

# Sustainability Appraisal

The Mill Gurney Slade BA3 4TE

October 2021



Prepared by:

**Energise**  
SAP ASSESSORS LIMITED

- ▶ SAP Assessments
- ▶ Sustainability Statements
- ▶ Energy Strategy Statements
- ▶ SBEM Calculations
- ▶ Energy Performance Certificates
- ▶ Part L Air Permeability Testing
- ▶ Part E Sound Testing
- ▶ Part G Water Use Calculations

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# 1.0 Introduction

## 1.1 The Energy & Sustainability Statement

This Energy & Sustainability Statement has been prepared to form part of a detailed planning application on behalf of the applicants, LKAB Minerals Limited.

The applicant has engaged Western Building Consultants Limited as their architectural and planning consultants for the preparation of the application.

This Energy & Sustainability Statement was prepared by Andrew Patrick, a qualified and accredited on-construction domestic energy assessor. Andrew is employed by Energise SAP Assessors Limited, a Bath based energy and sustainability consultancy. SBEM calculations have been provided by Nicholas Withey of BPS Property Surveys Limited.

## 1.2 Purpose of the Energy & Sustainability Statement

The purpose of the Energy & Sustainability Statement is to show how the proposed commercial development will help to meet the objectives and criteria of the relevant Mendip Council policies.

This is achieved with this Energy & Sustainability Statement by addressing: -

- Reducing Carbon Emissions
- Mitigating Impact on Climate Change
- Reducing, Re-using & Recycling of Waste
- Reducing Demand on Water Resources

Delivering Sustainable Design & Construction

The Energy & Sustainability Statement shows how the requirements of relevant policy are to be met, in a way which is proportionate to the scale of the development.

## 1.3 Limitations of Use of this Energy & Sustainability Statement

This Energy & Sustainability Statement and SBEM calculations that are included within it are for the sole use of the purchaser, LKAB Minerals Limited, for the single purpose of demonstrating how the proposed development can meet the objectives of the relevant planning policies. The Energy & Sustainability Statement should not be assigned to a third party without the written consent of Energise SAP Assessors Limited.

The SBEM calculations that form part of this Energy & Sustainability Statement should not be used to secure design stage Building Regulations Compliance, or for any other purpose other than obtaining planning permission.



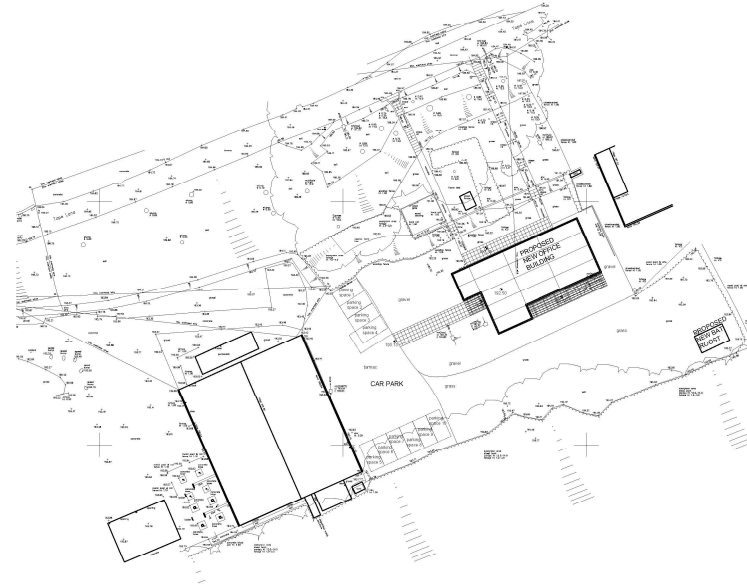
# 2.0 Site Location & Proposed Development

## 2.1 Location Map & Proposed Development

The site is situated at The Mill Gurney Slade BA3 4TE.

The proposal is for a single storey office development.

Please refer to location plan shown opposite, courtesy of Western Building Consultants Limited.



