Hurley Palmer Flatt.

Project:	**Symes Mews**	Date:	**15th February 2019**
Prepared By:	**Annie Marston**		
Status:	**For Information**	Issue:	**x**
Reference:	**WED14117**		
Design Note:	**Modelling details for the Energy Statement**		

1 MODELLING APPROACH

A dynamic thermal model has been created from architectural drawings received (dated 16th August 2018), using the IES-VE software tool (version 2018.0.1.0) to represent the development and enable an evaluation of external and internal conditions for all spaces within the basement and grounds floors as well as the yard building.

1.1 Climate Conditions and Weather File

Symes Mews is in the Borough of Camden, London. London has a moderate climate with the maximum temperature rarely rising above 26°C (Figure 1).

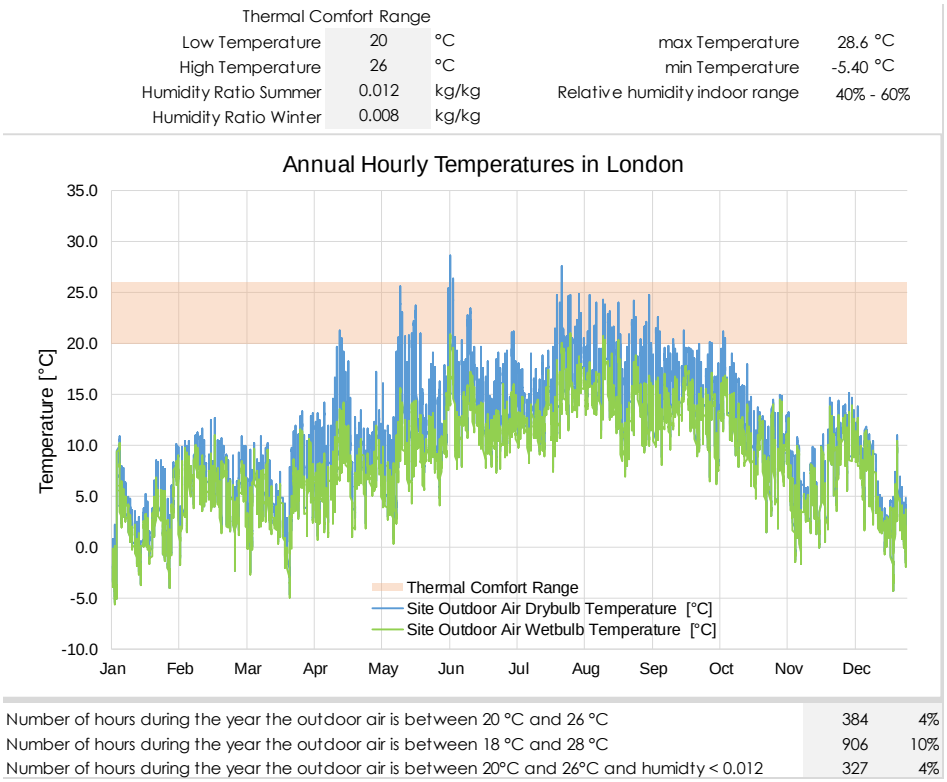
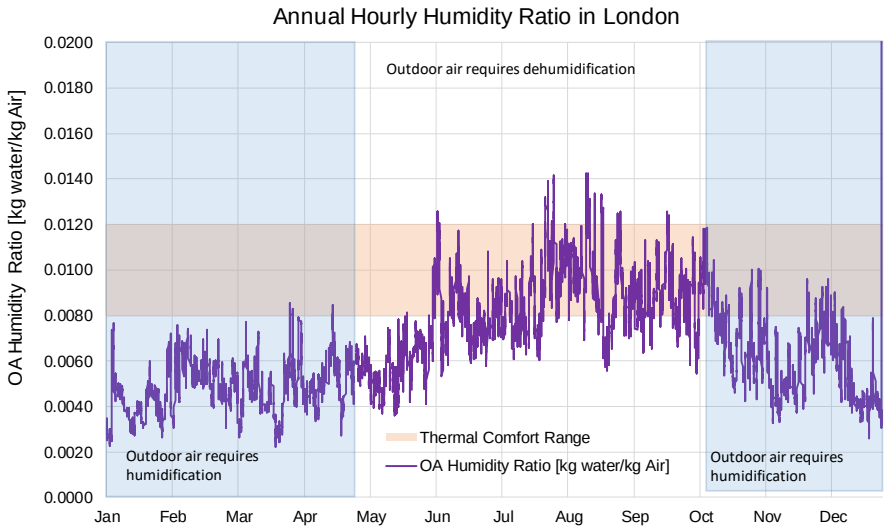


