EDSL Tas

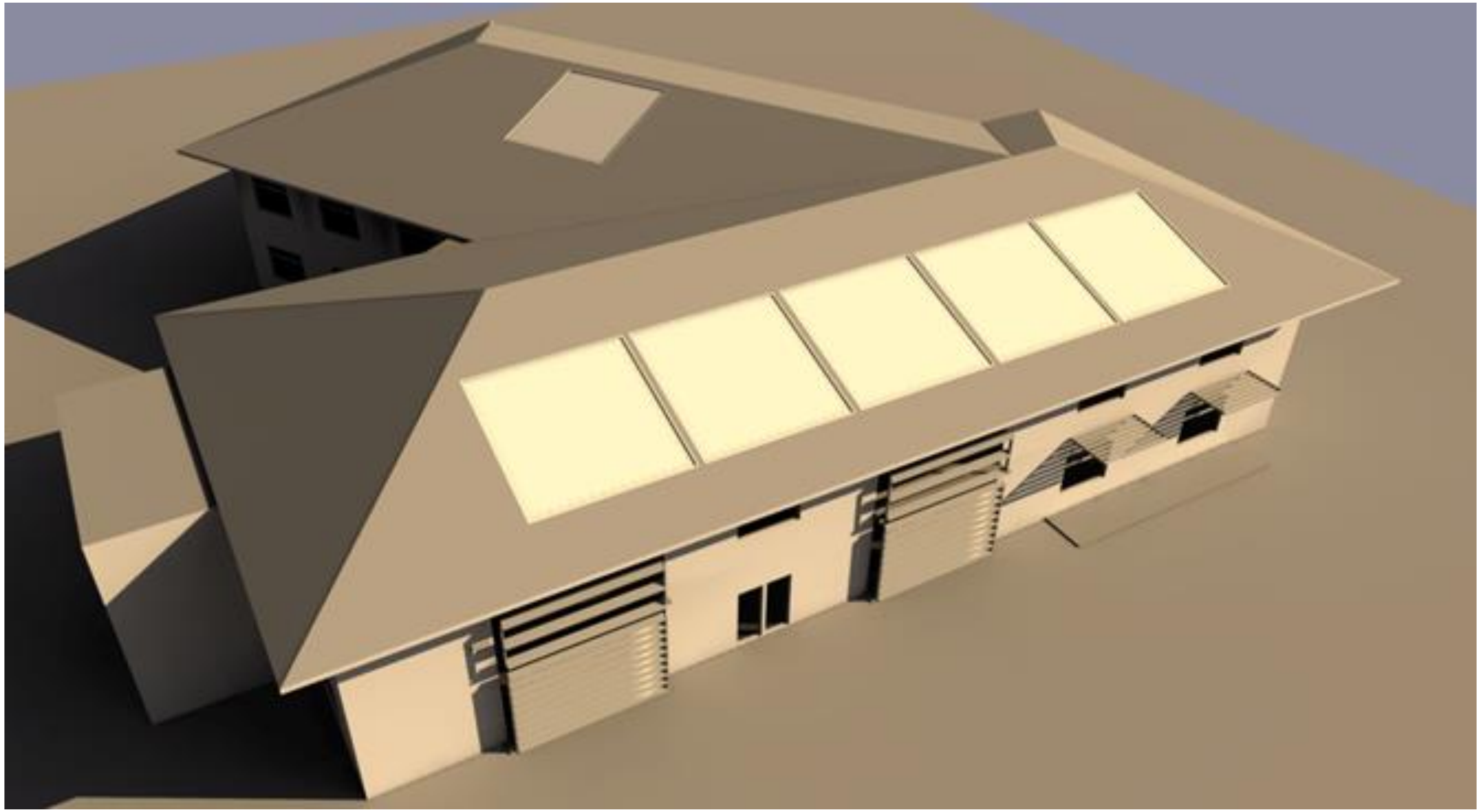
FAST AND ROBUST BUILDING SIMULATION SOFTWARE

Integrated Daylight Simulation

Daylight Render

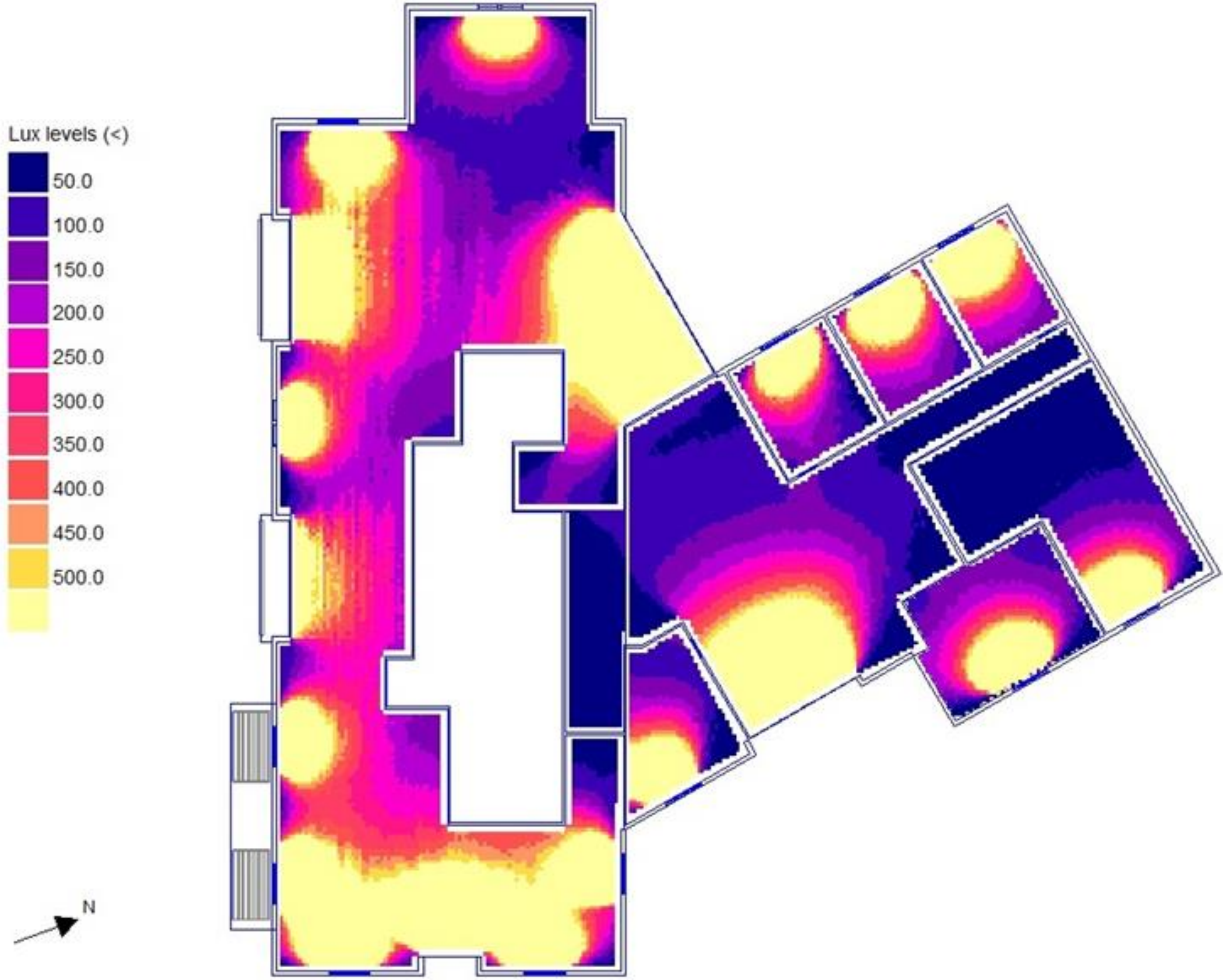
Tas daylight is based on **adaptive radiosity**

