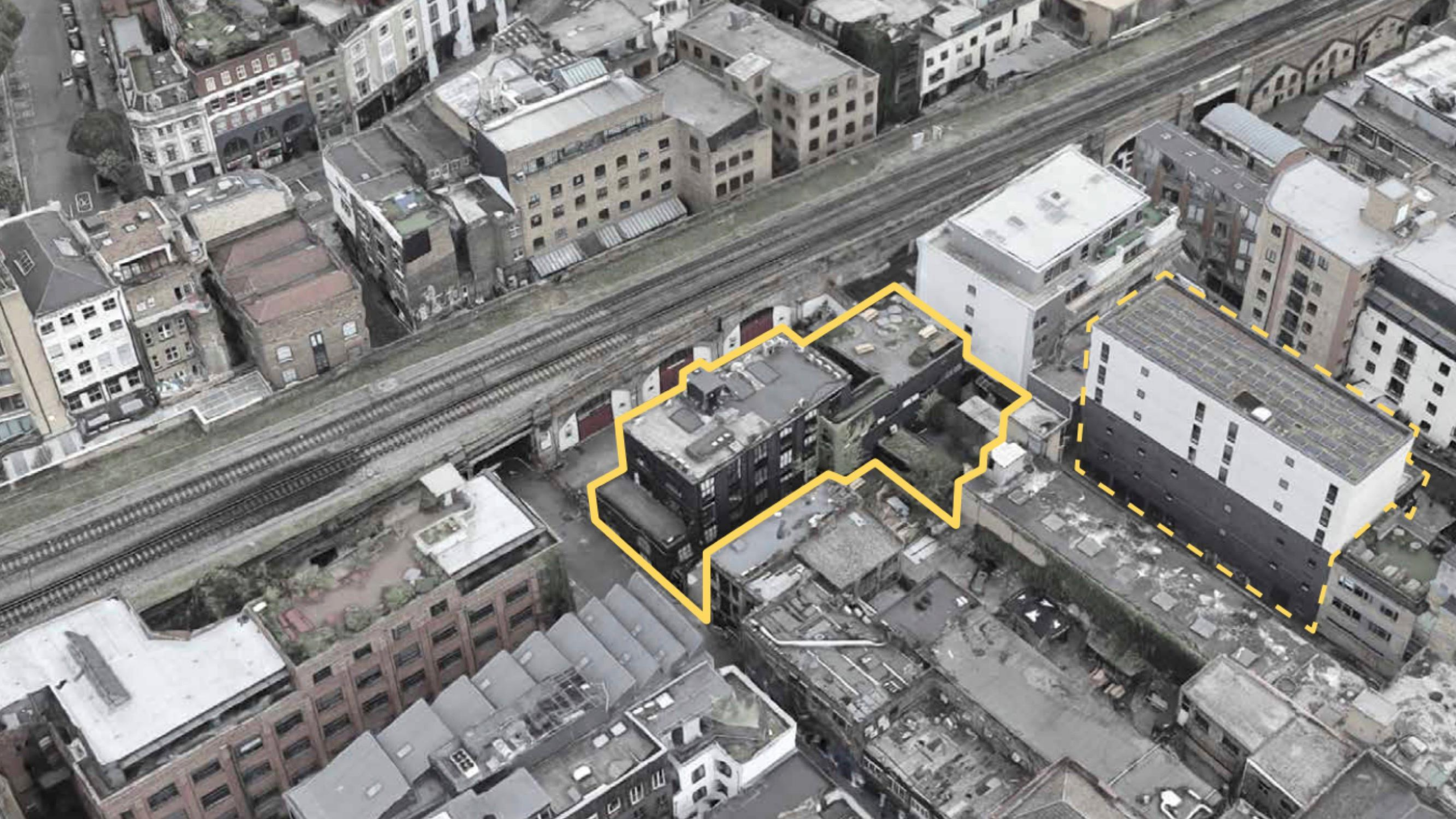
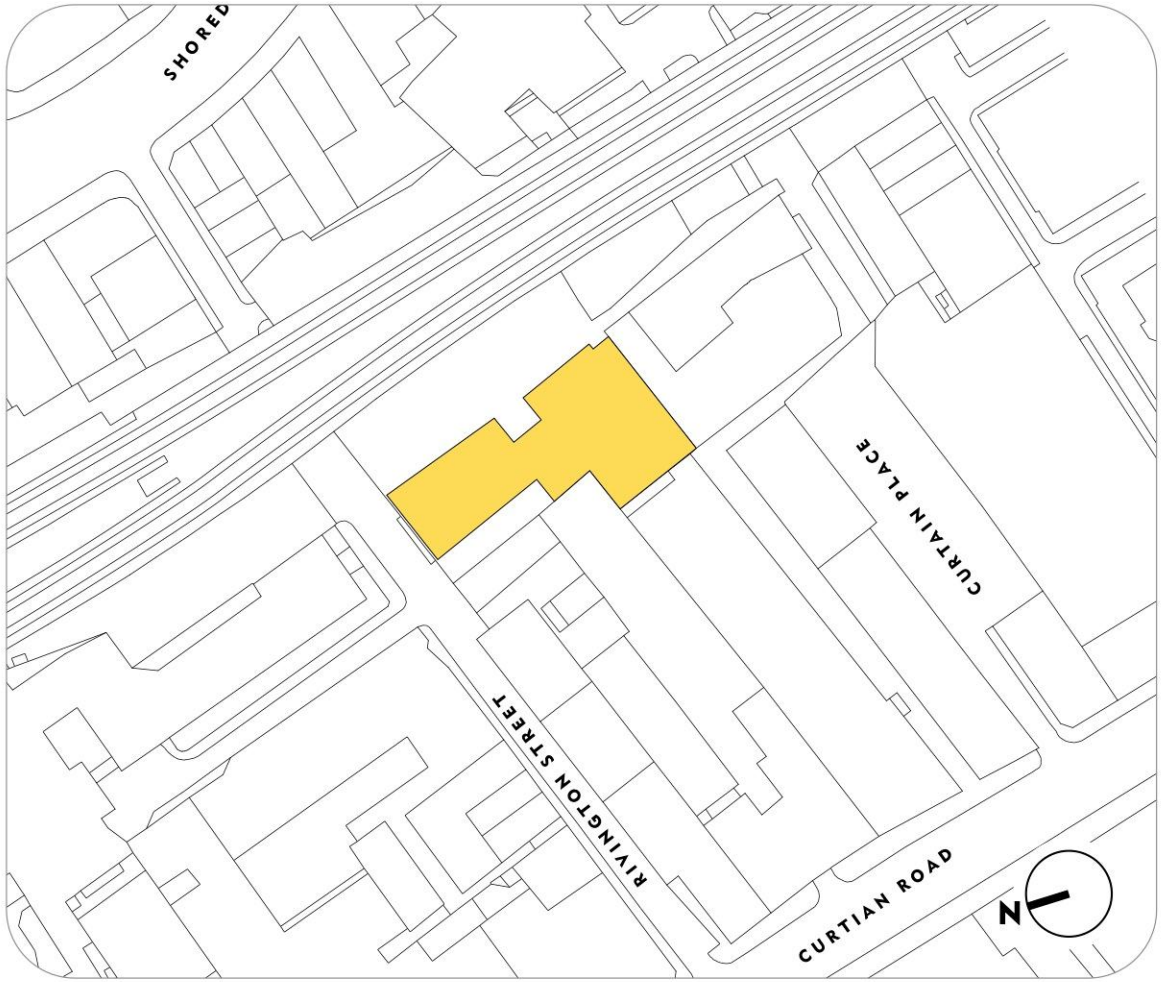
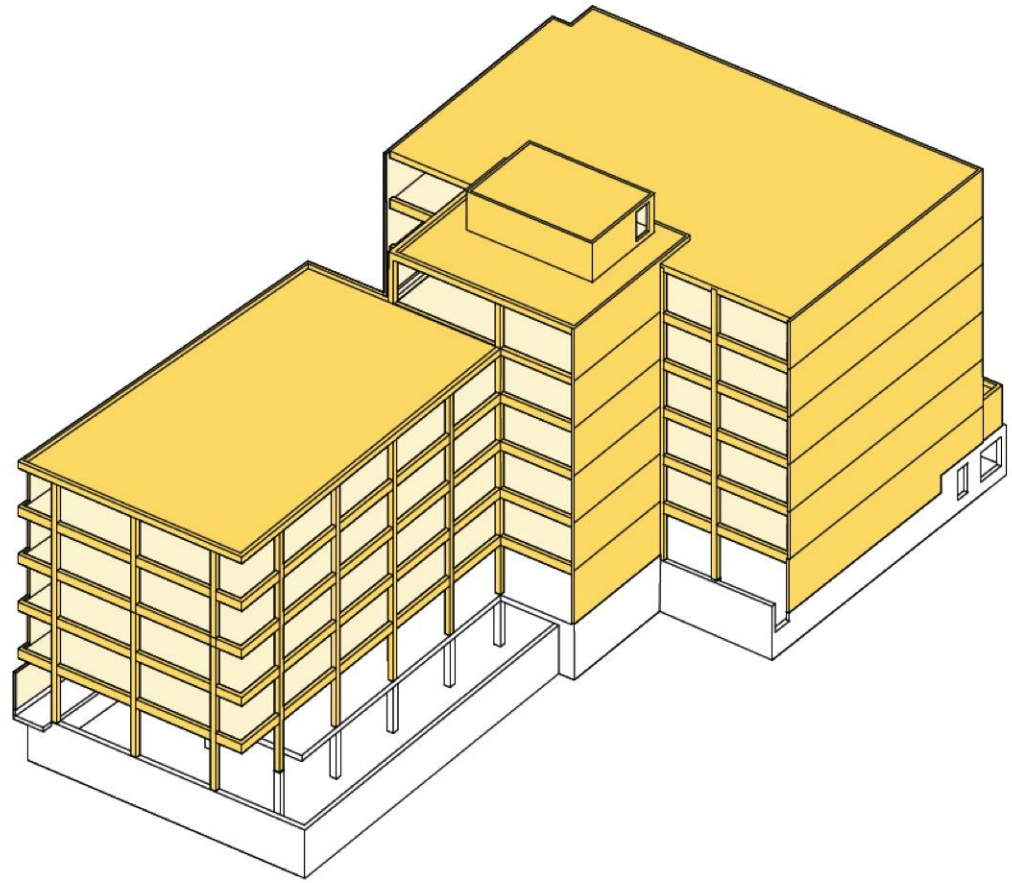
Dave Lomax
Waugh Thisleton Architects

Duncan Walters
Eckersley O'Callaghan

Client	TOG
Architect	WAUGH THISTLETON
Structural Engineering	Eckersley O'Callaghan
Façade Engineering	
M&E	
QS	GT GARDINER &THEOBALD
Project Manager	OPERA
Contractor	MidGroup
Timber Sub-contractor	HYBRID STRUCTURES
Façade sub-contractor	PACEGRADE LIMITED