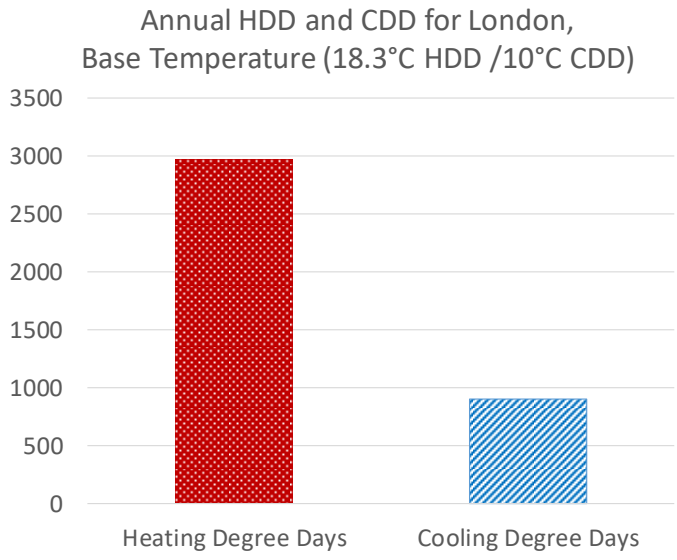
Figure 1: Annual Dry bulb and wet bulb outdoor air temperatures for London

It is an ideal climate for passive cooling through window opening in the summer months when the temperature outside is low enough, with dehumidification rarely required.



Occupied Hours between Jan - April and Nov - Dec (WINTER) dehumidification is required	0	0%
Occupied Hours between May - Oct (SUMMER) dehumidification is required	94	4%
Occupied Hours between Jan - April and Nov - Dec (WINTER) Humidification is required	2235	95%
Occupied Hours between May - Oct (SUMMER) Humidification is required	1161	49%

Figure 2: Annual outdoor humidity levels for London



Heating Degree Days	2968	(base 18.3°C)
Cooling Degree Days	898	(base 10°C)

1.2 Geometry

The IES-VE model includes all spaces and adjacent spaces have been modelled to capture their thermal and shading effects.

