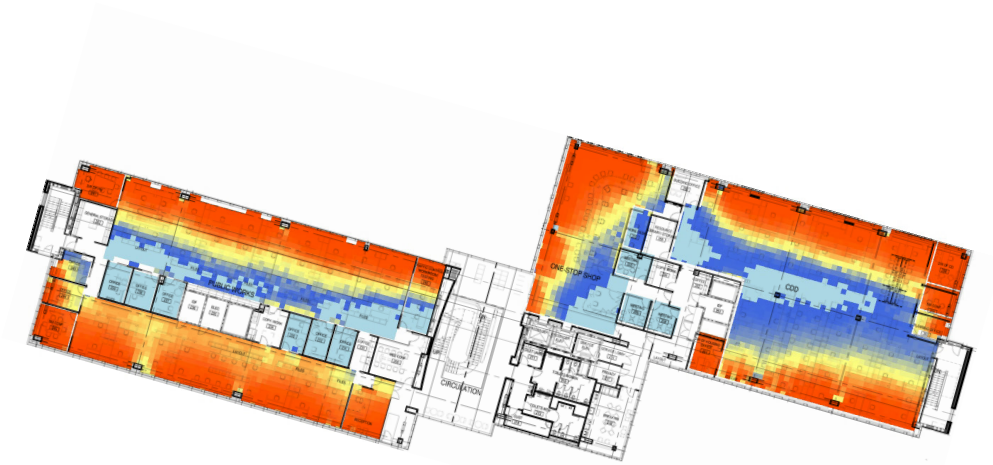
% time over 300 lux



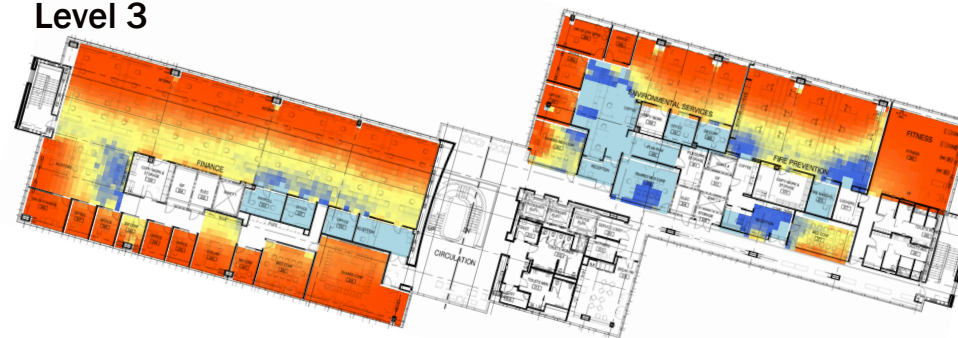
Level 1



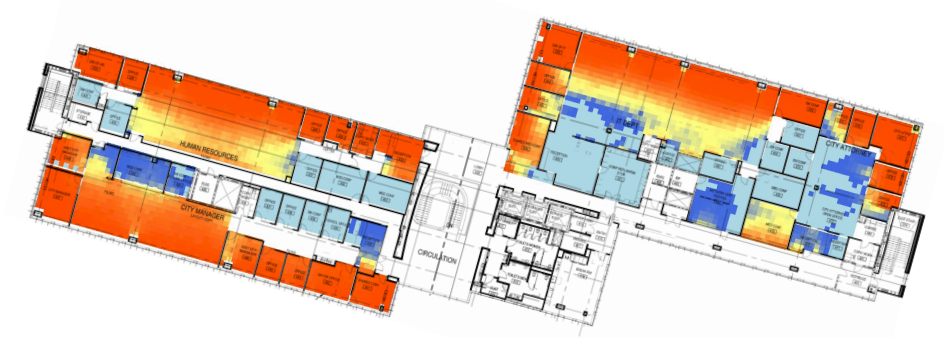
Level 2



Level 3



Level 4



Annual Daylight Analysis - LEED Pilot Credit Compliance (sDA) - Non-regularly Occupied Spaces

