
**Norcot Community Centre,
Lyndhurst Road,
Reading**

**Building Regulations Part L2A
Design Stage Compliance Document**

Prepared by:

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1	26/08/20	Design stage compliance issue		AJW

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1.0 INTRODUCTION

The purpose of this document is to demonstrate compliance with the following criteria for the Community Centre only, the Residential block fall under Building regulations part L1A and are subject to SAP calculations;

- Compliance with Criterion 1, 2, 3 and 4 of the Building Regulations Approved Document L2A 2013 at "Design" stage for the As Designed scheme at Norcot Community Centre, Lyndhurst Road, Reading, in line with current building regulations.
- A further requirement is compliance with Reading Borough Council Planning Policy CS1 that states *"the development is to achieve an energy efficiency standard of a minimum of 35% CO2 improvement over Building Regulations requirements Part L2013 edition with 2016 Amendments (Target Emission Rate Baseline)"*

As registered CIBSE Low Carbon Energy Assessors HWM Building Services Ltd are approved to self-assess Part L2 calculations and produce Energy Performance Certificates for new build non-domestic buildings up to Level 4. The approved software used is Bentley Hevacomp V8i.

A further SBEM calculation will be produced, self-assessed and submitted at practical completion stage to demonstrate "As built" compliance.

A building log book will also be produced by the contractor and will be provided to the occupier upon handover of the project at practical completion.

2.0 DEMONSTRATING COMPLIANCE

L2 compliance;

To satisfy Criterion 1: the CO2 Building Emission Rate (**BER**) for the building 'As Designed' must not be greater than the Target Emission Rate (**TER**) calculated as set out in the Approved Document.

To satisfy Criterion 2: the performance of the building fabric and building services systems should be no worse than the design limits set out in the Approved Document.

To satisfy Criterion 3: those parts of the building that are occupied or provided with mechanical cooling systems shall have appropriate passive control measures to limit the effects of solar heat gains in summer.

To satisfy Criterion 4: the performance of the building 'As Built' should be consistent with the BER calculated for Criterion 1.

3.0 MODEL DATA

The 3D model of the new building has been built to undertake the 2013 Part L assessment based on the latest architectural plans, elevations and sections and using the following input data;