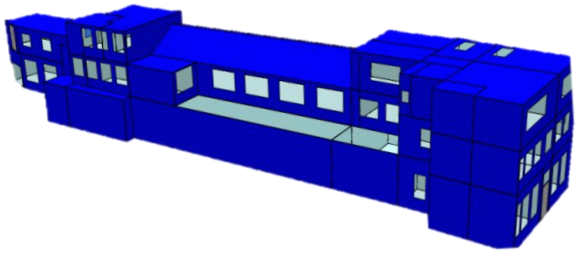


Figure 3: IES-VE model street East facing facade

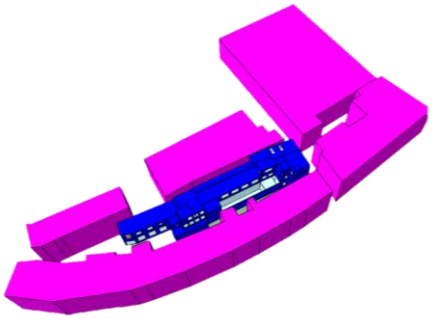


Figure 4: IES-VE model back

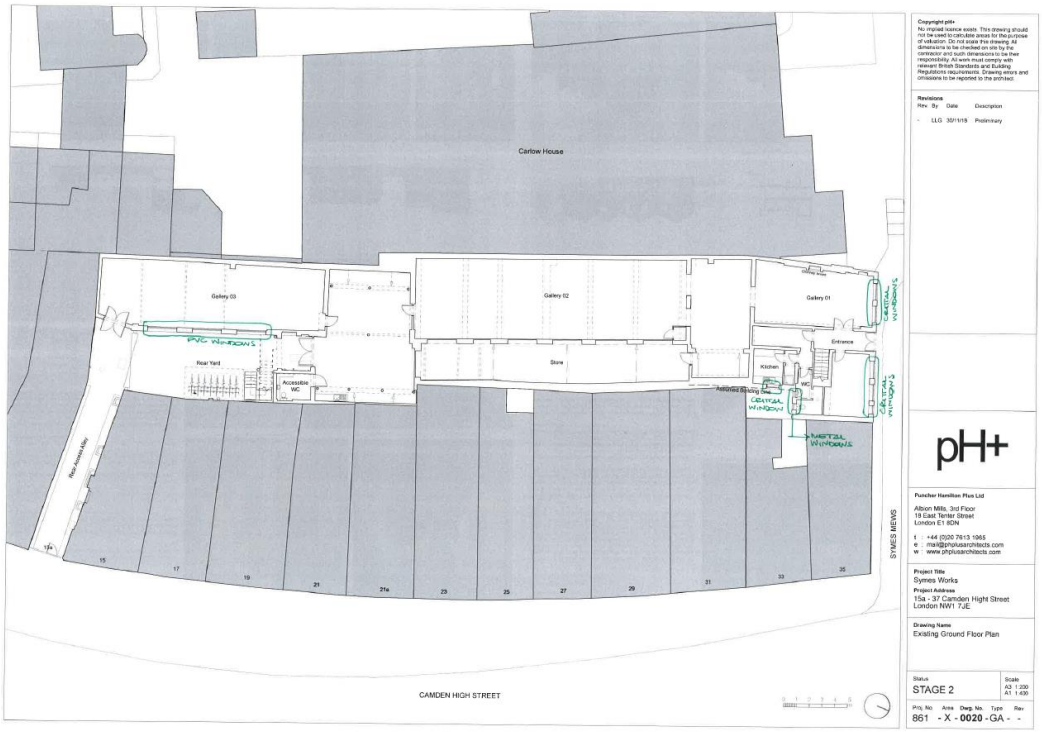


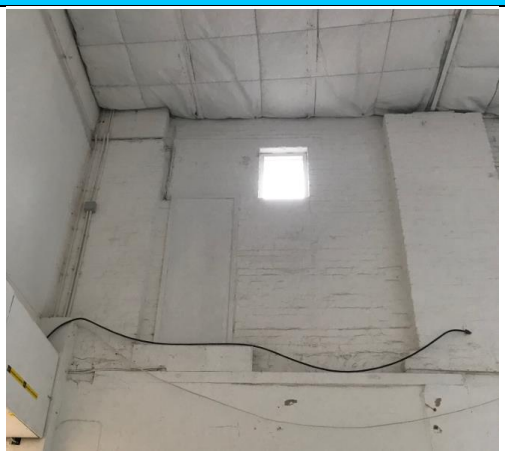
Figure 5: Ground floor plan

1.3 Constructions

The following constructions have been applied to the model. As this is an existing building, photos have been used to identify the type of construction currently in the building. This construction make up and u-value has then been found in IES-VE construction database and assumed to be the u-value for this building. All proposed constructions meet with Part L2B requirements.

