Waldram Tools Spring Review 2022

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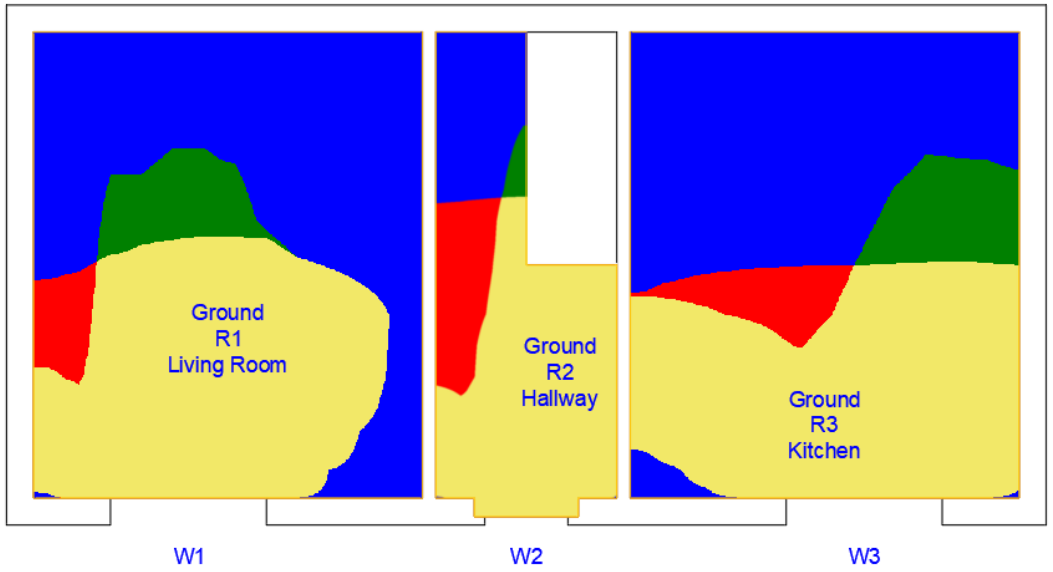
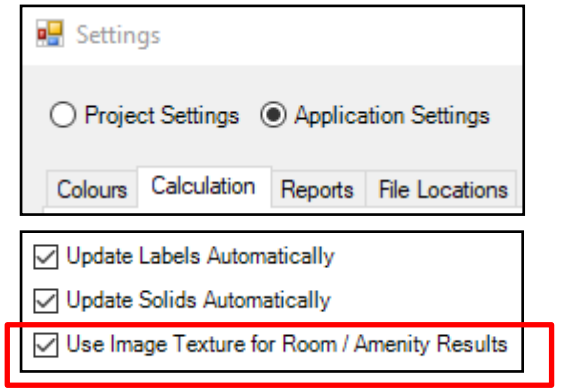
- What's New?
- GPU (Graphics Card Calculation)
- Waldram Tools for Revit
- BRE Incorporation of BS EN 17037
- In the Pipeline…

What's New?

- Contour Images Option (ROL & DD) AUTOCAD REVIT





Yellow + Red = Existing Lit Area

Yellow + Green = Proposed Lit Area

Green = Area of Gain

Red = Area of Loss

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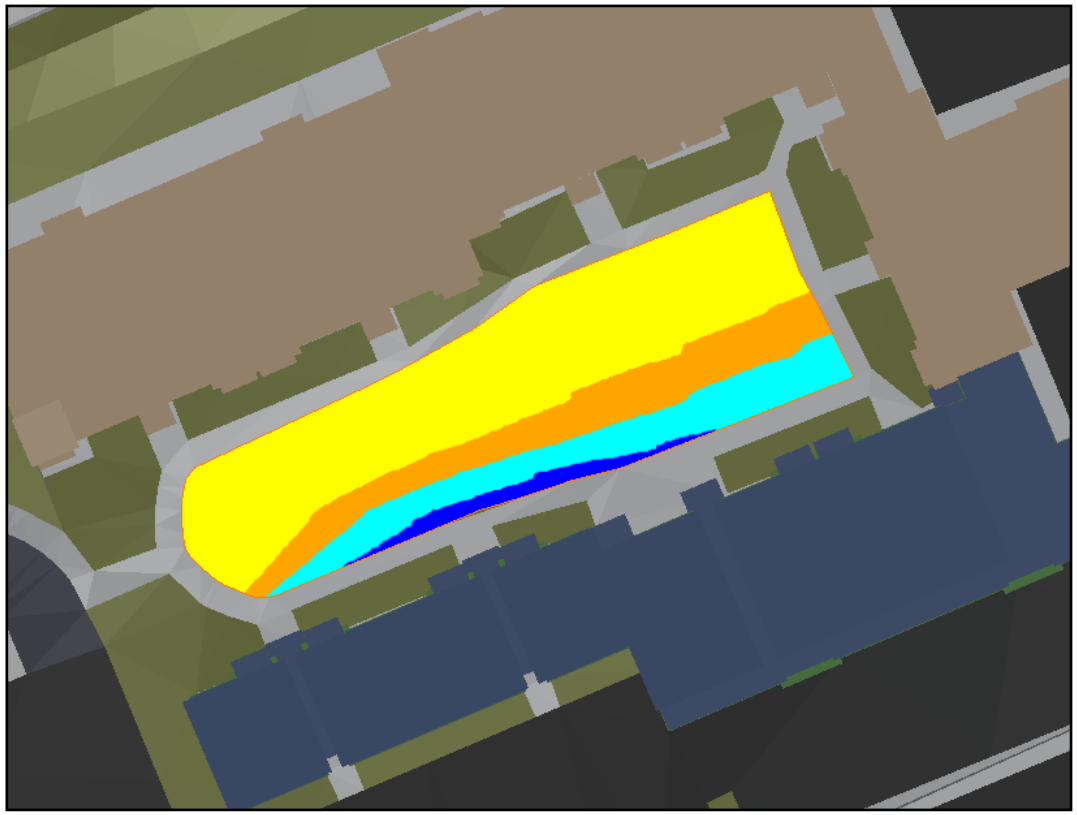
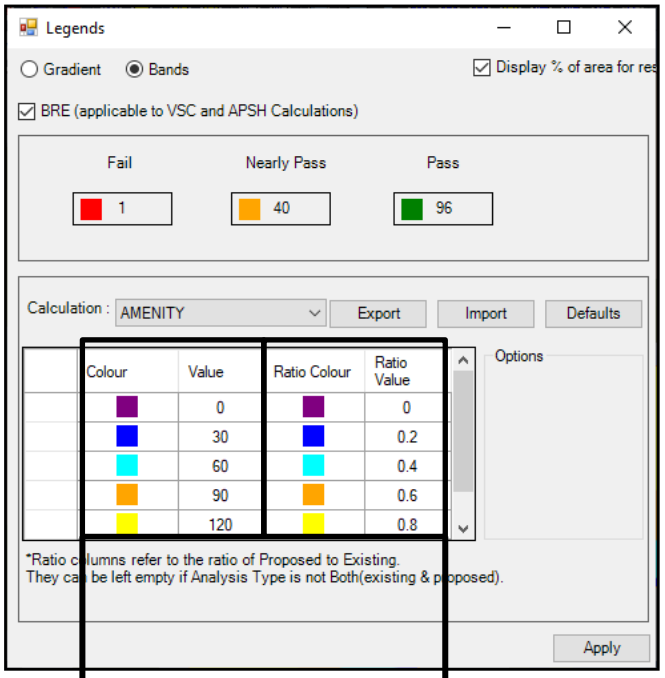
What's New?

- Contour Images Option (Amenity) AUTOCAD REVIT





Images for Existing & Proposed

Image for loss (Pr v Ex)

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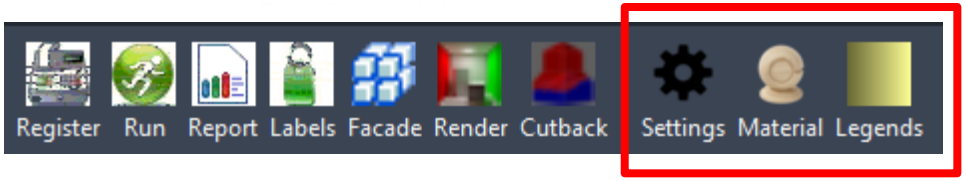
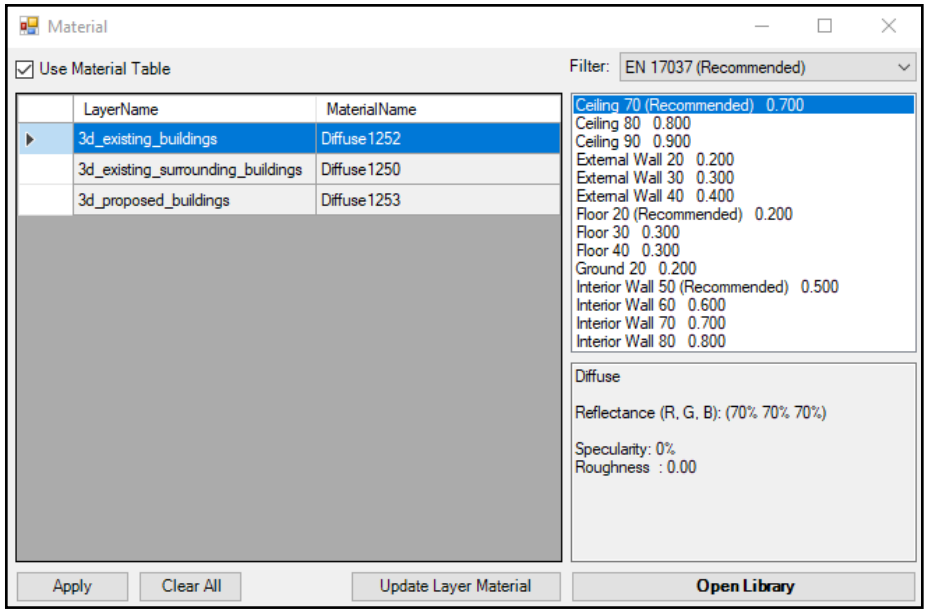
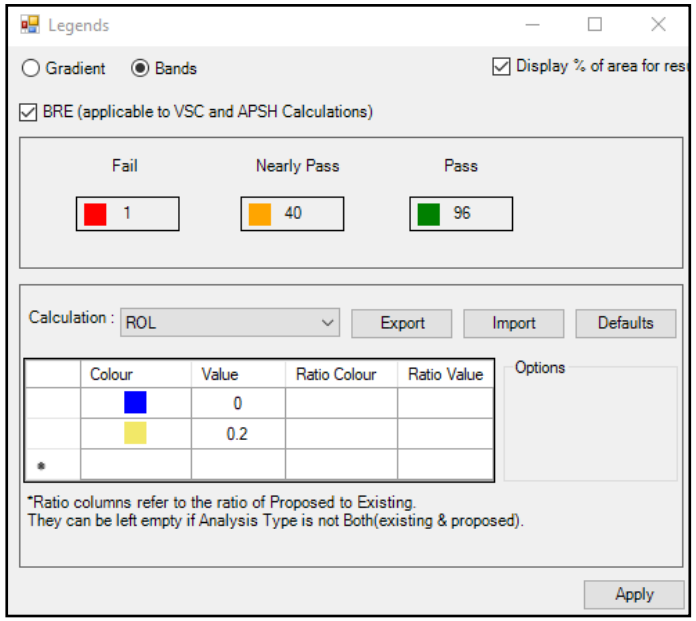
What's New?

