



Energy Consultants,
Architectural Design &
Surveyors



SAP Report Submission for Building Regulations Compliance

Client: Redmile Homes

Project: Plot 59 (Doveridge) Land at Goldthorpe Road
Goldthorpe, Barnsley, S63 9

Contact: ESAP Energy Consultants Arch Des & Surv
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esapenquiry@gmail.com

Report Issue Date: 27/03/2022

PREDICTED ENERGY ASSESSMENT

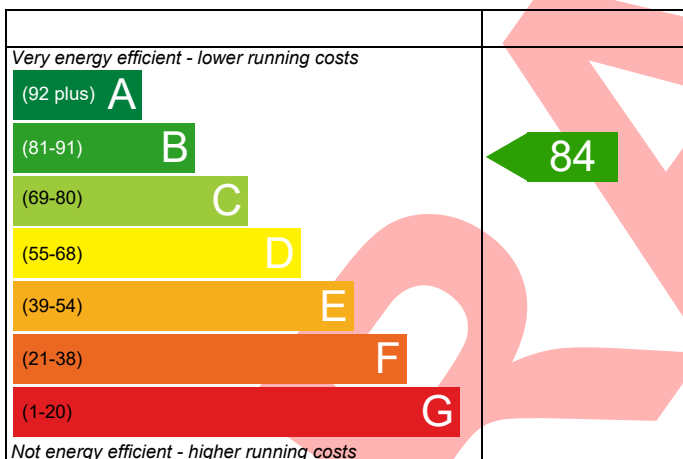
Goldthorpe Road,
Goldthorpe,
Barnsley,
S63 9

Dwelling type: House, Detached
Date of assessment: 27/03/2022
Produced by: ESAP Energy Consultants Arch Des & Surv
Total floor area: 113.06 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating

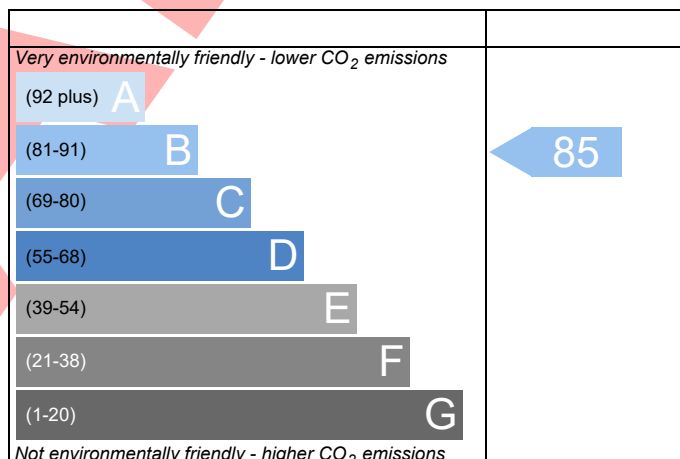


England

EU Directive
2002/91/EC

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO₂) Rating



England

EU Directive
2002/91/EC

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)

Property Reference	000649	Issued on Date	27/03/2022
Assessment Reference	Plot 59 As Design	Prop Type Ref	Plot 59 - Doveridge
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	84 B	DER	17.46
Environmental	85 B	TER	17.50
CO ₂ Emissions (t/year)	1.76	% DER<TER	0.21
General Requirements Compliance	Pass	DFEE	50.31
		TFEE	58.59
		% DFEE<TFEE	14.14
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com		Assessor ID
			H883-0001
Client	Redmile Homes, Redmile Homes		

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	17.50	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.46	kgCO ₂ /m ²	Pass
	-0.04 (-0.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	58.59	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	50.31	kWh/m ² /yr	
	-8.3 (-14.2%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.27 (max. 0.70)	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	m ³ /(h.m ²) @ 50 Pa	
Maximum	10.0	m ³ /(h.m ²) @ 50 Pa	Pass

Limiting System Efficiencies

4 Heating efficiency

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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)

Main heating system

Boiler system with radiators or underfloor - Mains gas
Data from database
Vaillant ecoFIT sustain 615 VU 156/6-3 (H-GB)

Efficiency: 89.8% SEDBUK2009
Minimum: 88.0%

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

Nominal cylinder loss: 1.79 kWh/day
Permitted by DBSCG 2.30

Pass

Primary pipework insulated

Yes

Pass

6 Controls

Space heating controls

Time and temperature zone control

Pass

Hot water controls

Cylinderstat

Pass

Independent timer for DHW

Pass

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100 %

Minimum

75 %

Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (East Pennines)

Slight

Pass

Based on:

Overshading

Average

Windows facing North

8.32 m², No overhang

Windows facing East

0.48 m², No overhang

Windows facing South

6.66 m², No overhang

Windows facing West

7.97 m², No overhang

Air change rate

4.00 ach

Blinds/curtains

None

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.00 (design value) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Roof U-value

0.10 W/m²K

Thermal bridging y-value

0.023 W/m²K

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THERMAL BRIDGING

Calculation Type: New Build (As Designed)