Existing building constructions and u-values

Exisiting Roof Construction

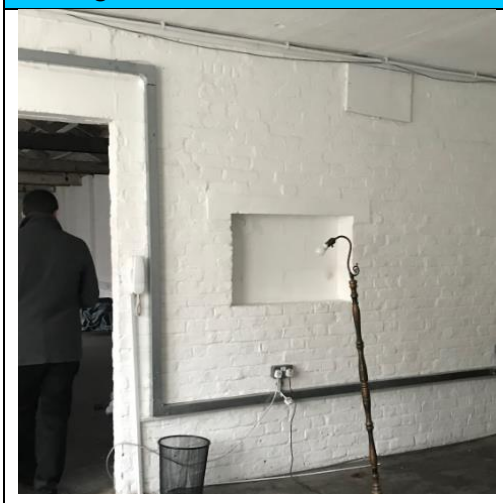


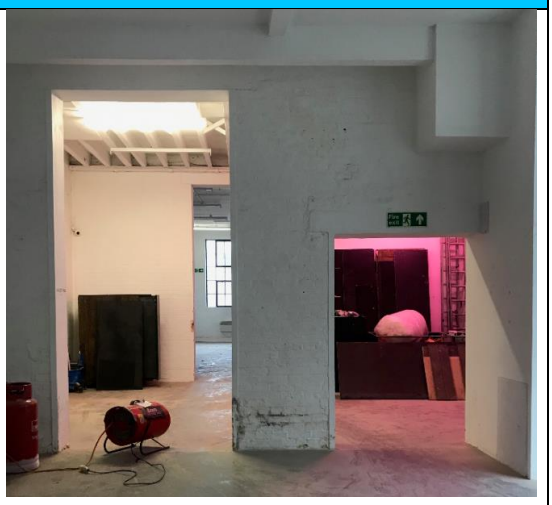
Exisiting Roof - Symes Mews									STD_ROO2
	Name of Assembly:	Concrete roof with insulation					Residential?	no	
Layer	Material	d [mm]	d [m]	Conductivity (W/mK) λ	R-Value (m²K/W) R	Density (kg/m³)	Specific Heat (J/kg.k)	Heat Capacity (Wh/m².K)	U-Value (W/m²K)
a e	Outside Air Film				0.04				25.00
1	Stone Chippings	10	0.01	0.96	0.01	1800	1000	5,000	96
2	Flet/Bitumen Layers	5	0.01	0.5	0.01	1700	1000	2,361	100.00
3	Cast Concrete	150	0.15	1.13	0.13	2000	1000	83,333	8
4	Cavity	250	0.25	-	0.17	-	-	-	5.88
5	Insulation	50	0.05	0.025	2.00	20	1030	286	0.50
a i	Inside Air Film				0.10				10.00
	Thickness of the construction		0.465	m				**U Value Assembly**	**0.41 W/m²K**
	R-value Insulation		2.00	m²K/W					
	Heat Capacity		91						

Existing Exterior Wall Construction

Existing Wall - Symes Mews									STD_WAL1
	Name of Assembly:	Double brick with unfilled cavity					Residential?	no	exisiting
Layer	Material	d [mm]	d [m]	Conductivity (W/mK) λ	R-Value (m²K/W) R	Density (kg/m³)	Specific Heat (J/kg.k)	Heat Capacity (Wh/m².K)	U-Value (W/m²K)
a e	Outside Air Film				0.04				25.00
1	Brick	105	0.11	0.84	0.13	1700	800	39,667	8
2	Cavity	50	0.05	-	0.18	-	-	-	5.56
3	Brick	105	0.11	0.62	0.17	1700	800	39,667	6
4	Plaster	13	0.01	0.5	0.03	1300	1000	4,694	38.46
a i	Inside Air Film				0.13				7.69
	Thickness of the construction		0.273	m				**U Value Assembly**	**1.49 W/m²K**
	R-value Insulation		0.00	m²K/W					
	Heat Capacity		84						