8718 Sunnyvale City Hall, June 30, 2020

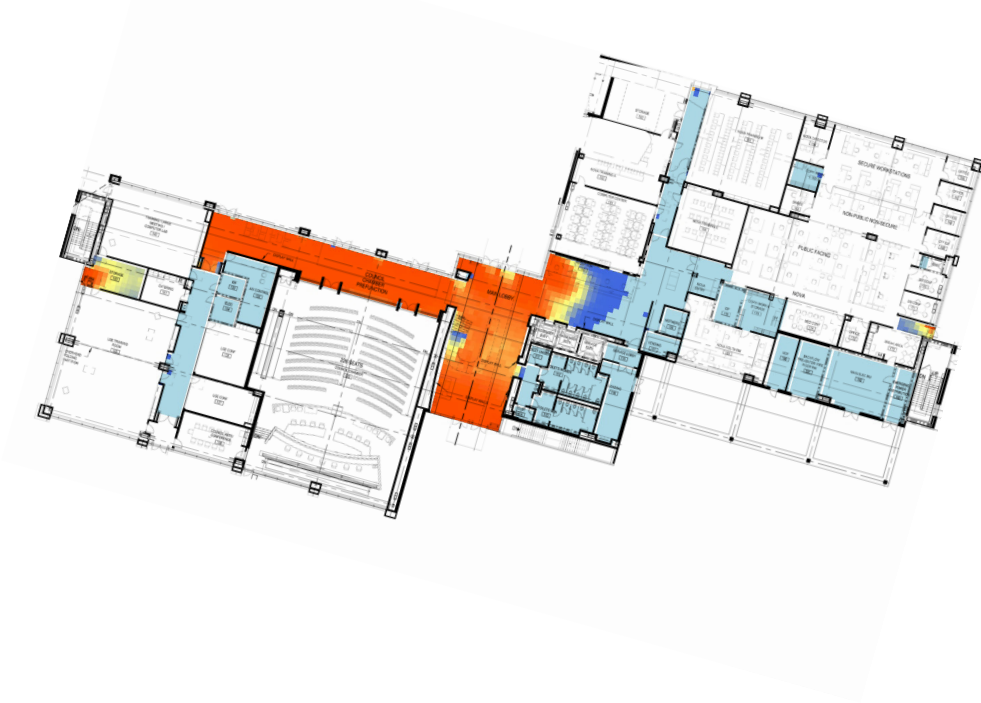
Requirements

A LEED Pilot credit can be achieved if the project can demonstrate an sDA threshold of >10% for non-regularly occupied spaces.

The Average sDA is 63% for non-regularly-occupied spaces, meeting the minimum required for credit achievement.

Avg. sDA: 65%

Level 1



Level 2



Level 3

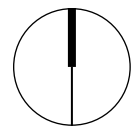
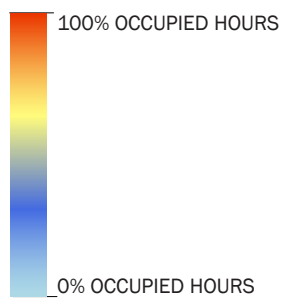