Property Reference	000649	Issued on Date	27/03/2022
Assessment Reference	Plot 59 As Design	Prop Type Ref	Plot 59 - Doveridge
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	84 B	DER	17.46
Environmental	85 B	TER	17.50
CO ₂ Emissions (t/year)	1.76	% DER<TER	0.21
General Requirements Compliance	Pass	DFEE	50.31
		TFEE	58.59
		% DFEE<TFEE	14.14
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com		Assessor ID
			H883-0001
Client	Redmile Homes, Redmile Homes		

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Independently assessed	0.030	20.74	0.62	
External wall	E3 Sill	Independently assessed	0.015	18.70	0.28	
External wall	E4 Jamb	Independently assessed	0.010	42.30	0.42	
External wall	E5 Ground floor (normal)	Independently assessed	0.056	30.47	1.71	
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.001	30.47	0.03	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	13.93	0.84	
External wall	E12 Gable (insulation at ceiling level)	Independently assessed	0.055	16.54	0.91	
External wall	E16 Corner (normal)	Independently assessed	0.059	20.08	1.18	

Total: **5.99** W/mK:
Y-Value: **0.023** W/m²K:

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

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SAP Rating	84 B	DER	17.46	TER	17.50	
Environmental	85 B	% DER<TER	0.21			
CO ₂ Emissions (t/year)	1.76	DFEE	50.31	TFEE	58.59	
General Requirements Compliance	Pass	% DFEE<TFEE	14.14			
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com				Assessor ID	H883-0001
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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

DWELLING AS DESIGNED

Detached House, total floor area 113 m²

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating:Mains gas
Fuel factor:1.00 (mains gas)
Target Carbon Dioxide Emission Rate (TER) 17.50 kgCO₂/m²
Dwelling Carbon Dioxide Emission Rate (DER) 17.46 kgCO₂/m²OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)58.6 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)50.3 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.27 (max. 0.70)	OK
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	OK
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	OK
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals: 5.00 (design value)
Maximum 10.0 OK

4 Heating efficiency

Main heating system: Boiler system with radiators or underfloor - Mains gas
Data from database
Vaillant ecoFIT sustain 615 VU 156/6-3 (H-GB)

Efficiency: 89.8% SEDBUK2009

Minimum: 88.0% OK

Secondary heating system: None

5 Cylinder insulation

Hot water storage Nominal cylinder loss: 1.79 kWh/day
Permitted by DBSCG 2.30 OK
Primary pipework insulated: Yes OK

6 Controls

Space heating controls: Time and temperature zone control OK

Hot water controls:

Cylinderstat OK
Independent timer for DHW OK

Boiler interlock

Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:100%
Minimum 75% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (East Pennines): Slight OK

Based on:

Overshading: Average
Windows facing North: 8.32 m², No overhang
Windows facing East: 0.48 m², No overhang
Windows facing South: 6.66 m², No overhang
Windows facing West: 7.97 m², No overhang
Air change rate: 4.00 ach
Blinds/curtains: None

10 Key features

Roof U-value 0.10 W/m²K
Thermal bridging y-value 0.023 W/m²K

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	56.5300 (1b)	x 2.4000 (2b)	= 135.6720 (1b) - (3b)
First floor	56.5300 (1c)	x 2.6200 (2c)	= 148.1086 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	113.0600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 283.7806 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					4 * 10 = 40.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				40.0000 / (5) =	0.1410 (8)
Pressure test					Yes
Measured/design AP50					5.0000
Infiltration rate					0.3910 (18)
Number of sides sheltered					1 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.3616 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4611	0.4520	0.4430	0.3978	0.3888	0.3436	0.3436	0.3345	0.3616	0.3888	0.4068	0.4249 (22b)
Effective ac	0.6063	0.6022	0.5981	0.5791	0.5756	0.5590	0.5590	0.5559	0.5654	0.5756	0.5828	0.5903 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Entrance Door			4.2900	1.4000	6.0060		(26a)
Windows (Uw = 1.40)			19.6300	1.3258	26.0246		(27)
Patio Doors (Uw = 1.40)			3.8000	1.3258	5.0379		(27)
Main Floor			56.5300	0.1400	7.9142	75.0000	4239.7500 (28a)
Main Wall	152.9600	27.7200	125.2400	0.2700	33.8148	60.0000	7514.4000 (29a)
Main Roof	56.5300		56.5300	0.1000	5.6530	9.0000	508.7700 (30)
Total net area of external elements Aum(A, m ²)			266.0200				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		84.4505		(33)
Block Walls			63.2600			75.0000	4744.5000 (32c)
Stud Walls			168.9300			9.0000	1520.3700 (32c)
First Floor			56.5300			18.0000	1017.5400 (32d)
Ground Floor Ceiling			56.5300			18.0000	1017.5400 (32e)