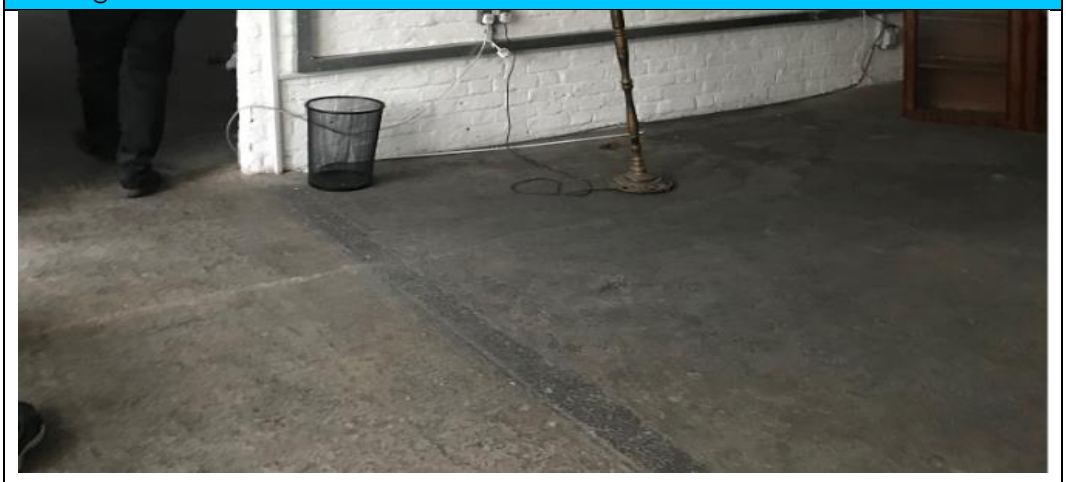
Existing Interior Wall Construction





Exisiting Interior Wall - Symes Mews									Int Wall 2
	Name of Assembly:	Single Brick Interior Wall					Residential?	No	Code in documen
Layer	Material	d [mm]	d [m]	Conductivity (W/mK) λ	R-Value (m²K/W) R	Density (kg/m³)	Specific Heat (J/kg.k)	Heat Capacity (Wh/m².K)	U-Value (W/m²K)
a e	Outside Air Film				0.06				17.05
1	Brick	220	0.22	0.84	0.26	1845	900	101,475	4
a i	Inside Air Film				0.12				8.29
	Thickness of the construction		0.220				**U Value Assembly**		**2.27 W/m²K**
	R-value Insulation		0.00				**Heat Capacity**		**101**

Existing Ground Floor Construction



Exisitng Ground Floor - Symes Mews									Slab 1
	Name of Assembly:	Concrete floor no insulation					Residential?	no	
Layer	Material	d [mm]	d [m]	Conductivity (W/mK) λ	R-Value (m²K/W) R	Density (kg/m³)	Specific Heat (J/kg.k)	Heat Capacity (Wh/m².K)	U-Value (W/m²K)
a e	Outside Air Film				0.03				
1	London Clay	750	0.75	1.41	0.53	1900	1000	395,833	2
2	Brickwork	250	0.25	0.84	0.30	1700	800	94,444	3.36
3	Cast Concrete	100	0.10	1.13	0.09	2000	1000	55,556	11
4	Screed	50	0.05	0.41	0.12	1200	840	50,400	8.20
a i	Inside Air Film				0.12				8.29
	Thickness of the construction		1.150				**U Value Assembly**		**0.84 W/m²K**
	R-value Insulation		0.00	0					
	Heat Capacity		596						