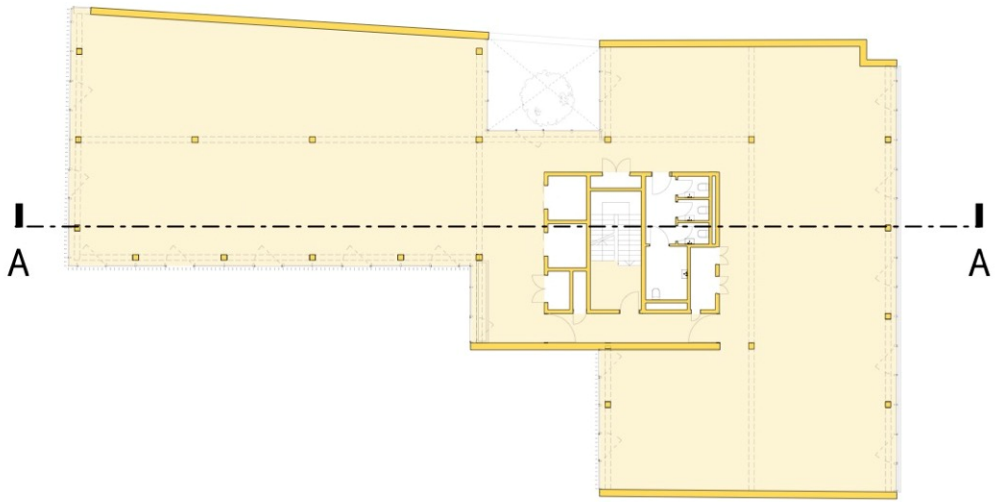




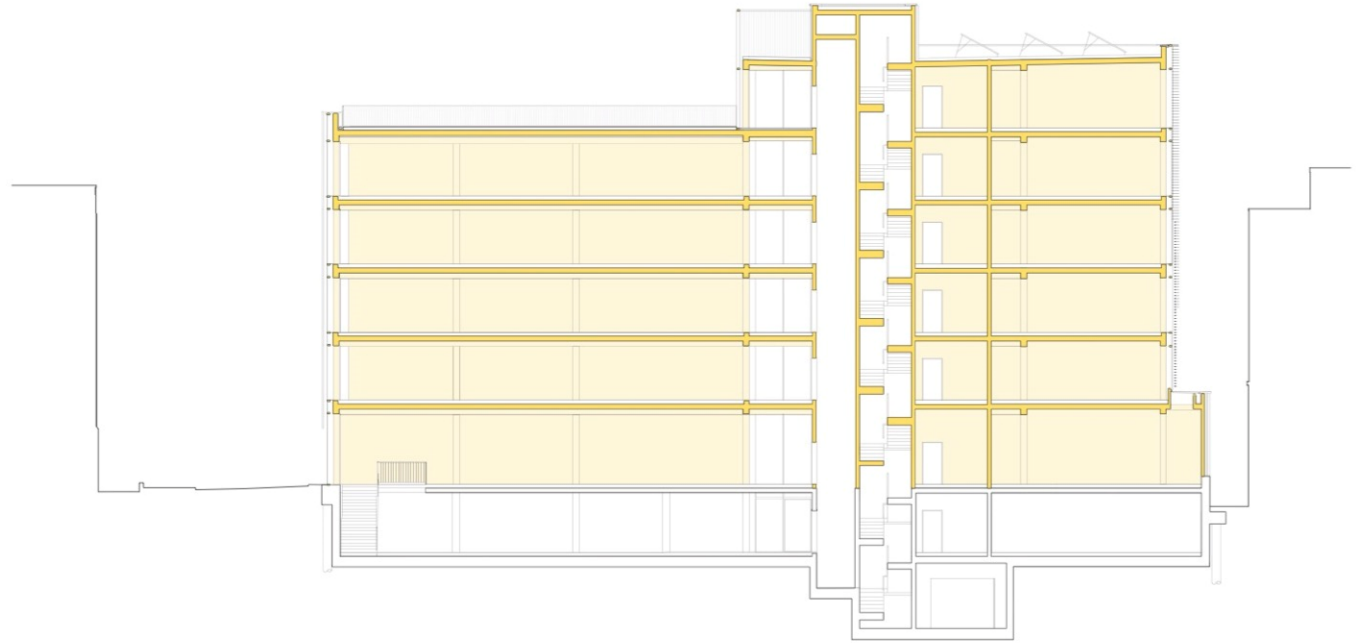


A TIGHT URBAN INFILL

A new 6 storey timber building



TYPICAL PLAN



SECTION ON A-A

IN PLAN AND SECTION

STOREY HEIGHT

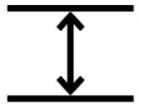
5 TO THE NORTH

6 TO THE SOUTH

HIGHEST FLOOR

17.8M ABOVE

GRADE



FLOOR TO FLOOR

3.4M TYPICAL

4.2M AT GROUND

BUILDING AREA

GROSS 52,808 SQFT

NET 38,341 SQFT

SITE TEAM

6-8 PERSONNEL TO

ERECT THE FRAME

EFFICIENCY

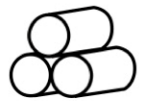
79.5% OVERALL,

87.5% TYPICAL FLOOR

TIME TO GROW

THE TIMBER REQUIRED WOULD

GROW IN 52 MINUTES



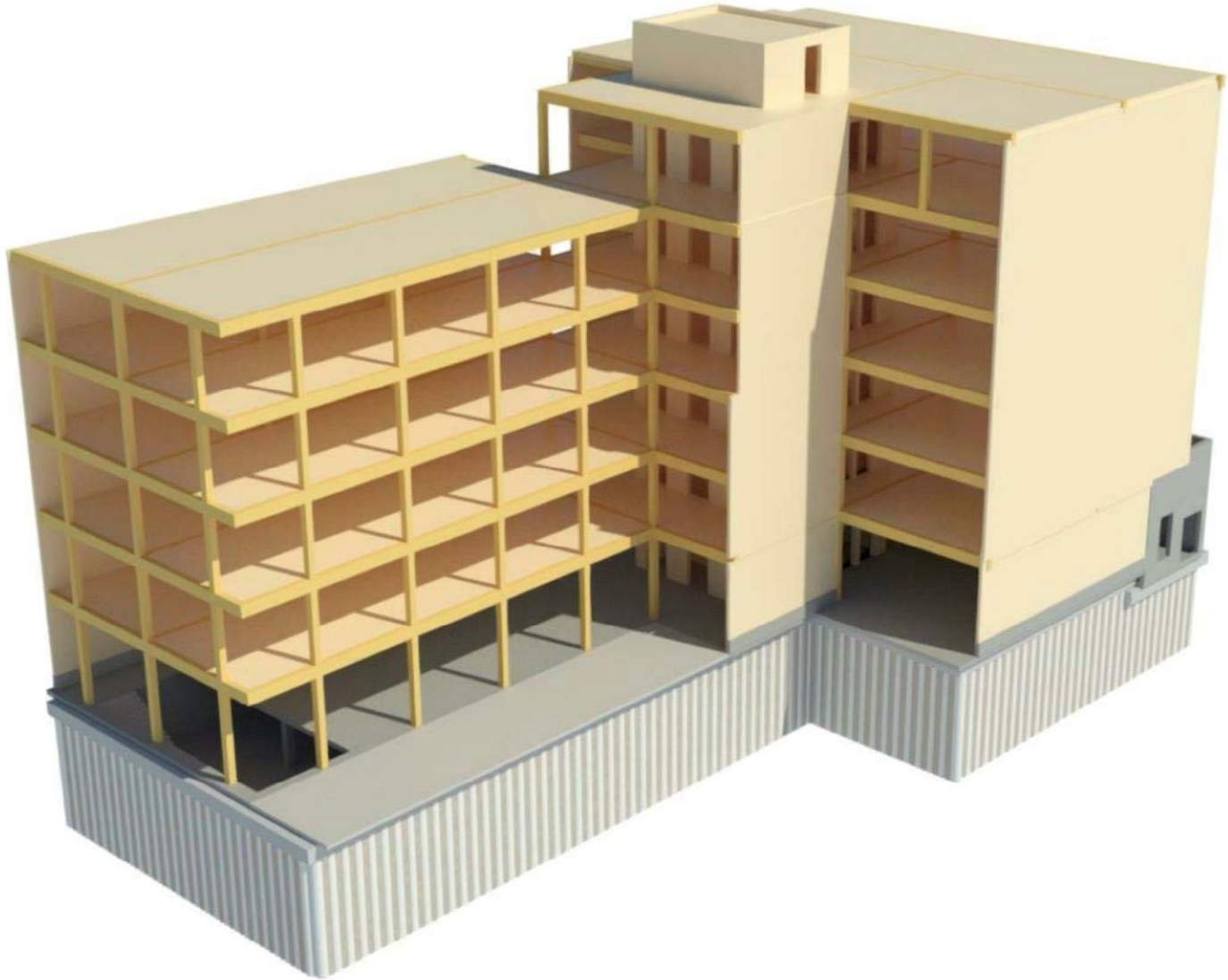
AMOUNT OF TIMBER

1,330 M^3

OR 1,774 TREES

IN FACTS AND FIGURES

The scale of the project in numbers

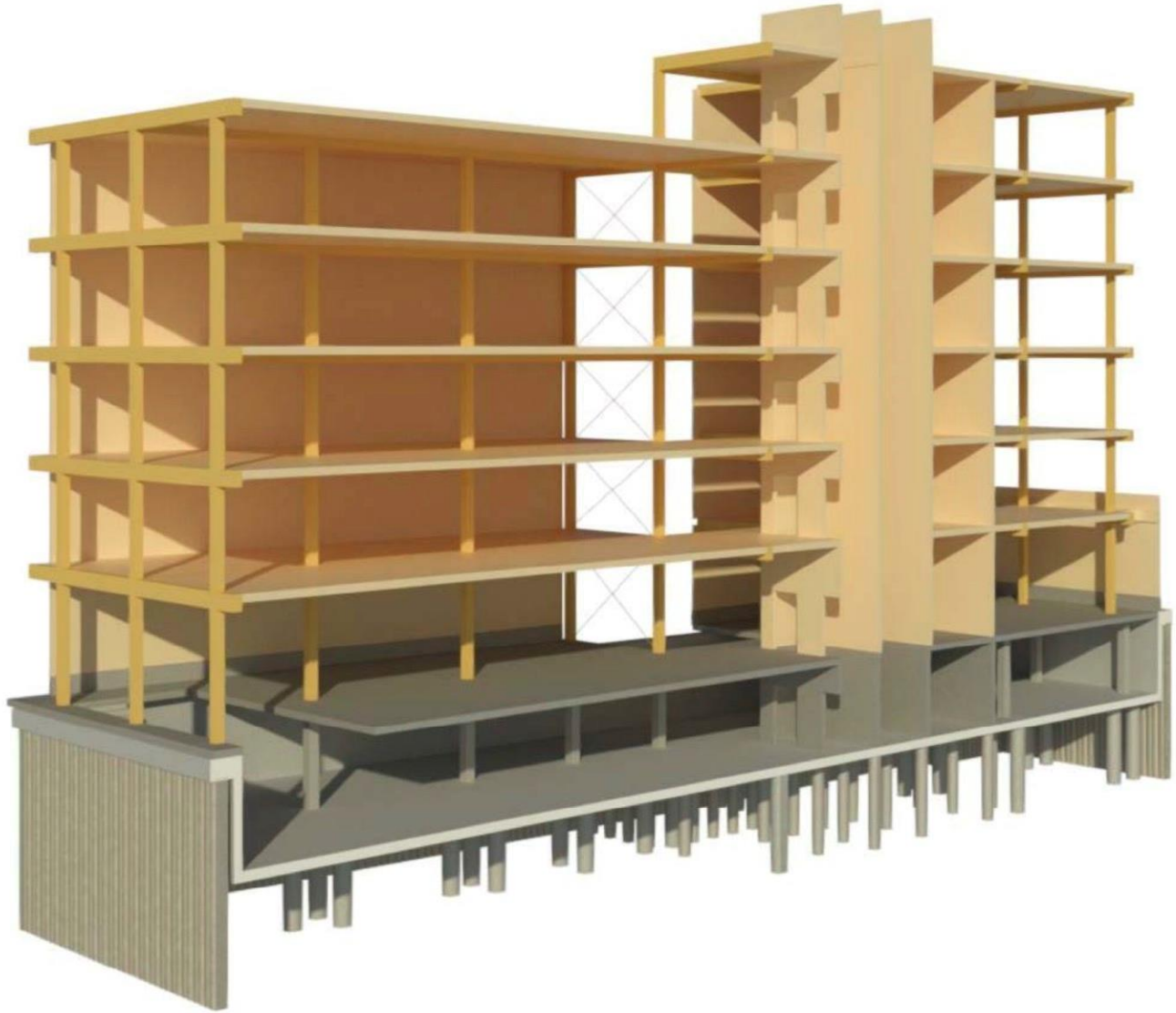


Erected in 14 weeks

Constructed in 32 weeks

FAST AND SLOW

Timber is fast, where concrete is slow.



Glulam & CLT:

Sections too large

Panellised CLT:

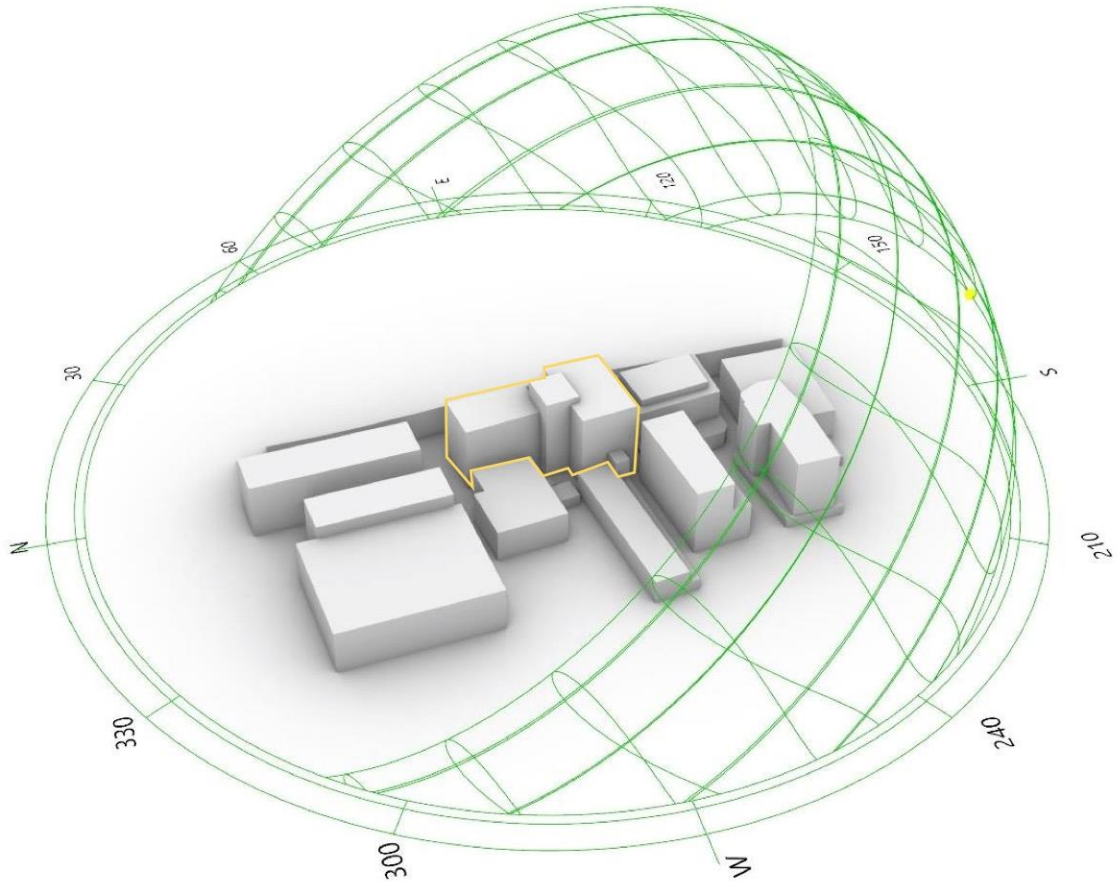
Spans too small

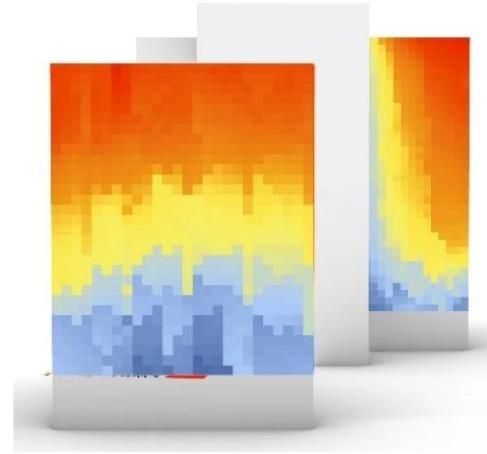
Hardwood LVL & CLT:

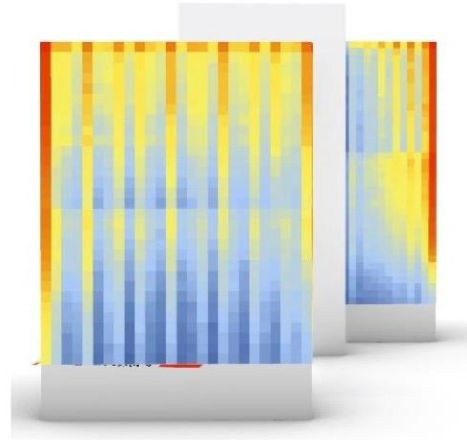
Optimum combination

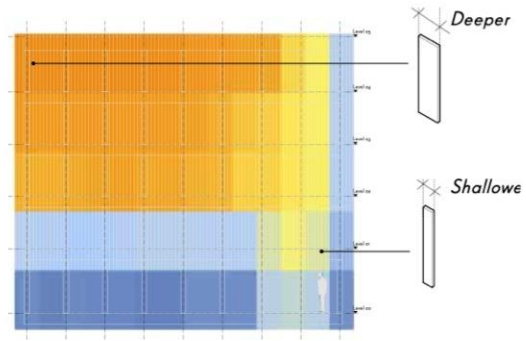
HARD AND SOFT (WOODS)

Choosing the right products in the right places.



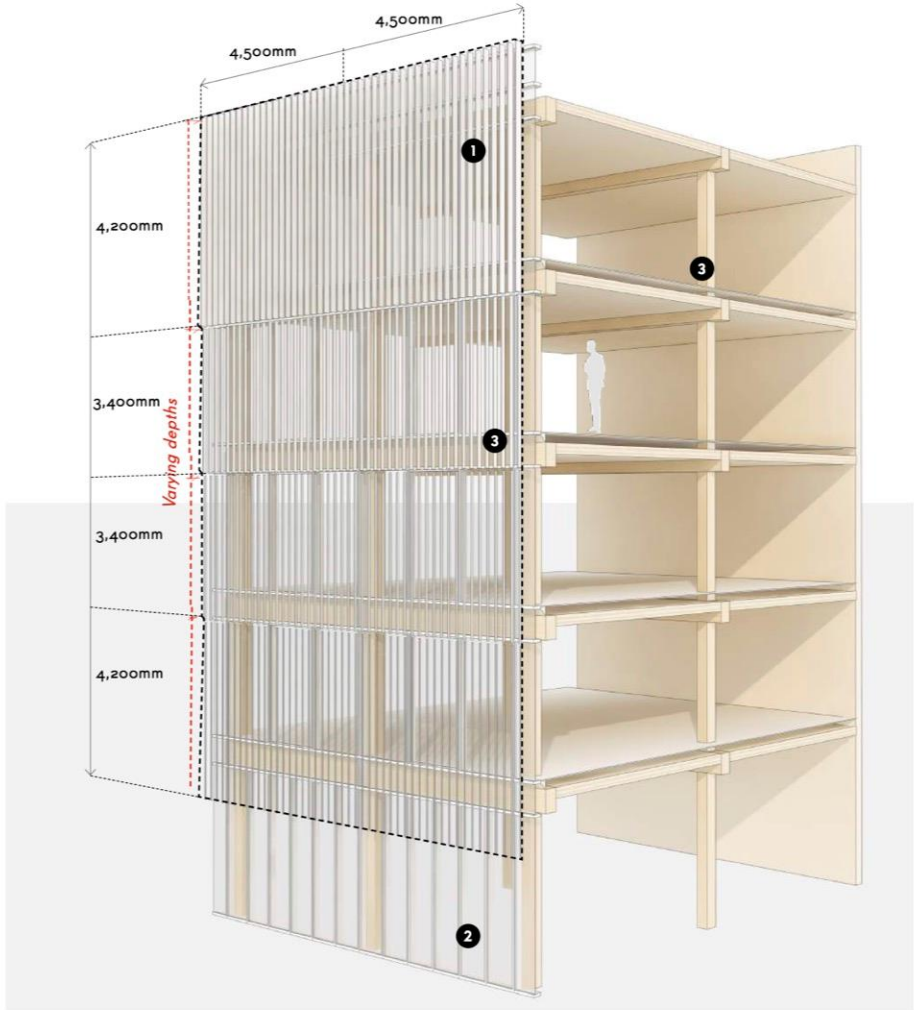


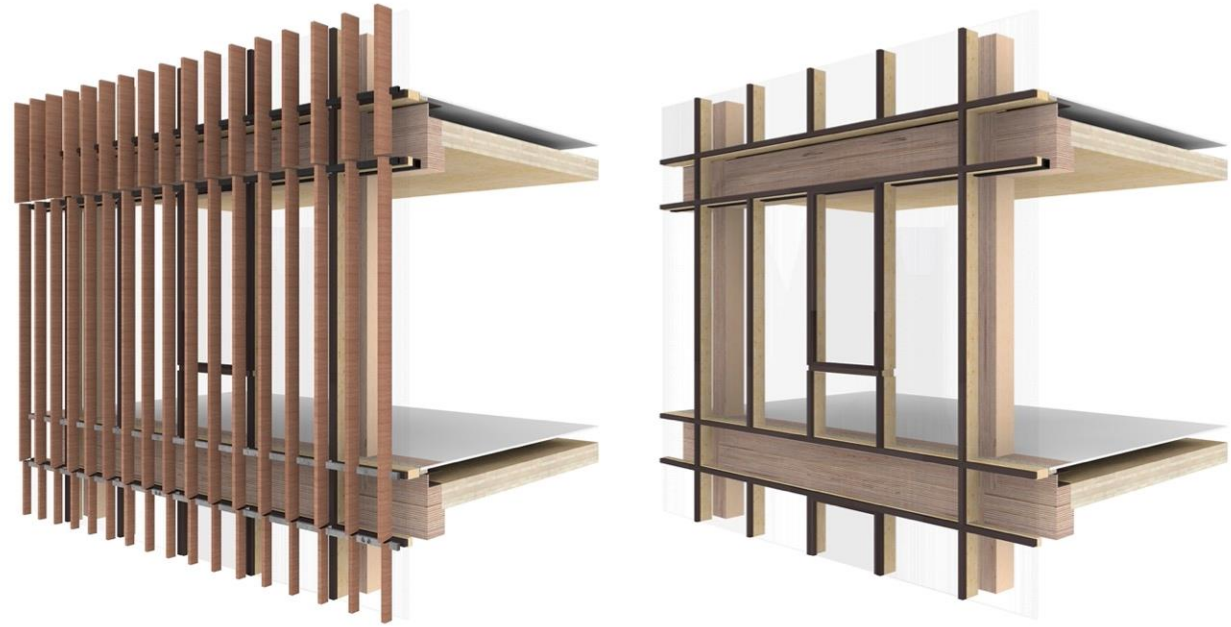




PARAMETRIC ANALYSIS

Defining the performance of the facade





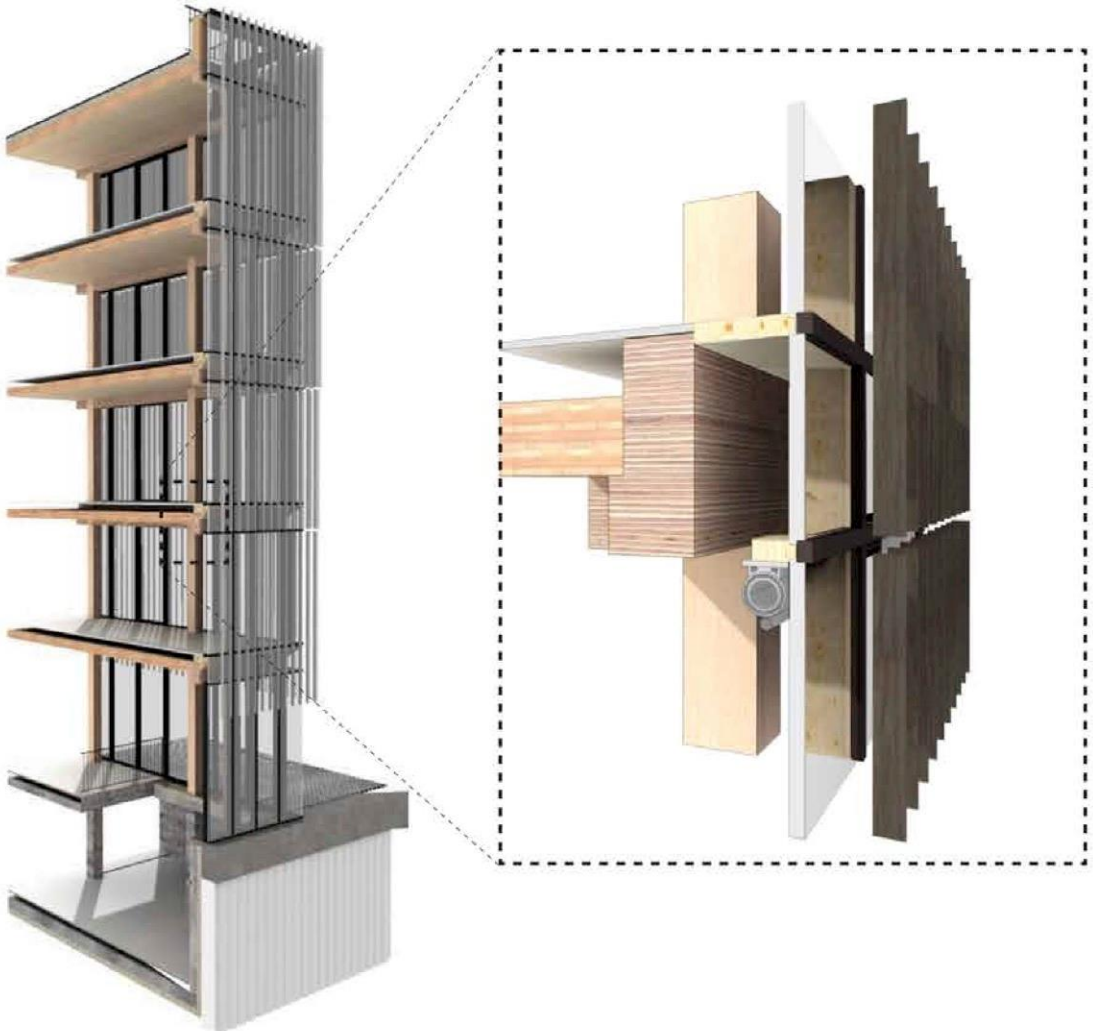
NORTH ELEVATION

WEST ELEVATION

SOUTH ELEVATION

FORM IS FUNCTION

Every element has a clear and necessary function.