- Toolbar Icons AUTOCAD REVIT







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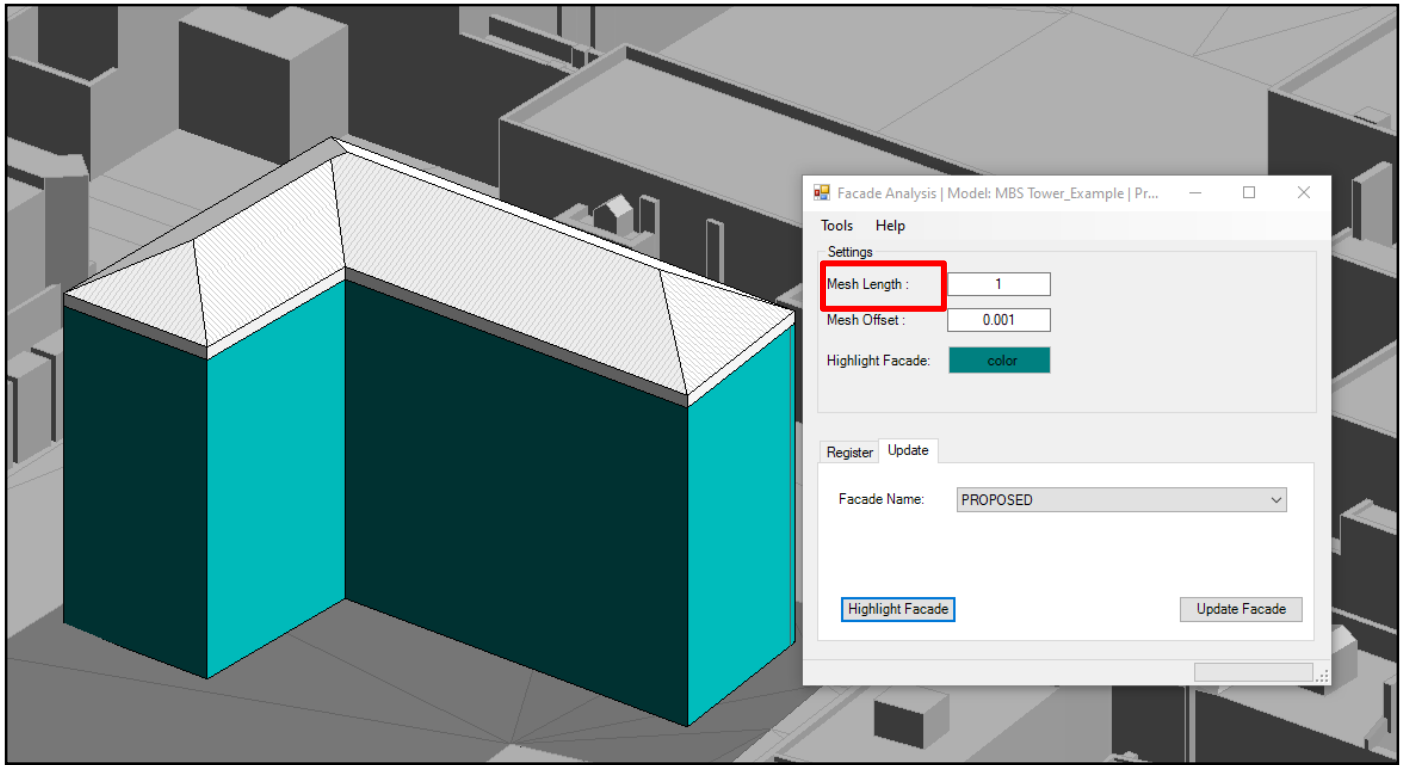
What's New?

- Façade Interface (Highlight/Mesh Length) AUTOCAD REVIT



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What's New?

- CSV Output for Façade Analysis AUTOCAD REVIT

  VSC, APSH and 2hr Sunlight Amenity

Facade Name	Facade Area	VSC Proposed	VSC Proposed %
FACADE_1	1274.1229	673.536341	52.86%

Facade Name	Facade Area	Lit Area Existing	Lit Area Existing %	Lit Area Proposed	Lit Area Proposed %	Lit Area Ratio	Lit Area Ratio %
AMENITY_1	673.878746	615.619026	91.35%	405.039078	60.11%	4.530975	0.67%

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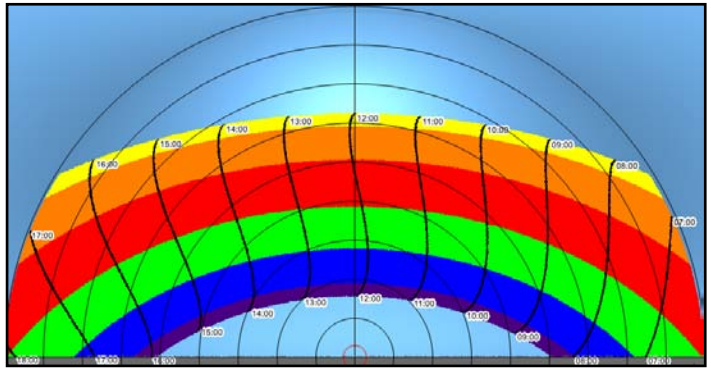
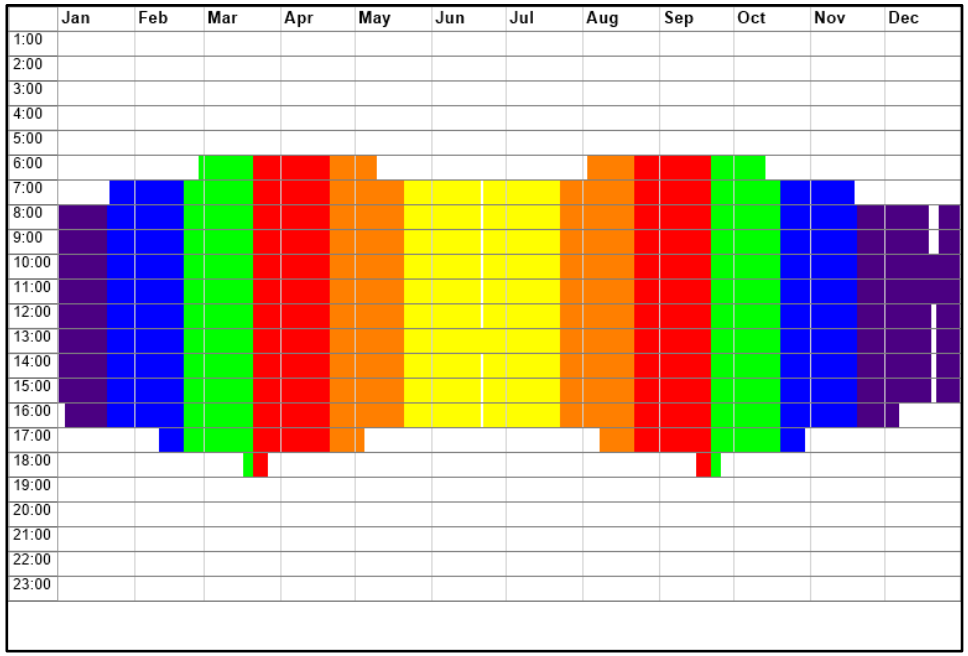
What's New?

- CSV Output for Solar Glare AUTOCAD REVIT

Date	Hour	Glare duration (minutes x2)	Probable Glare duration (mintues)	Weight Month1	Weight Month2	Average veiling luminance(cd/m2)	Min veiling luminance(cd/m2)	Max veiling luminance(cd/m2)	Average glare angle	Min glare angle	Max glare angle	All minutes
01-Mar / 11-Oct	5:00 PM	2	0.03	0.03	0	115.47	115.37	115.56	25.22	25.19	25.25	7;
02-Mar / 10-Oct	5:00 PM	2	0.03	0.03	0	116.35	116.15	116.54	24.85	24.78	24.92	8;
11-Apr / 31-Aug	5:00 AM	2	0.22	0.04	0.18	72.29	71.89	72.54	17.47	17.44	17.52	35;

Clear Sky		
Total glare duration	1004	Minutes
Total no of different hours glare occurs	140	Hours
Climate Based Sky		
Total probable glare duration	280	Minutes
Total probable no of different hours glare occurs	34	Hours





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What's New?

- Daylight Glare Probability (DGP) AUTOCAD REVIT

"DGP is used to assess protection from glare for space where the activities are comparable to reading, writing or using display devices and the occupants are not able to choose position and viewing direction."

Table A.7 — Proposed different levels of threshold $DGP_{e<5\,\%}$ for glare protection

Level of recommendation for glare protection	$DGP_{e<5\,\%}$
Minimum	0,45
Medium	0,40
High	0,35

- For minimum recommendation: DGP should not exceed a value of 0.45 for more than 5% of the occupied time.

- Occupation time is typically set between 8am and 6pm Monday to Friday.

- Climate based calculation

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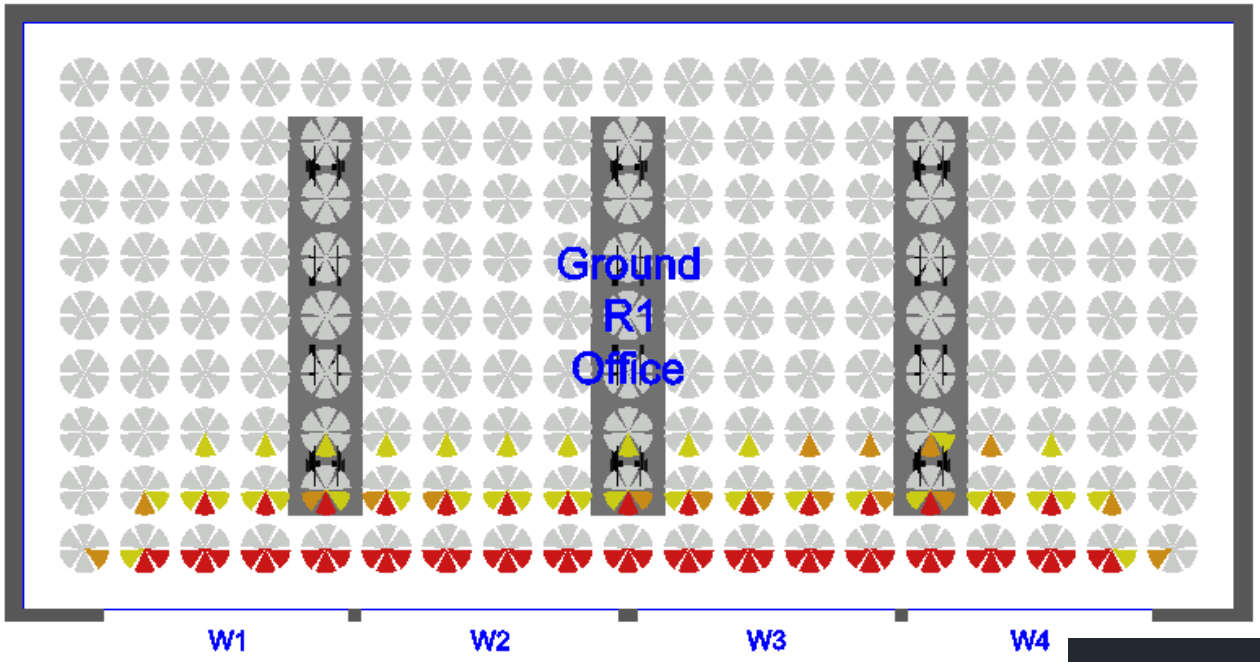
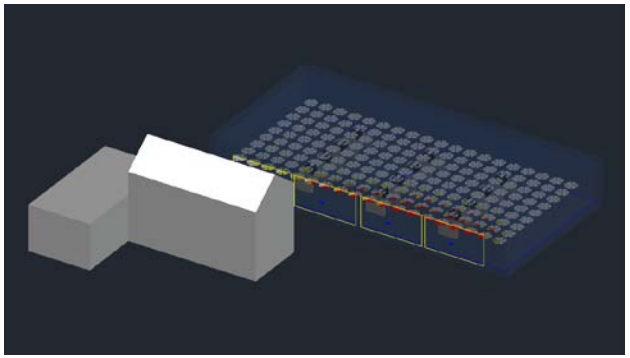
What's New?