External Weather data

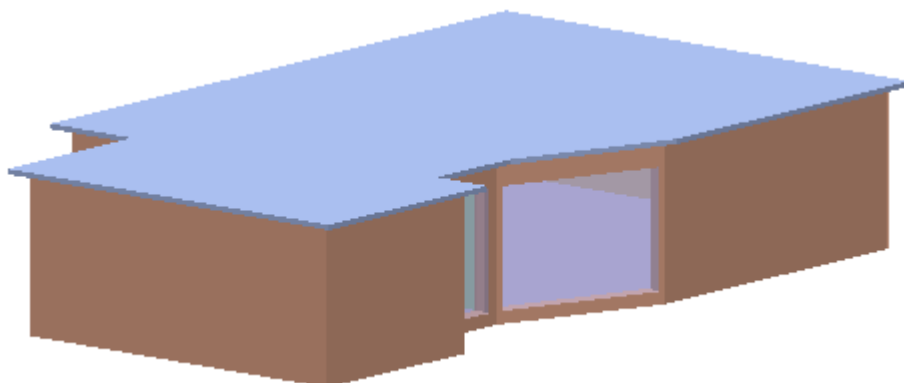
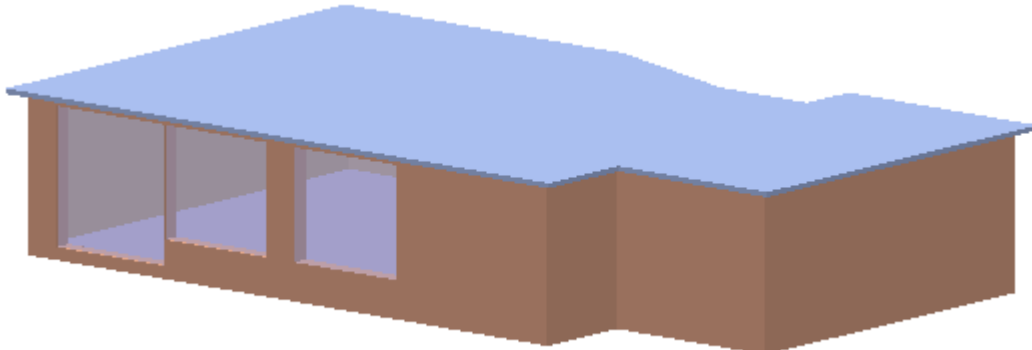
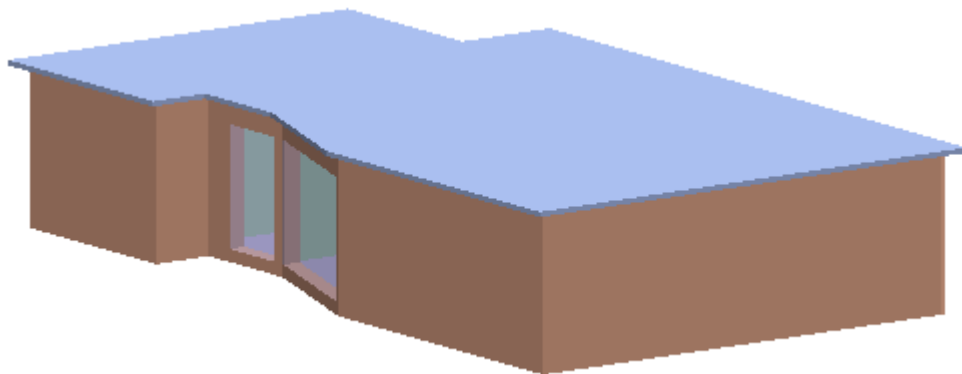
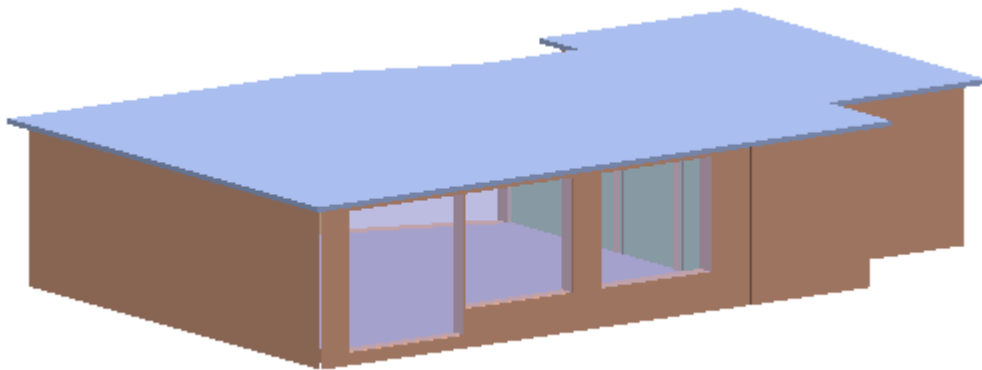
The Chartered Institute of Building Services Engineers (CIBSE) weather files (TRY and DSY) are used to mainly show compliance with UK building regulations. They contain whole-year weather variables for various locations throughout the UK designed for use in dynamic thermal simulation.

TRY data, Test Reference Year, contains "typical" weather data for the selected location and is used primarily for assessment of criterion 1 (CO2 emissions) of Building Regulations Part L (England /Wales) and section 6 (Scotland).

Reading weather data has been used in this calculation as this weather location is the closest to the project location.

	As Designed	As Built
Building Plan, Form, Orientation	As Per Saunders Architecture Drawings	
Weather File	Reading	
Building Type	D1 Non-Residential Institutions: Community/Day Centre	
U-Values Walls Roof Exposed Floor Windows Personnel Doors Internal partitions	0.23 W/m2K 0.15 W/m2K 0.13 W/m2K 0.80 W/m2K 2.20 W/m2K 0.35 W/m2K	
Glazing Glazing Type	Optifloat 6mm Clear/16mm argon/ Optifloat 6mm Clear /no blind 0.80 W/m2K, SHGC 0.39	
General Air Permeability Power Factor PV System Peak Power Inclination Orientation Overshading	5.0m3/hr/m2 >0.95 Mono Crystalline Silicon 2.03 kWp 30 degrees South West None	
Heating System System Type Seasonal Heating Efficiency Seasonal Cooling EER Nominal Cooling EER	Gas Fired Boiler and Underfloor Heating 94% n/a n/a	
WC Mechanical Ventilation Specific Fan Power Demand Control Air Flow Rate	0.3 PIR 4.54 l/s/m²	
Utility Room Mechanical Ventilation Specific Fan Power Demand Control Air Flow Rate	0.3 Switched 7.57 l/s/m²	
Domestic Hot Water System System Type Efficiency	Gas Fired Boiler 94%	
Electric Power Factor	>0.95	
Lighting Lighting Power Lighting Type Lighting control Sub-metered	As per LENI Calculation LED Manual in Hall, PIR in ancillary spaces Yes	