Proposed Site Plan

Revisions:  
1: 15/09/2021 - Updated to Client's  
Agreement



ALL DIMENSIONS TO BE CHECKED ON SITE

0m 5m 10m 15m



Form and Structure Plans  
The works in accordance with these drawings may be carried out after the provision of the A.C.I. in the Building Control Department to ensure the applicable regulations to building control and otherwise comply with the A.C.I.

Responsibility is not accepted for errors made by the contractor in the drawing. All discrepancies should be reported to Western Building Consultants.

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Drawing:  
Proposed Site Plan

Project:  
The Mill  
Gurney Slade  
BA3 4TE

Drawing No.: 000019 - Revision: 1.4  
Client: WBCB-BA3 - Job No.: WBCB-BA3  
Drawn By: WBC - Date: 15/09/2021



Western House  
2 Rush Hill, Bath  
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www.westernbuildingconsultants.co.uk

## 3.0 Meeting the Policy Requirements

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### **3.1 Minimising Carbon Emissions, Energy Use and Climate Change Impacts during Construction**

To limit the impact of delivery transport on climate change, materials will be sourced from local suppliers wherever possible.

Any material generated by demolition and landscaping will be re-used on site wherever possible.

The building will be largely pre-fabricated off site, all waste generated in the manufacturing phase will be re-used or recycled where possible.

For on-site works, locally based contractors will be employed to minimise vehicle use and distance travelled to attending site.

Materials suppliers will be required to demonstrate that materials supplied are responsibly sourced, with timber products FSC or PEFC Certified wherever possible.

Materials selection criteria will include their BRE Green Guide Rating, with materials rated A or B only to be used.

### **3.2 Minimising Carbon Emissions, Energy Use and Climate Change Impacts during Occupation**

The design of the building will have a “fabric first” approach, with thermal element standards better than those in Approved Document L2A wherever practical.

A closely managed methodology to ensure high levels of air tightness will be applied throughout the manufacturing and construction phase.

Enhanced heating controls will be provided.

### **3.3 Waste & Recycling During Construction**

On site contractors will be required to separate waste for re-use or recycling, for collection by a waste disposal contractor with solid recycling credentials.

The amounts of waste generated will be measured and recorded, and reported to site operatives to raise awareness.

### **3.4 Waste & Recycling During Occupation**

There is an existing arrangement on site for separation and recycling of waste, the proposed office development will be included in this scheme.