CIE 171,2006 compliant



Fast multi-zone daylight simulations

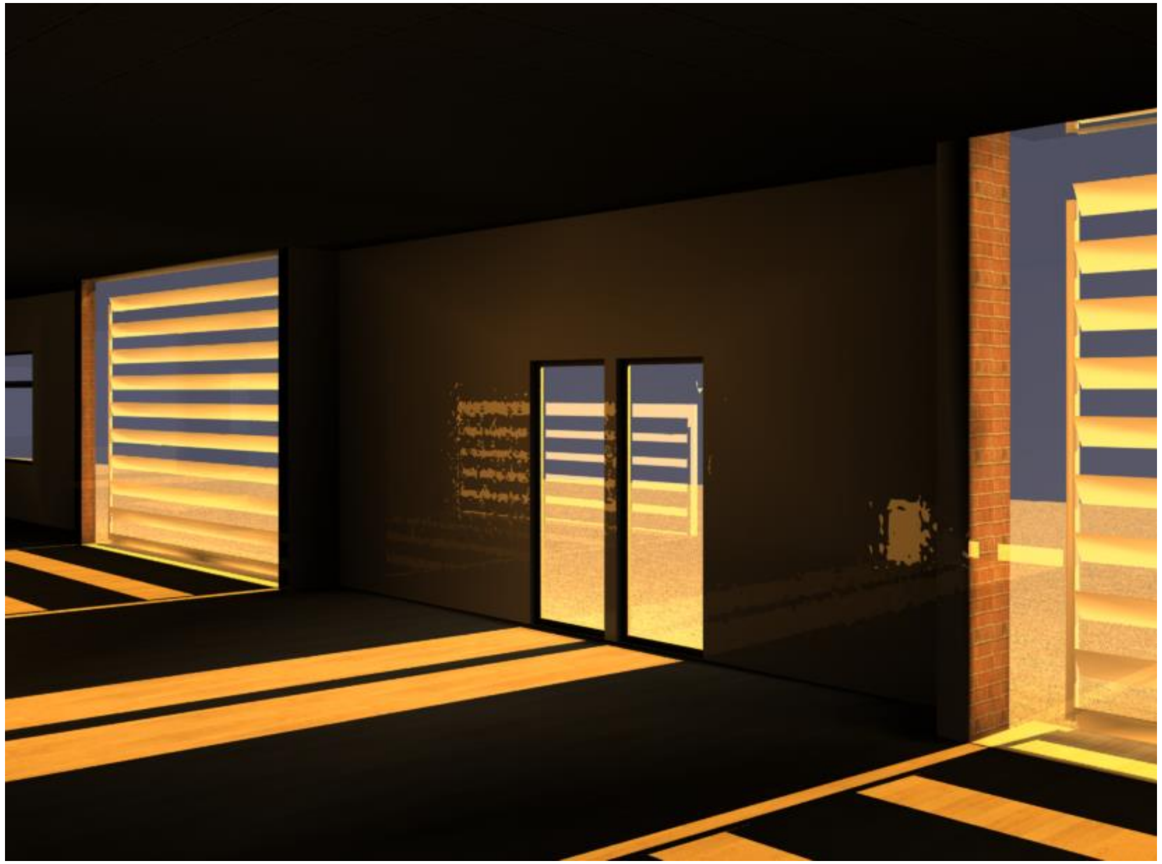
Multi-core processing

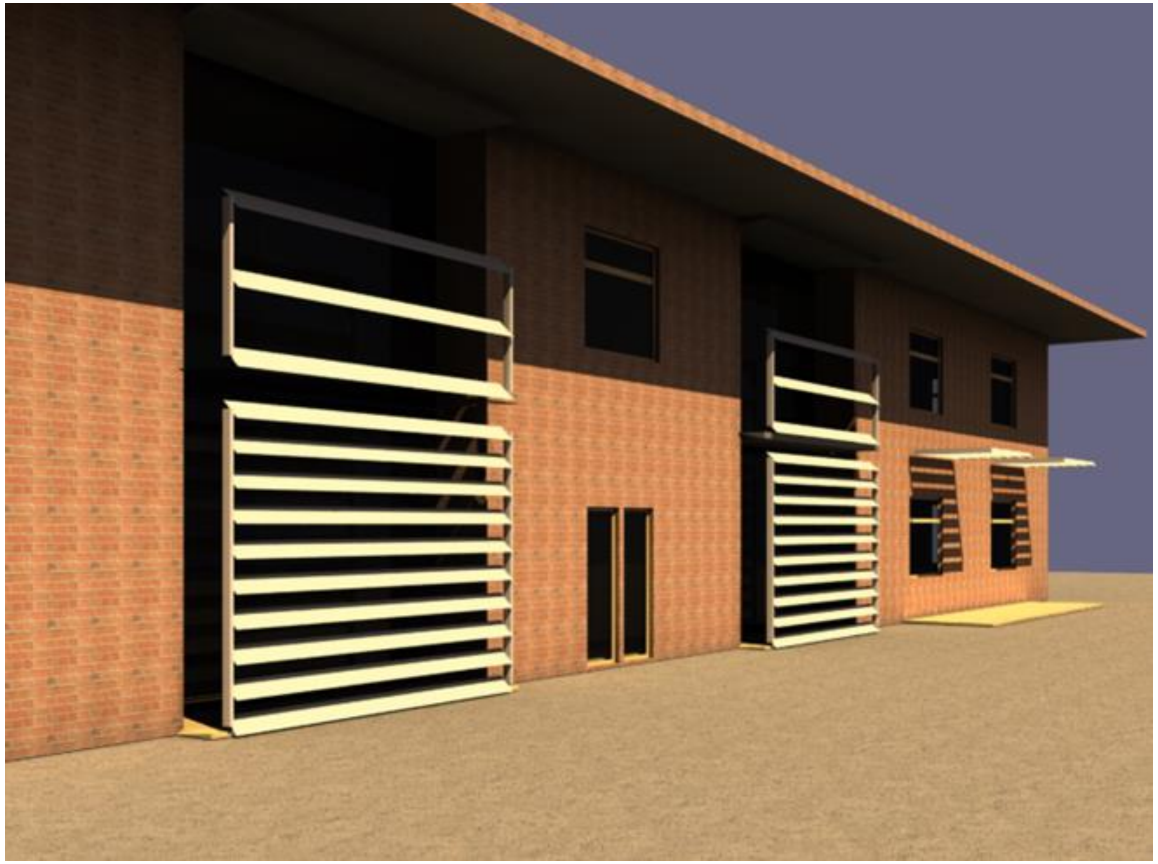


Inside & outside specular reflection analysis

Uses ray tracing over radiosity results

Direct & diffuse daylight simulation and solar shading





Tas Climate Based Daylight Modelling

Climate based daylight modelling originated in the **lighting simulation community**. Hourly diffuse and direct solar radiation climate data is used to produce daylight coefficients for patches of sky. Irradiance data is converted to illuminance using a luminous efficacy model. The daylight contribution to the space is then calculated hourly through the year for each sky patch.

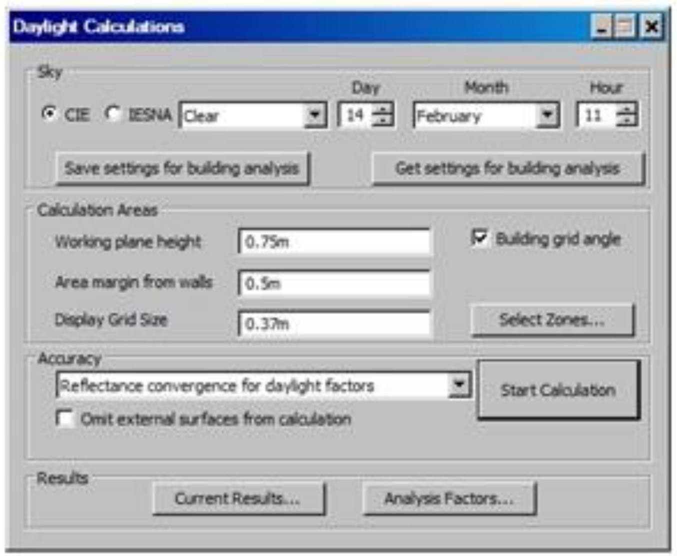
EDSL's Tas software has originated in the **thermal simulation community**. Our Tas software calculates the diffuse and direct solar distribution in spaces hourly through the year. We have developed a daylighting simulation engine, which is fully integrated with our thermal simulation engine. We are, therefore, able to calibrate the daylight contribution from the solar contribution in a space using luminous efficacy. Put simply, we convert the hourly solar income into hourly daylight income.

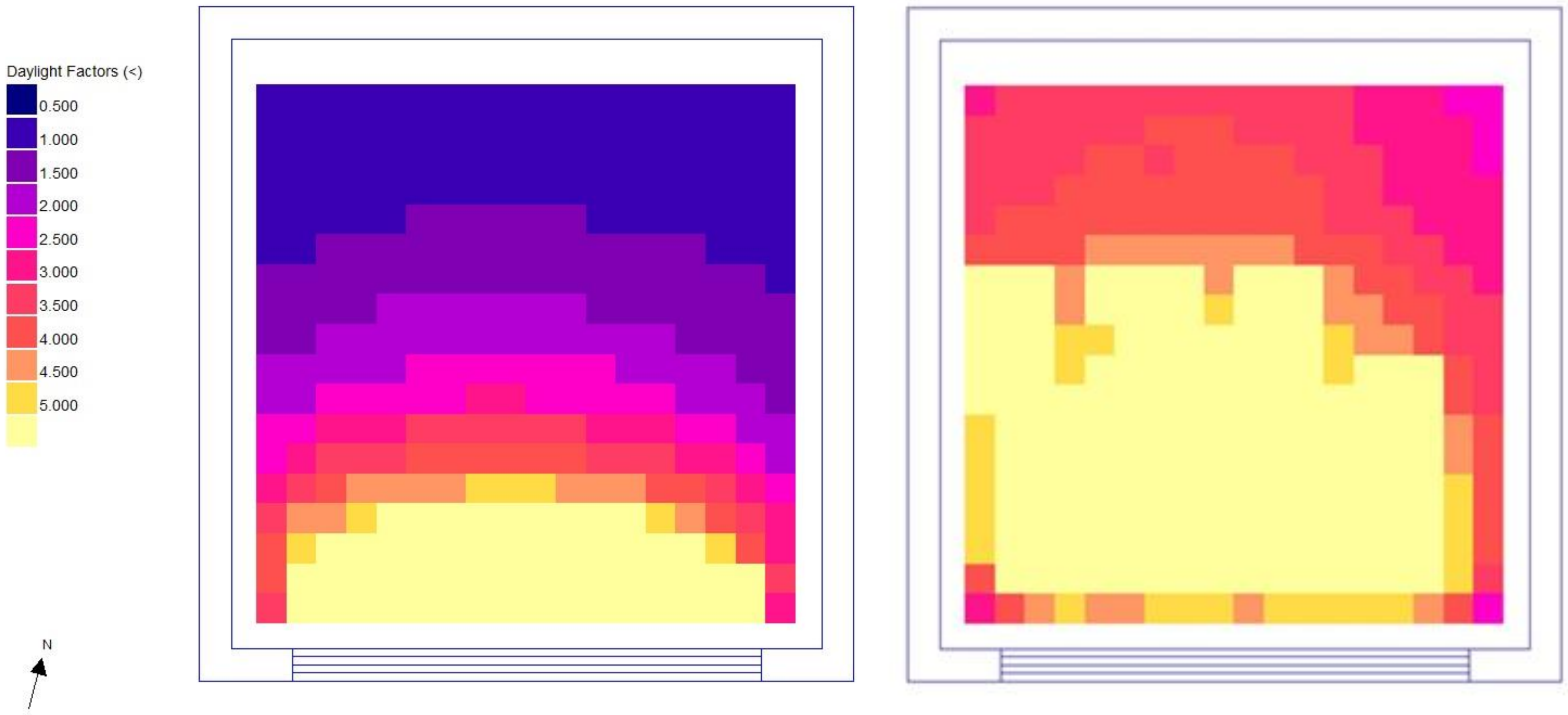
The following slides illustrate the functionality of the combined thermal and daylight simulation model on a classroom.