Level 4



Spatial Daylight Auonomy

% time over 100 lux



Point in Time Daylight Analysis

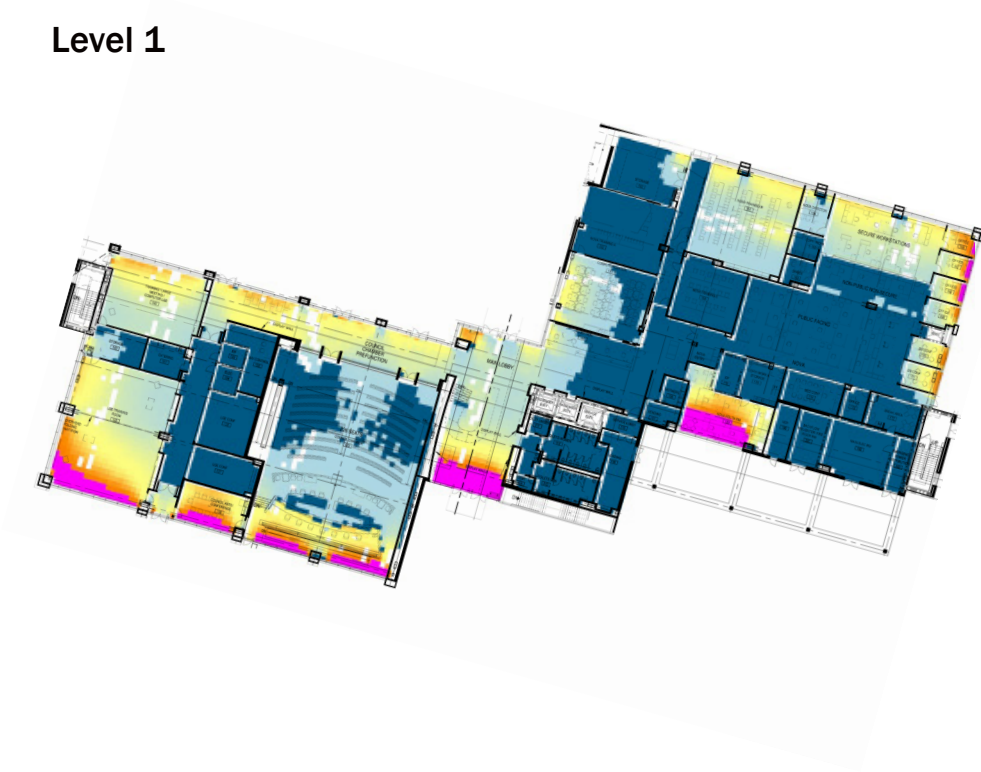
8718 Sunnyvale City Hall, June 30, 2020

Daylight at 9/21, 12pm

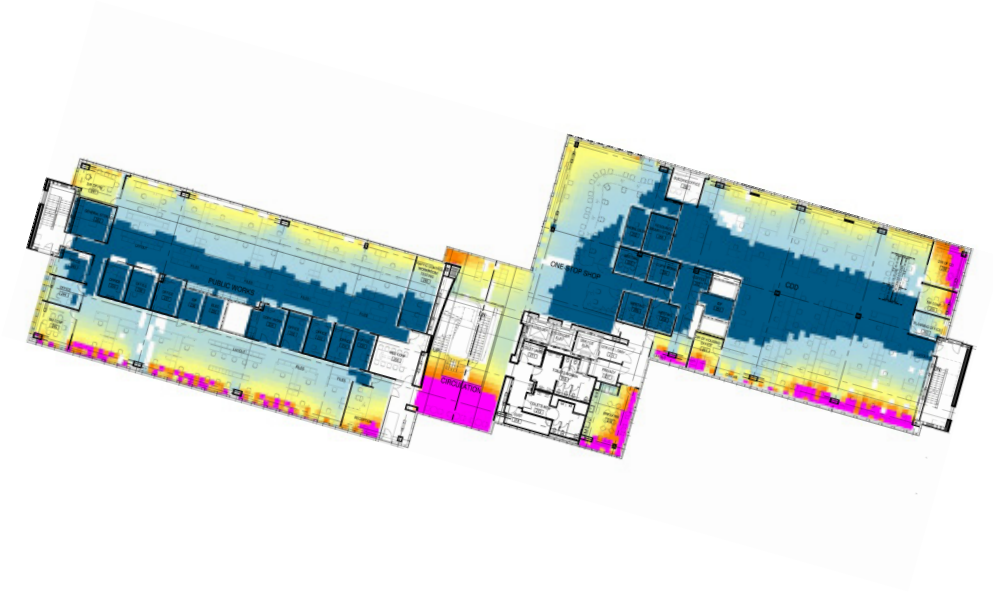
A LEED Pilot credit can be achieved if the project can demonstrate an sDA threshold of >10% for non-regularly occupied spaces.

The Average sDA is 63% for non-regularly-occupied spaces, meeting the minimum required for credit achievement.