- Daylight Glare Probability (DGP)



Occupied Hours
0-5%
5-10%
10-15%
>15%



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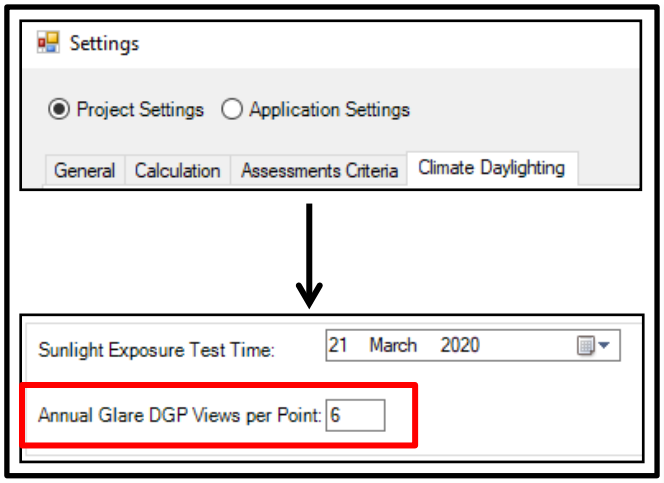
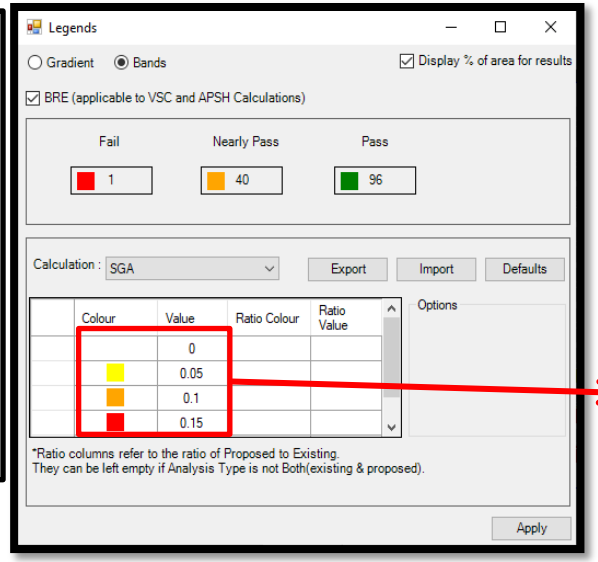
What's New?

- Daylight Glare Probability (DGP)





Occupied Hours

0-5%

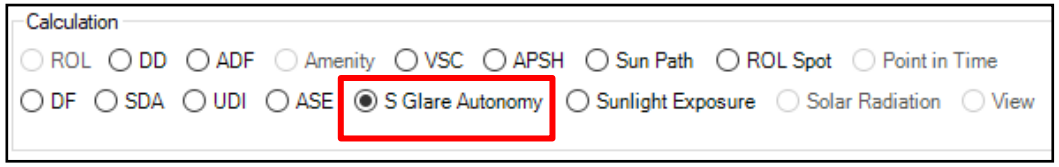
5-10%

10-15%

>15%

Table E.1 — *DGP* values can be categorized in following ranges

Criterion	*DGP*
Glare is mostly not-perceived	$DGP \leq 0{,}35$
Glare is perceived but mostly not disturbing	$0{,}35 < DGP \leq 0{,}40$
Glare is perceived and often disturbing	$0{,}4 < DGP \leq 0{,}45$
Glare is perceived and mostly intolerable	$DGP \geq 0{,}45$



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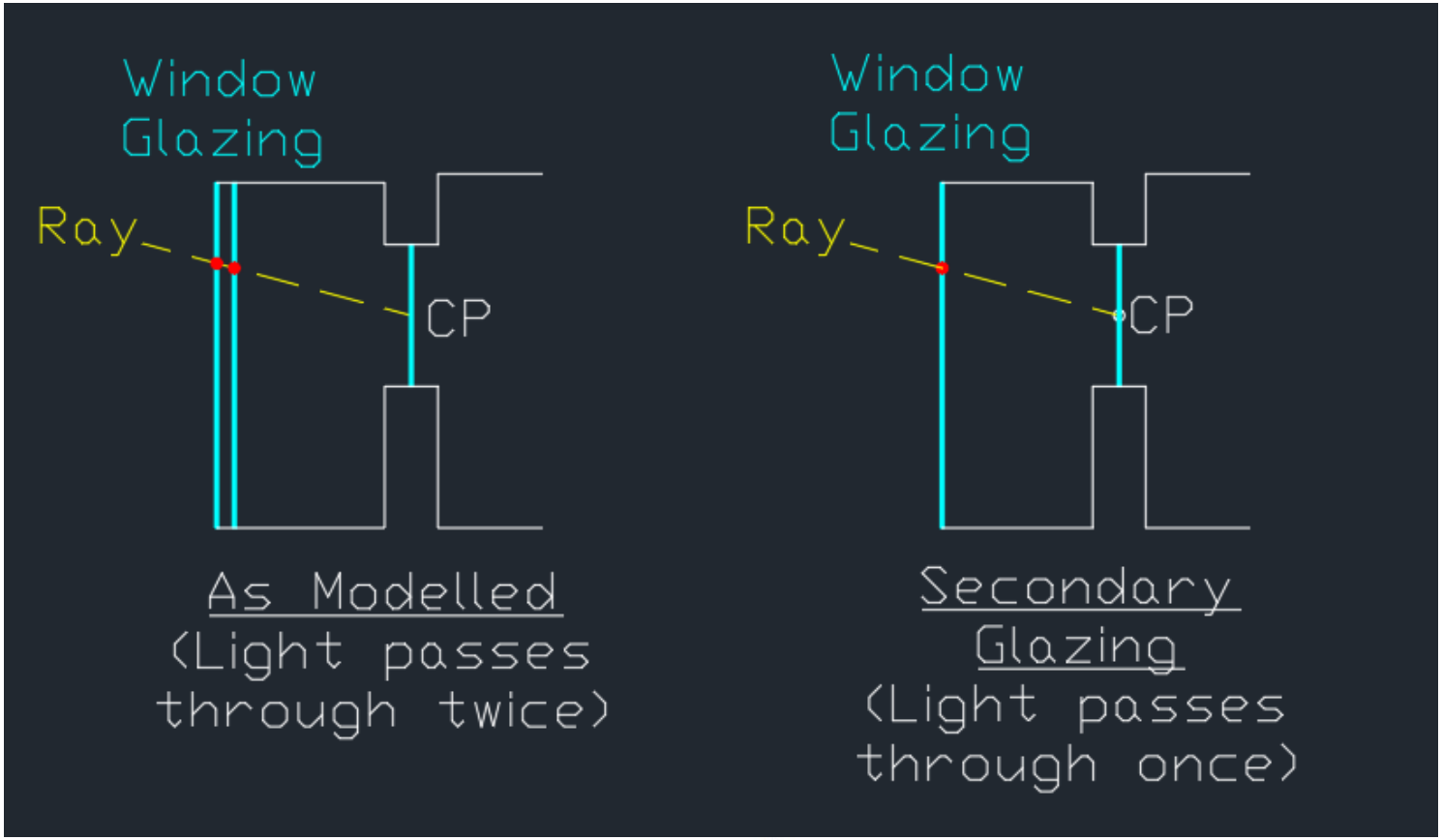
What's New?

- Secondary Glazing REVIT



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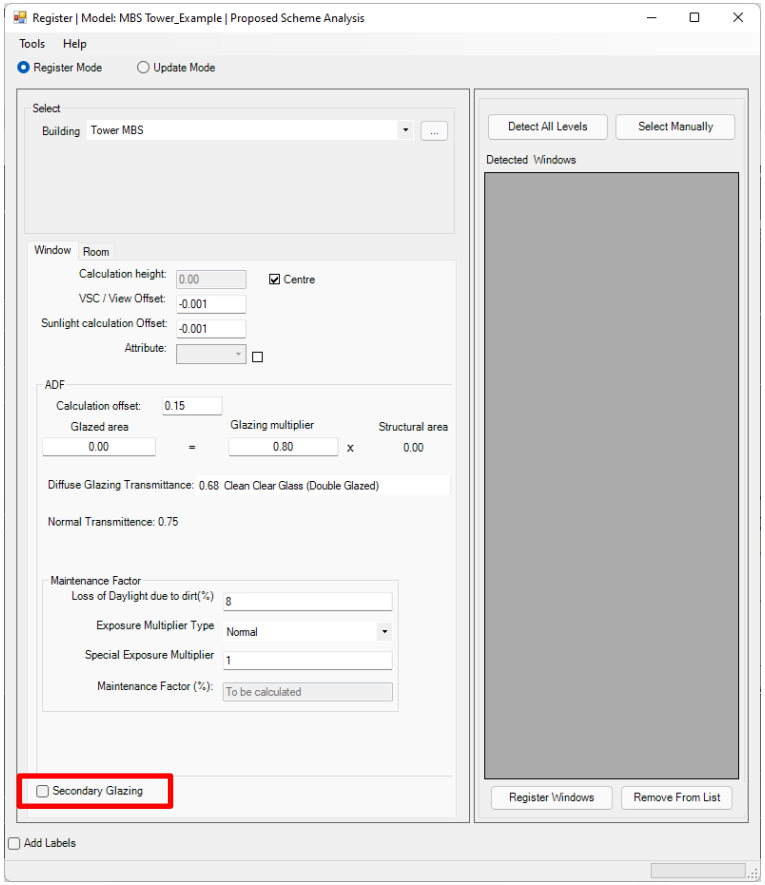
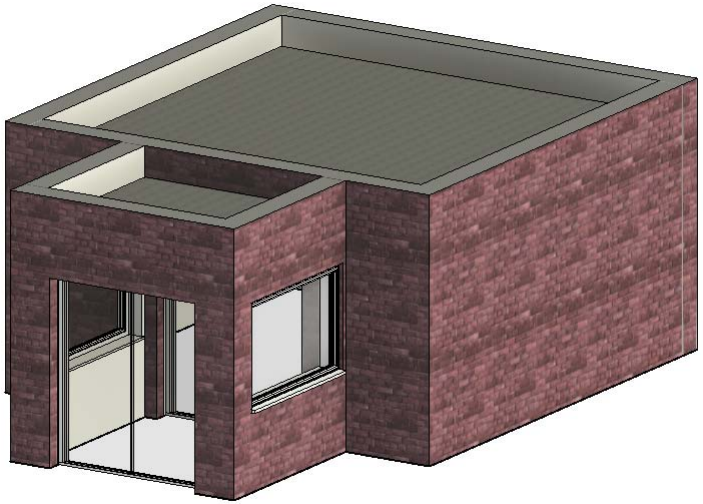
What's New?