Climate Based Daylight Modeling

Calibrate sampled beam & diffuse daylight analysis against equivalent solar gains from thermal simulations.

Calculate daylight levels from hourly solar gain over a year to produce **UDI**, **DA**, daylight distribution



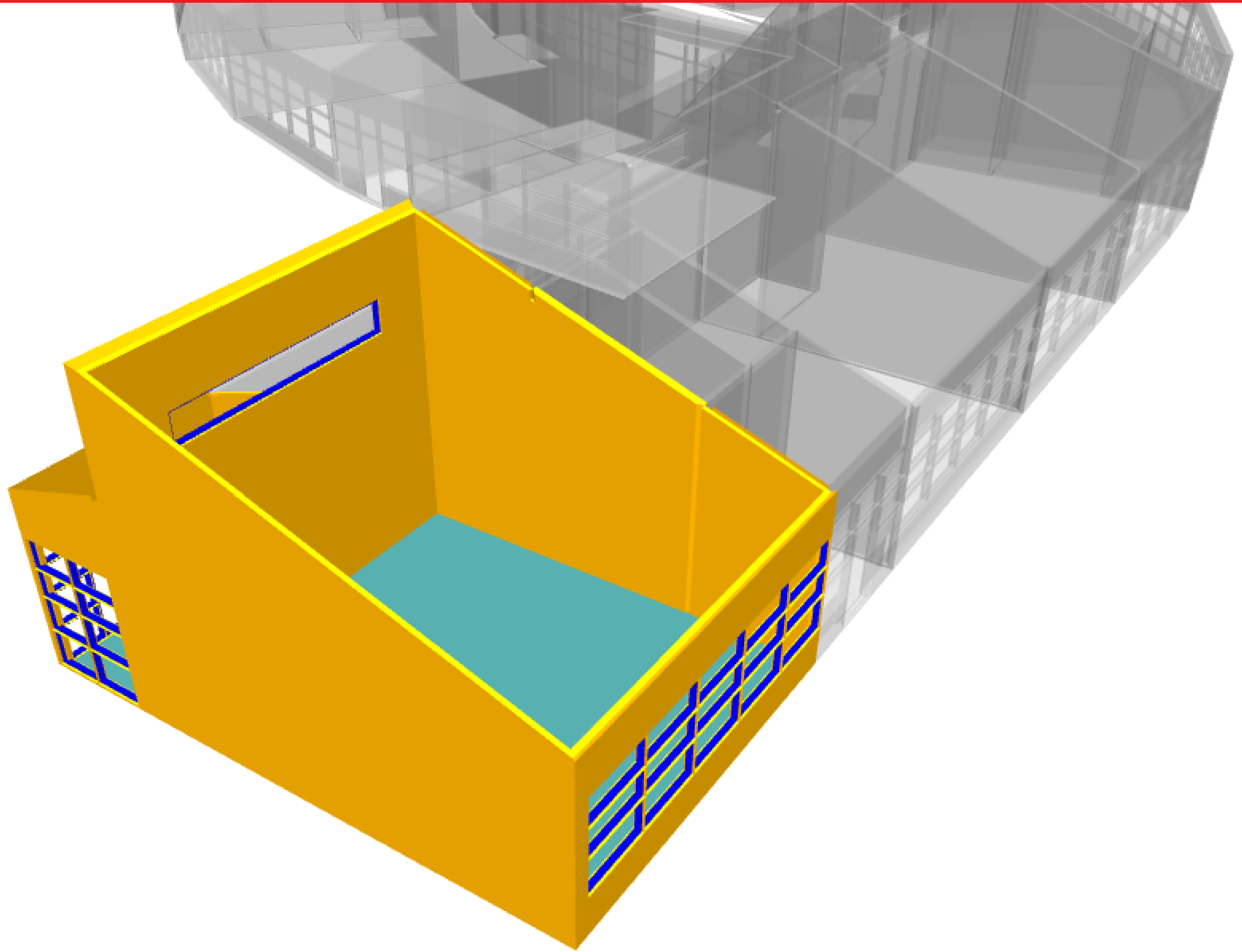


Tas allows specific spaces from a large model to be selected for individual analysis.

A complete range of analysis may be undertaken on the selected space(s) without having to simulate the entire building model.

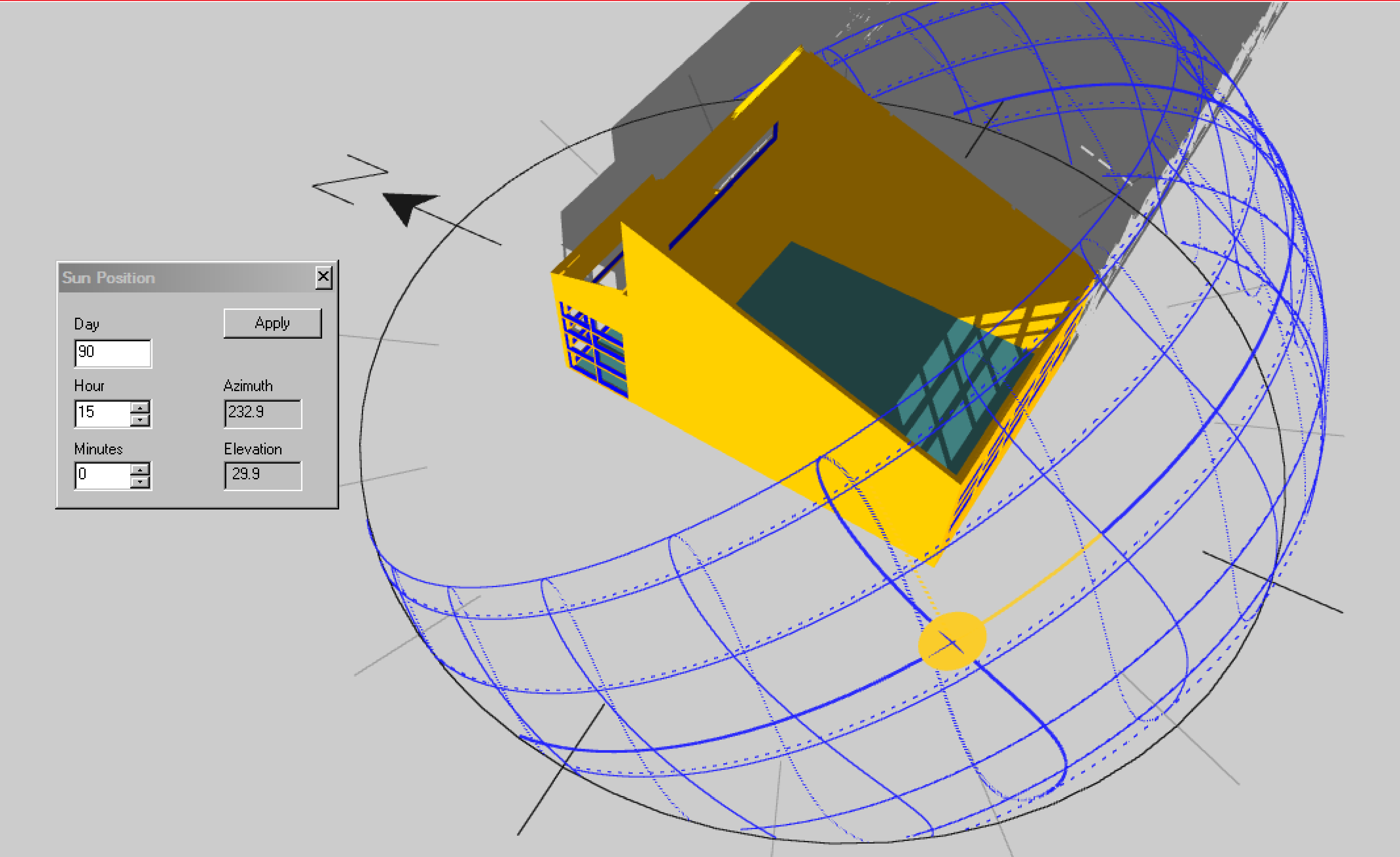
Here a classroom has been selected to produce CBDM metrics and adaptive comfort analysis.