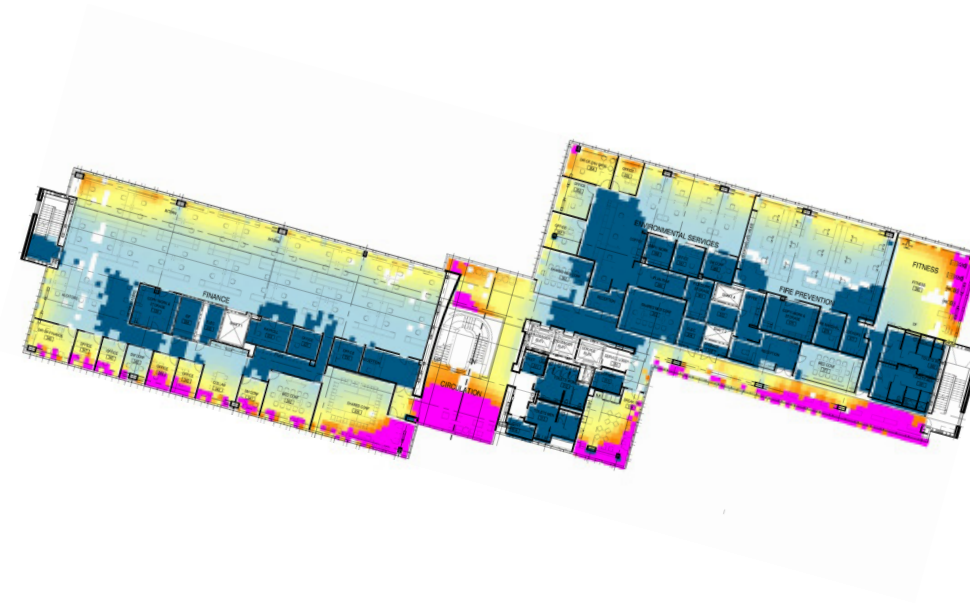
Level 1



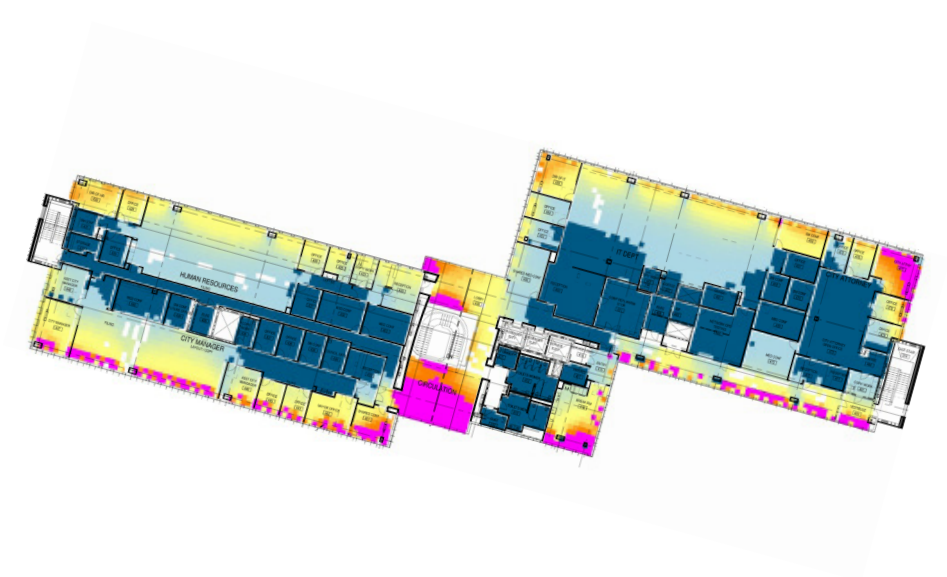
Level 2



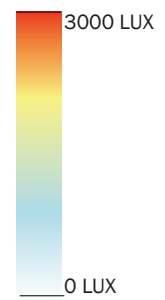
Level 3



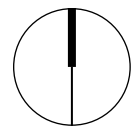
Level 4



Illuminance (lux)