- Secondary Glazing REVIT





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What's New?

- Secondary Glazing REVIT

Image without registered windows

Image with registered windows as secondary glazing

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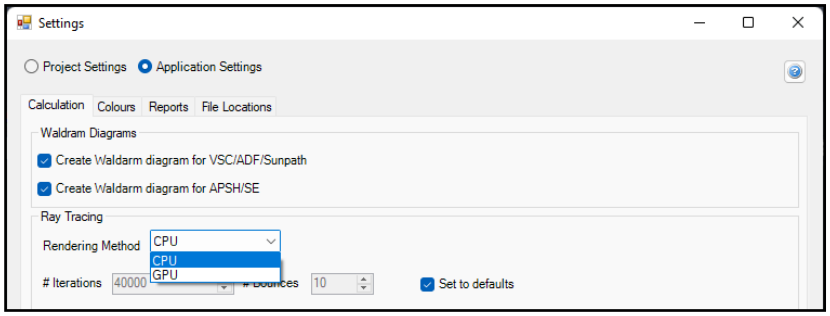
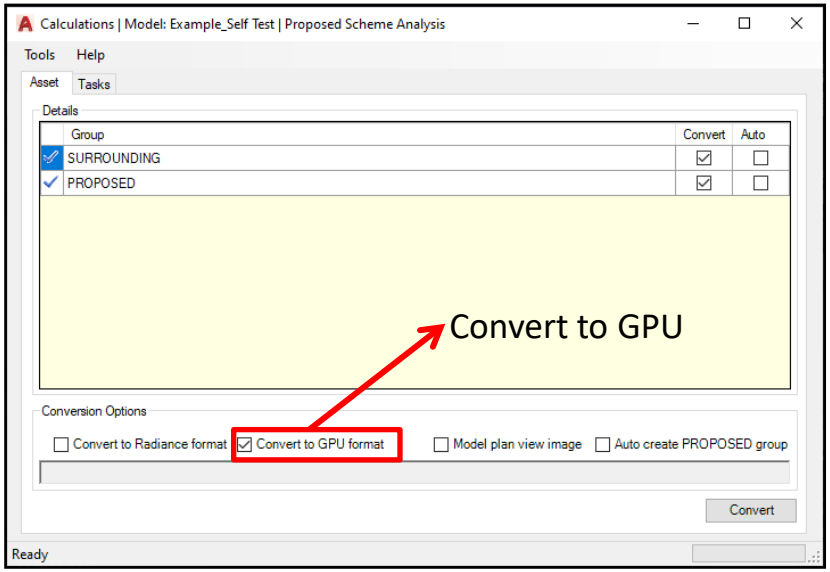
GPU

- Even faster calculations





AUTOCAD REVIT

CPU = Radiance Rendering Method

GPU = Radiance Based Rendering Method

Requirements for GPU

NVIDIA GEFORCE RTX

- NVIDIA Graphics Card
- CUDA Runtime (Can be downloaded from our website)

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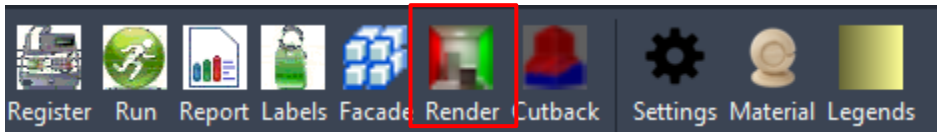
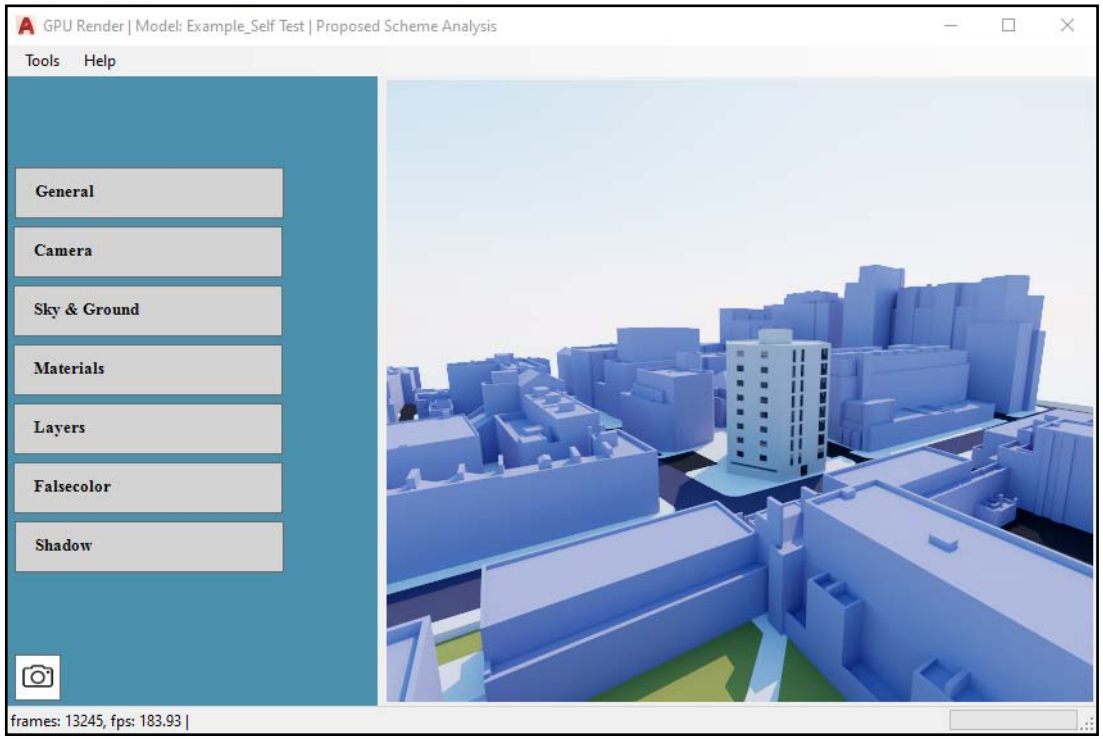
GPU



- Quicker Runtime
- Live Rendering
- Quality Images
- Group checking



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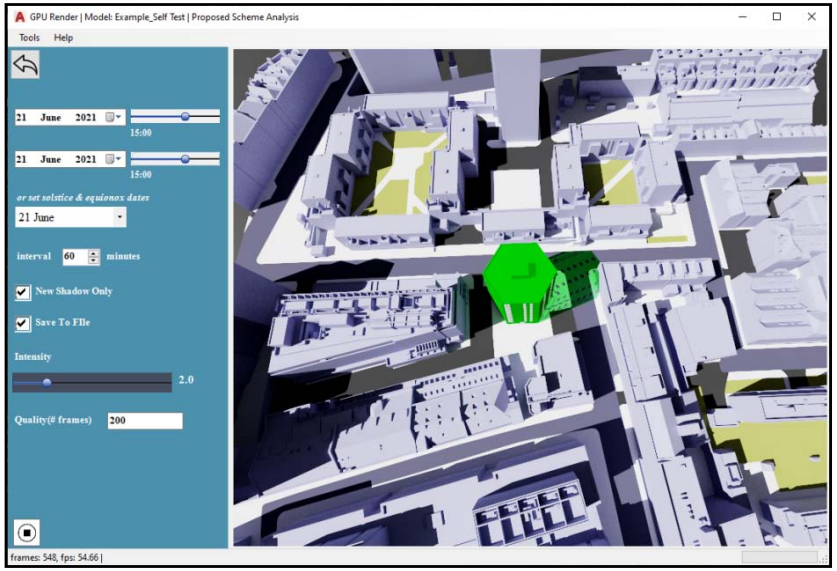
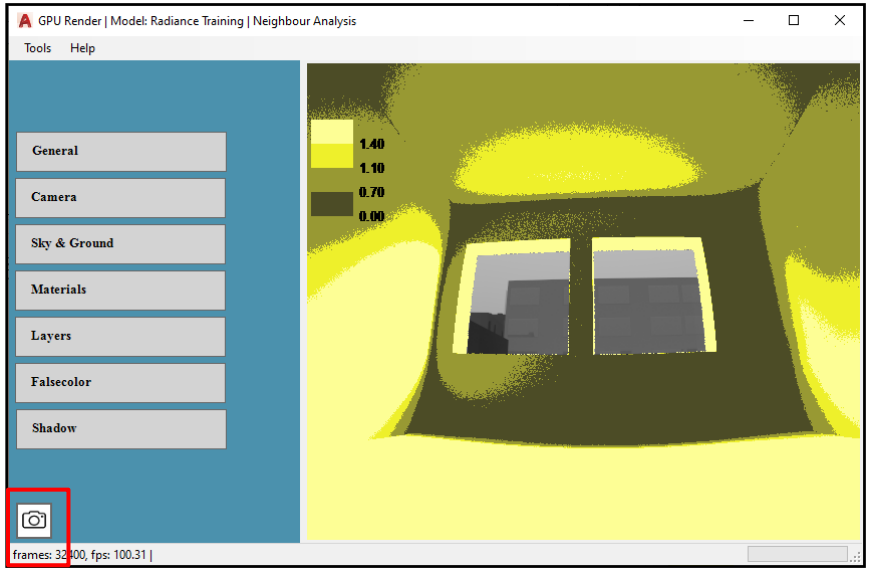
GPU

- Live Daylight Factor
- Live Transient Shadow
- Live Sky Component





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GPU

GPU v CPU (Approx 600 rooms)

Task	GPU	CPU
VSC (Ex & Pr)	1 minute	5 minutes
ROL (Ex v Pr)	40s	15 minutes
Daylight Factor (BS EN 17037)	5 minutes	105 minutes
sDA (BS EN 17037)	8 minutes	6.5 hours

Only View, Solar Radiation and Point in Time currently do not run with GPU. Also, any models with transtree materials will not convert to GPU.