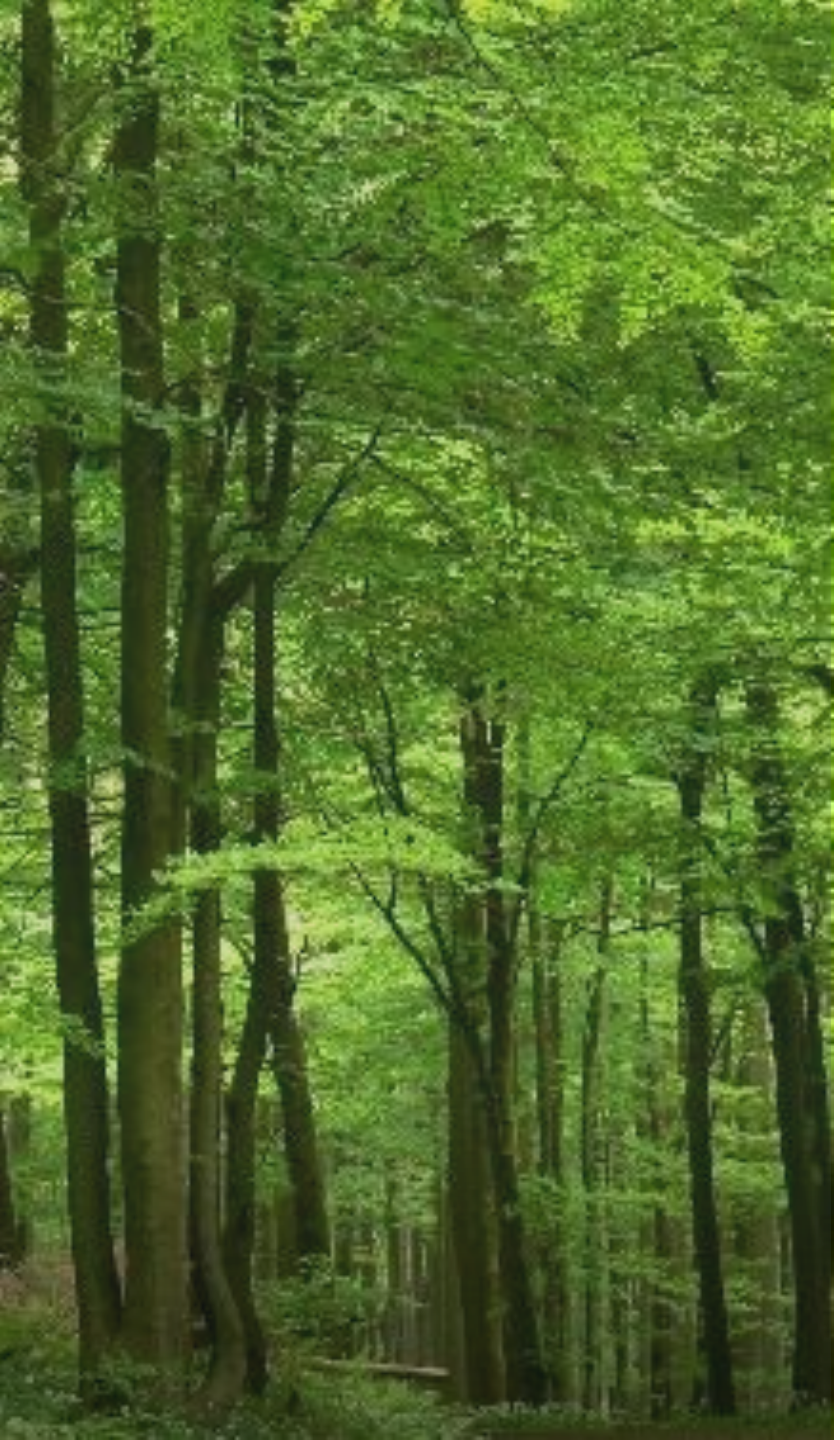


A COORDINATED RESPONSE

Using BIM for efficient off-site construction.

STRUCTURE

Eckersley O'Callaghan



BauBuche – Beech LVL by Pollmeier

Eckersley O'Callaghan

Hardwood Beech LVL
BauBuche

2.9

x Strength in bending and axial

1.4

x Stiffness in bending and axial

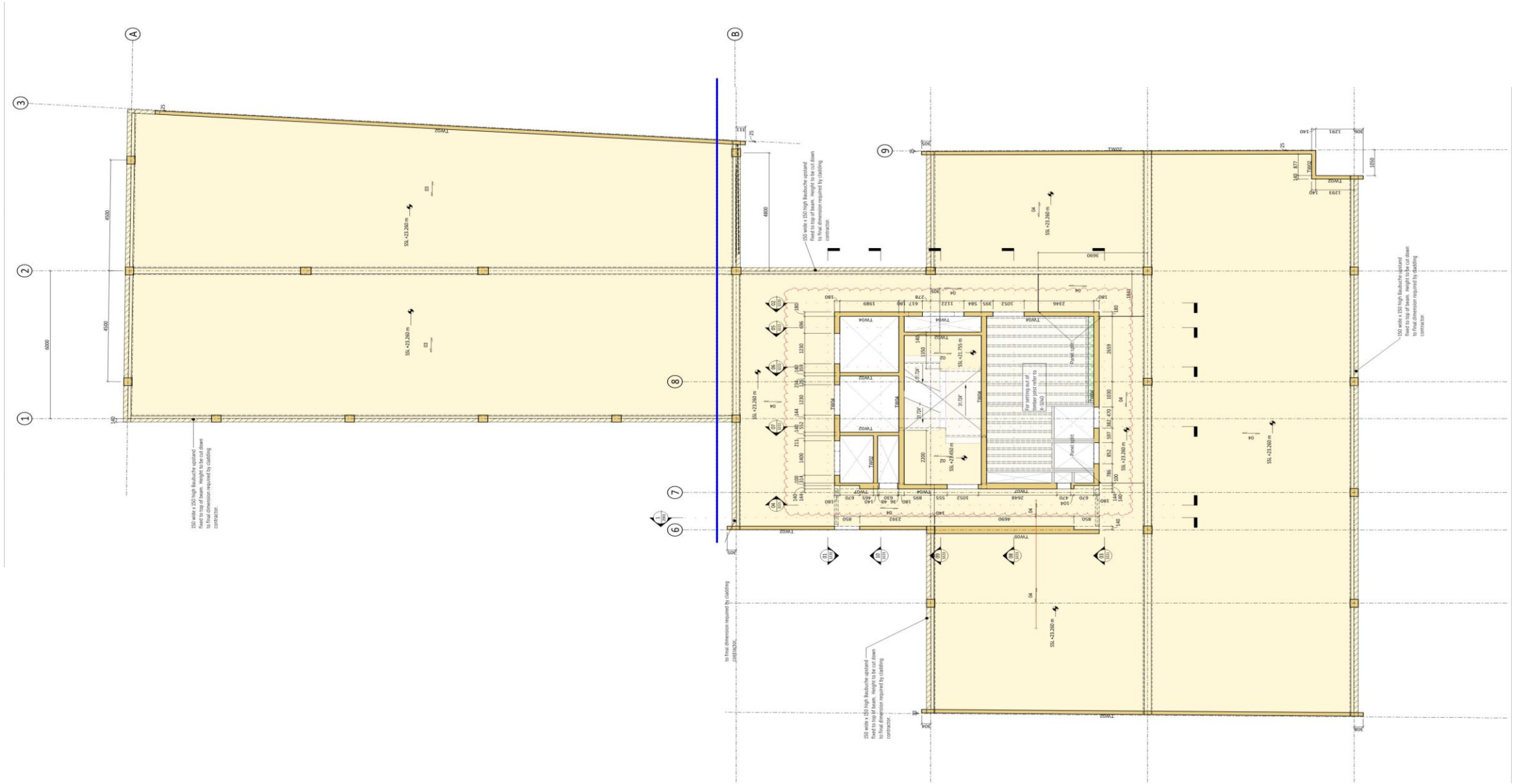
1.6

x Density

Softwood Glulam
Spruce Pine Fir

Eckersley O'Callaghan

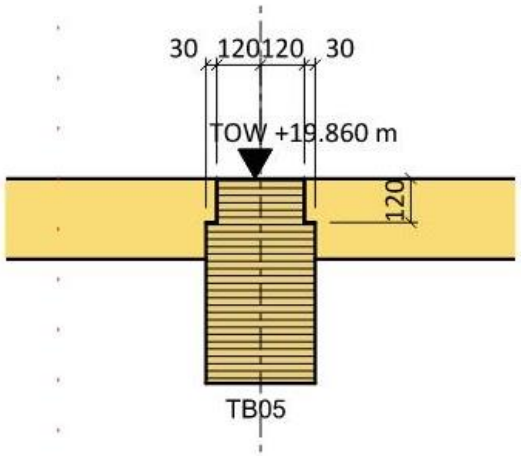

Eckersley
O'Callaghan



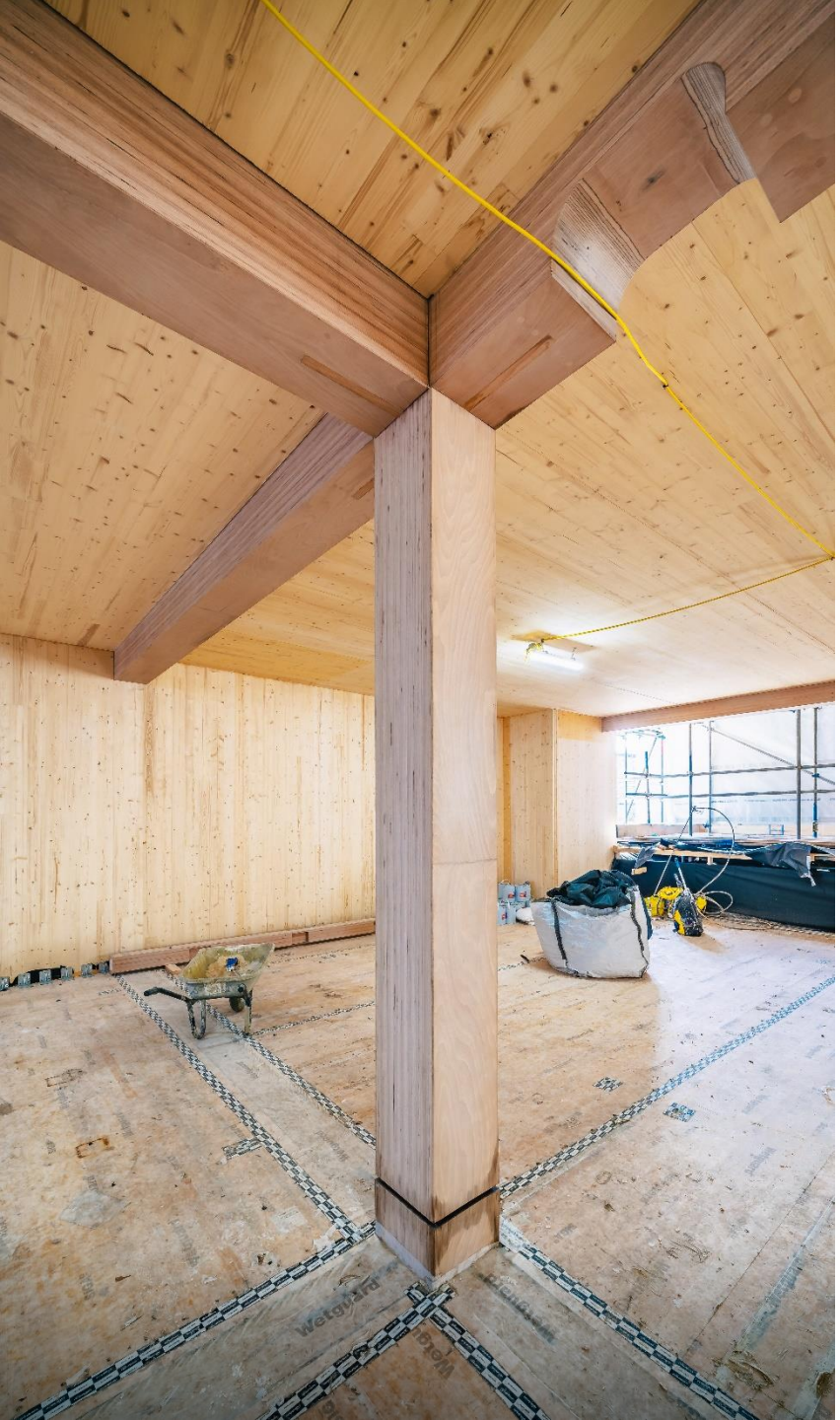
Open flexible internal layouts | One way spanning beams

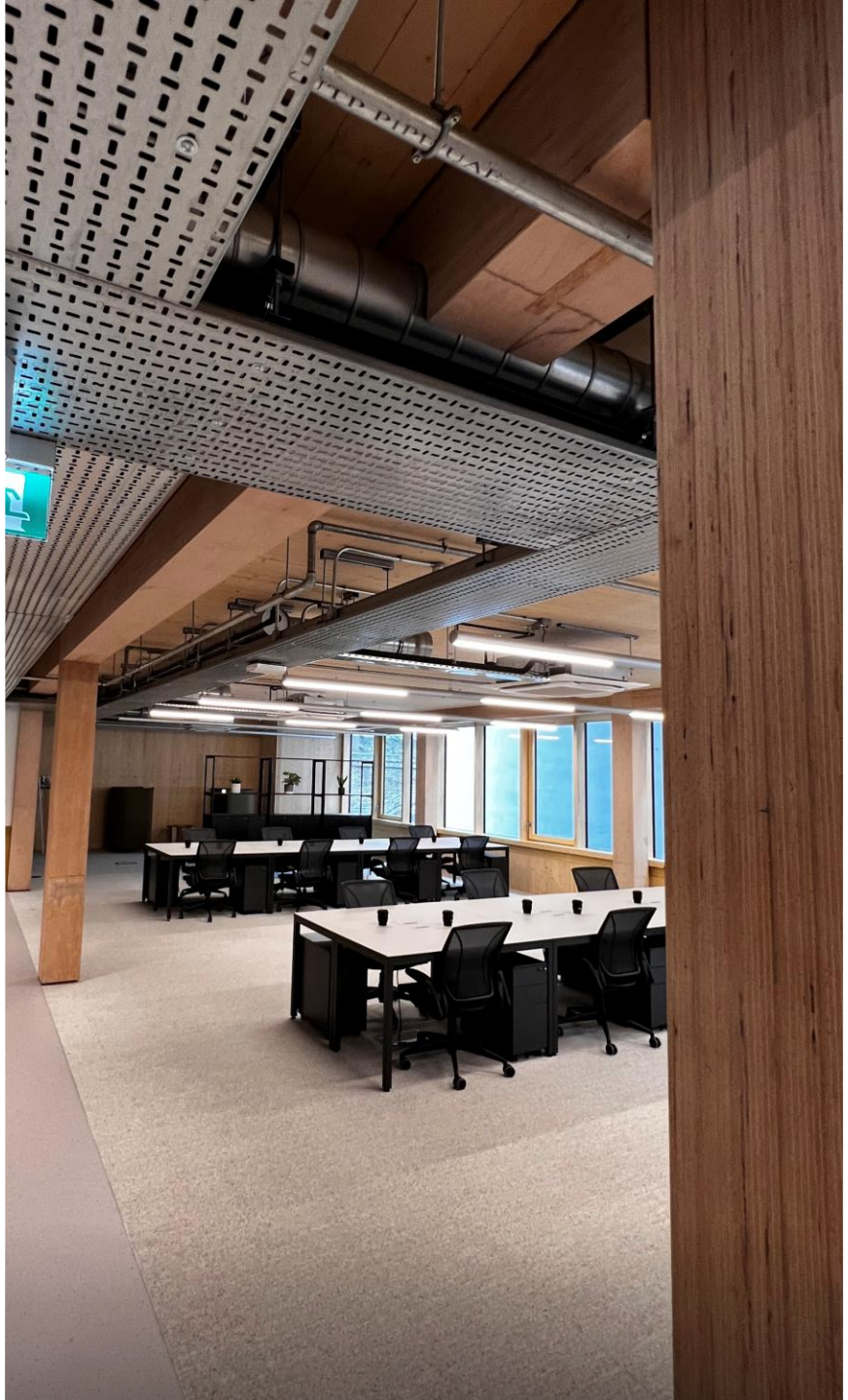
Eckersley O'Callaghan

Beam tricks: High strength LVL | Rigid beam to column connections | Recessed beams