Hevacomp Model



4.0 RESULTS SUMMARY – Building Regulations 2013

4.1 Building Regulations 2013

4.1.1 Criterion 1

In compliance with the approved document L2A 2013a CO₂ emission rate calculation has been undertaken, the calculation provides the following Target CO₂ Emission Rate (TER) and designed building CO₂ Emission Rate (BER);

Target CO ₂ Emissions Rating (TER)	21.3 kgCO ₂ /m ² .annum
Building CO ₂ Emissions Rating (BER) for building as designed	13.2 kgCO ₂ /m ² .annum
CO ₂ Emission Compliance	PASS
Improvement over TER	38%

The results show that the building as designed complies with Criterion 1 and Reading Borough Council Planning Policy CS1, refer to Appendix A for the BRUKL output document.

4.1.2 Criterion 2

The performance of the building fabric and building services proposals are no worse than the design limits set out in the approved document. Refer to the BRUKL output document in appendix A.

4.1.3 Criterion 3

Those parts of the building that are occupied do not exceed permissible solar gain limits. Refer to the BRUKL output document in appendix A.

4.1.4 Criterion 4

Calculation to be undertaken at “As Built” stage.

4.2 Energy Performance Certificate

A draft design stage energy performance certificate has been produced based on Building Regulation Part L2A 2013 giving an Energy performance rating of A 17, refer to appendix B.

APPENDIX A - AS DESIGNED BRUKL OUTPUT DOCUMENT

Project name

Norcot Community Centre**As designed**

Date: Wed Aug 26 09:09:03 2020

Administrative information**Building Details**

Address: ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.a.2

Interface to calculation engine: Design Database

Interface to calculation engine version: v26.06.00.12

BRUKL compliance check version: v5.6.a.1

Owner Details

Name: Information not provided by the user

Telephone number: Information not provided by the user

Address: Information not provided by the user, Information not provided by the user, Information not provided by the user

Certifier details

Name: Information not provided by the user

Telephone number: Information not provided by the user

Address: Information not provided by the user, Information not provided by the user, Information not provided by the user

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	21.3
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	21.3
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	13.2
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 _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.26	0.35	001 Partition 1
Floor	0.25	0.13	0.13	001 Exposed Floor 1
Roof	0.25	0.15	0.15	001 Exposed Roof 1
Windows***, roof windows, and rooflights	2.2	0.8	0.8	001 Window 1 (1)
Personnel doors	2.2	-	-	"No external personnel doors"
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_a-Limit = Limiting area-weighted average U-values [W/(m²K)]U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

* 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 ³ /(h.m ²) at 50 Pa	10	5

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	>0.95

1- Underfloor Heating + Natural Ventilation - Hall, Circulation

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	-	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- Underfloor Heating + Mechanical Ventilation - WC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	-	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

1- Default DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.94	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

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
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
003		0.3	-	-	-	-	-	-	-	-	-	N/A
004		0.3	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
001	-	154	-	478

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
005		-	480	-	10
002		235	-	-	11
003		243	-	-	20
004		-	538	-	8

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?
001	NO (-19.5%)	NO
003	N/A	N/A

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?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	97.6	97.6
External area [m ²]	316.7	316.7
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	5	5
Average conductance [W/K]	76.45	116.76
Average U-value [W/m ² K]	0.24	0.37
Alpha value* [%]	32.47	18.26

* 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
	B1 Offices and Workshop businesses
	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
100	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/m²]

	Actual	Notional
Heating	34.84	56.6
Cooling	0	0
Auxiliary	2.39	1.62
Lighting	14.96	14.44
Hot water	4.02	4.38
Equipment*	6.19	6.19
TOTAL**	56.21	77.03