There could be a subtle difference between results on GPU compared with CPU.

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Waldram Tools for Revit

- Great for Internal Daylight Assessments/Self Tests
- Familiar Icons.
- Fast Set-Up
- Software detects the inherent windows and rooms. (No polylines!)
- Uses the information already provided within the Revit model (i.e. Window Number, Room Number and Room Name) .

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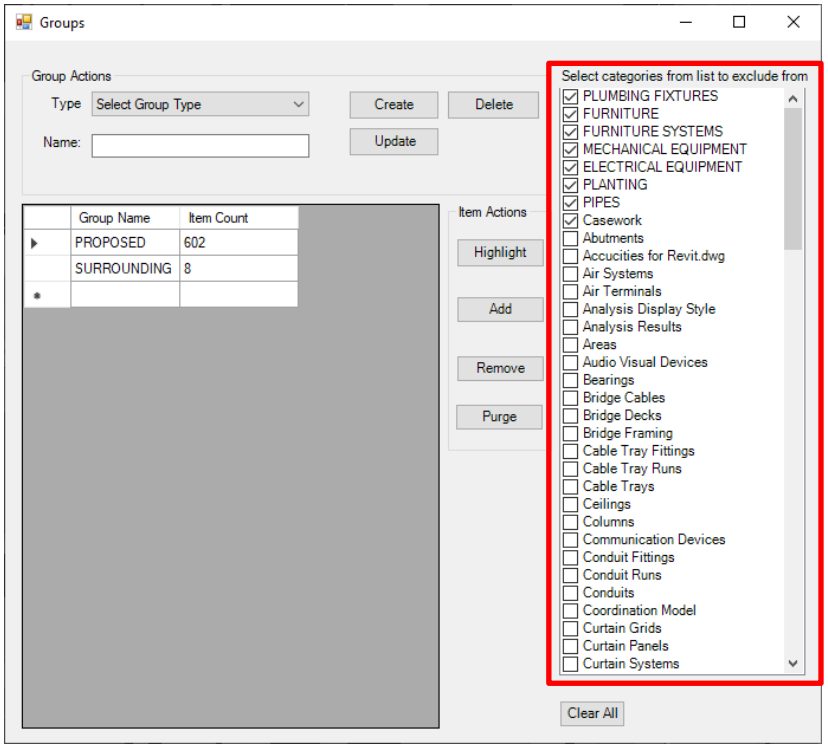
Waldram Tools for Revit

- Include/Exclude specific categories when selecting groups.



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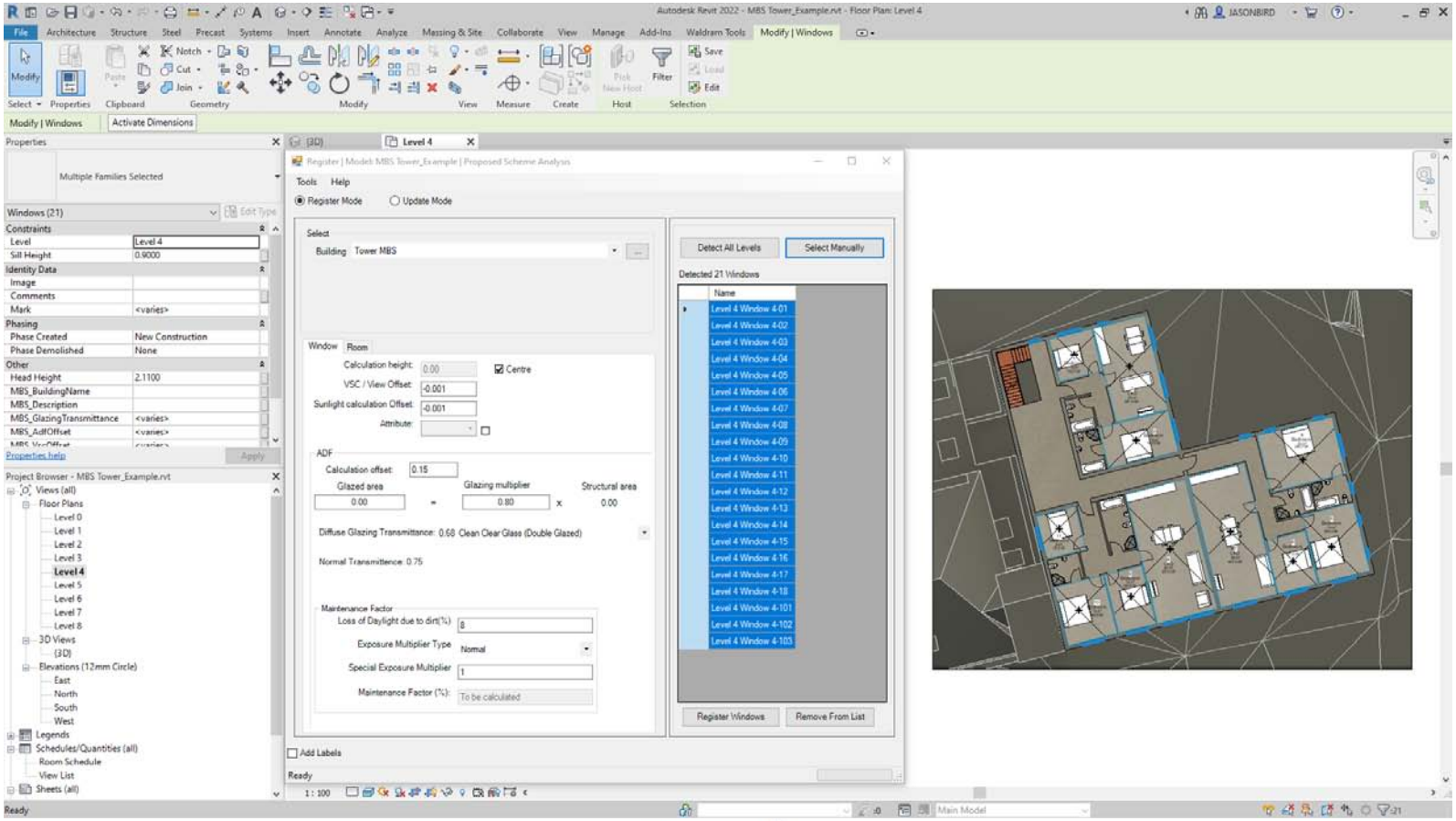
Waldram Tools for Revit

- Register Windows (Select manually or detect all levels).



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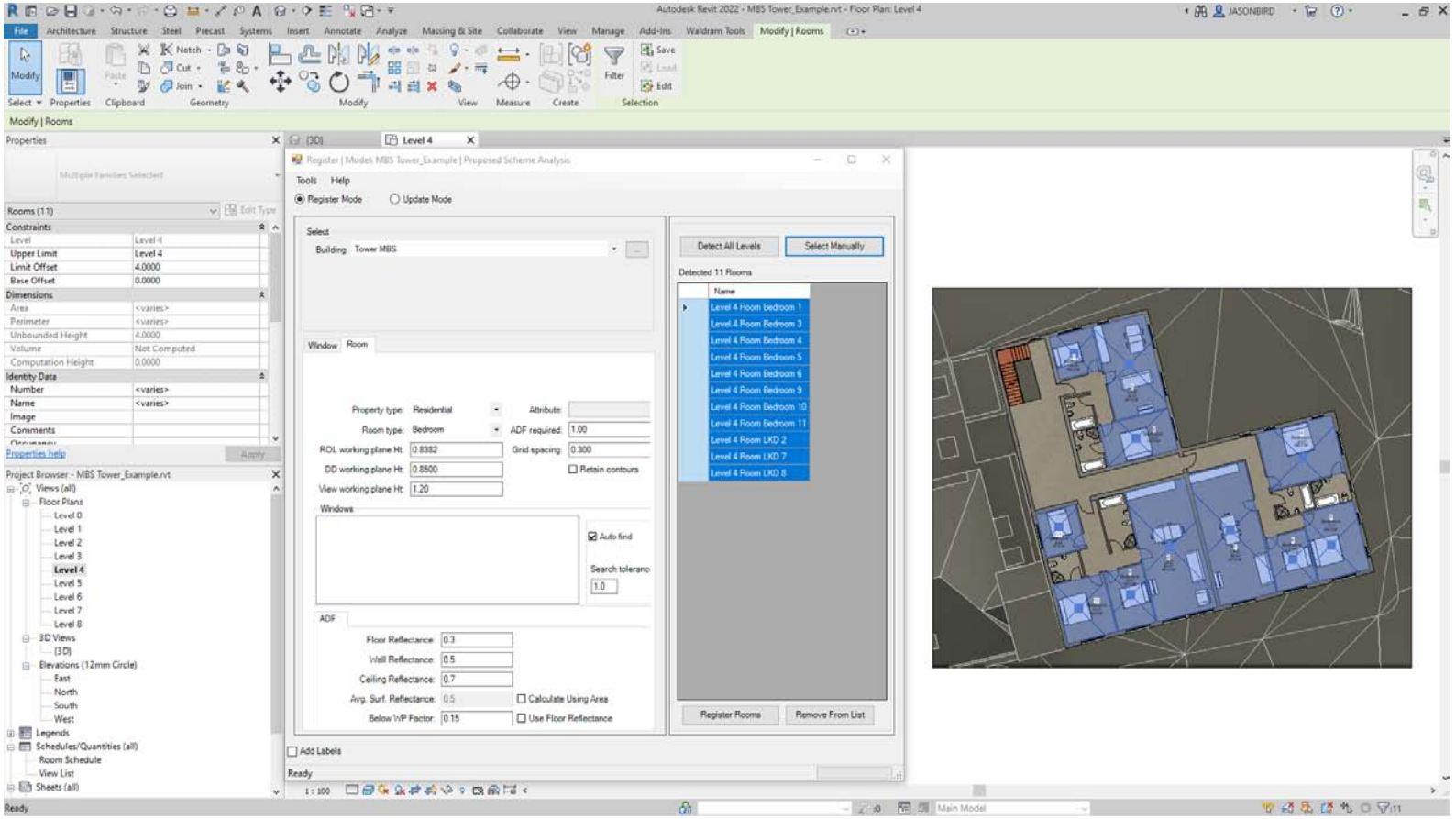
Waldram Tools for Revit

- Register Rooms (Select manually or detect all levels).