Eckersley O'Callaghan

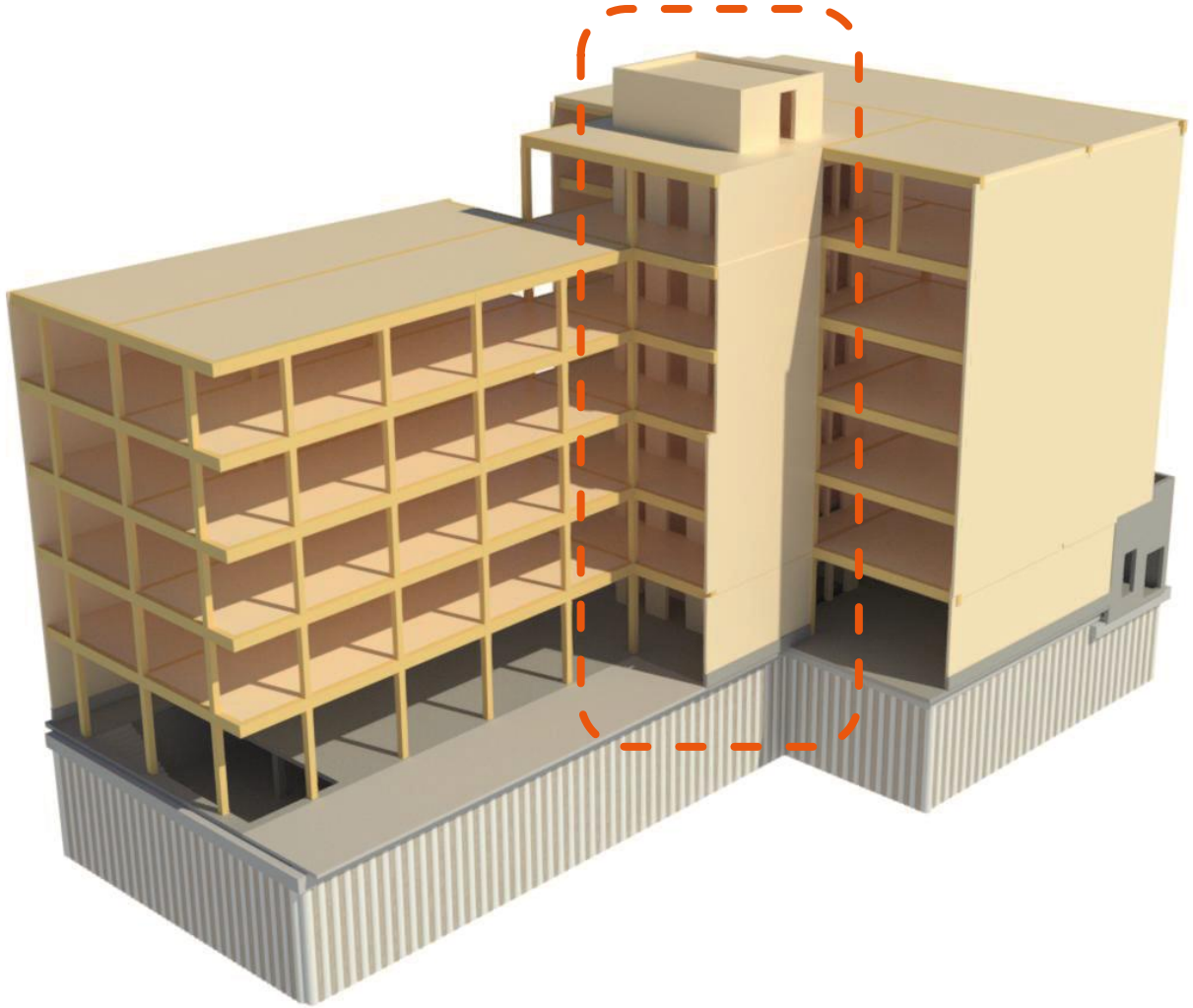


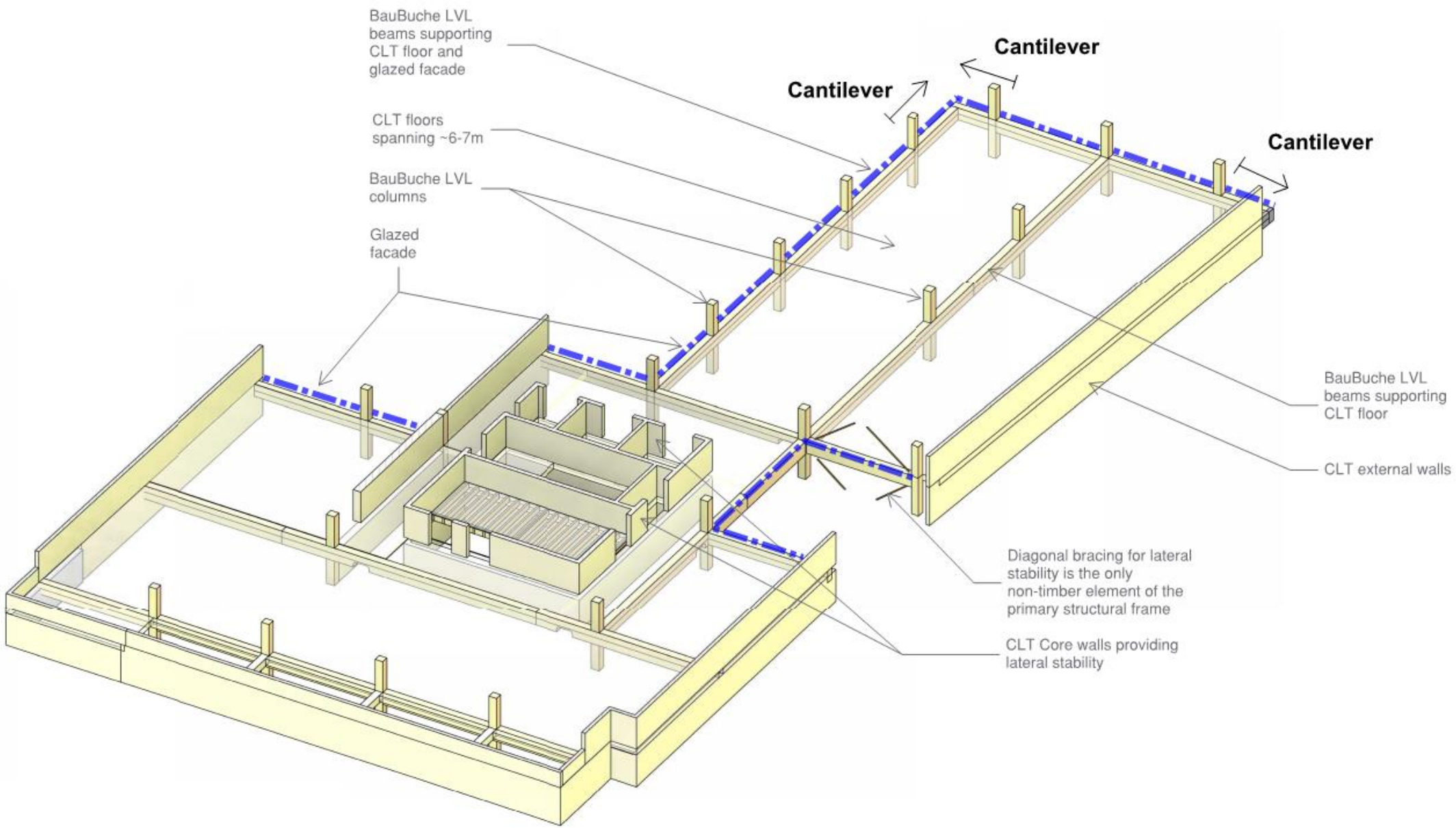


Beam tricks: Notches for ductwork crossovers

Eckersley O'Callaghan

Timber stability core





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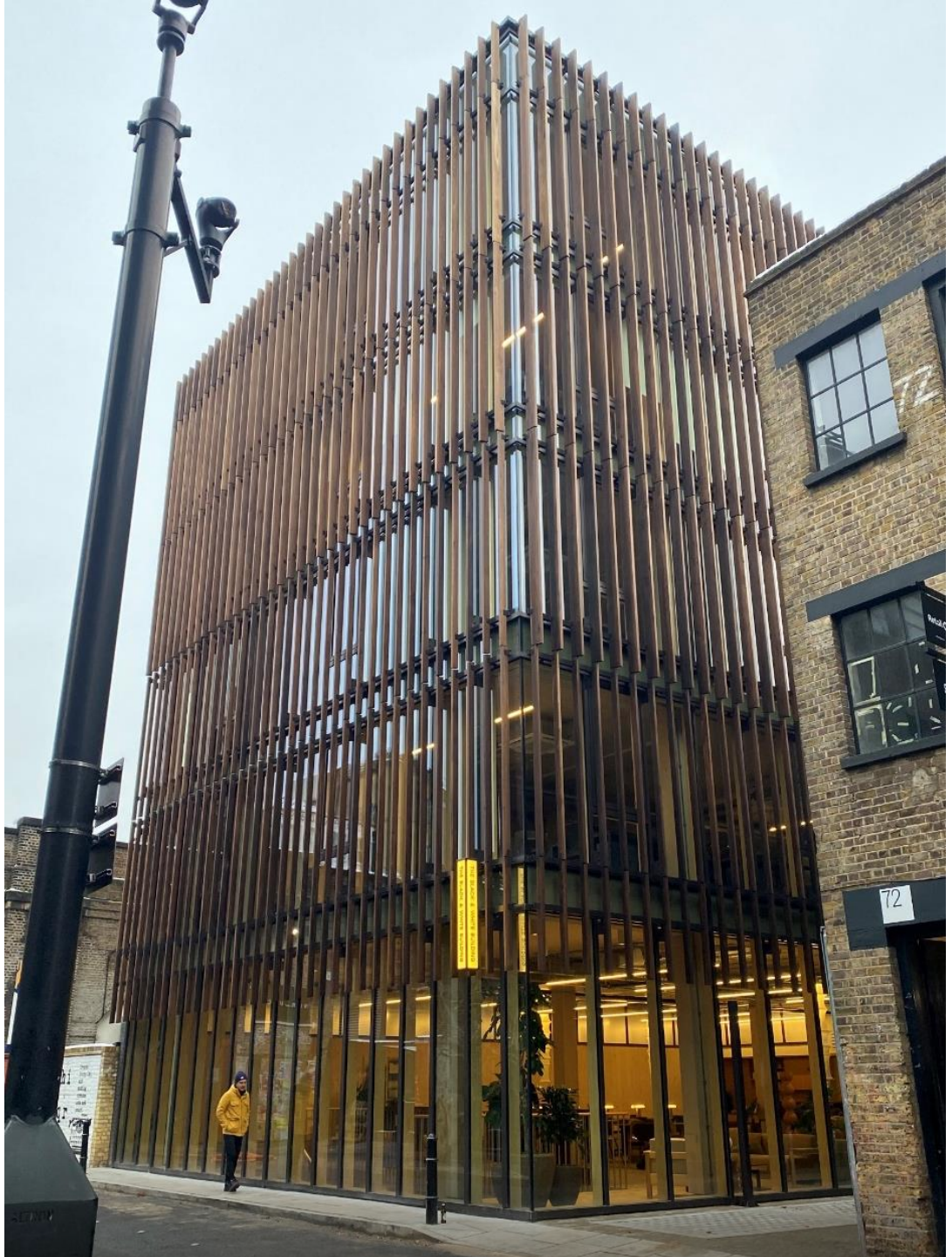

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EOC ECO - 2.2.0.0

Material Assignment

All (GWP Unit = kg CO2 per kg)

Reset

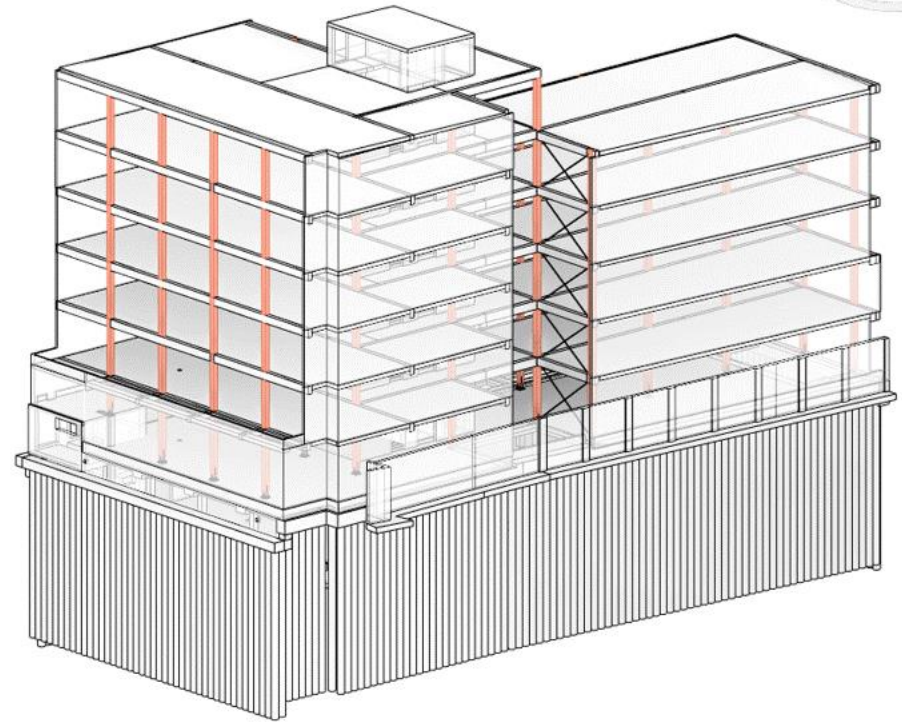
Material Type	Material Name	Name	Category	Factor	Volume	GWP Value	GWP Type	Rebar Unit Weight
Steel	Metal - Main Steel 2 - EOC	Allow M42 Macalloy 46(	Framing	1	0.1 m^3	2.45	UK Steel open secti	0
Timber	Timber CLT / Glulam - EOC(1)	varies	Floor	1	785.7 m^3	0.44	CLT, 100% FSC/PEF(	0
Timber	Timber CLT Walls - EOC	varies	Wall	1	371.5 m^3	0.44	CLT, 100% FSC/PEF(	0
Timber	Wood - Dimensional Lumber	varies	Column	1	32.6 m^3	0.39	LVL	0
Timber	Wood - Dimensional Lumber	varies	Framing	1	115.4 m^3	0.39	LVL	0
Concrete	Male Pile	varies	Foundation	1	211.5 m^3	0.09	C32/40, 50% GGBS	80
Concrete	Concrete - Cast-in-Place Concrete - C4	varies	Floor	1	337.0 m^3	0.09	C32/40, 50% GGBS	120
Concrete	Concrete - Cast-in-Place Concrete - C4	varies	Floor	1	159.5 m^3	0.09	C32/40, 50% GGBS	165
Concrete	Metal - Steel - 345 MPa	Female Pile	Foundation	1	205.0 m^3	0.09	C32/40, 50% GGBS	80
Concrete	Concrete - Cast-in-Place Concrete - C4	350x350mm RC Column	Column	1	7.2 m^3	0.09	C32/40, 50% GGBS	150
Concrete	Concrete - Cast-in-Place Concrete - C4	varies	Wall	1	144.0 m^3	0.09	C32/40, 50% GGBS	80
Other		Sheet Pile	Other	0	0.0 m^3	0.00	Other	0
Other		Pile cap concrete infill 3	Foundation	0	0.0 m^3	0.00	Other	0
Other		Adjacent Building 1	Other	0	0.0 m^3	0.00	Other	0
Other		M20 4	Other	0	0.0 m^3	0.00	Other	0
Other		Corner	Wall	0	0.0 m^3	0.00	Other	0
Other	Concrete - Mass - EOC	100mm thk MC infill	Wall	0	0.0 m^3	0.00	Other	0
Other		700 RC Upstand	Wall	0	0.0 m^3	0.00	Other	0
Other	Blockwork - EOC	varies	Wall	0	0.0 m^3	0.00	Other	0
Other	Concrete - Cast-in-Place Concrete - C4	450mm Diameter	Foundation	0	0.0 m^3	0.00	Other	0
Other		Structural Foundations 1	Foundation	0	0.0 m^3	0.00	Other	0
Other		Floor thickening	Foundation	0	0.0 m^3	0.00	Other	0
Other		Structural Connections 2	Other	0	0.0 m^3	0.00	Other	0
Other		Structural Connections 2	Other	0	0.0 m^3	0.00	Other	0
Other		Rods1	Other	0	0.0 m^3	0.00	Other	0
Other		M16 Bolt into Plate	Other	0	0.0 m^3	0.00	Other	0
Other		M20	Other	0	0.0 m^3	0.00	Other	0
Other		M27	Other	0	0.0 m^3	0.00	Other	0
Other		M20 Holding Down Bolt	Other	0	0.0 m^3	0.00	Other	0
Other		M24	Other	0	0.0 m^3	0.00	Other	0
Other		Structural Connections 1	Other	0	0.0 m^3	0.00	Other	0
Other		Structural Connections 8	Other	0	0.0 m^3	0.00	Other	0
Other		Attenuation Storage Tan	Other	0	0.0 m^3	0.00	Other	0
Other		Structural Connections 1	Other	0	0.0 m^3	0.00	Other	0
Other		M16 Holding down	Other	0	0.0 m^3	0.00	Other	0
Other		CAst In Plate	Other	0	0.0 m^3	0.00	Other	0
Other		Structural Connections 2	Other	0	0.0 m^3	0.00	Other	0
Other		Structural Connections 4	Other	0	0.0 m^3	0.00	Other	0
Other		RC Upstand 2	Wall	0	0.0 m^3	0.00	Other	0