UNDERLIT SPACE
OVERLIT SPACE

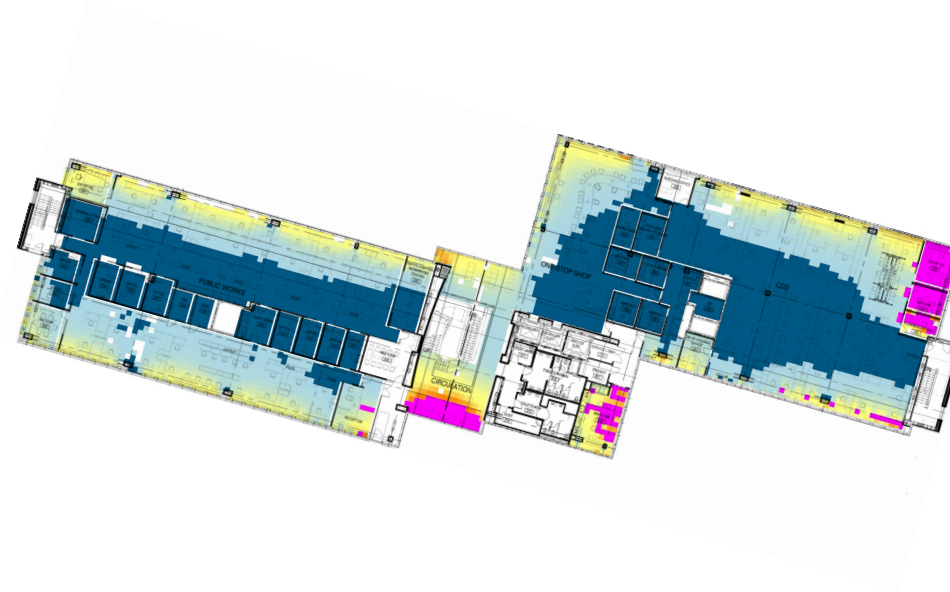


Point in Time Daylight Analysis

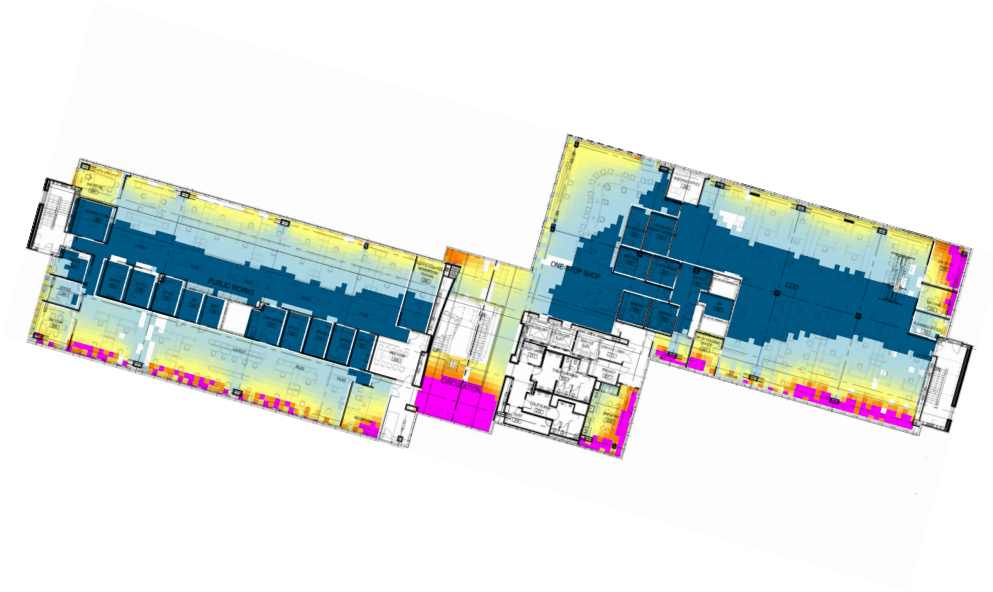
8718 Sunnyvale City Hall, June 30, 2020

Level 2 on 9/21 through the day