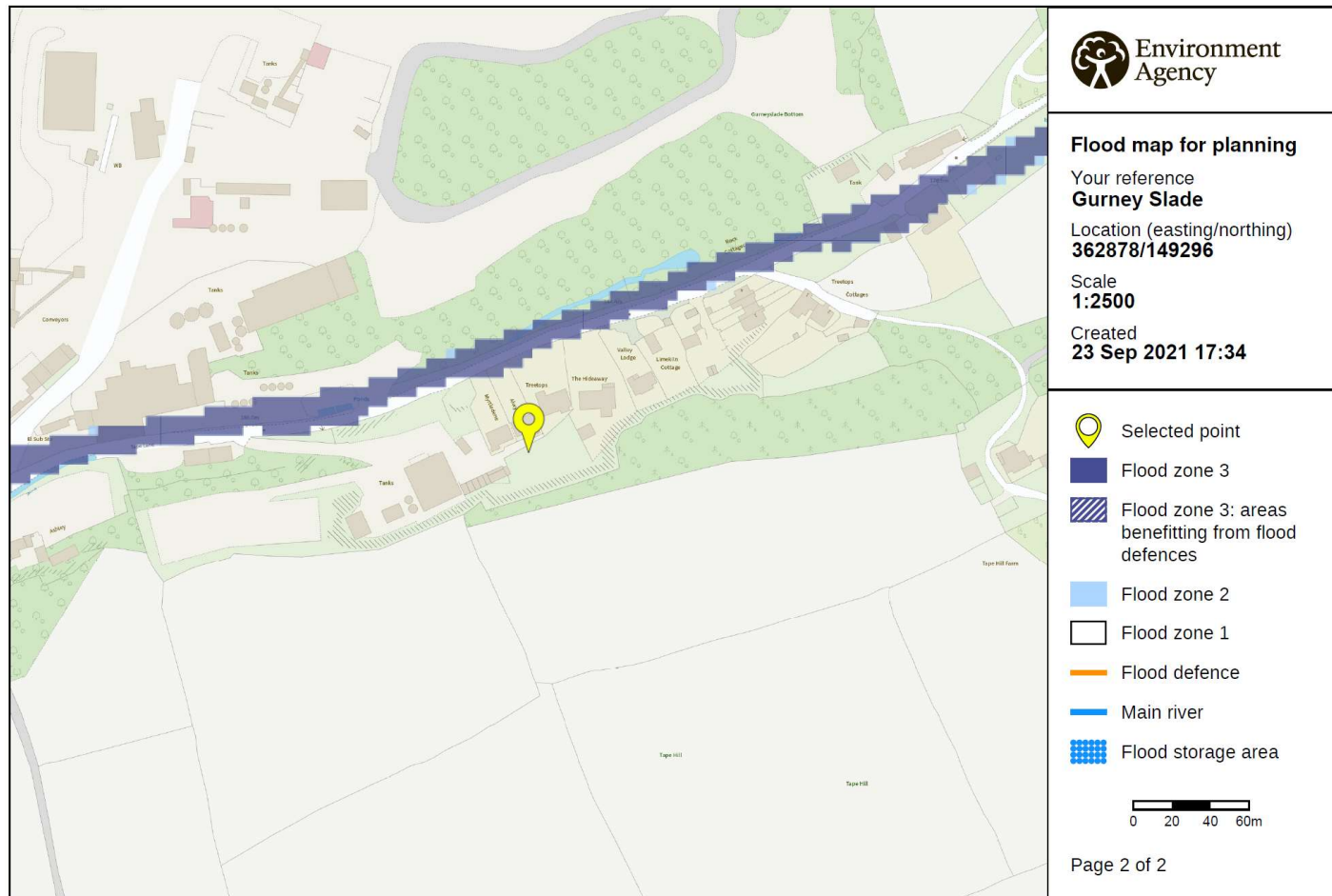
### **3.5 Promoting Biodiversity**

The proposed site has green infrastructure and wooded areas to provide wildlife habitat. A bat roost will be constructed as part of the proposal.

# 3.0 Meeting the Policy Requirements

## 3.6 Flood Risk

The site location is Flood Zone 1 with a low probability of flooding. Permeable surface and green infrastructure are incorporated in the design. See Environment Agency Flood Map for Planning below.



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## 4.0 SAP Assessments & Energy Efficiency

### 4.1 Base Line SBEM Assessments

A design SBEM calculation was carried out for the building, to establish the regulated energy use and CO<sup>2</sup> emissions associated with minimum Part L2A Compliance.

Building Reference	Energy Use Kwh/year	CO <sup>2</sup> Emissions kg/year
New Office	11362	5845

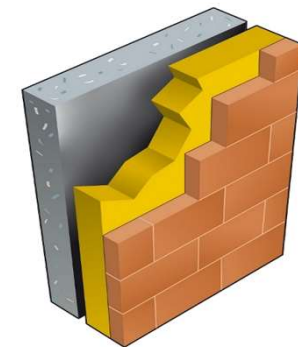
### 4.2 Energy Efficient Design Measures

All thermal elements will exceed the minimum standards required by Building Regulations set out in section of AD L2A as shown in table 4.3 below.

The building will be air permeability tested on completion to ensure the design standards are achieved in the construction stage.

### 4.3 Energy Efficient Design Standards

Element	As Designed Standard	SBEM Limit Value
External Walls	0.20 W/m <sup>2</sup> K	0.35 W/m <sup>2</sup> K
Floor	0.13 W/m <sup>2</sup> K	0.25 W/m <sup>2</sup> K
Warm Flat Roof	0.25 W/m <sup>2</sup> K	0.20 W/m <sup>2</sup> K
Air Permeability Rate	4.0 m <sup>3</sup> /m <sup>2</sup> per hour	10.0 m <sup>3</sup> /m <sup>2</sup> per hour



## 4.0 SAP Assessments & Energy Efficiency

### 4.4 Renewable Technologies Review

A review of the potential options for utilising renewable technologies to achieve a reduction in the CO<sup>2</sup> emissions of the building to 10% below the regulated emissions was carried out.