Highlight elements on click

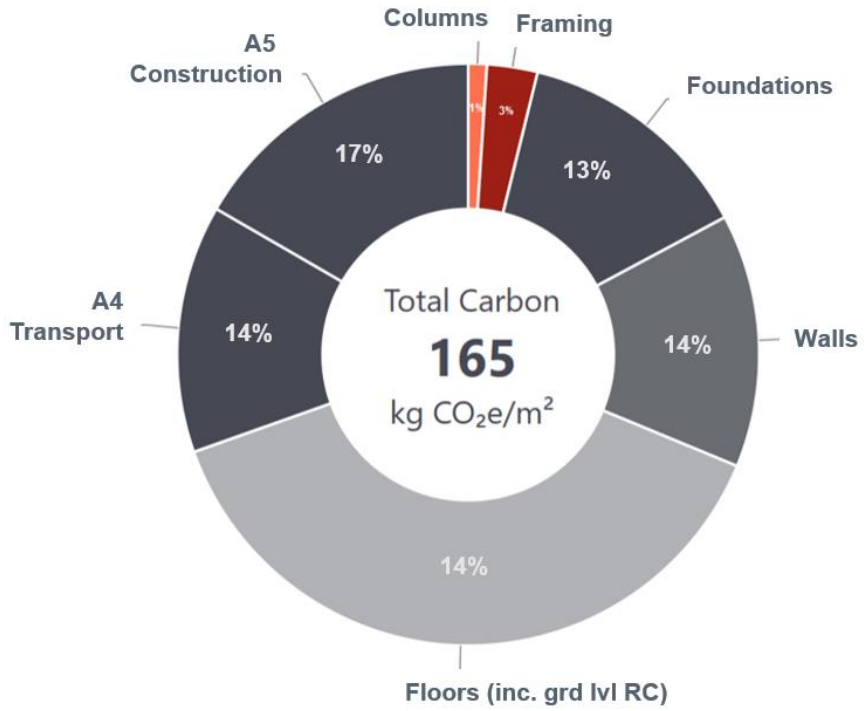
Add-Ins | Modify

Embodied Carbon | Convert RFA to FormIt | About FormIt | Print & Export | Publish Aconex | Generate Transmittal | Manage Transmittals | Settings

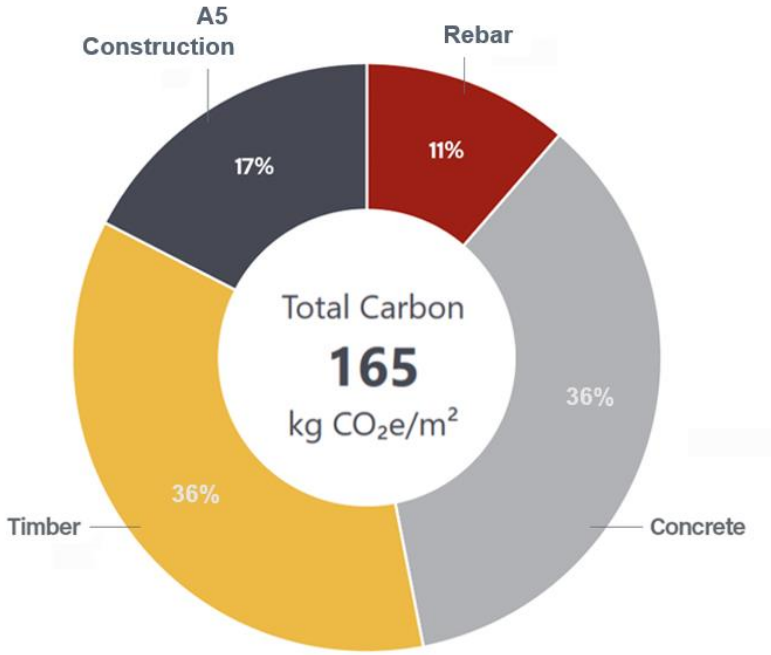
EOC ECO | FormIt Converter | Xrev Transmit



Embodied Carbon Distillation



by Element



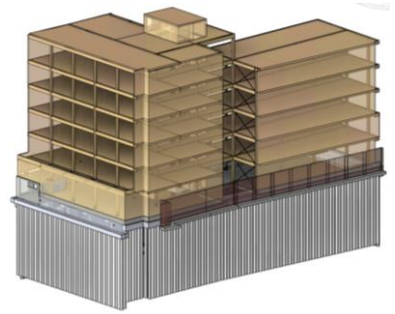
by Material

Export Data | Project Info | Material Library

Project Name: 74 Rivington Street
Project Number: 17144
Building Use: Office/Commercial
Floor Area: 5200m²
Elements extracted: 1863 of 2100, 88.7%

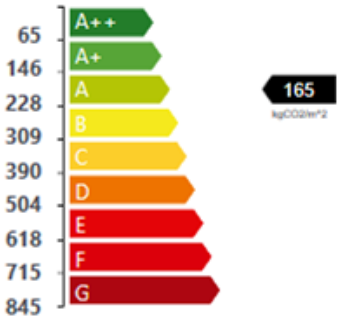
Total Embodied Carbon:

Type	Volume [m^3]	CO2 [kg]
Steel	0.1	1,156
Concrete	1,064.2	227,305
Timber	1,305.2	282,286
Other	0.0	0
Rebar	0.0	85,631
A4	0.0	118,104
A5	0.0	142,693
Total	48,855.4	857,177



☑ Structure ☐ Facade ☐ Other

Expected SCORS value
LETI 2020 Target (A1-A5): C
LETI 2030 Target (A1-A5): A



IN CONSTRUCTION


MR MH
Safe Crane Campaign
BLUE LIGHT


DANGER


ENTIRE BUILDING FOR RENT
1,929 sq ft
020 7377 8989
ENTIRE BUILDING FOR RENT
1,929 sq ft
020 7377 8989
BLUE LIGHT
MEMBERS CAN BUZZ TO BROWSE & BORROW.

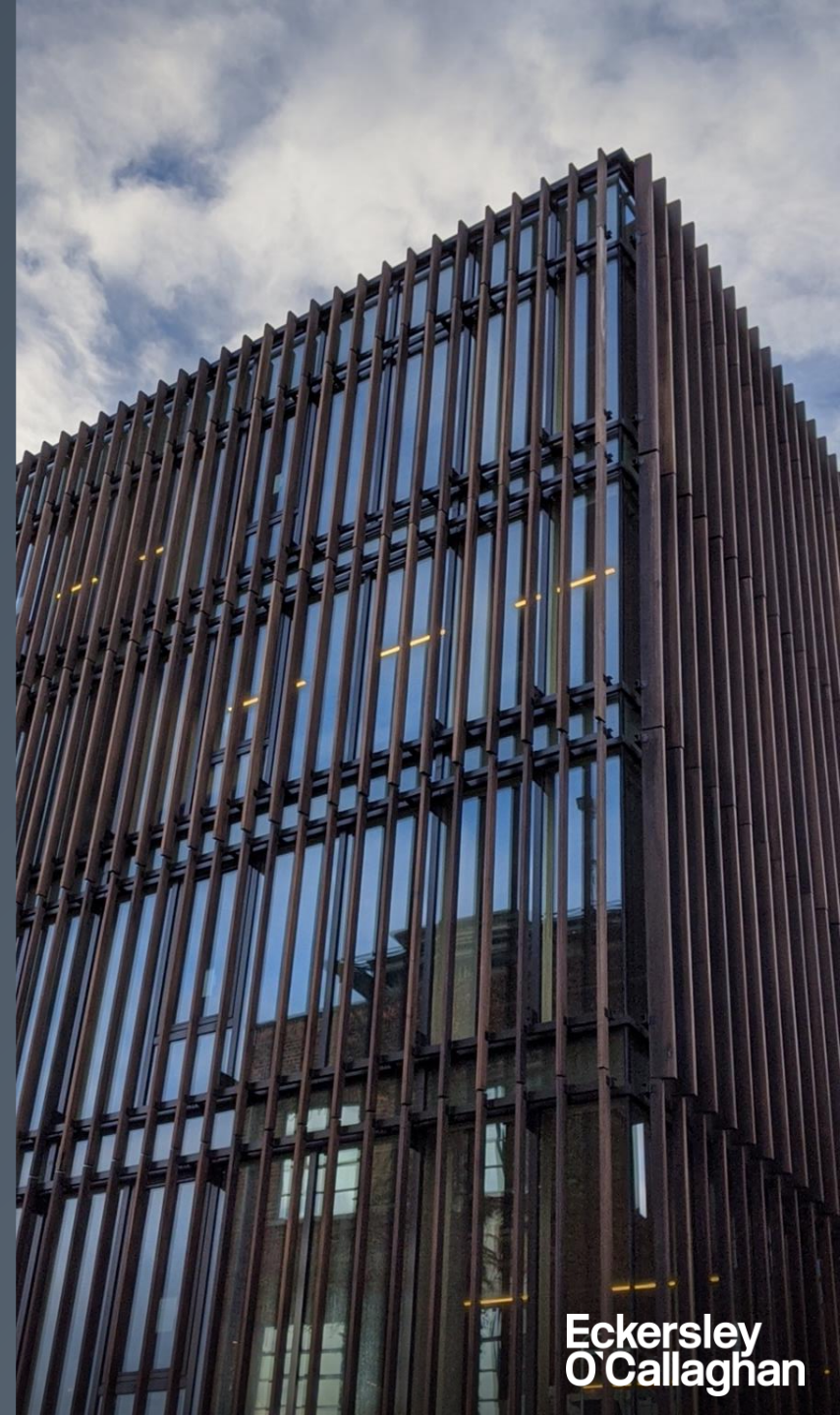

10 MPH
SLOW

FACADE

Eckersley O'Callaghan

Our work on The Black & White Building helped minimise the up-front carbon by

37%



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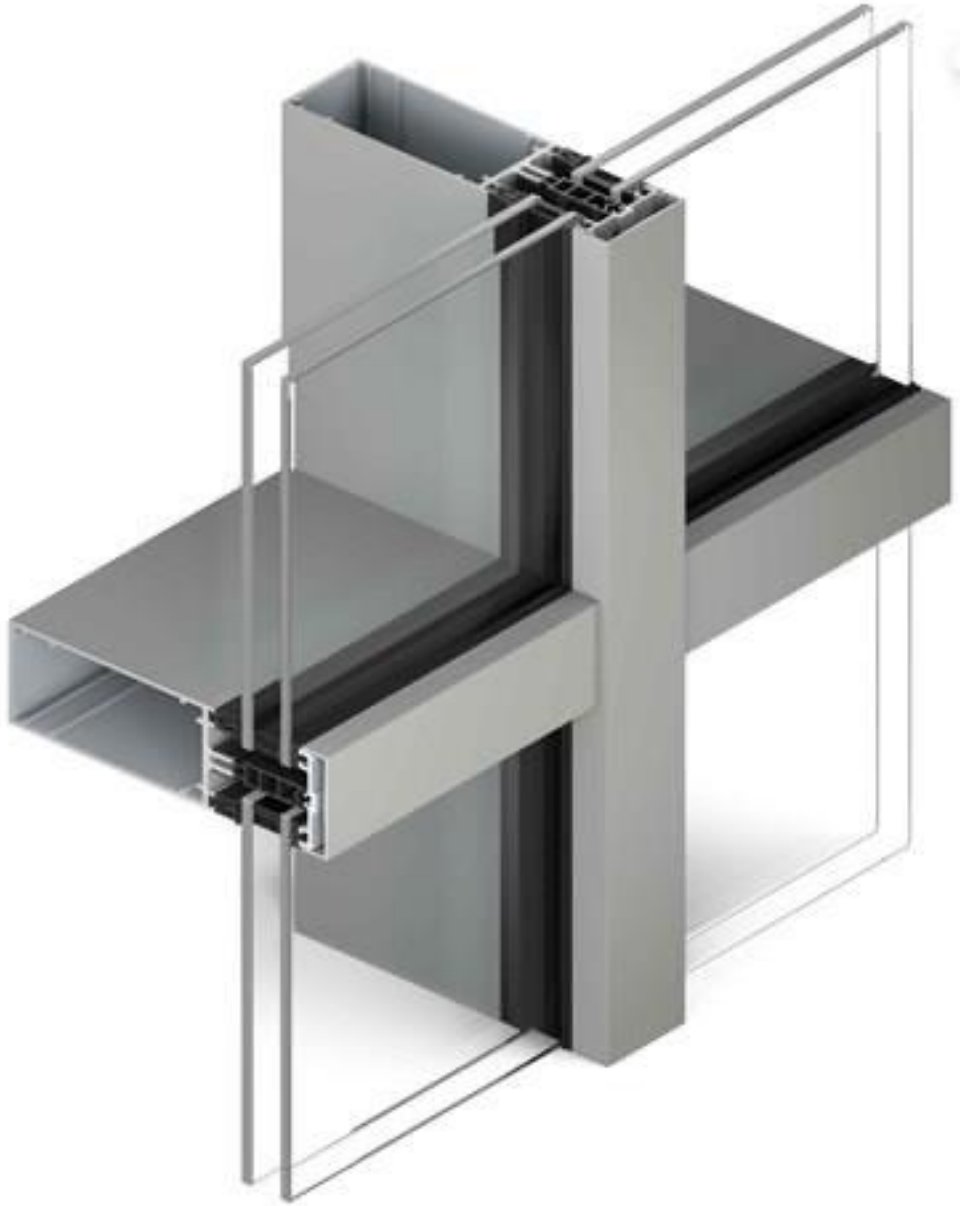
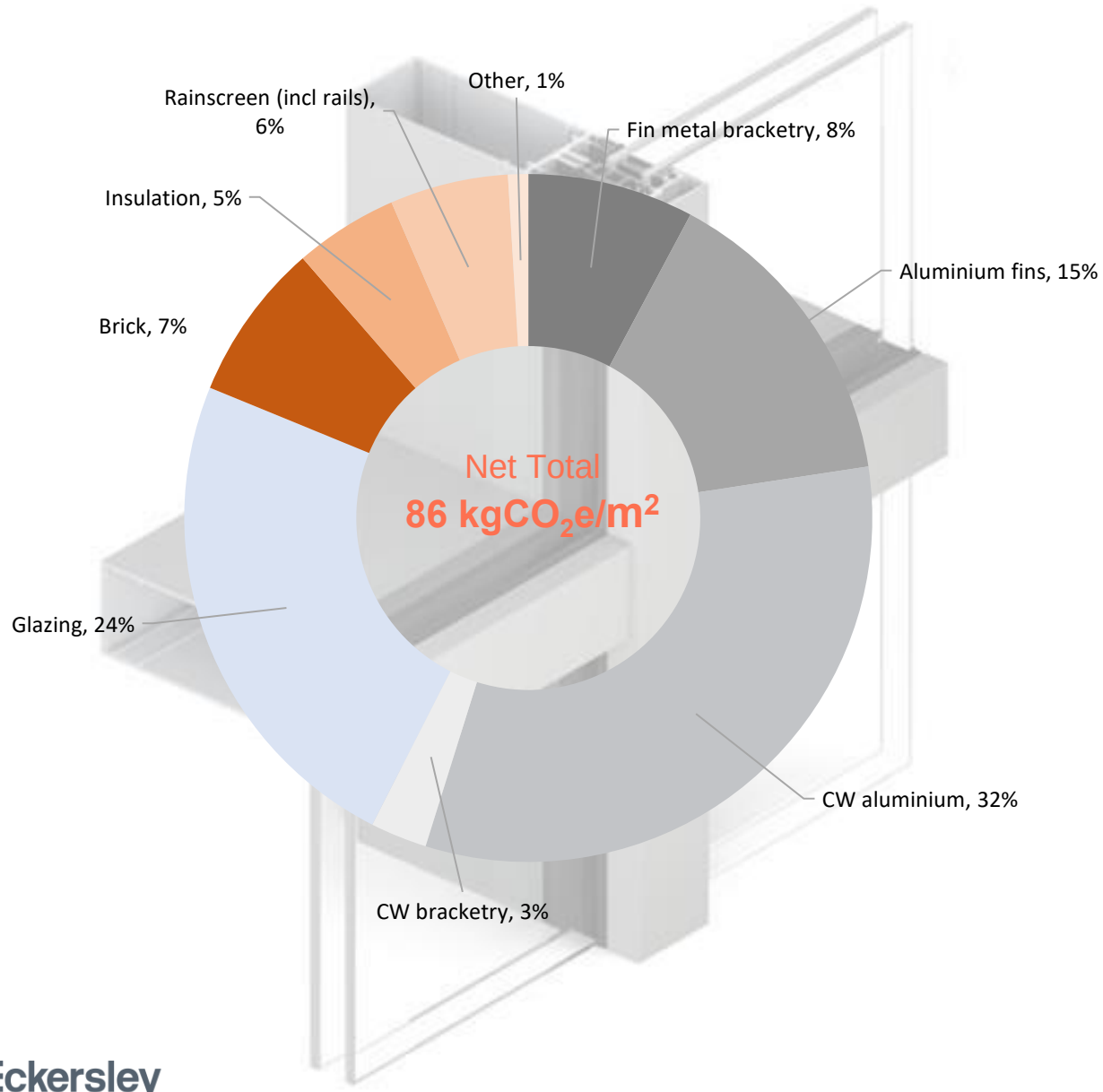
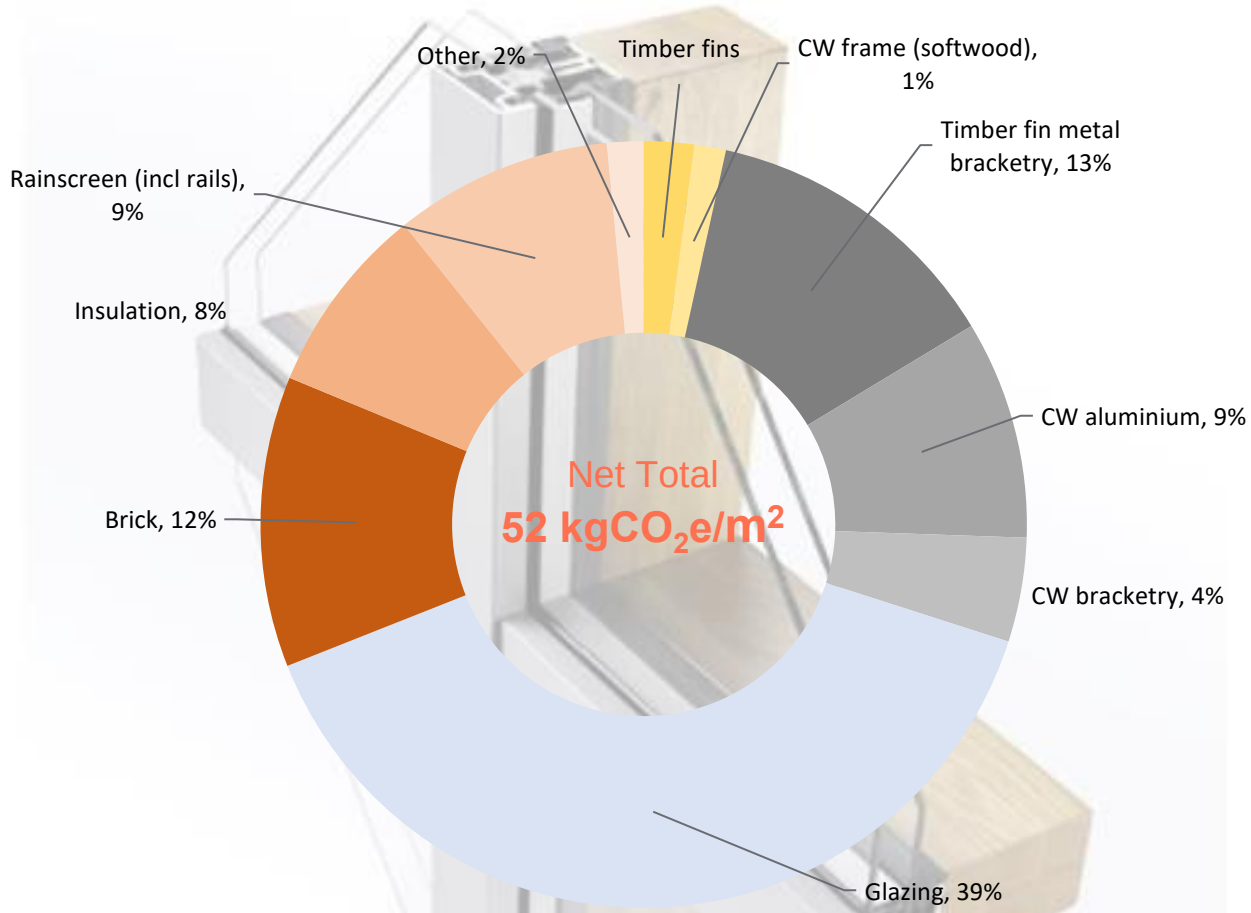
Aluminium vs Timber