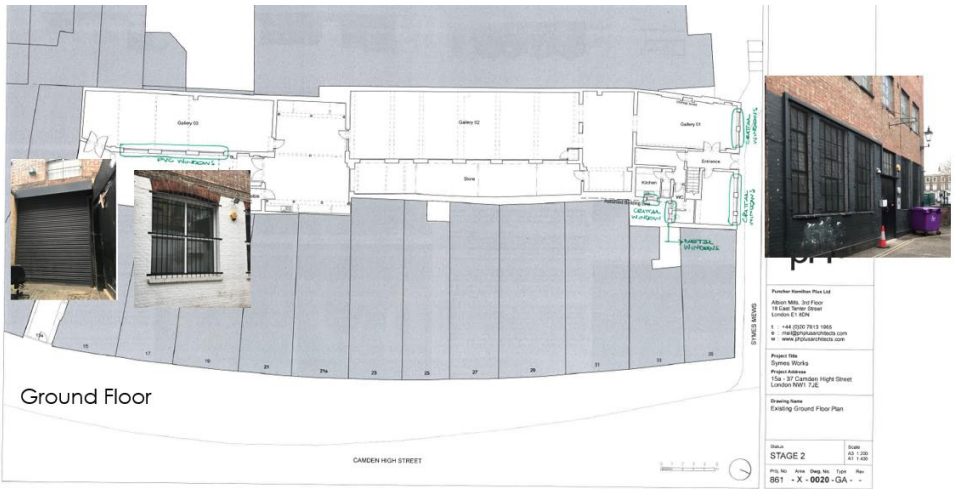
Upgraded Roof Construction – Proposed Design

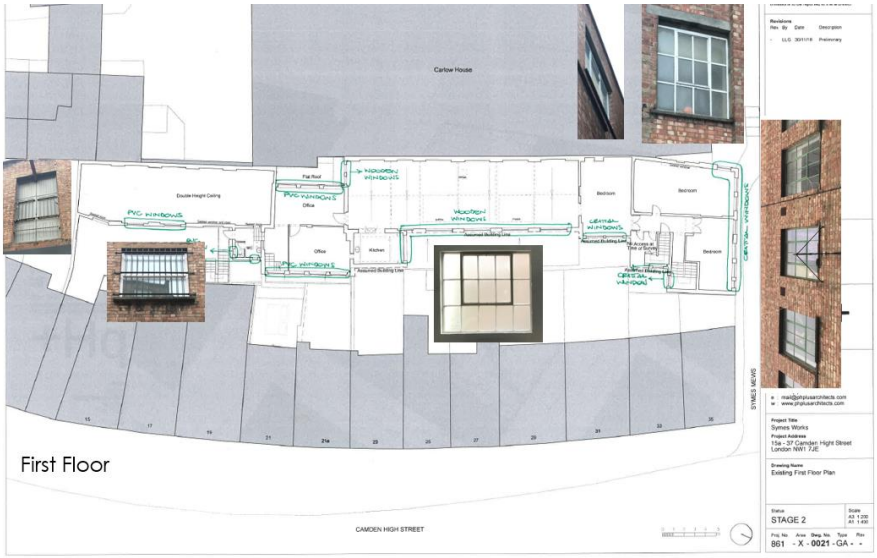
New Roof - Symes Mews									STD_ROO1
	Name of Assembly:	Insulation above deck - Part L complaint					Residential?	no	Exisiting building
Layer	Material	d [mm]	d [m]	Conductivity (W/mK) λ	R-Value (m²K/W) R	Density (kg/m³)	Specific Heat (J/kg.k)	Heat Capacity (Wh/m².K)	U-Value (W/m²K)
a e	Outside Air Film				0.04				25.00
1	Insulation	154.4	0.15	0.03	5.15	40	1450	2.488	0
2	membrane	0.1	0.00	1	0.00	1100	1000	31	10000.00
3	Concrete deck	100	0.10	2	0.05	2400	1000		20
4	Cavity	50	0.05	0	0.16	0	0	-	6.25
5	Plasterboard	12.5	0.01	0.21	0.06	700	1000	8.750	16.80
a i	Inside Air Film				0.10				10.00
	Thickness of the construction		0.317				**U Value Assembly**		**0.18 W/m²K**
	R-value Insulation		5.31	30					
	Heat Capacity		11						