The roof has been made transparent in the display to show internal layout.



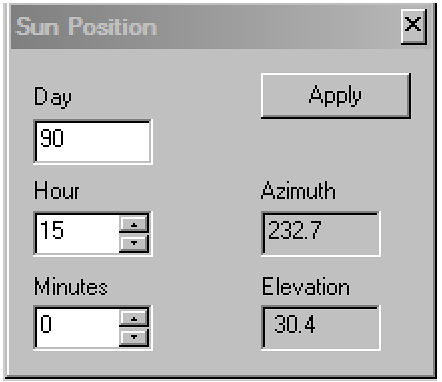
15.00 hours, end of March:

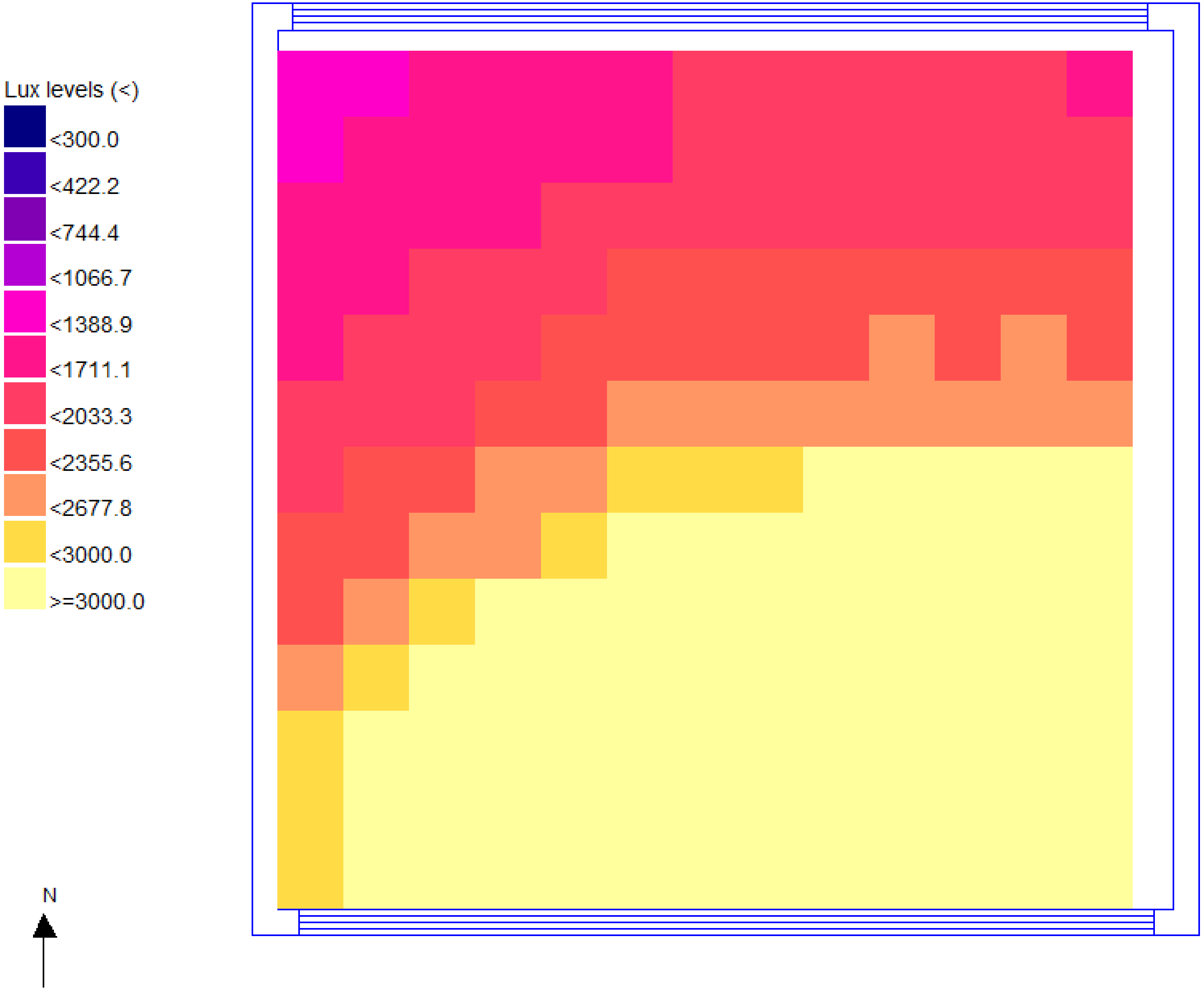
Direct sunlight patches visible through the windows



15.00 hours,
end of March:

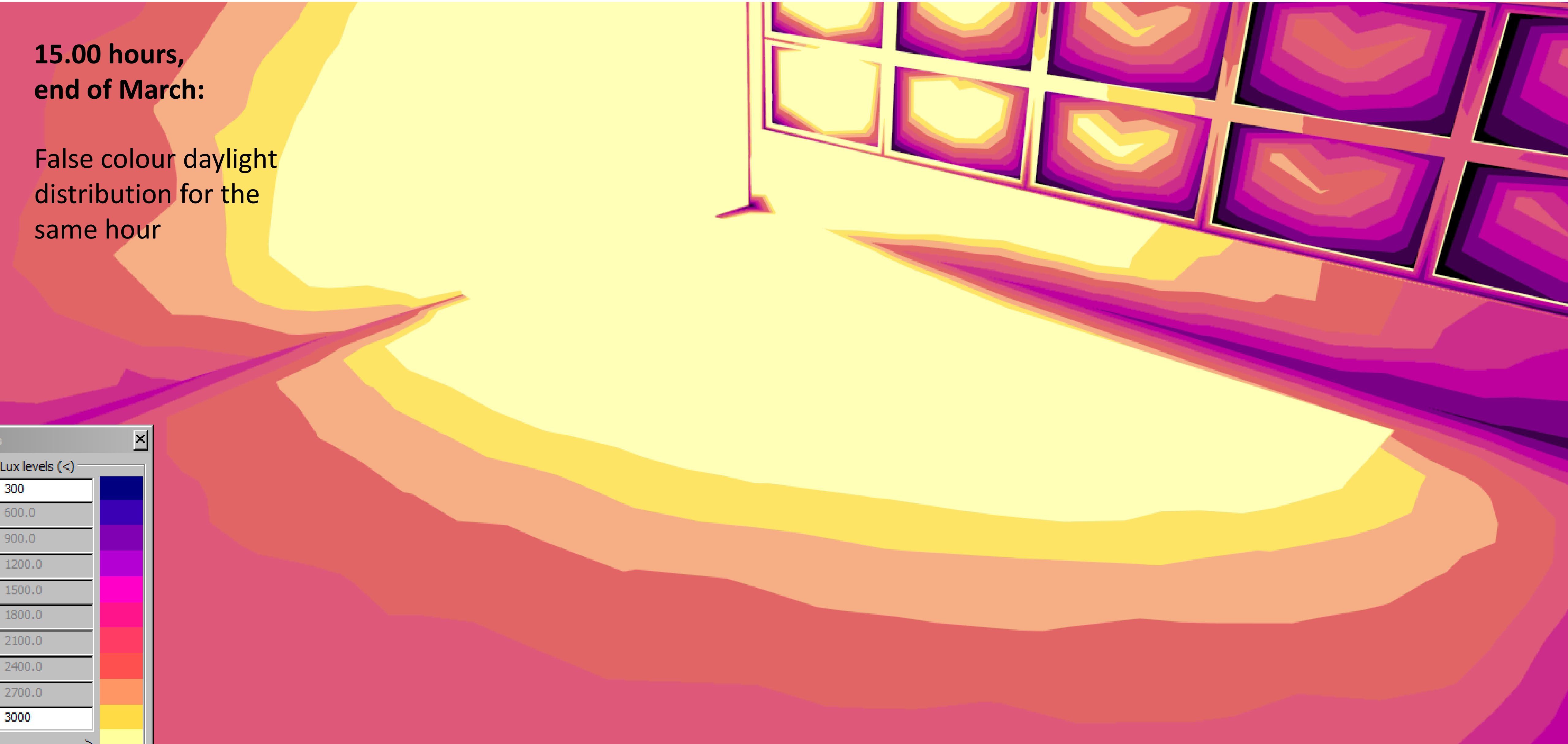
Plan View of Classroom:
Clear sky daylight
simulation shows daylight
lux level distribution





15.00 hours,
end of March:

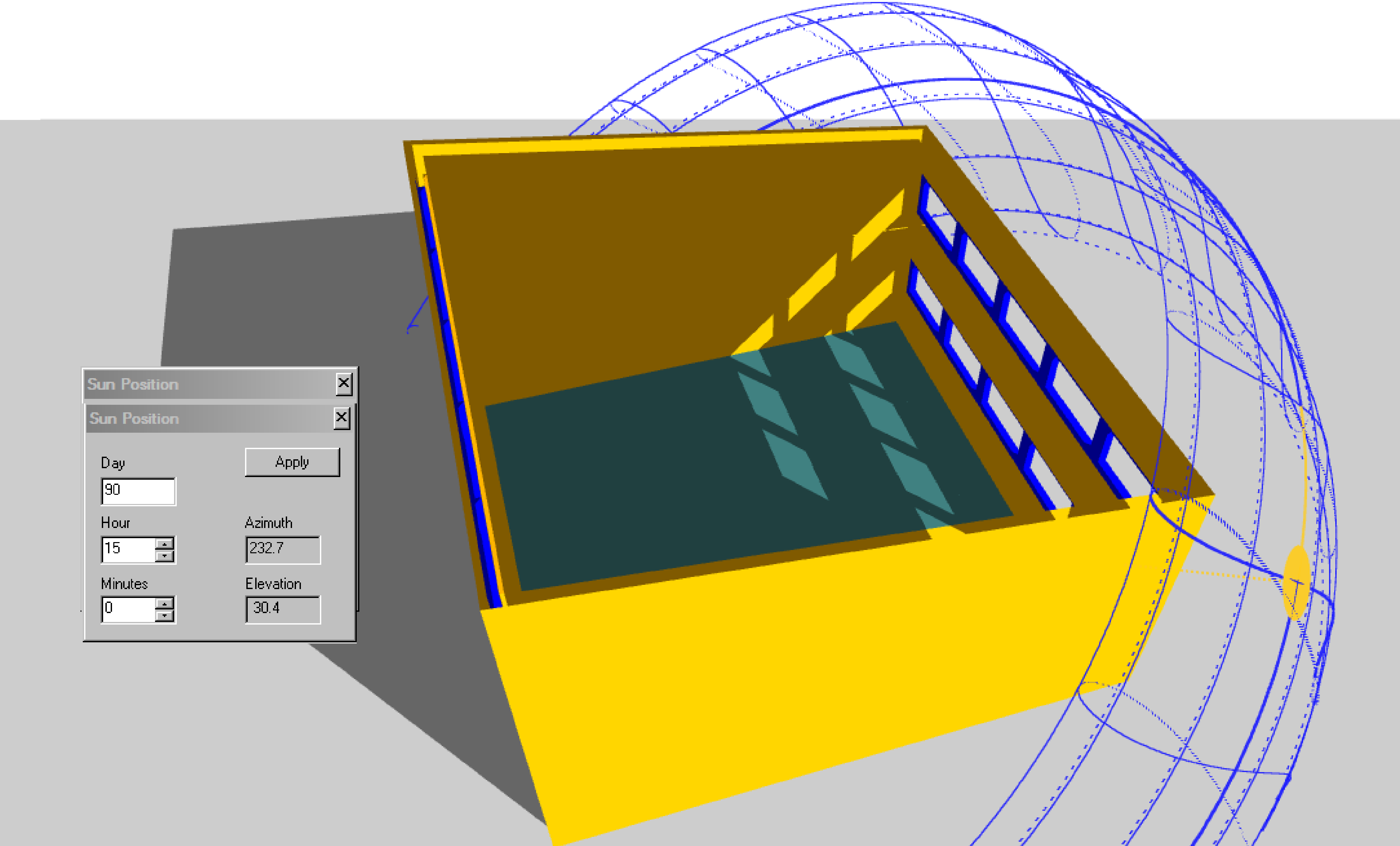
False colour daylight distribution for the same hour



This new configuration of the south wall's windows has the middle row removed.

The high level windows still throw light to the back of the space.

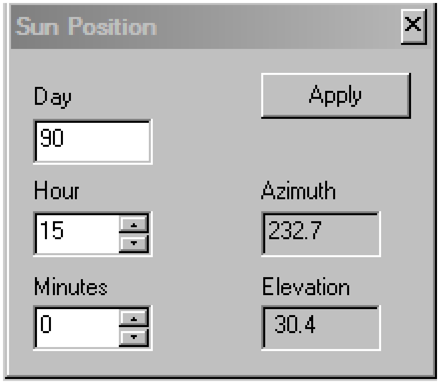
The view is maintained by the lower row of windows.

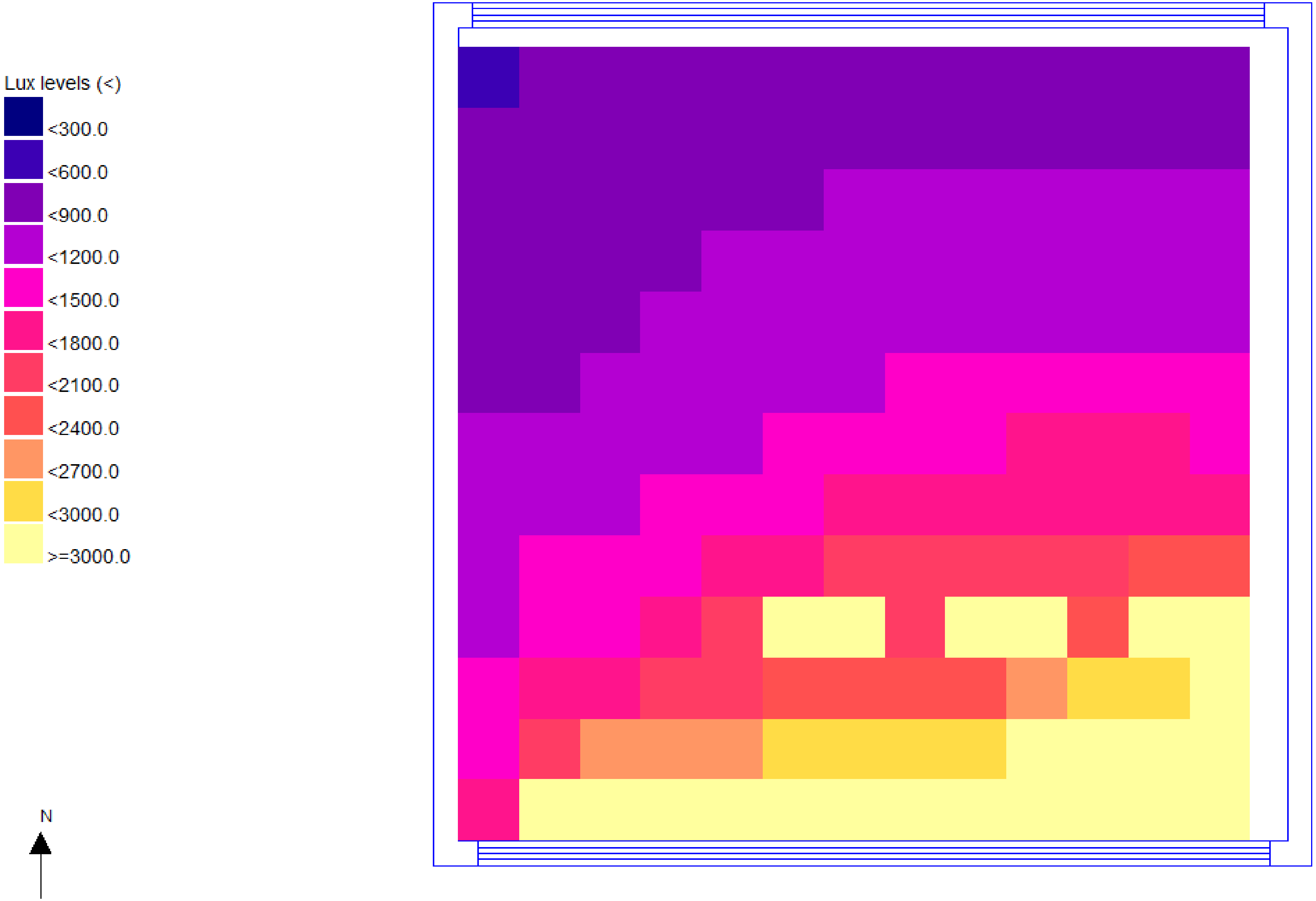


Daylight analysis: 15:00 hours, end of March

A useful amount of daylight is reaching the back of the room via the high level windows.

The amount of direct sunlight next to the windows is reduced.

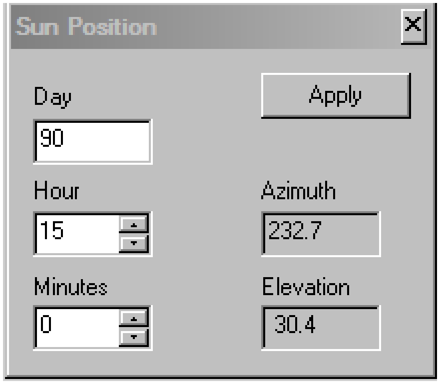




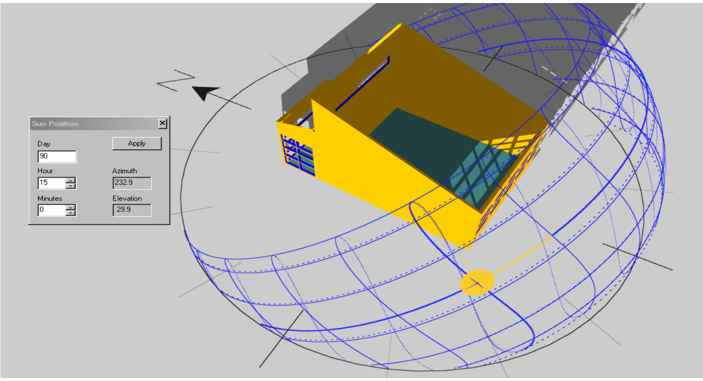
Daylight analysis: 15:00 hours, end of March