Eckersley O'Callaghan

Aluminium vs Timber





- 40% reduction in embodied carbon for the curtain wall incl. fins

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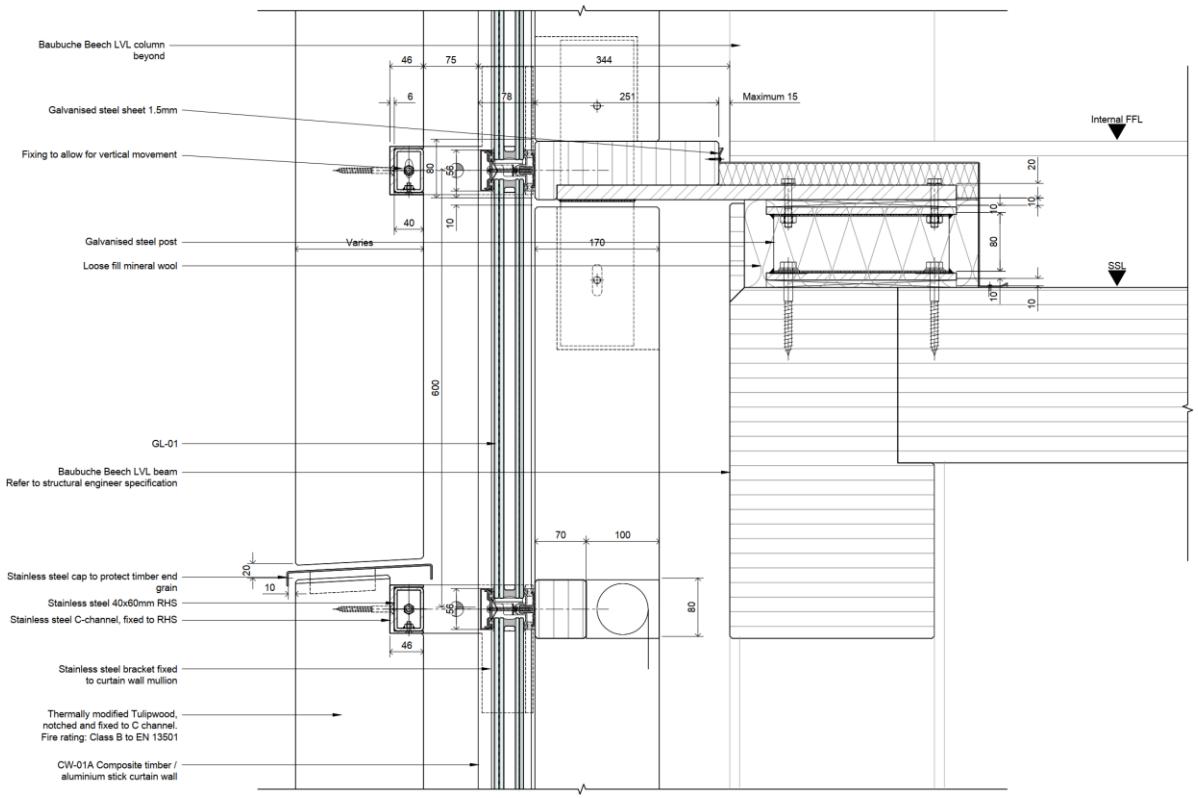
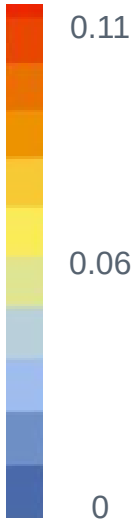
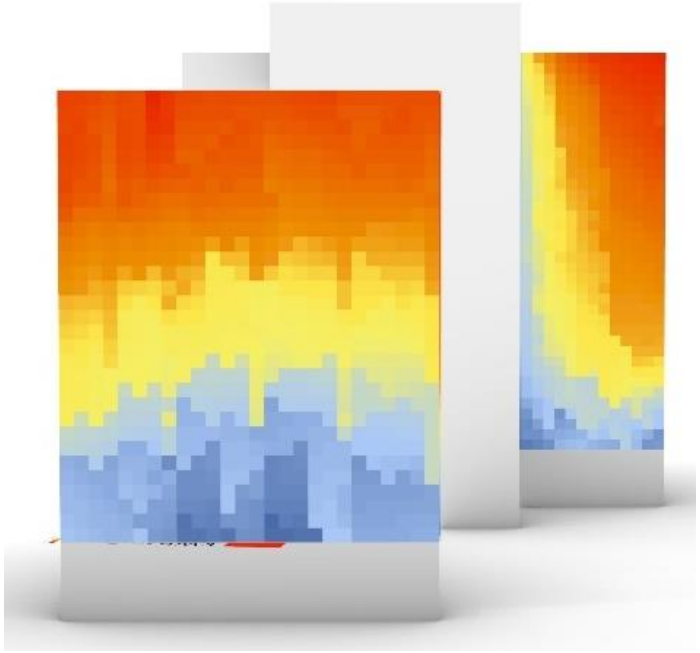

Baubuche Beech LVL column beyond
Galvanised steel sheet 1.5mm
Fixing to allow for vertical movement
Galvanised steel post
Loose fill mineral wool
GL-01
Baubuche Beech LVL beam
Refer to structural engineer specification
Stainless steel cap to protect timber end grain
Stainless steel 40x60mm RHS
Stainless steel C-channel, fixed to RHS
Stainless steel bracket fixed to curtain wall mullion
Thermally modified Tulipwood, notched and fixed to C channel. Fire rating: Class B to EN 13501
CW-01A Composite timber / aluminium stick curtain wall
Internal FFL
SSL
Maximum 15
Varies
46
75
344
6
78
251
60
55
40
10
170
600
20
10
80
70
100
46

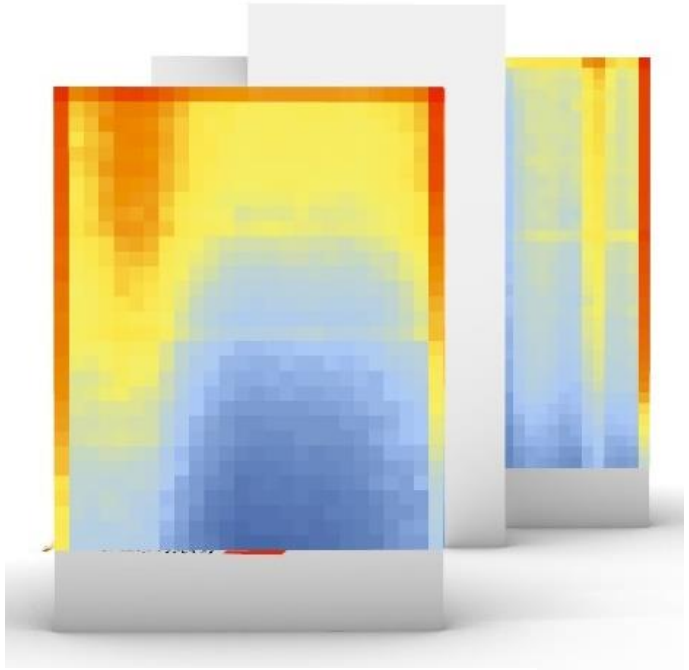

Eckersley
O'Callaghan

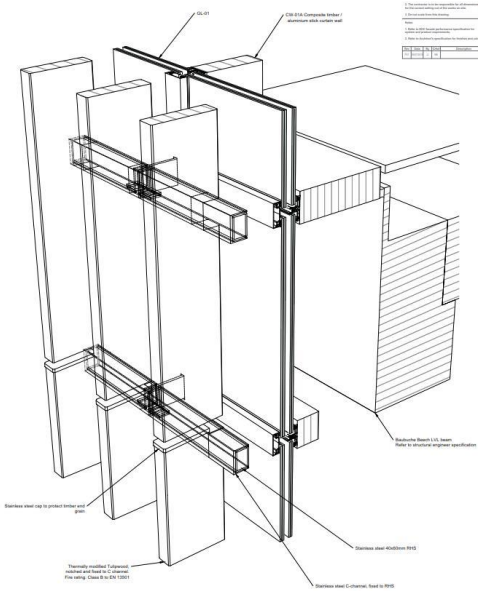
Shading Design: Solar Radiation Analysis

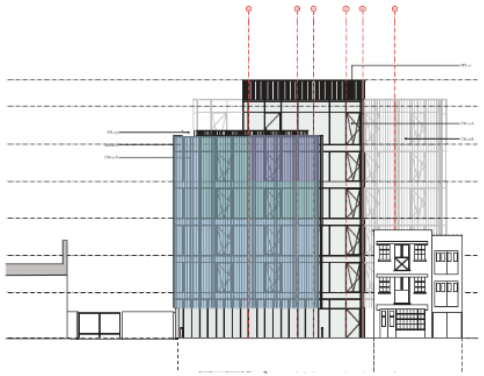
MWh/m^2

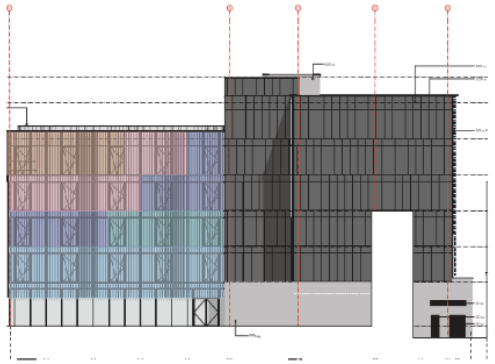


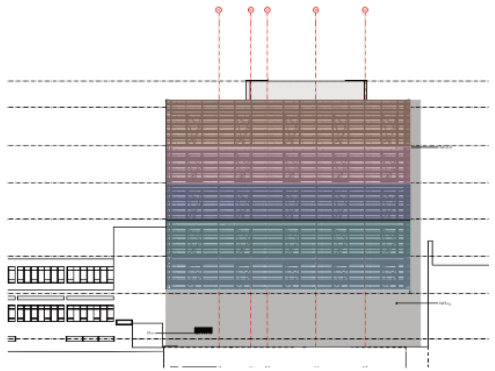












Fin depth:
250mm
220mm
200mm
150mm
100mm

NORTH ELEVATION

WEST ELEVATION

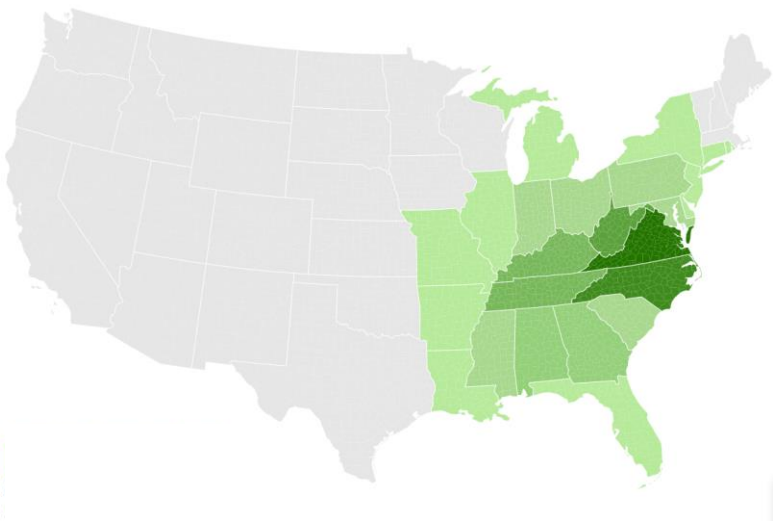
SOUTH ELEVATION

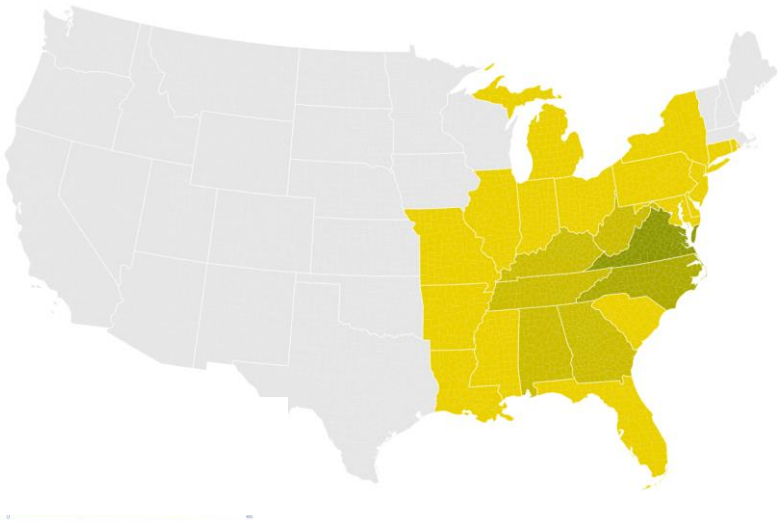
Eckersley O'Callaghan

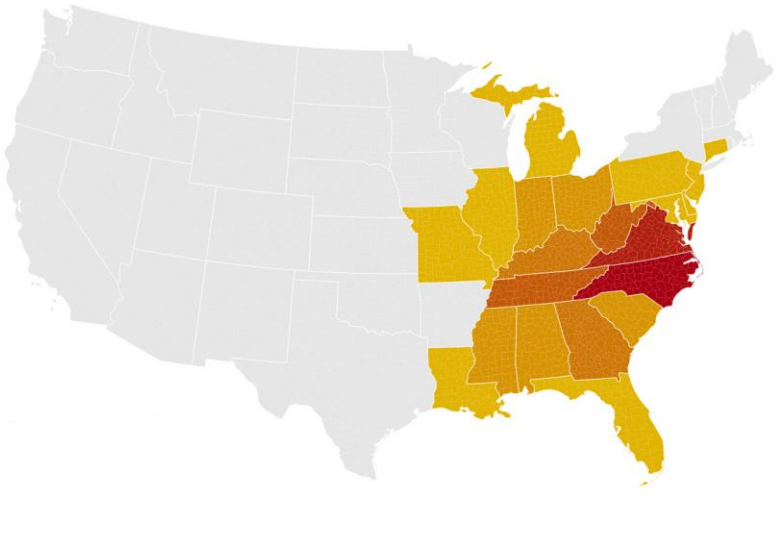
	UNTREATED TIMBER						CHEMICALLY MODIFIED TIMBER		HEAT TREATED TIMBER			COMPOSITE TIMBER VENEER CLADDING
	WESTERN RED CEDAR	EUROPEAN OAK	SWEET CHESTNUT	EUROPEAN LARCH	SIBERIAN LARCH	DOUGLAS FIR	ACCOYA	KEBONY	THERMOWOOD	THERMALLY MODIFIED TULIPWOOD	CHARRED TIMBER	
TIMBER TYPE	Softwood	Hardwood	Hardwood	Softwood	Softwood	Softwood	Softwood (treated)	Softwood (treated)	Softwood (treated)	Hardwood (treated)	Softwood (treated)	Softwood and veneer
APPEARANCE	Reddish brown, possible wood knots	Pale yellow brown, possible wood knots	Light to medium brown, possible wood knots	Yellow to medium red, possible wood knots	Pale yellow, golden brown, possible wood knots	Orange red to reddish brown, possible wood knots	Natural, no wood knots	Natural with darker brown tint, possible wood knots	Natural	Natural, darker tint	Dark grey, charred	Natural, plastic sheen
SOURCE	Canada	UK & EU	EU	UK	Russia	Canada	EU	UK	EU	USA	UK	UK
DENSITY (kg/m3)	370	670-760	590	575	628	530	432-592	600-680	Increases with temp. increase	450-530	Increases with temp. increase	TBC
JANKA HARDNESS (lbs)	350	1050	540	745	1100	660	4090	540-800	Decreases with temp. increase	Decreases with temp. increase	Decreases with temp. increase	TBC
STRUCTURAL GRADE	C16-C20	D24-D30	D24	C16-C24	C16-C24	C16-C24	C24	Depends on timber type	Depends on timber type	D30-D40	Depends on timber type	Depends on timber type
DURABILITY (EN 113, EN 460 & EN 350)	Class 2	Class 1-2	Class 1-2	Class 3	Class 3	Class 3	Class 1	Class 1-2	Class 2	Class 1	Class 1	Class 2
MAINTENANCE REGIME	High, additional surface treatment required	High, additional surface treatment required	High, additional surface treatment required	High, additional surface treatment required	High, additional surface treatment required	High, additional surface treatment required	Very low	Very low	Very low	Very low	None	Very low
DESIGN LIFE	40-60 years	40-60 years	30-40 years	30-40 years	30-40 years	25-35 years	50-70 years	40-60 years 30 years warranty	TBC	30-40 years	Up to 50 years	10 years warranty
WEATHERING	Turns light grey	Turns light grey (staining possible)	Turns light grey (staining possible)	Turns light grey	Turns light grey	Turns light grey	Turns light grey	Turns light grey	Turns light grey	Turns light grey	No change	No change
FIRE CLASSIFICATION	Class D	Class D	Class D	Class D	Class D	Class D	Class D	Class D	Class D	Class D	Class C	Class B
EMBODIED CARBON (kg/CO2/m3)	Low	Low	Low	Low	Low	Low	+127	+232	+104	+104	TBC	High
MOVEMENTS	Small - medium	Large	Medium	Medium	Medium	Medium	Small	Small - medium	Small	Small	Small - medium	Small
COST	++	++	++	++	++	++	++++	++++	+++	+++	++++	+