Technology	Considerations	Suitability
Photovoltaic Panels (PV)	Flat roof not suitable for mounting PV. Areas on ground allocated for biodiversity enhancements. Site heavily overshadowed by mature trees.	Not Suitable
Solar Thermal Hot Water	Flat roof not suitable for mounting solar thermal hot water equipment. Areas on ground allocated for biodiversity enhancements. Site heavily overshadowed by mature trees.	Not Suitable
	Hot water cylinders not included in dwelling design	Not suitable
Air Source Heat Pump	Suitable external wall available	Good
	Intermittent operation due to occupancy profile not suited to optimum operation	Not Suitable
Ground Source Heat Pump	Suitable external wall available	Good
	Excavation for heat collectors not practical or economically viable	Not Suitable
	Intermittent operation due to occupancy profile not suited to optimum operation	Not Suitable
Biomass	Proposal not large enough scale	Not Suitable
Combined Heat & Power (CHP)	Proposal not large enough scale	Not Suitable
District Heating	No known energy centre currently available	Not Suitable



### 4.5 Implementation of Renewable Technologies

Following review of the suitability of a range of renewable technologies, there are no viable or practical opportunities identified that are suitable for the proposal.



## 5.0 SAP Worksheets

### 5.1 SBEM Worksheets

Please see attached SBEM Compliance documents for the proposal.

#### Contact Details:

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BA2 2QH



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## Project name

**The Mill, baseline**

As designed

Date: Mon Oct 18 08:51:04 2021

## Administrative information

## Building Details

**Address:** The Mill, Gurney Slade, Information not provided by the user, BA3 4TE

## Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v5.6.b.0

**Interface to calculation engine:** G-ISBEM

**Interface to calculation engine version:** v24.0

**BRUKL compliance check version:** v5.6.b.0

## Certifier details

**Name:** Nicholas Withey

**Telephone number:** 07903266468

**Address:** 24 Park Avenue, Abergavenny, NP75SH

Criterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

The building does not comply with England Building Regulations Part L 2013

CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum	27.8
Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	27.8
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	35.4
Are emissions from the building less than or equal to the target?	BER > TER
Are as built details the same as used in the BER calculations?	Separate submission

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

## Building fabric

Element	U <sub>a</sub> -Limit	U <sub>a</sub> -Calc	U <sub>i</sub> -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	"z0/kitchen/ne"
Floor	0.25	0.15	0.2	"z0/wc_A/f"
Roof	0.25	0.25	0.25	"z0/kitchen/c"
Windows***, roof windows, and rooflights	2.2	2.2	2.2	"z0/kitchen/se/g"
Personnel doors	2.2	2.2	2.2	"z0/kitchen/ne/d"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"
U <sub>a</sub> -Limit = Limiting area-weighted average U-values [W/(m <sup>2</sup> K)]		U <sub>a</sub> -Calc = Calculated area-weighted average U-values [W/(m <sup>2</sup> K)]		U <sub>i</sub> -Calc = Calculated maximum individual element U-values [W/(m <sup>2</sup> K)]
* There might be more than one surface where the maximum U-value occurs.				
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.				
*** Display windows and similar glazing are excluded from the U-value check.				
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	10	4

## Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the [Non-Domestic Building Services Compliance Guide](#) for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	0.9 to 0.95

1- eph

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	1	-	-	-	-
<b>Standard value</b>	N/A	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					NO

1- Default HWS

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	1	-
<b>Standard value</b>	1	N/A

### Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
	<b>Standard value</b>	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
z0/kitchen		0.3	-	-	-	-	-	-	-	-	-	N/A
z0/wc_A		0.3	-	-	-	-	-	-	-	-	-	N/A
z0/wc_B		0.3	-	-	-	-	-	-	-	-	-	N/A