Original: 3 rows of windows at south wall

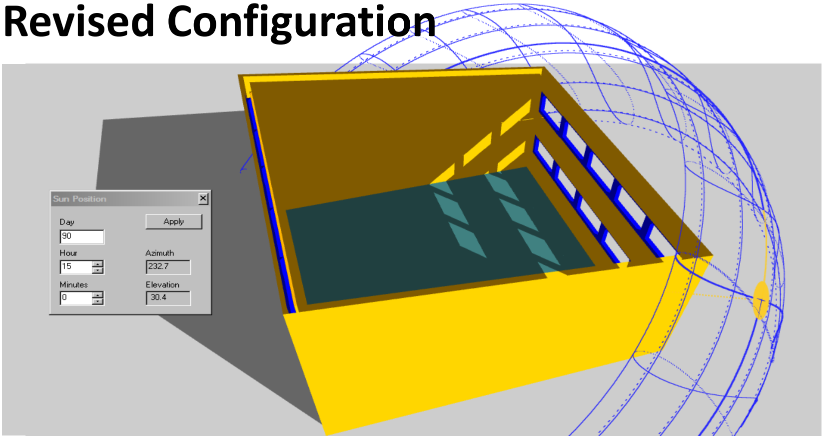
Revised: 2 rows, middle row removed

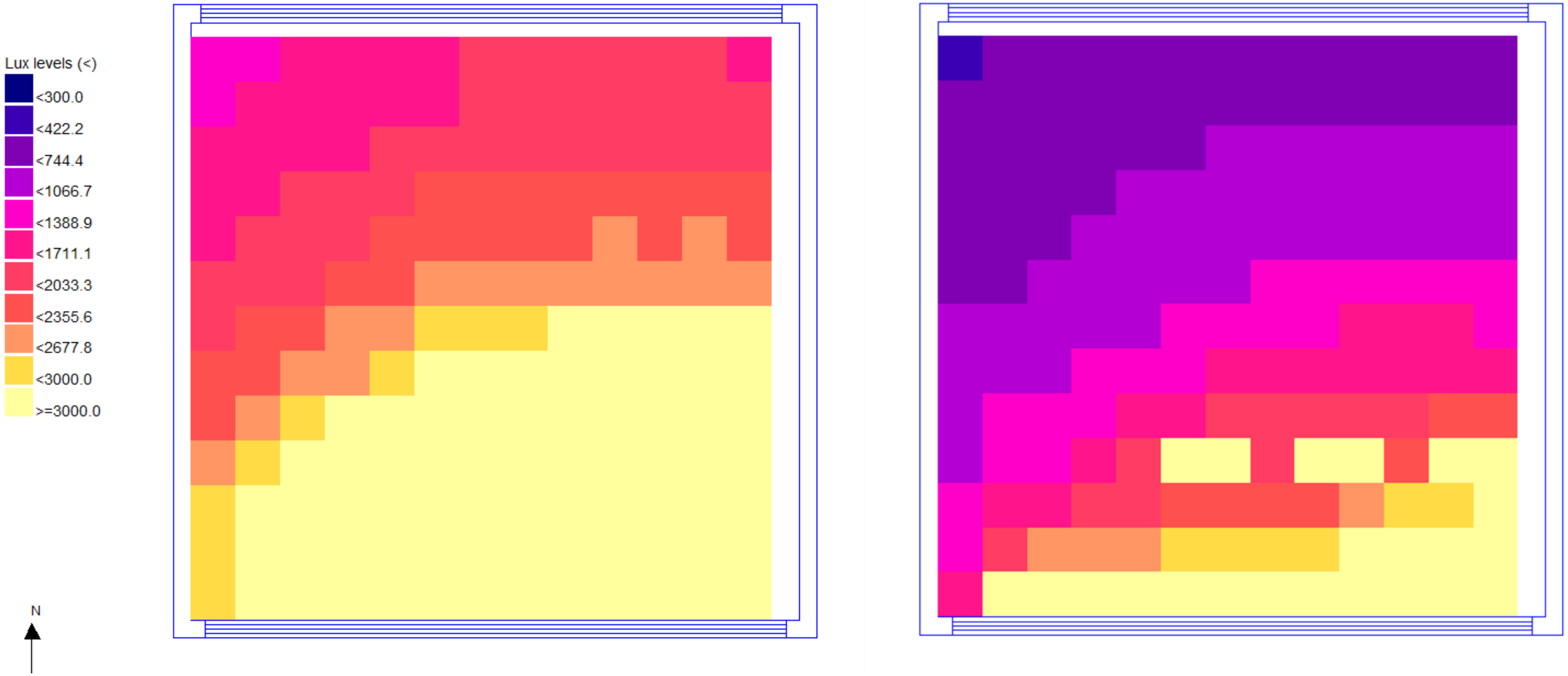


Original Configuration



Revised Configuration





Grid Size:	0.25m	Accuracy	Factors	Area Margin:	0.5m	Plane Height:	0.7m

London TRY (Dir:145/Diff:155)	London TRY (Dir:145/Diff:155)	
UDIs:	4 %	<=100 lux
UDIa:	85 %	100<x<3000 lux
UDIt:	73 %	300<x<3000 lux
UDIe:	11 %	x>3000 lux
DA(300/50%):	100%	
UDIa Min	41 %	
Run Name:	centre row of glazing removed	
Description::	(Start Hour: 9, End Hour:16)	

This time the **UDIa** *(UDI - acceptable)* is at **85%** giving a **very good performance**.
UDIe *(UDI Exceedance)* is at an acceptable level.

High level windows have given a good general distribution of daylight
Low level view windows do not produce excessive glare.

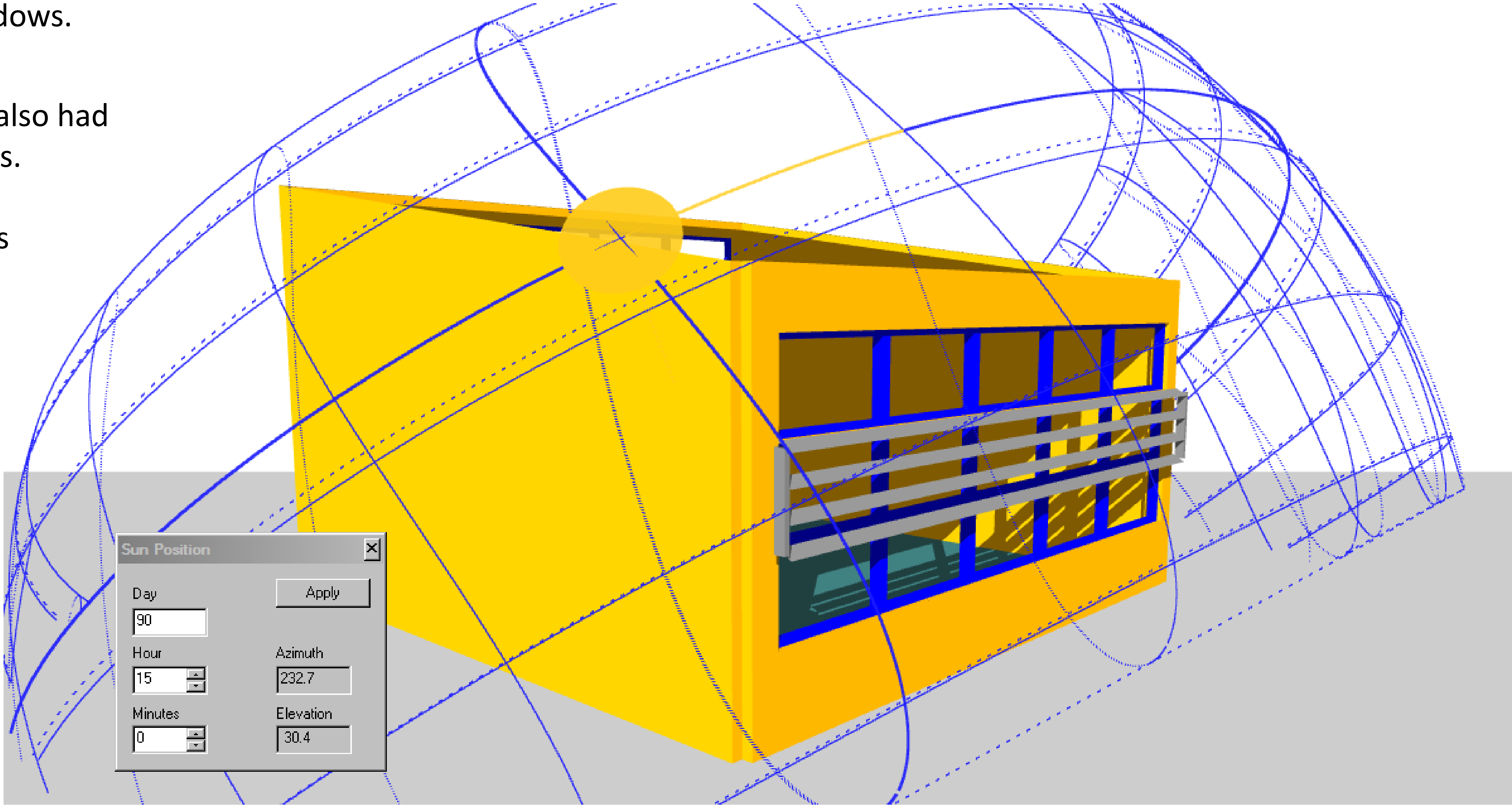
EDSL Tas

An alternative to removing the middle row of windows would be to provide some solar shading to reduce the direct sunlight through these windows.