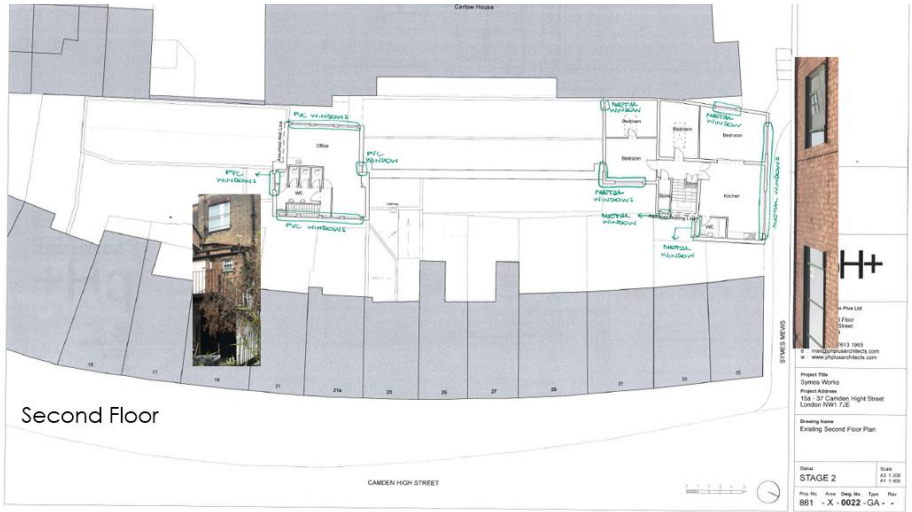
1.4 Windows and External Openings

The existing windows are a mixture of Crittall, metal framed and uPVc single and double glazed. All the windows will be replaced except the those on the north façade.

Existing windows around the façade are shown on the floor plans below. These existing windows were measured from the survey drawings for their frame to glazing ratio. Except for the uPVc windows they are assumed to be single paned. The uPVc are modelled as double glazed in the existing conditions.




First Floor
CAMDEN HIGH STREET
SYMES MEWS
STAGE 2


Second Floor
CAMDEN HIGH STREET
SYMES MEWS
STAGE 2

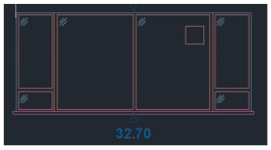

RoofLight over the store
Roof
CAMDEN HIGH STREET
SYMES MEWS
PLANNING

Residential - glazing west 1 and 2

	Name of Assembly:	Metal Framed Single Glazed 6mm						
	Type	Glazed area	frame area	Total area	Glazed Area ratio	G-value	Transmittance	U-Value (W/m²K)
	Total framing and glazing	1.48	0.35	1.83	19.2%	0.6	0.72	5.4
	Interior blinds							
U Value Assembly								**5.40 W/m²K**

Residential - glazing north 1, 2, 3, 5 and 6

	Name of Assembly:	Metal Framed single glazed 6mm						
	Type	Glazed area	frame area	Total area	Glazed Area ratio	G-value	Transmittance	U-Value (W/m²K)
	Total framing and glazing	1.26	0.34	1.60	21.2%	0.6	0.72	5.4
	Interior blinds							
U Value Assembly								**5.40 W/m²K**



Residential - glazing north 7 and 8

	Name of Assembly:	Metal Framed single glazed 6mm						
	Type	Glazed area	frame area	Total area	Glazed Area ratio	G-value	Transmittance	U-Value (W/m²K)
	Total framing and glazing	4.89	0.51	5.39	9.4%	0.6	0.72	5.4
	Interior blinds							
U Value Assembly								**5.40 W/m²K**