* 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/m²]

	Actual	Notional
Photovoltaic systems	7.6	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	288.39	263.2
Primary energy* [kWh/m ²]	99.33	122.45
Total emissions [kg/m ²]	13.2	21.3

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

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: floor heating, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	112.8	172.7	37.4	0	2	0.84	0	0.94	0
Notional	185.7	72.7	63	0	0.9	0.82	0	----	----
[ST] No Heating or Cooling									
Actual	559	0	0	0	0	0	0	0	0
Notional	564.6	0.8	0	0	0	0	0	----	----
[ST] No Heating or Cooling									
Actual	153.2	12.6	0	0	7.5	0	0	0	0
Notional	108.9	38.6	0	0	10	0	0	----	----
[ST] Central heating using water: floor heating, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	184.7	4.7	61.2	0	7.4	0.84	0	0.94	0
Notional	147.7	14.1	50.1	0	8	0.82	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= 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 _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.23	001 Wall 1
Floor	0.2	0.13	001 Exposed Floor 1
Roof	0.15	0.15	001 Exposed Roof 1
Windows, roof windows, and rooflights	1.5	0.8	001 Window 1 (1)
Personnel doors	1.5	-	"No external personnel doors"
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 _{i-Typ} = Typical individual element U-values [W/(m²K)] U _{i-Min} = Minimum individual element U-values [W/(m²K)] * There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	5

APPENDIX B – ENERGY PERFORMANCE CERTIFICATE

Energy Performance Certificate

Non-Domestic Building



Norcot Community Centre
Lyndhurst Road
Reading

Certificate Reference Number:

0000-3005-0080-0000-4091

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

Energy Performance Asset Rating

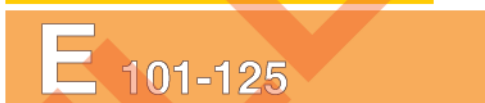
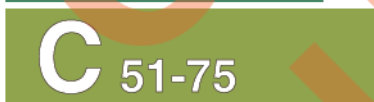
More energy efficient



Net zero CO₂ emissions



This is how energy efficient the building is.



Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Heating and Natural Ventilation
Total useful floor area (m ²):	97.6
Building complexity (NOS level):	4
Building emission rate (kgCO ₂ /m ² per year):	13.23
Primary energy use (kWh/m ² per year):	99.33

Benchmarks

Buildings similar to this one could have ratings as follows:

27 If newly built

78 If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software:	Design Database v26.06.00.12 using calculation engine SBEM v5.6.a.2
Property Reference:	000000000000
Assessor Name:	HWM Building Services
Assessor Number:	ABCD123456
Accreditation Scheme:	Information not available
Employer/Trading Name:	Information not provided by the user
Employer/Trading Address:	Information not provided by the user
Issue Date:	26 Aug 2020
Valid Until:	25 Aug 2030 (unless superseded by a later certificate)
Related Party Disclosure:	Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 0400-0048-0000-0095-0002

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by Information not available. You can obtain contact details of the Accreditation Scheme at Information not available.

A copy of this certificate has been lodged on a national register as a requirement under the Energy Performance of Buildings Regulations 2012 as amended. It will be made available via the online search function at www.ndepcregister.com. The certificate (including the building address) and other data about the building collected during the energy assessment but not shown on the certificate, for instance heating system data, will be made publicly available at www.opendatacommunities.org.

This certificate and other data about the building may be shared with other bodies (including government departments and enforcement agencies) for research, statistical and enforcement purposes. For further information about how data about the property are used, please visit www.ndepcregister.com. To opt out of having information about your building made publicly available, please visit www.ndepcregister.com/optout.

There is more information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government website at: www.gov.uk/government/collections/energy-performance-certificates. It explains the content and use of this document and advises on how to identify the authenticity of a certificate and how to make a complaint.

Opportunity to benefit from a Green Deal on this property

The Green Deal can help you cut your energy bills by making energy efficiency improvements at no upfront costs. Use the Green Deal to find trusted advisors who will come to your property, recommend measures that are right for you and help you access a range of accredited installers. Responsibility for repayments stays with the property - whoever pays the energy bills benefits so they are responsible for the payments.

To find out how you could use Green Deal finance to improve your property please call 0300 123 1234.