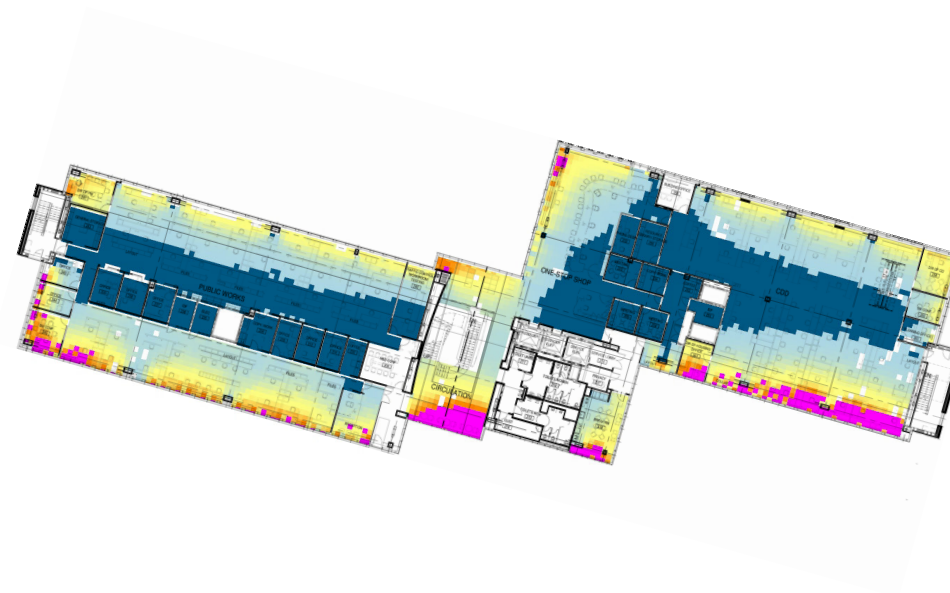
9am



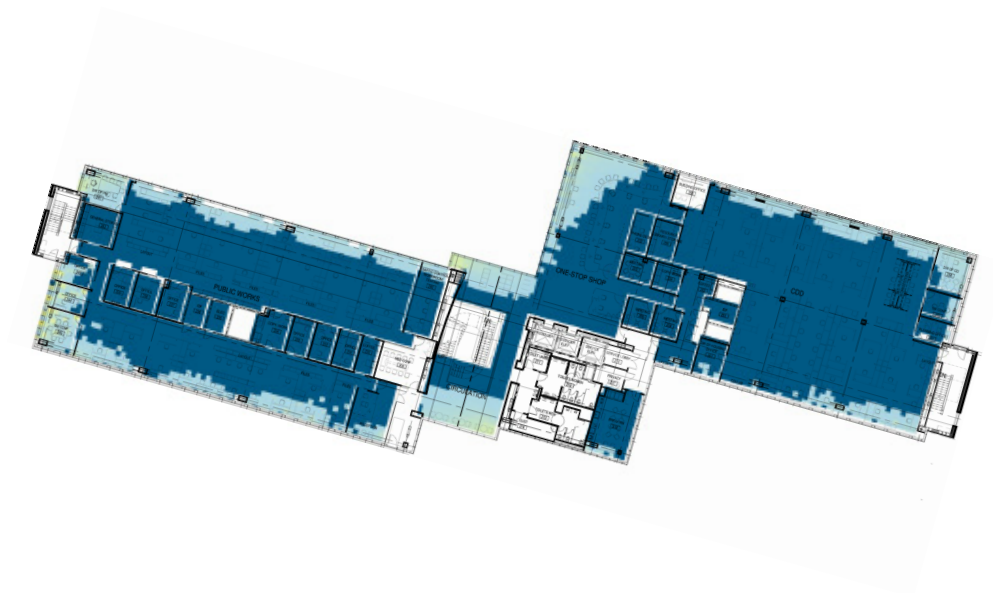
12 noon



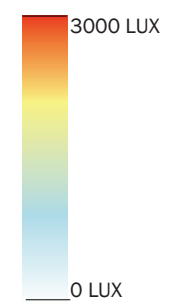
3pm



6pm



Illuminance (lux)



UNDERLIT SPACE

OVERLIT SPACE