### General lighting and display lighting

Zone name	Luminous efficacy [lm/W]	Luminous efficacy [lm/W]			General lighting [W]
		Luminaire	Lamp	Display lamp	
	<b>Standard value</b>	60	60	22	
z0/kitchen		-	125	-	106
z0/office_A		119	-	-	84
z0/office_B		119	-	-	50
z0/office_C		119	-	-	145
z0/office_D		119	-	-	398
z0/lobby		-	125	-	12
z0/wc_A		-	125	-	17
z0/circ		-	125	-	13
z0/wc_B		-	125	-	19

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
z0/office_E		119	-	-	104
z0/office_F		119	-	-	181

**Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains**

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
z0/office_A	NO (-56.1%)	NO
z0/office_B	NO (-28.7%)	NO
z0/office_C	NO (-55.1%)	NO
z0/office_D	NO (-45.5%)	NO
z0/office_E	NO (-18.6%)	NO
z0/office_F	NO (-49.7%)	NO

**Criterion 4: The performance of the building, as built, should be consistent with the calculated BER**

Separate submission

**Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place**

Separate submission

**EPBD (Recast): Consideration of alternative energy systems**

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

	Actual	Notional
Area [m <sup>2</sup> ]	211	211
External area [m <sup>2</sup> ]	582.3	582.3
Weather	SWI	SWI
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	4	5
Average conductance [W/K]	225.05	221.77
Average U-value [W/m <sup>2</sup> K]	0.39	0.38
Alpha value* [%]	15.1	20.38

\* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

## Building Use

### % Area Building Type

	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
<b>100</b>	<b>B1 Offices and Workshop businesses</b>
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

## Energy Consumption by End Use [kWh/m<sup>2</sup>]

	Actual	Notional
Heating	49.28	48.99
Cooling	0	0
Auxiliary	1.91	1.23
Lighting	15.07	21.01
Hot water	2.59	3
Equipment*	44.16	44.16
<b>TOTAL**</b>	<b>68.86</b>	<b>74.22</b>

\* Energy used by equipment does not count towards the total for consumption or calculating emissions.

\*\* Total is net of any electrical energy displaced by CHP generators, if applicable.

## Energy Production by Technology [kWh/m<sup>2</sup>]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

## Energy & CO<sub>2</sub> Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	266.95	231.67
Primary energy* [kWh/m <sup>2</sup> ]	209.27	123.75
Total emissions [kg/m <sup>2</sup> ]	35.4	27.8

\* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## HVAC Systems Performance

System Type	Heat dem MJ/m <sup>2</sup>	Cool dem MJ/m <sup>2</sup>	Heat con kWh/m <sup>2</sup>	Cool con kWh/m <sup>2</sup>	Aux con kWh/m <sup>2</sup>	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - fanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	141.9	125	49.3	0	1.9	0.8	0	1	0
Notional	144.4	87.2	49	0	1.2	0.82	0	----	----

### Key to terms

Heat dem [MJ/m <sup>2</sup> ]	= Heating energy demand
Cool dem [MJ/m <sup>2</sup> ]	= Cooling energy demand
Heat con [kWh/m <sup>2</sup> ]	= Heating energy consumption
Cool con [kWh/m <sup>2</sup> ]	= Cooling energy consumption
Aux con [kWh/m <sup>2</sup> ]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

# Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

## Building fabric

Element	U <sub>i-Typ</sub>	U <sub>i-Min</sub>	Surface where the minimum value occurs*
Wall	0.23	0.35	"z0/kitchen/ne"
Floor	0.2	0.12	"z0/office_E/f"
Roof	0.15	0.25	"z0/kitchen/c"
Windows, roof windows, and rooflights	1.5	2.2	"z0/kitchen/se/g"
Personnel doors	1.5	2.2	"z0/kitchen/ne/d"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"
U <sub>i-Typ</sub> = Typical individual element U-values [W/(m <sup>2</sup> K)]		U <sub>i-Min</sub> = Minimum individual element U-values [W/(m <sup>2</sup> K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	5	4