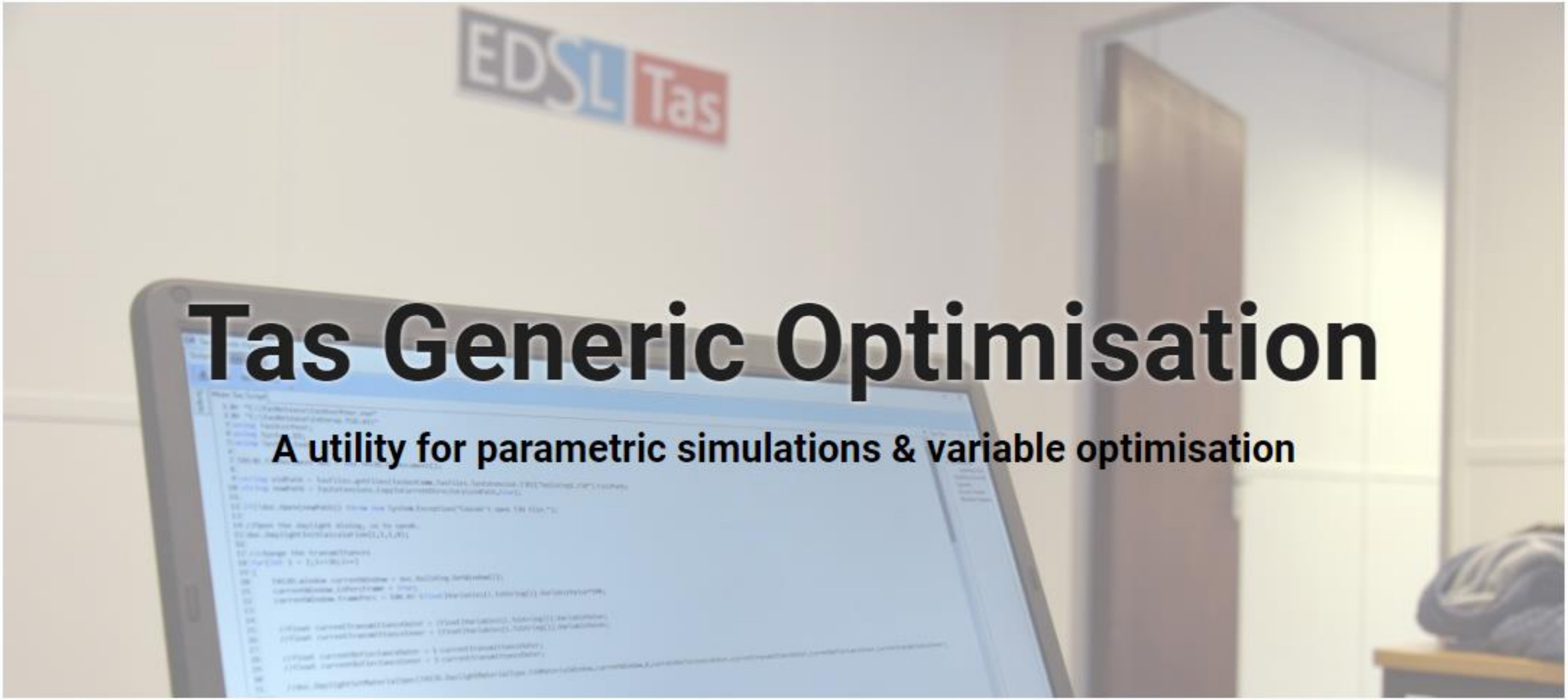
This configuration also had good CBDM metrics.

Both configurations worked well on all orientations.

This façade solution is but one of many that would comply with the CBDM criteria



EDSL Tas



Tas Generic Optimisation

A utility for parametric simulations & variable optimisation

TasGenOpt is a utility for performing **parametric simulations** and for **intelligently changing variables** to achieve a **desirable result**. This utility combines **GenOpt** (Lawrence Berkeley National Laboratory) with a powerful **c# scripting** interface in order to achieve incredible **flexibility** and **design options**.

EDSL Tas

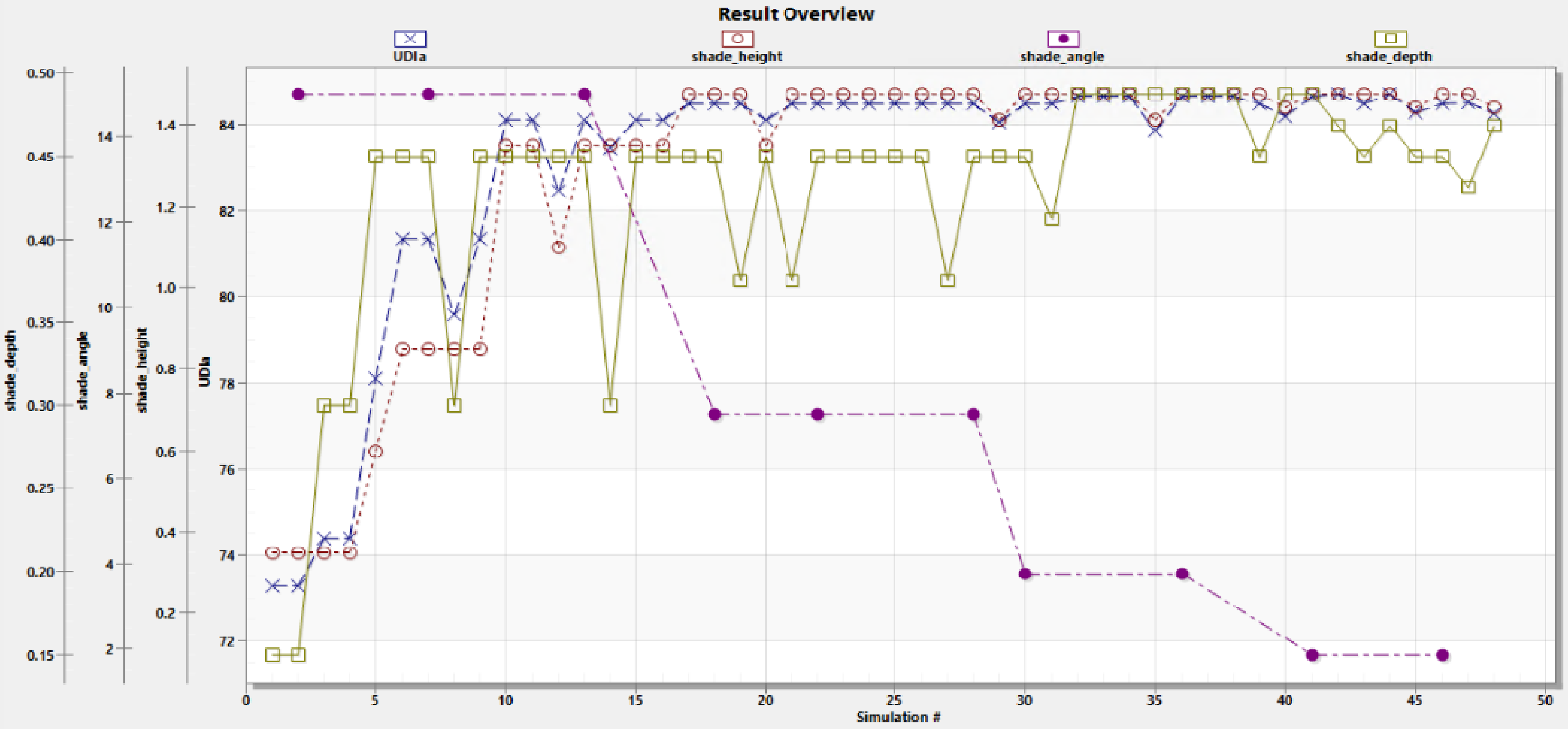
CBDM

Classroom analysis shading configuration optimised for:

- shade blade width
- vertical spacing
- angle

In the below example, we're using **TasGenOpt** to change the **shades** for a classroom in order to get the best **CBDM result**. With CBDM, it's important to make sure the space isn't too bright or too dim, so a careful balance of the parameters is needed.

In the below image, **TasGenOpt** is being used to optimise the **CBDM UDIa** result by changing the properties of a shade.