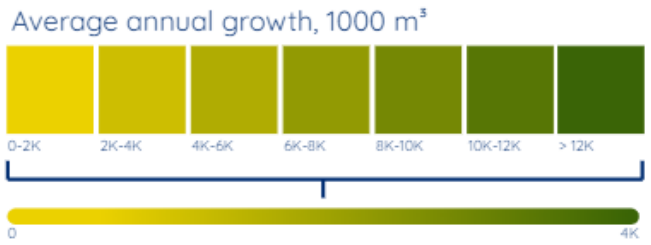
Eckersley O'Callaghan

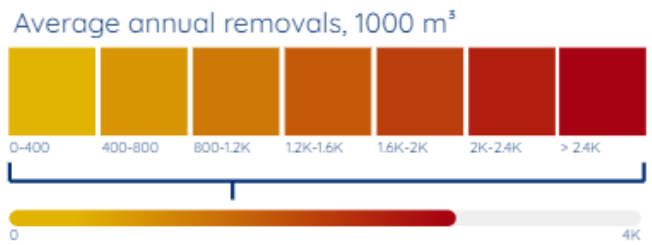
American Tulipwood











Growth rate: 34.6 million m3 / year
Harvest: 12.8 million m3 / year
Net growth: 21.8 million m3 / year
Source: AHEC

Eckersley O'Callaghan

Procurement and Treatment Process

Logs to lumber, drying
(US)

Thermal modification
treatment
(US)

Machining / planing
(UK)

Fire treatment
impregnation
(UK)

Cross cutting,
QA checking
(UK)

+5 months

+3 weeks

+9-10 weeks

+1 week

NFP NORTHLAND FOREST PRODUCTS

MORGAN TIMBER

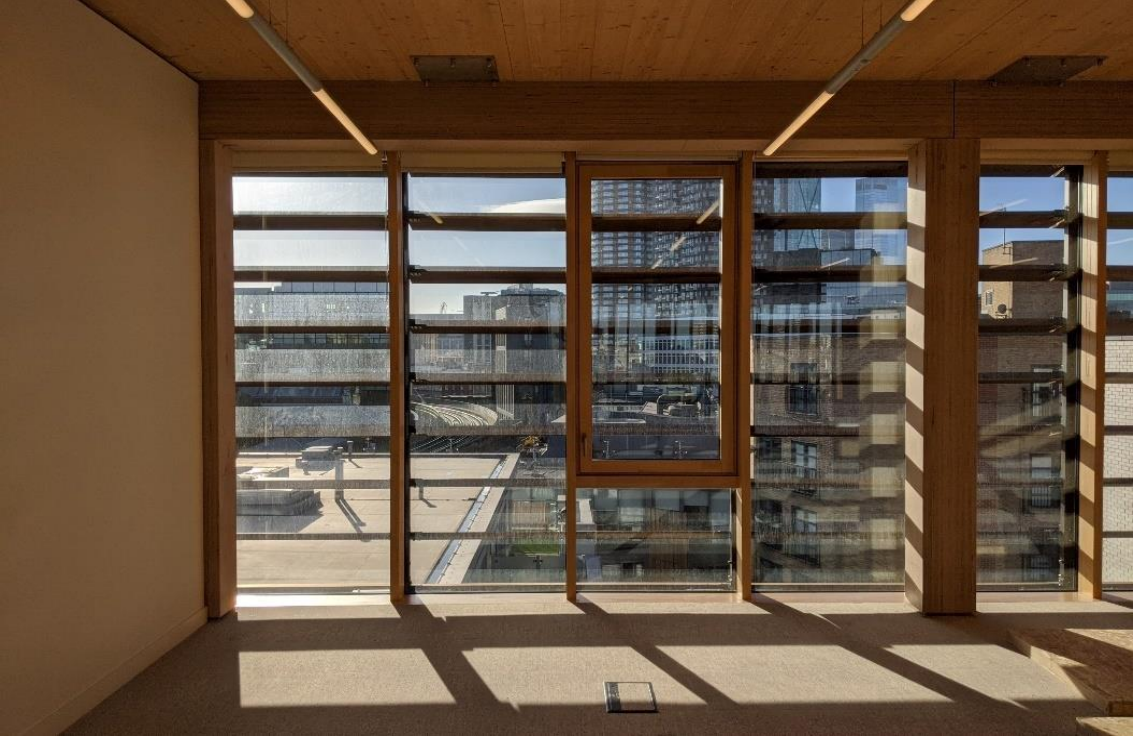
Vincent Timber

PTG TREATMENTS

Vincent Timber

contrasol ltd
solar shading solutions

Eckersley O'Callaghan

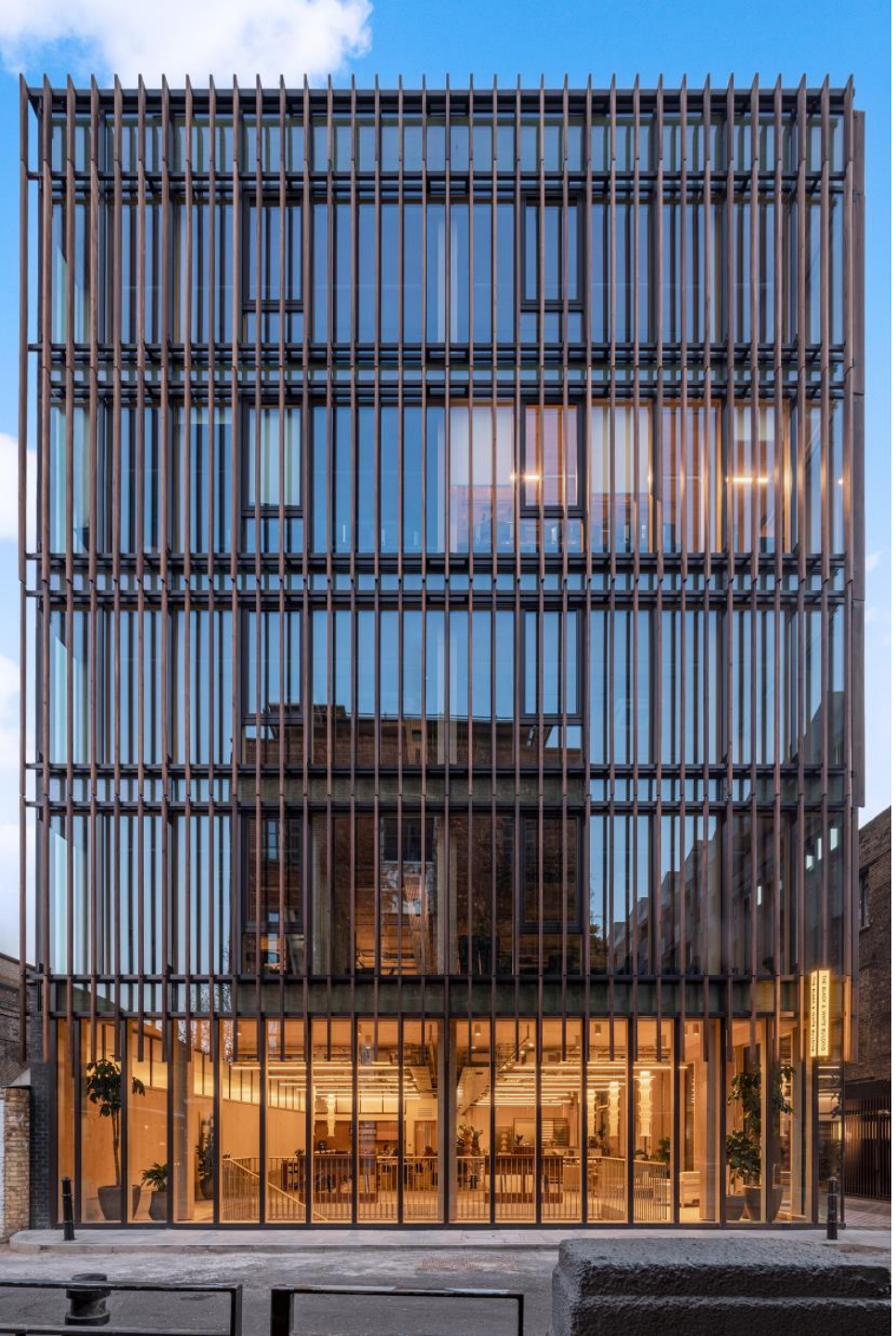



Eckersley
O'Callaghan

THE COMPLETED BUILDING

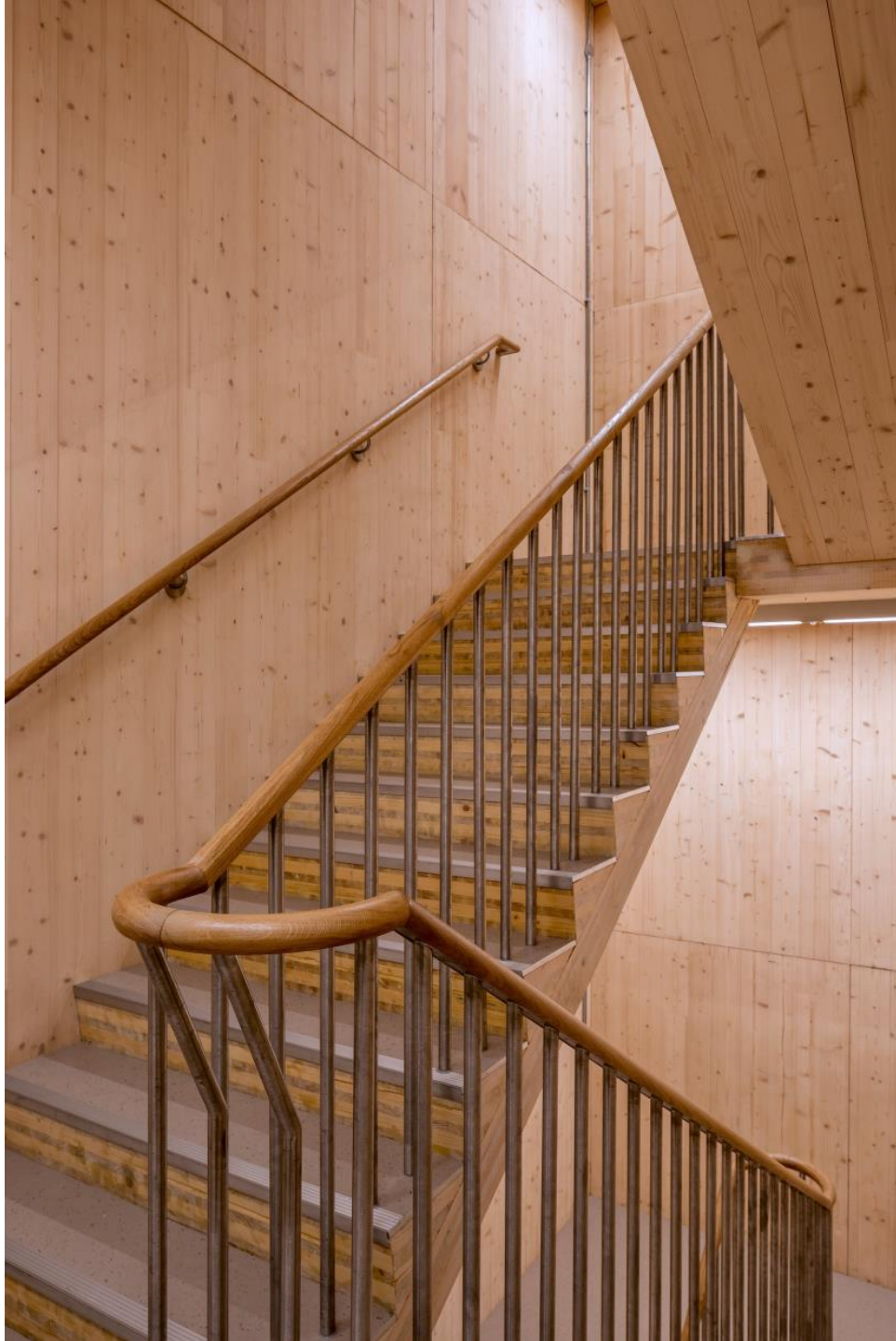

BASH ST
playground72


BASH ST



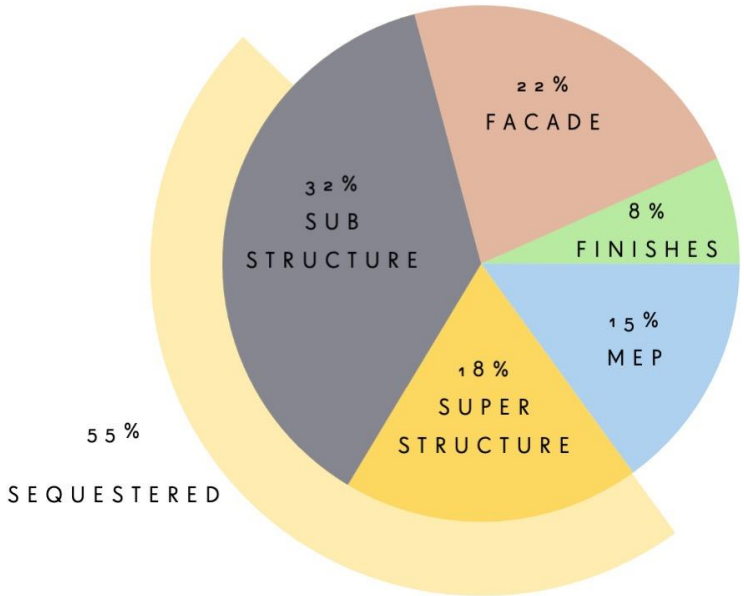

THE BLACK & WHITE BUILDING


THE BLACK & WHITE BUILDING



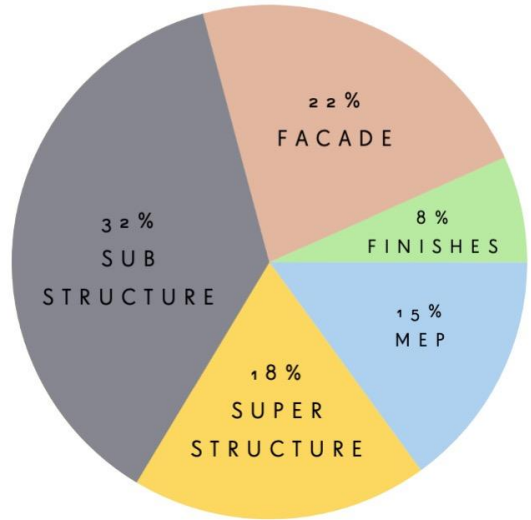

LUCIAN
FREUD

MEASURING OUTCOMES



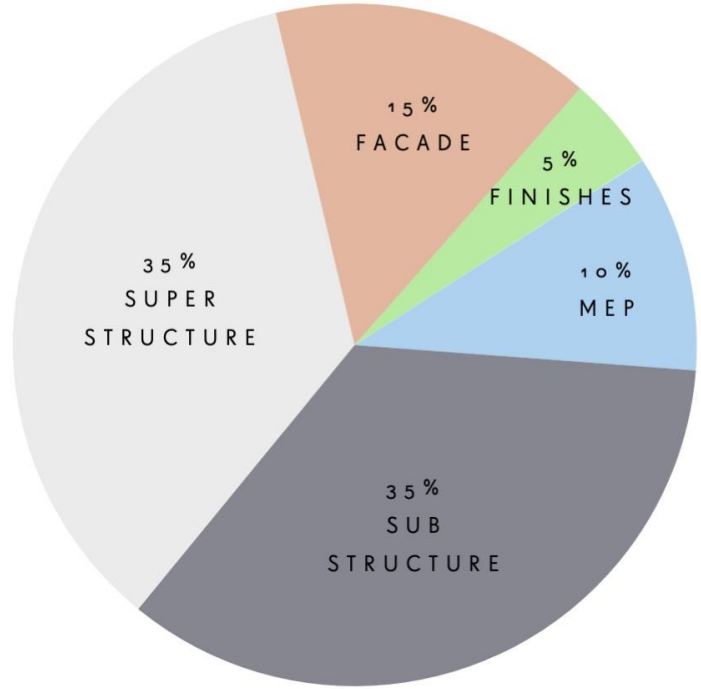
183 kg CO2e/m² (A1-A5)

WHOLE BUILDING



410 kg CO2e/m² (A1-A5)