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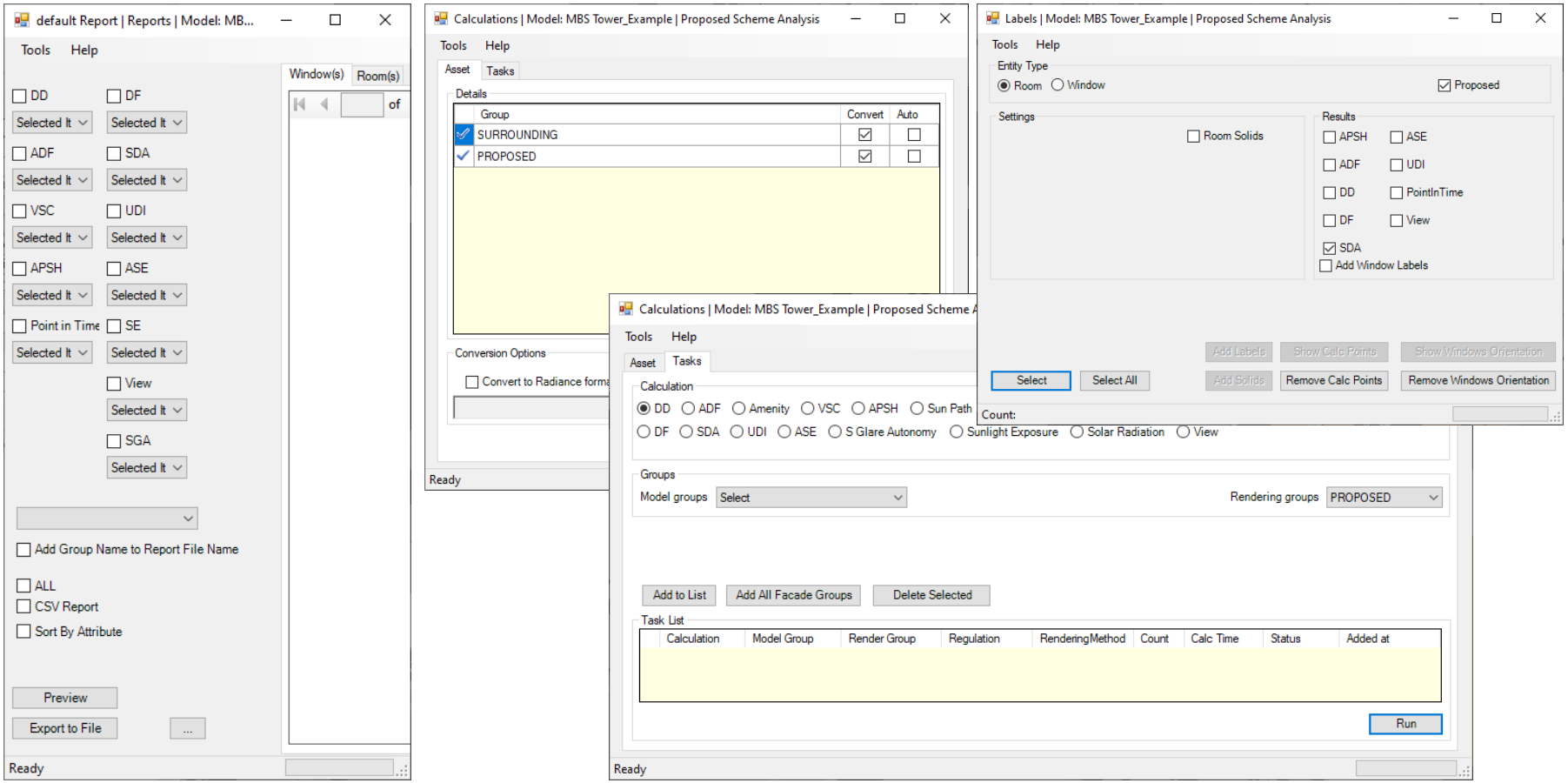
Waldram Tools for Revit

- Same Interface for Running, Reporting and Labels



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Waldram Tools for Revit

Click to watch a short demo on YouTube

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Waldram Tools for Revit

Tips & Tricks

- Delete all unnecessary rooms
- Simplify and tidy the model
- Make use of the room separation tool to cut off rooms.
- Make good use of the room schedule.
- Ensure walls are ‘room bounding’
- Always check phasing and design options!

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BRE Incorporation of BS EN 17037

There are two new main metrics likely to be included in the BRE release for **new developments** which are:

1. Daylight Provision (To replace ADF)

2. Sunlight Exposure (To replace APSH)

Others:

1. View Out (Predominately seen as a test for space with fixed seating locations, i.e Offices and Schools)

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BRE Incorporation of BS EN 17037

Of which, there are two methods of assessing daylight provision in interior spaces.

1. Daylight Factor

2. Spatial Daylight Autonomy (sDA) / Illuminance Method.

BS EN 17037 states that the assessment grid should exclude a band of 0.5m from the walls.

It is expected that BRE will recommend a band of 0.3m from the walls.

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BRE Incorporation of BS EN 17037

The recommendations for daylight provision in a space specified in EN 17037 may not be achievable in some buildings ;

Table A.1 — Recommendations of daylight provision by daylight openings in vertical and inclined surface

Level of recommendation for vertical and inclined daylight opening	Target illuminance E_T lx	Fraction of space for target level $F_{plane,\%}$	Minimum target illuminance E_{TM} lx	Fraction of space for minimum target level $F_{plane,\%}$	Fraction of daylight hours $F_{time,\%}$
Minimum	300	50 %	100	95 %	50 %
Medium	500	50 %	300	95 %	50 %
High	750	50 %	500	95 %	50 %
NOTE Table A.3 gives target daylight factor (D_T) and minimum target daylight factor (D_{TM}) corresponding to target illuminance level and minimum target illuminance, respectively, for the CEN capital cities.					

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BRE Incorporation of BS EN 17037

Therefore the BS EN 17037 National Annex provides minimum target illuminances for room types in UK dwellings.

Room Type	Target Illuminance (lux)
Bedroom	100
Living Room	150
Kitchen	200

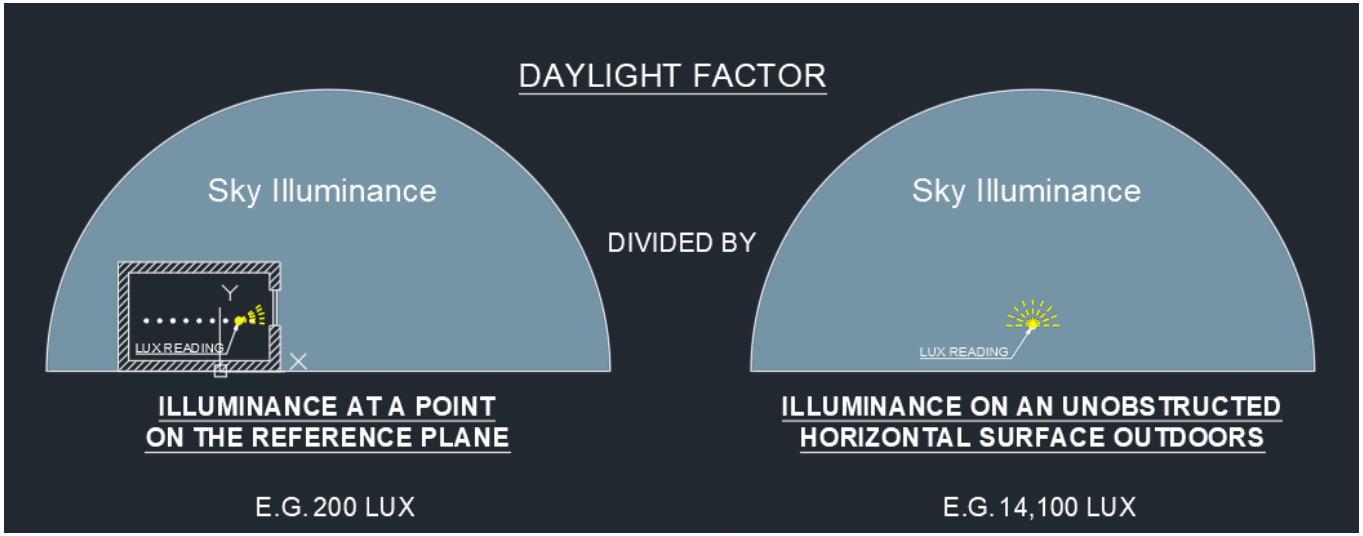
BRE Incorporation of BS EN 17037

Daylight Factor

Illuminance at a point on the reference (working) plane in a room

Divided by

Illuminance on an unobstructed horizontal surface.



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BRE Incorporation of BS EN 17037

The National Annex for BS EN 17037 specify target daylight factors

Location	Geographical latitude φ [°]	Median External Diffuse Illuminance $E_{v,d,med}$	*D* to exceed 100 lx	*D* to exceed 150 lx	*D* to exceed 200 lx	*D* to exceed 300 lx	*D* to exceed 500 lx	*D* to exceed 750 lx
St Peter (Jersey Airport)	49,22	16 600	0,6 %	0,9 %	1,2 %	1,8 %	3,0 %	4,5 %
London (Gatwick Airport)	51,15	14 100	0,7 %	1,1 %	1,4 %	2,1 %	3,5 %	5,3 %
Birmingham	52,45	16 300	0,6 %	0,9 %	1,2 %	1,8 %	3,1 %	4,6 %
Hemsby	52,68	15 800	0,6 %	0,9 %	1,3 %	1,9 %	3,2 %	4,7 %
Finningley	53,48	14 900	0,7 %	1,0 %	1,3 %	2,0 %	3,4 %	5,0 %
Aughton (Lancashire)	53,55	14 200	0,7 %		1,4 %	2,1 %	3,5 %	5,3 %
Belfast	54,65	14 500				2,1 %	3,4 %	5,2 %
Leuchars	56,38	14 000				2,1 %	3,6 %	5,4 %
Oban	56,42	13 100				2,3 %	3,8 %	5,7 %
Aberdeen	57,20	14 100				2,1 %	3,5 %	5,3 %

Bedroom

Living Room

Kitchen

(100/14,100) x 100% = 0.7%

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BRE Incorporation of BS EN 17037

Daylight Factor

- At least 50% of the points on the reference plane must exceed the target value.
- Ratio is usually expressed as a percentage.
- Based on an CIE standard overcast sky
- Based on location specific sky illuminance
- **Not** reliant on orientation.
- Includes reflected light.