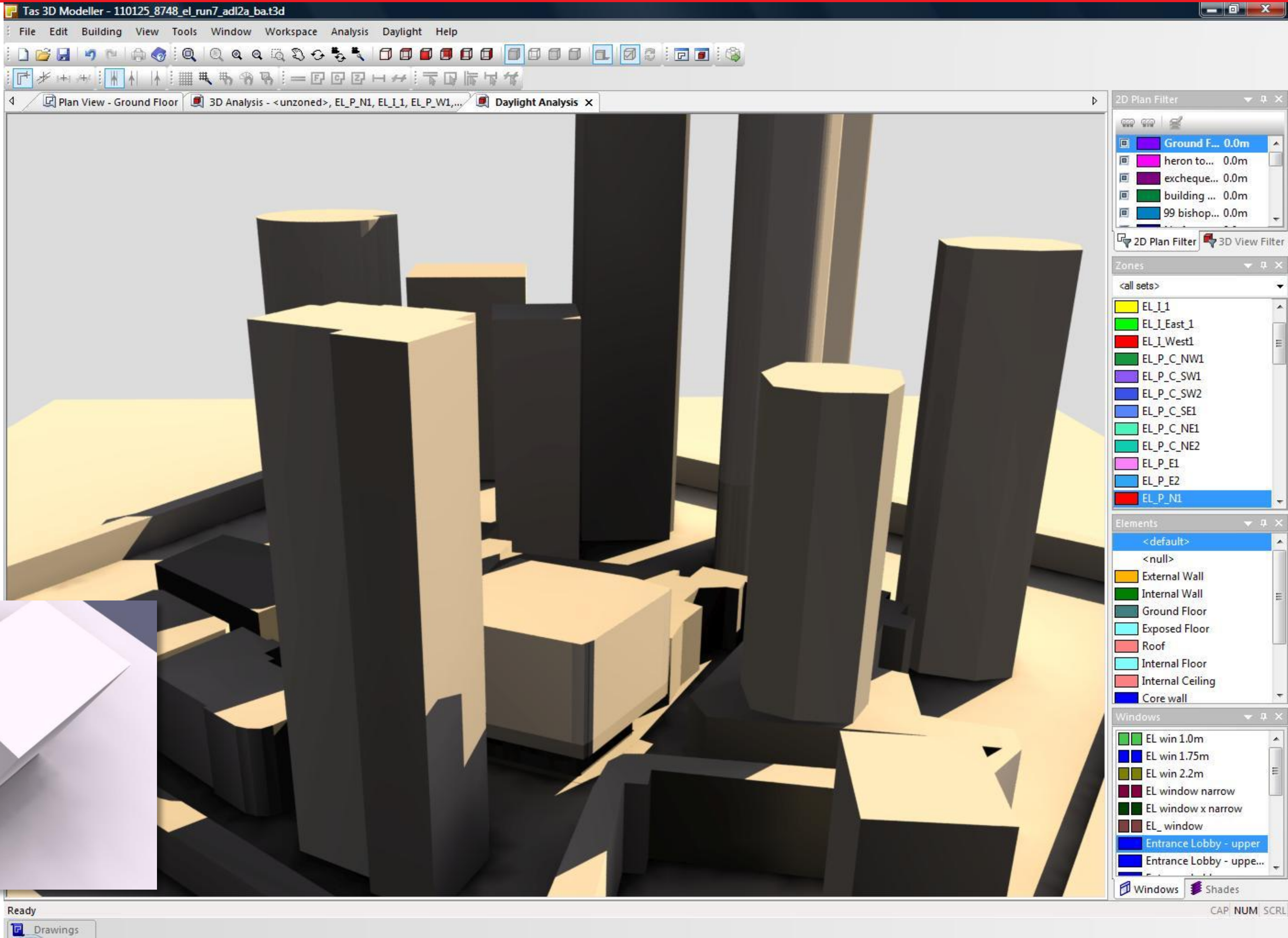
Once **TasGenOpt finds the optimum result** for the variables we specified, **it will notify us**. The **results** of each simulation are **automatically exported**

EDSL Tas

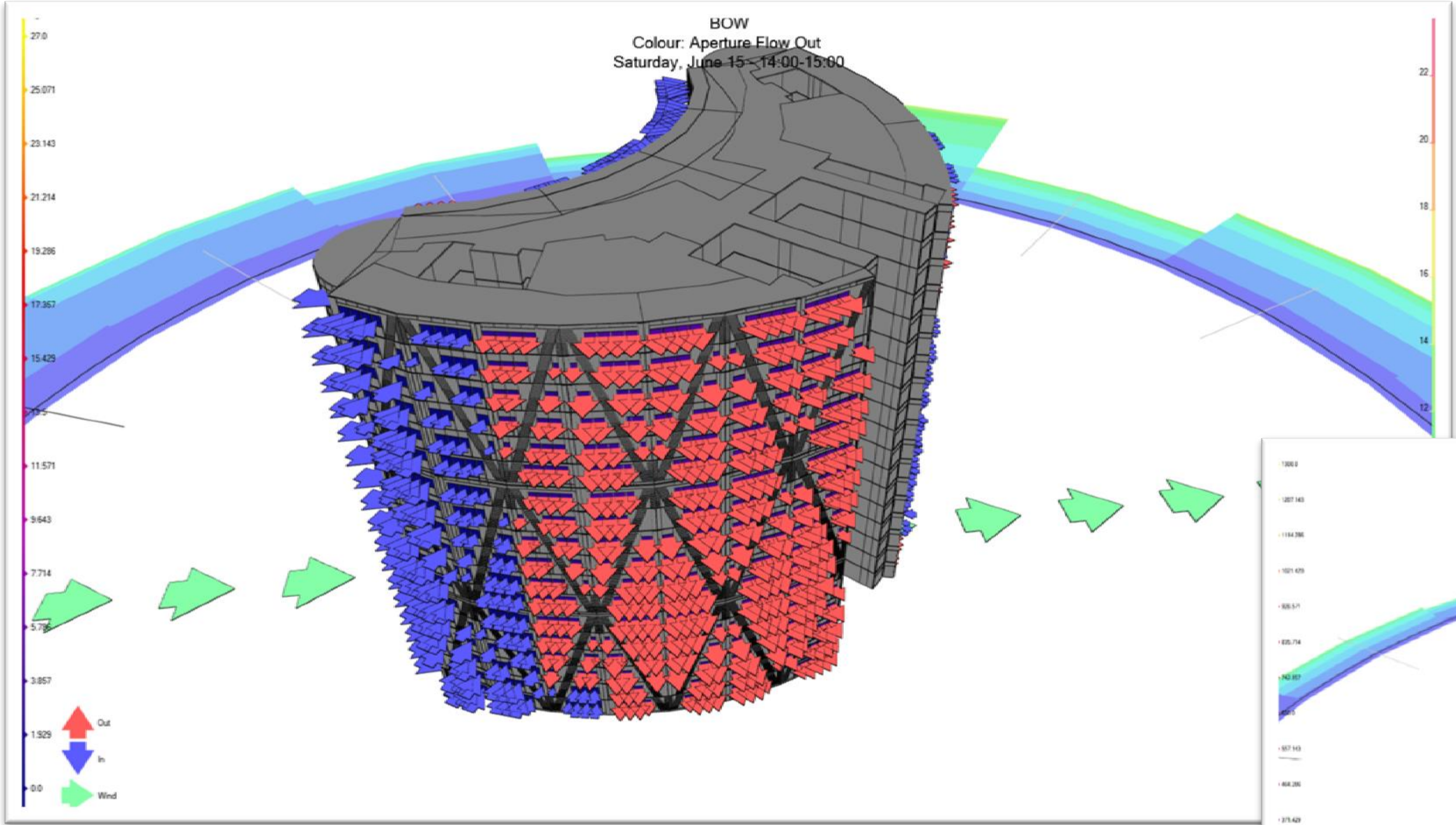
Shadowcast Studies

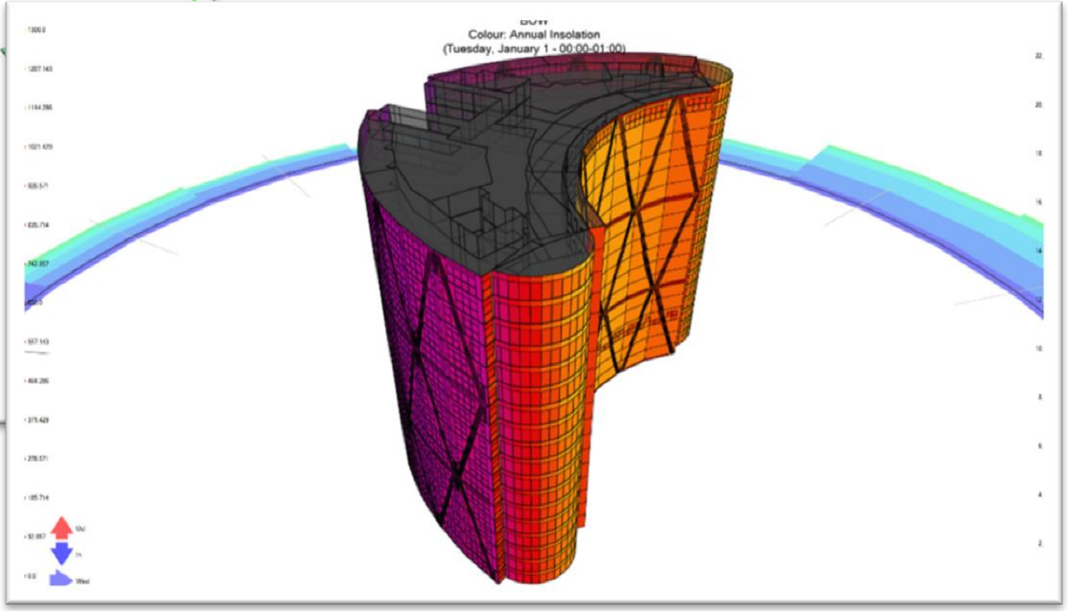
Context Analysis

Daylight Views



Tas Natural Ventilation Studies





Tas Engineering also offers integrated Natural Ventilation and solar gain (insolation) analysis.

Please visit our website for more details