WHOLE BUILDING
EX. SEQUESTRATION

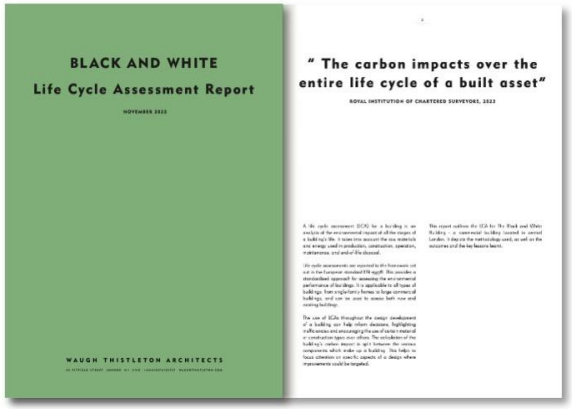


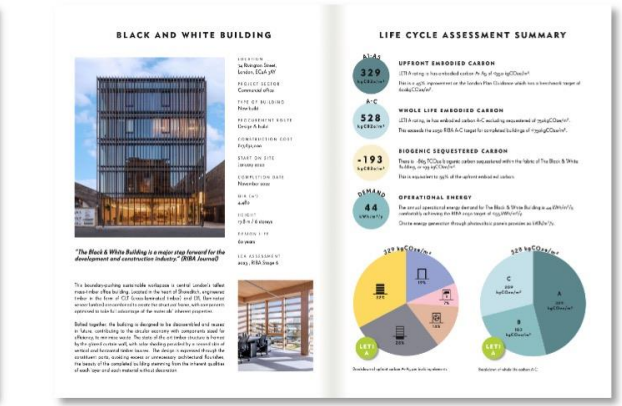
670 kg CO2e/m² (A1-A5)

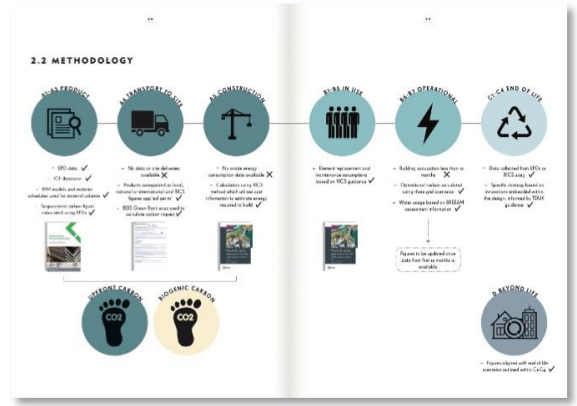
CONCRETE EQUIVALENT

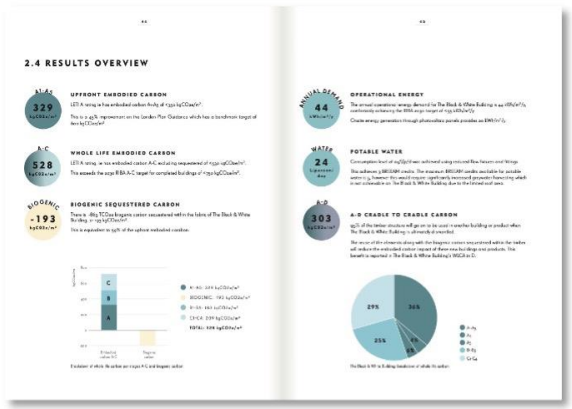
DESIGN STAGE APPRAISAL

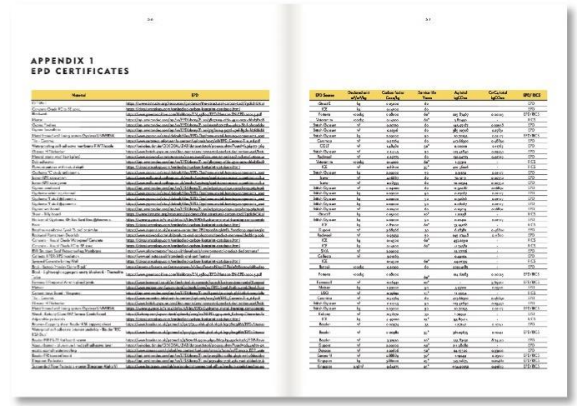
1/3 less embodied carbon than concrete

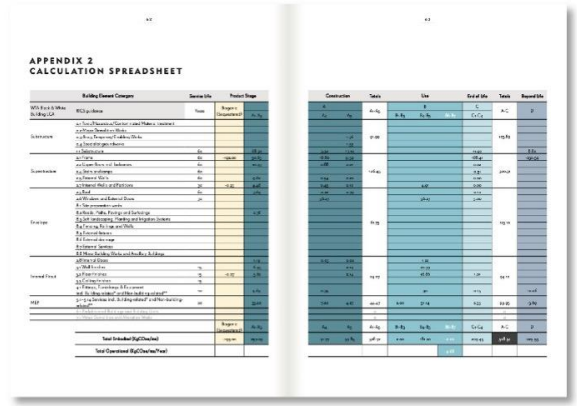






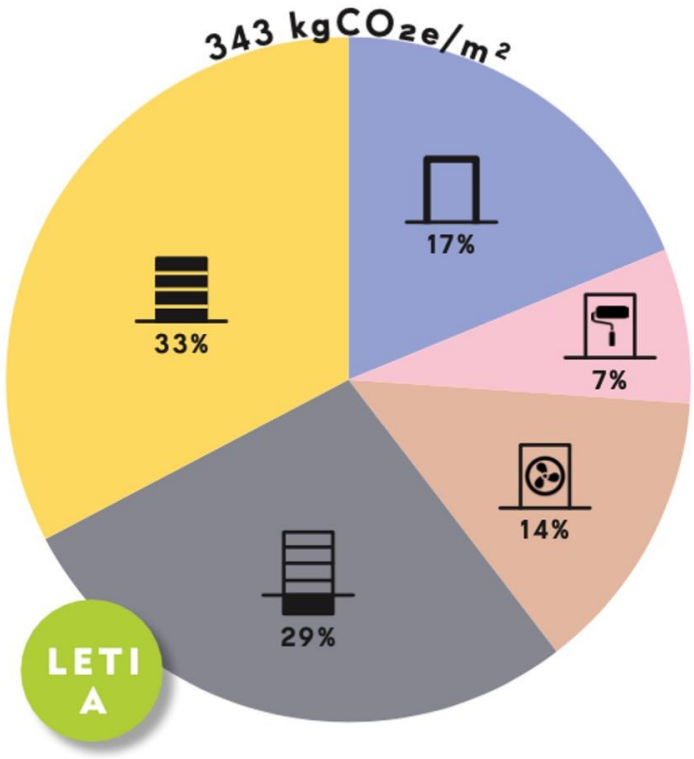




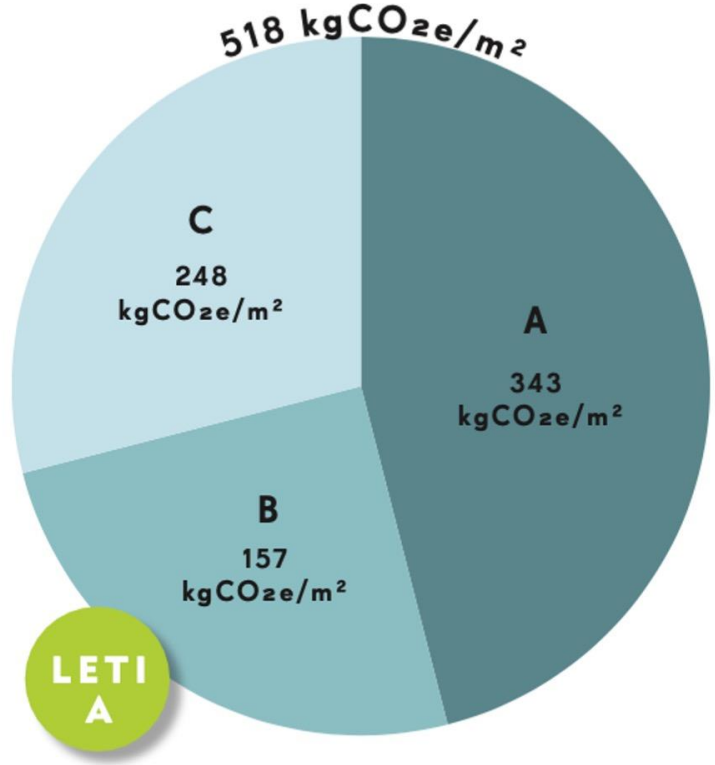


CHECKING OUR WORK

We have re-run the data post completion



Breakdown of upfront carbon A1-A5 per building elements



Breakdown of whole life carbon A-C

A1-A5

343
kgC02e/m²

UPFRONT EMBODIED CARBON

LETI A rating ie has embodied carbon A1-A5 of <350 kgCO2e/m².

This is a 43% improvement on the London Plan Guidance which has a benchmark target of 600kgCO2e/m².

A-C

518
kgC02e/m²

WHOLE LIFE EMBODIED CARBON

LETI A rating, ie has embodied carbon A-C excluding sequestered of 750kgCO2e/m².

This exceeds the 2030 RIBA A-C target for completed buildings of <750kgCO2e/m².

-231
kgC02e/m²

BIOGENIC SEQUESTERED CARBON

There is 1035 TCO2e biogenic carbon sequestered within the fabric of The Black & White Building, or 231 kgCO2e/m².

This is equivalent to 67% of the upfront embodied carbon.

DEMAND

44
kWh/m²/y

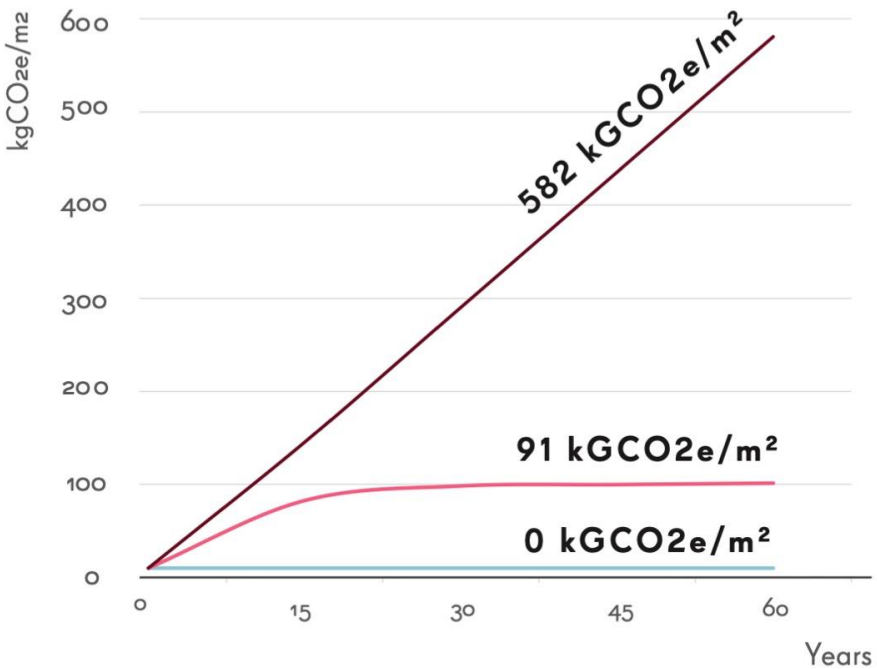
OPERATIONAL ENERGY

The annual operational energy demand for The Black & White Building is 44 kWh/m²/y, comfortably achieving the RIBA 2030 target of <55 kWh/m²/y.

Onsite energy generation through photovoltaic panels provides 20 kWh/m²/y.

OUR ESTIMATES WERE CONSERVATIVE

We can robustly substantiate lower carbon outcomes

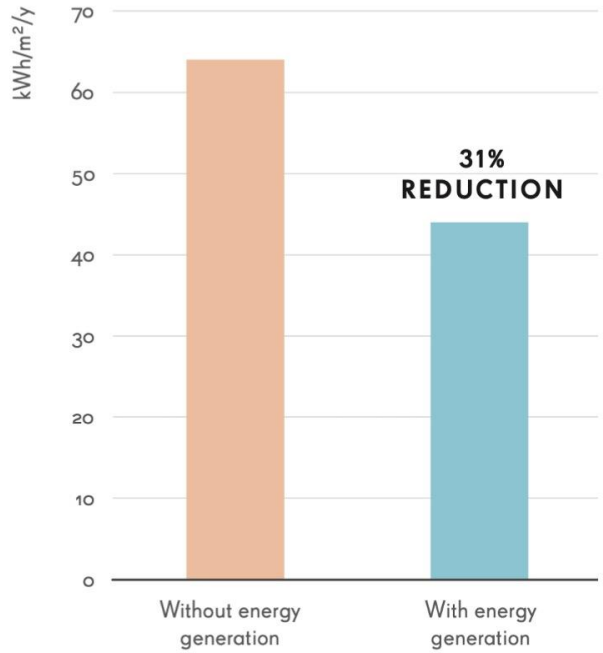


Operational carbon of The Black & White building using REGO energy supply

Operational carbon using current standard grid

Operational carbon using decarbonised grid as per the BEIS Green Book 2022

The Black & White Building operational energy is net zero supply

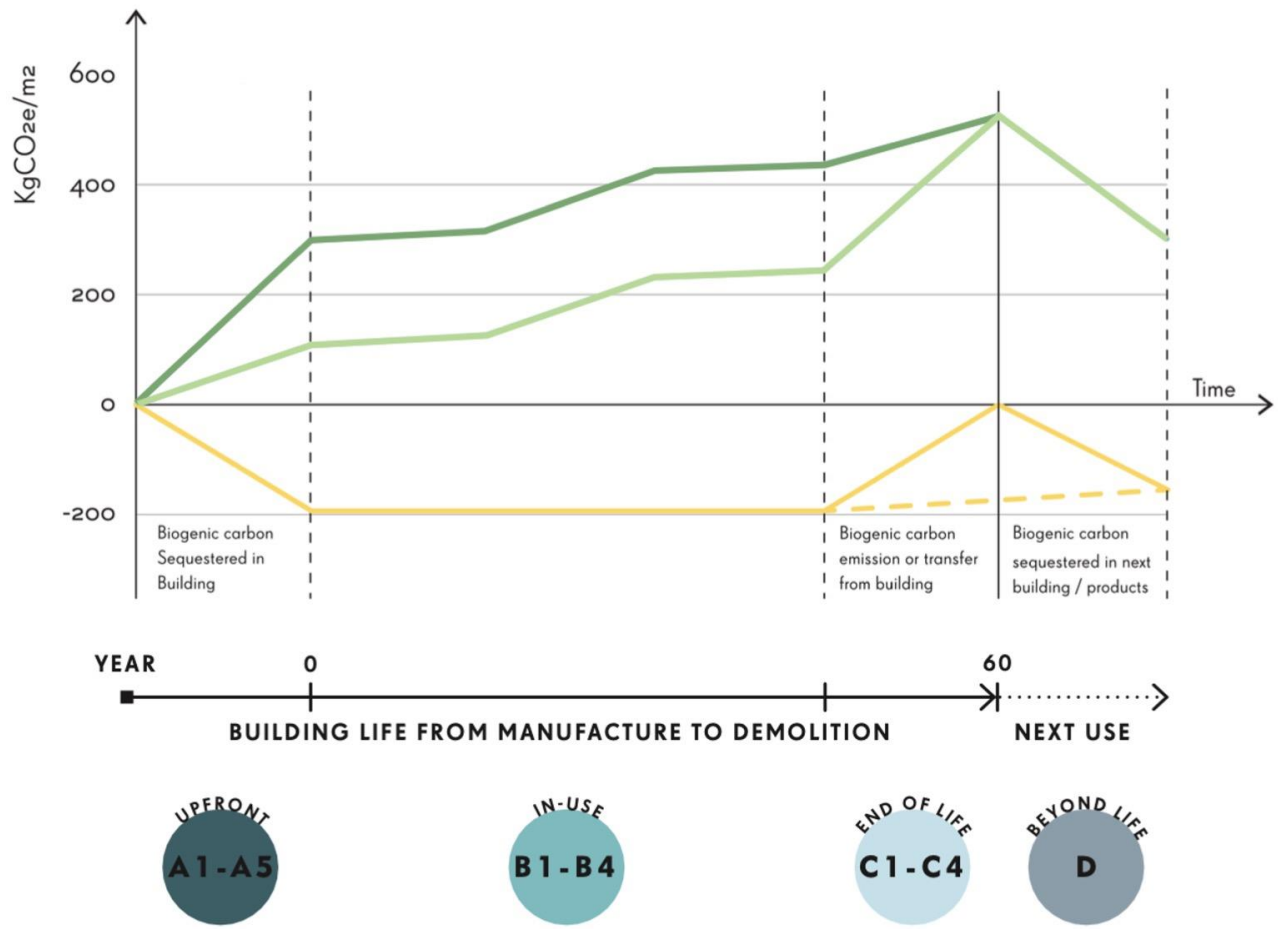


Operational energy demand with and without on-site energy generation

20% improvement on RIBA 2030 target (55kWh/m2/y)

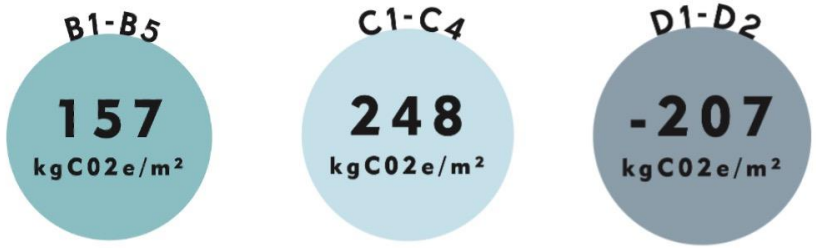
OPERATIONAL ENERGY

Is still important in a low embodied carbon project!



Biogenic carbon journey from building's manufacture to demolition, and future inclusion in the next use

- Embodied carbon
- Net result
- Biogenic carbon



Embodied carbon comparison between stages A, B and C. Stage B represents 21% of the building's whole life emissions.

THE DAY AFTER TOMORROW

We need to design for tomorrow's project as well as today's