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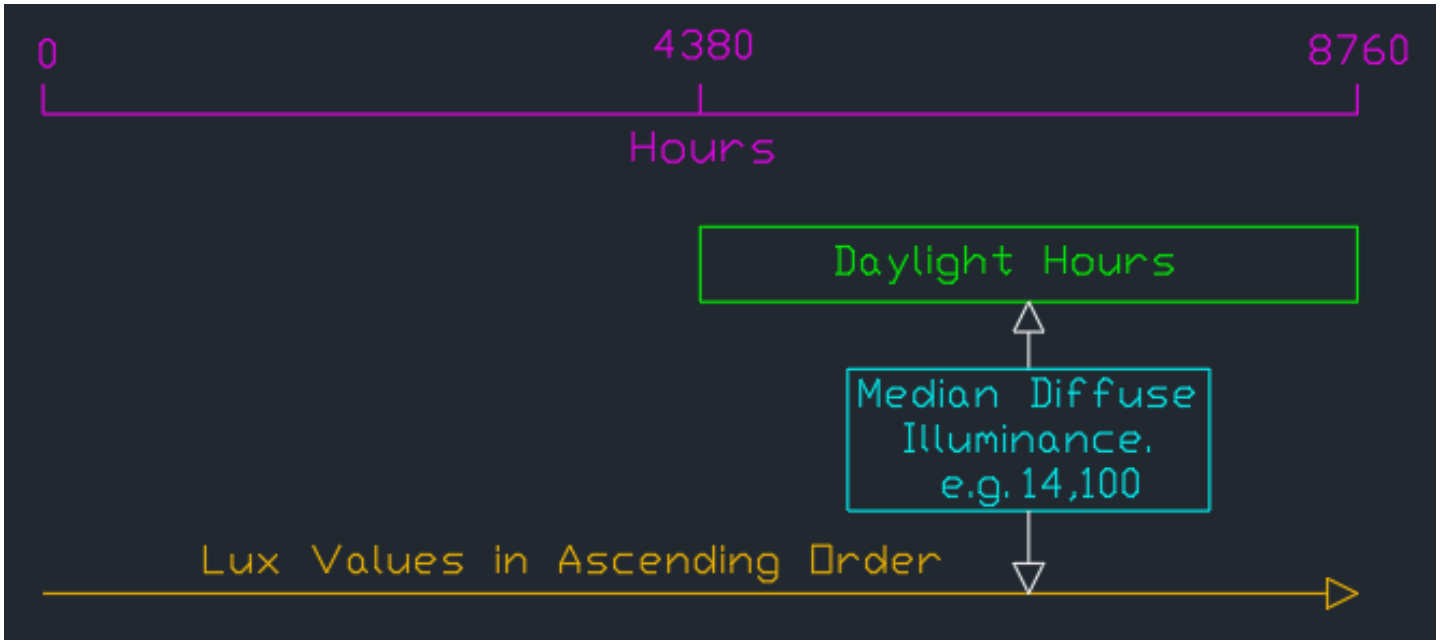
BRE Incorporation of BS EN 17037

Daylight Factor



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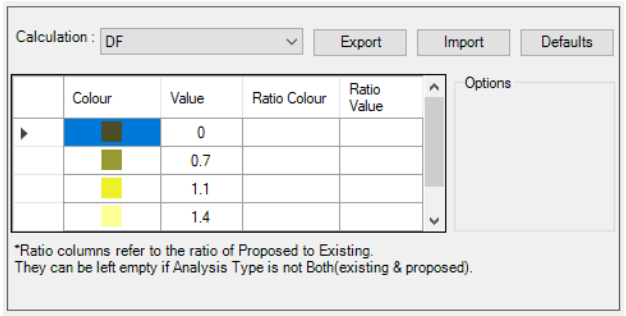
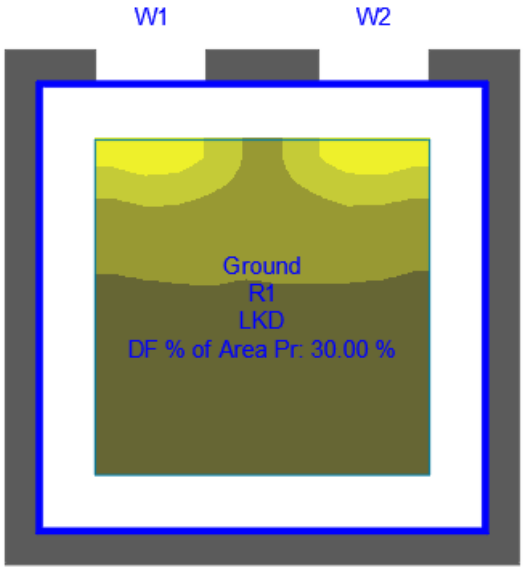
BRE Incorporation of BS EN 17037

Project Name: MBS Tower_Example
Project No.: 1234
Report Title: Daylight Factor - Proposed Scheme
Date of Analysis: 11/11/2021

Floor Ref	Room Ref	Property Type	Room Use	Room Area m2	Effective Area	Area Meeting Req DF	% of Area Meeting Req DF	Criteria: Req DF	Criteria: Req % of Effective Area	Criteria: Median Diffuse Horizontal Illuminance	Meets Criteria
Tower MBS											
Level 4	1	Residential	Bedroom	9.73	4.49	4.49	100%	0.70%	50%	14100	YES
	2	Residential	LKD	26.16	16.47	10.34	63%	1.40%	50%	14100	YES
	3	Residential	Bedroom	15.14	8.07	3.62	45%	0.70%	50%	14100	NO
	4	Residential	Bedroom	22.92	14.25	13.13	92%	0.70%	50%	14100	YES
	5	Residential	Bedroom	18.61	10.89	10.80	99%	0.70%	50%	14100	YES
	6	Residential	Bedroom	11.30	5.51	3.58	65%	0.70%	50%	14100	YES
	7	Residential	LKD	39.67	26.91	2.23	8%	1.40%	50%	14100	NO
	8	Residential	LKD	42.08	29.12	3.74	13%	1.40%	50%	14100	NO
	9	Residential	Bedroom	11.75	5.72	2.08	36%	0.70%	50%	14100	NO
	10	Residential	Bedroom	15.51	8.60	2.43	28%	0.70%	50%	14100	NO
	11	Residential	Bedroom	9.03	4.01	4.01	100%	0.70%	50%	14100	YES





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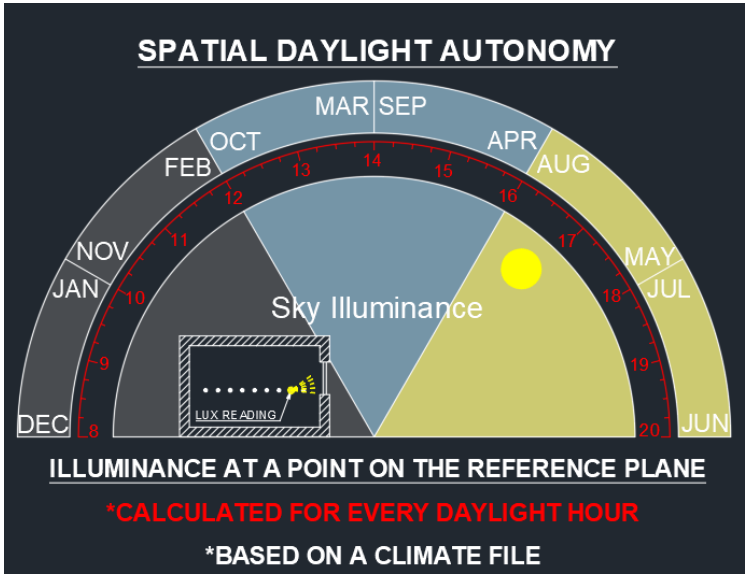
Spatial Daylight Autonomy

A target illuminance should be achieved across at least half of the reference plane, for at least half of the daylight hours.



Daylight Hours = 4380

50% of Daylight Hours = 2190

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Spatial Daylight Autonomy

- Based on a climate file.
- Is an annual calculation.
- Relies on orientation.
- Includes reflected light.

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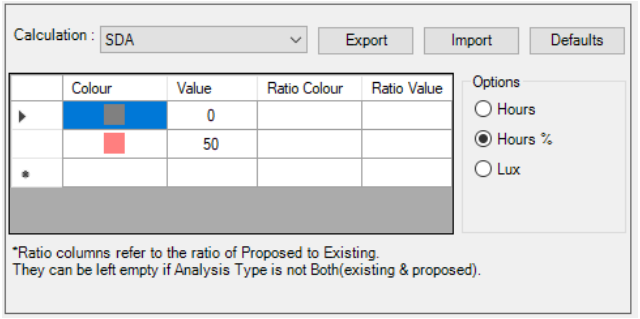
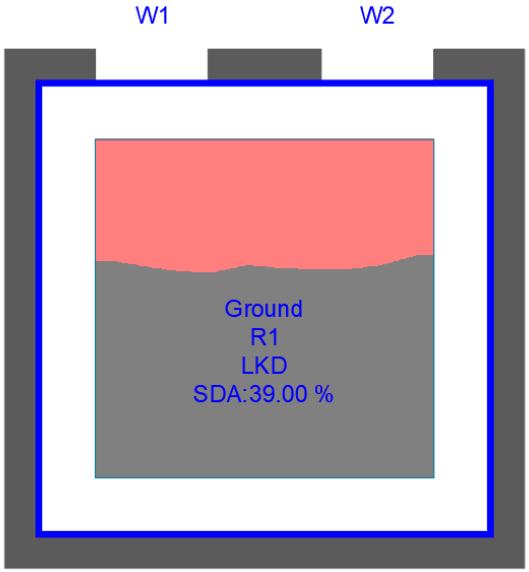
Project Name: MBS Tower_Example
Project No.: 1234
Report Title: SDA BS En17037 - Proposed Scheme
Date of Analysis: 11/11/2021

Floor Ref	Room Ref	Property Type	Room Use	Room Area m2	Effective Area	Area Meeting Req Lux	% of Area Meeting Req Lux	Criteria: Req Lux	Criteria: Req % of Effective Area	Criteria: Req % of Daylight Hours	Criteria: Daylight Hours	Meets Criteria
Tower MBS												
Level 4	1	Residential	Bedroom	9.73	4.49	4.49	100%	100	50%	50%	4380	YES
	2	Residential	LKD	26.16	16.47	14.82	90%	200	50%	50%	4380	YES
	3	Residential	Bedroom	15.14	8.07	4.69	58%	100	50%	50%	4380	YES
	4	Residential	Bedroom	22.92	14.25	14.25	100%	100	50%	50%	4380	YES
	5	Residential	Bedroom	18.61	10.89	10.89	100%	100	50%	50%	4380	YES
	6	Residential	Bedroom	11.30	5.51	5.14	93%	100	50%	50%	4380	YES
	7	Residential	LKD	39.67	26.91	3.16	12%	200	50%	50%	4380	NO
	8	Residential	LKD	42.08	29.12	5.11	18%	200	50%	50%	4380	NO
	9	Residential	Bedroom	11.75	5.72	2.60	45%	100	50%	50%	4380	NO
	10	Residential	Bedroom	15.51	8.60	3.04	35%	100	50%	50%	4380	NO
	11	Residential	Bedroom	9.03	4.01	4.01	100%	100	50%	50%	4380	YES





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Daylight Provision Summary

	Daylight Factor (DF)	Spatial Daylight Autonomy
Calculation	Single Calculation	Annual Calculation (hourly)
Sky Illuminance	Based on an CIE Overcast sky, location specific.	Based on each hourly interval from a selected climate file.
Dependent on Orientation	No	Yes
Criteria	50% of assessment area to meet target DF.	50% of assessment area to meet required target illuminance value for 50% of the daylight hours.

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Sunlight Exposure

- Date of assessment to be March 21st

- At least one habitable room (preferably living room) should meet.

- Applies to rooms of all orientations.
(Even though north facing rooms are unlikely to meet) .

- The amount of sunlight can be added together for rooms with windows on different facades (providing it occurs at different times).

- Calculation point at inside of the reveal.