Commerical - glazing east 3 and 4

	Name of Assembly:	uPVC double glazed (air) 15% frame						
	Type	Glazed area	frame area	Total area	Glazed Area ratio	G-value	Transmittance	U-Value (W/m²K)
	Total framing and glazing	4.83	0.78	5.62	13.9%	0.54	0.72	2.26
	Interior blinds							
U Value Assembly								**2.26 W/m²K**

Commerical - glazing east 8

	Name of Assembly:	wooden frame double glazed						
	Type	Glazed area	frame area	Total area	Glazed Area ratio	G-value	Transmittance	U-Value (W/m²K)
	Total framing and glazing				20.0%	0.6	0.72	5.5
	Interior blinds							
U Value Assembly								**5.50 W/m²K**

1.5 Internal gains

Internal gains were set using NCM templates, in the existing building all lighting is set to T8 fluorescent bulbs and in the proposed building the following lighting has been applied:

Usage Type	Averaged lighting power density lm/W	Local Manual Switching	Constant illuminance control* [Y/N]	Occupancy Sensor Type / Controls	Automatic Daylighting Control [Y/N]	Daylight Control Type (Switching/Dimming)	Daylight Sensor Type (Standalone / Addressable)
Office	100	Local PIR Switching	Y	Auto-On-Off (0.9)	Y	Dimming (Daylight only) Rest shall be switched via PIR	Addressable
Circulation	90	Local PIR Switching	Y	Auto-On-Off (0.9)	N	N/A	Addressable
kitchens	60	manual	Y	None (0.1)	N	N/A	Strand Alone
Reception / Entrance	60	Local PIR Switching	Y	Auto-On-Off (0.9)	N	N/A	Strand Alone
Toilet	90	Local PIR Switching	Y	Auto-On-Off (0.9)	N	N/A	Strand Alone

1.6 Heating and cooling strategy

The electric panel heating in the building is being replaced by a LTHW system. Cooling and fresh air are provided by natural ventilation through the openable windows.

Description	Units	Office/Gallery/Bedrooms and Kitchens Existing	Office / Kitchen Proposed
System Description			
Outdoor air delivery (Ventilation)		Natural Ventilation	Natural Ventilation
Central Plant		none	Gas Boiler
Room Conditioning Heating		Electric Panel Radiator	Radiator
Room Conditioning Cooling		Open Windows	Open Windows
Plant Heating Details			
Heating system type (assumed system in model)	Description	Electric panel radiators (100% efficient)	LTHW system, gas boiler w/Radiators
Heat Fuel Type	Elec/gas	Electricity	Gas
Heat generator seasonal efficiency	SCOP/%	100	92%
Boiler installed on or after 1998?	Yes/No	n/a	yes
Central Time Control?	Yes/No	none	
Optimum start/stop control?	Yes/No	none	
Local Time Control?	Yes/No	none	
Local Temperature Control?	Yes/No	yes	
Weather Compensation Control?	Yes/No	none	
Is there provision for metering?	Yes/No	none	
Does the metering warn "out of range" values?	Yes/No	none	
Pump	List	N/A	
Plant Cooling Details			
Cooling system type (assumed system in model)	Description	open windows	open windows
Ventilation / AHU			
Specific Fan power for AHU	W/l/s	none	none
Demand controlled ventilation?	List	none	none
Ductwork Leakage Classification	Type	none	none
AHU Leakage Classification	Type	none	none
Heat recovery	Type % efficiency	none n/a	none n/a
8. DHW			
DHW system type	Description	Electric	From main boiler
DHW system delivery efficiency	%	100%	92%
DHW Fuel Type	Elec/gas	Electricity	Gas
Is the system a storage system?	Yes/No	no	yes
10. Building Management			
Lighting systems have provision for metering?	Yes/No	no	no

Lighting systems metering warns of 'out of range' values?	Yes/No		no	no
11. LZC technologies				
Low carbon technologies	Description	none		None
Renewable technologies	Description			