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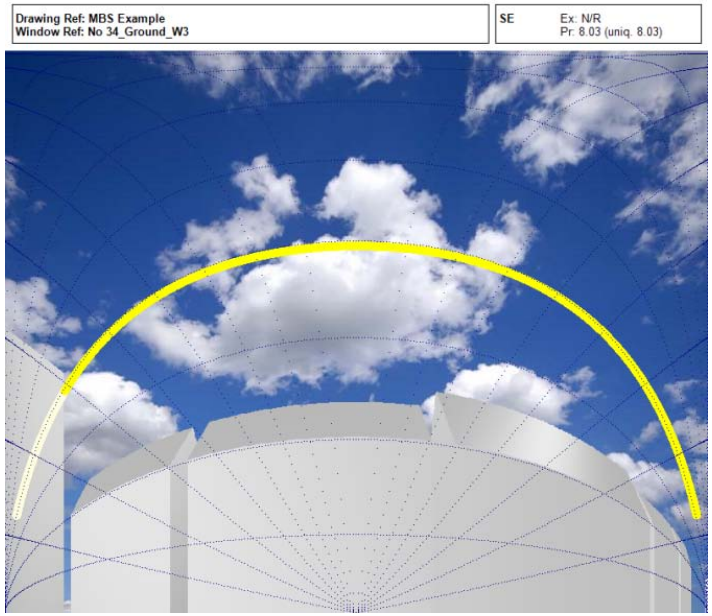
Sunlight Exposure

Level of recommendation for exposure to sunlight	Sunlight exposure
Minimum	**1,5 h**
Medium	**3,0 h**
High	**4,0 h**



Project Name: xxxx
Project No.: 1234
Report Title: Sunlight Exposure (BS EN17037) - Proposed Scheme
Date: 22/02/20222

Floor Ref.	Room Ref.	Property Type	Room Use.	Window Ref.	Proposed Sunlight Exposure	Rating
Block A						
Ground	1000	Residential	Bedroom	W3000	1.8	
					1.8	Minimum

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View Out (Recap Ref: 2019)

An additional daylight test – The method is most applicable to spaces with fixed seating locations such as offices and schools.

Table A.5 — Assessment of the view outwards from a given position

	Parameter [a]		
Level of recommendation for view out	**Horizontal sight angle**	**Outside distance of the view**	**Number of layers to be seen from at least 75 % of utilized area:** **- sky** **- landscape (urban and/or nature)** **- ground**
Minimum	≥ 14°	≥ 6,0 m	At least landscape layer is included
Medium	≥ 28°	≥ 20,0 m	Landscape layer and one additional layer is included in the same view opening
High	≥ 54°	≥ 50,0 m	all layers are included in the same view opening

[a] For a space with room depth more than 4 m, it is recommended that the respective sum of the view opening(s) dimensions is at least 1,0 m × 1,25 m (width × height).

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View Out (Recap Ref: 2019)

Grey Areas

- What is defined as depth of view?

- Both sight angle and distance to view are specified to be from a given position, where as layers seen refer to an area

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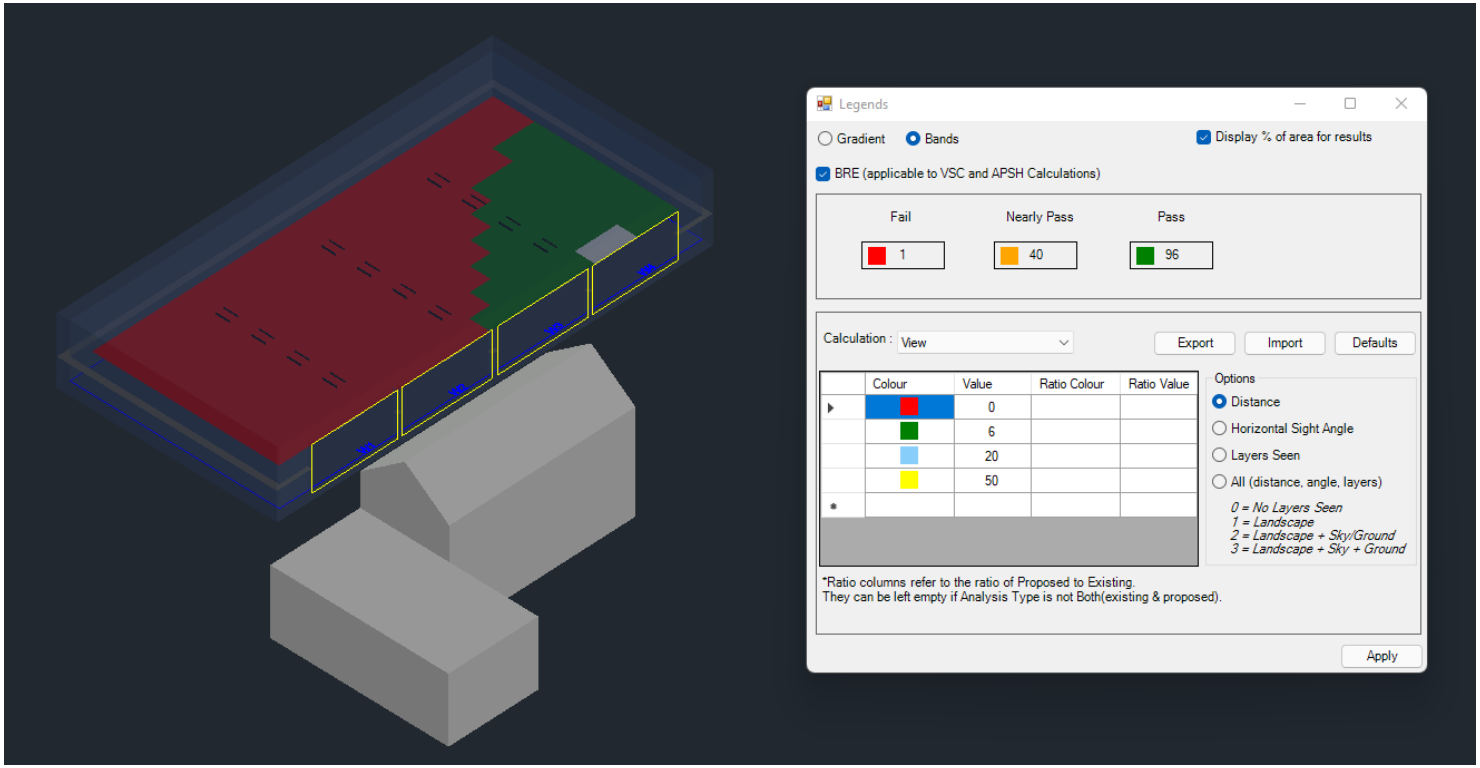
View Out (Recap Ref: 2019)



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View Out (Recap Ref: 2019)

Project Name: View
Project No.: 1234
Report Title: View Out - Proposed Analysis
Date of Analysis: 22/11/2021

Floor Ref	Room Ref	Property Type	Room Use	Room Area	Effective Room Area	Level of Recommendation	Criteria 1		Criteria 2		Criteria 3		% Achieving all Three Criteria
							Horizontal Sight Angle (°)	% Achieved	Outside Distance of View (m)	% Achieved	Visible Layers	% Achieved	
						MBS							
Ground	R1	Commercial	Office	182.36	154.56	Min	14	100%	6	24%	Landscape	100%	24%
						Med	28	100%	20	1%	Landscape + Sky/Ground	100%	1%
						High	54	100%	50	1%	All	100%	1%

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MBS Services

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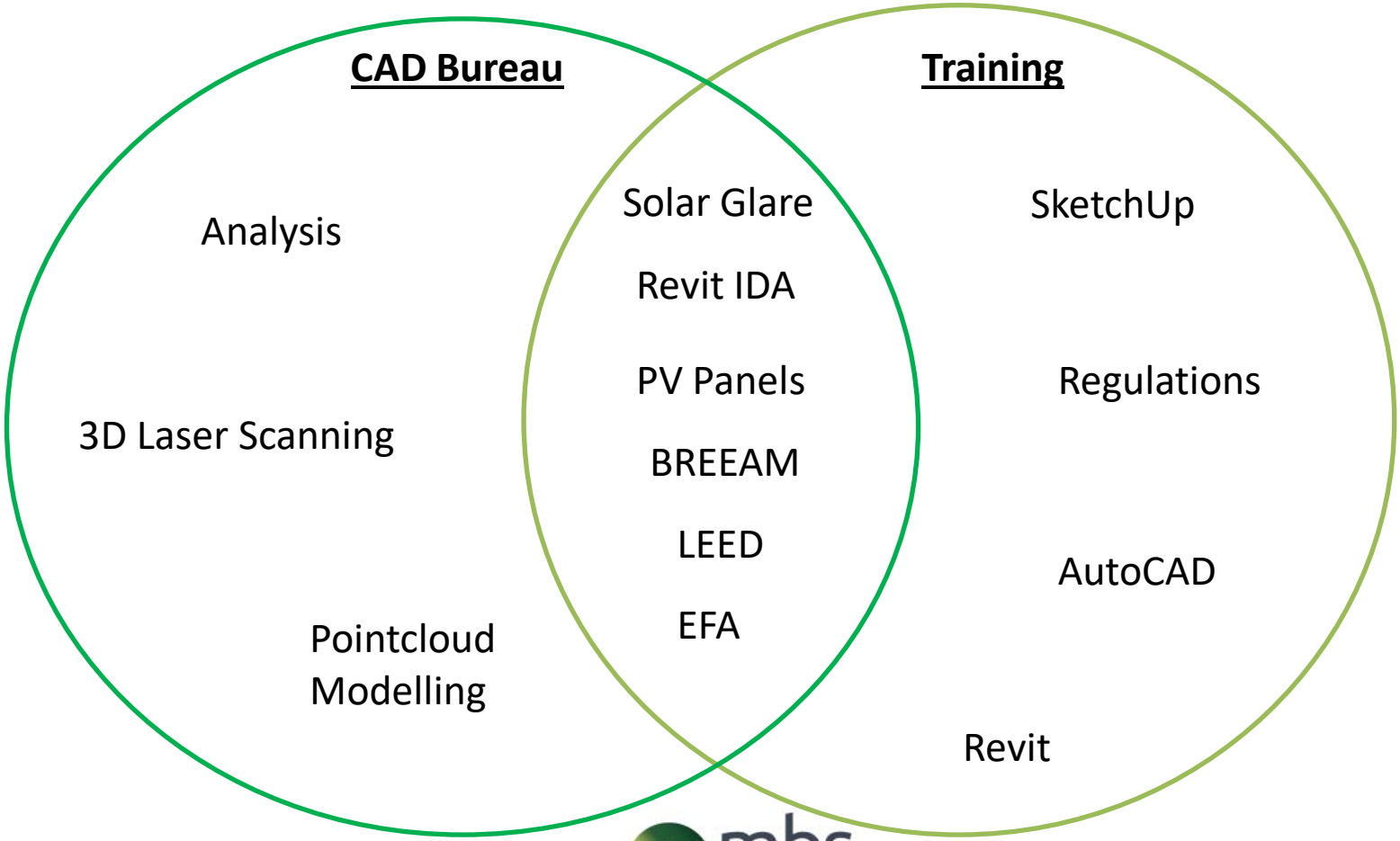

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In the Pipeline…

- Period of Transition for Users and MBS
- Development of GPU Render (Viewer)
- User Feedback and Suggestions

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Any Questions?

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