Heat capacity Cm = Sum(A x k)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m²K
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Total fabric heat loss
(28)...(30) + (32) + (32a)...(32e) = 20562.8700 (34)
181.8757 (35)
5.9927 (36)
(33) + (36) = 90.4432 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	56.7784	56.3918	56.0129	54.2333	53.9003	52.3503	52.3503	52.0632	52.9473	53.9003	54.5739	55.2781 (38)
Heat transfer coeff	147.2216	146.8350	146.4561	144.6765	144.3435	142.7935	142.7935	142.5064	143.3905	144.3435	145.0171	145.7213 (39)
Average = Sum(39)m / 12 =												144.6749 (39)
HLP	1.3022	1.2987	1.2954	1.2796	1.2767	1.2630	1.2630	1.2604	1.2683	1.2767	1.2827	1.2889 (40)
HLP (average)												1.2796 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.8320 (42)
Average daily hot water use (litres/day)												101.4600 (43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	111.6060	107.5476	103.4892	99.4308	95.3724	91.3140	91.3140	95.3724	99.4308	103.4892	107.5476	111.6060 (44)
Energy conte	165.5084	144.7547	149.3739	130.2278	124.9567	107.8281	99.9186	114.6580	116.0274	135.2188	147.6019	160.2861 (45)
Energy content (annual)										Total = Sum(45)m =		1596.3605 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Distribution loss (46)m = 0.15 x (45)m	24.8263	21.7132	22.4061	19.5342	18.7435	16.1742	14.9878	17.1987	17.4041	20.2828	22.1403	24.0429 (46)
Water storage loss:												
Store volume												210.0000 (47)
b) If manufacturer declared loss factor is not known :												
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0103 (51)
Volume factor from Table 2a												0.8298 (52)
Temperature factor from Table 2b												0.5400 (53)
Enter (49) or (54) in (55)												0.9682 (55)
Total storage loss	30.0132	27.1087	30.0132	29.0450	30.0132	29.0450	30.0132	30.0132	29.0450	30.0132	29.0450	30.0132 (56)
If cylinder contains dedicated solar storage	30.0132	27.1087	30.0132	29.0450	30.0132	29.0450	30.0132	30.0132	29.0450	30.0132	29.0450	30.0132 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	218.7840	192.8746	202.6495	181.7848	178.2323	159.3852	153.1942	167.9337	167.5845	188.4944	199.1589	213.5617 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Solar input (sum of months) = Sum(63)m =												0.0000 (63)
Output from w/h	218.7840	192.8746	202.6495	181.7848	178.2323	159.3852	153.1942	167.9337	167.5845	188.4944	199.1589	213.5617 (64)
Total per year (kWh/year) = Sum(64)m =												2223.6379 (64)
Heat gains from water heating, kWh/month	97.6520	86.6269	92.2873	84.5464	84.1686	77.0985	75.8434	80.7443	79.8248	87.5807	90.3233	95.9156 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	24.6870	21.9268	17.8321	13.5000	10.0914	8.5196	9.2057	11.9660	16.0607	20.3927	23.8013	25.3732 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	275.8811	278.7439	271.5298	256.1718	236.7851	218.5643	206.3917	203.5289	210.7430	226.1010	245.4877	263.7085 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800 (71)
Water heating gains (Table 5)	131.2527	128.9090	124.0421	117.4255	113.1298	107.0812	101.9401	108.5273	110.8677	117.7160	125.4490	128.9188 (72)
Total internal gains	500.3009	498.0597	481.8840	455.5773	428.4863	402.6451	386.0175	392.5021	406.1514	432.6898	463.2180	486.4805 (73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
North					4.5200	10.6334		0.7600	0.7000	0.7700	17.7196 (74)	
East					0.4800	19.6403		0.7600	0.7000	0.7700	3.4756 (76)	
South					6.6600	46.7521		0.7600	0.7000	0.7700	114.7942 (78)	
West					7.9700	19.6403		0.7600	0.7000	0.7700	57.7099 (80)	
North					3.8000	10.6334		0.7600	0.7000	0.7700	14.8971 (74)	

Solar gains	208.5964	370.0274	542.5160	728.2797	863.5533	877.4443	837.6366	734.2323	606.7689	419.0021	252.5983	176.6997 (83)
Total gains	708.8973	868.0871	1024.4000	1183.8571	1292.0396	1280.0894	1223.6540	1126.7344	1012.9203	851.6918	715.8164	663.1802 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	38.7980	38.9002	39.0008	39.4806	39.5716	40.0012	40.0012	40.0818	39.8346	39.5716	39.3878	39.1975
alpha	3.5865	3.5933	3.6001	3.6320	3.6381	3.6667	3.6667	3.6721	3.6556	3.6381	3.6259	3.6132
util living area	0.9917	0.9825	0.9611	0.9065	0.7991	0.6390	0.4908	0.5456	0.7759	0.9407	0.9848	0.9935 (86)
MIT	19.2047	19.4535	19.8334	20.3038	20.6813	20.9011	20.9714	20.9579	20.7903	20.2801	19.6536	19.1648 (87)
Th 2	19.8391	19.8418	19.8445	19.8568	19.8591	19.8699	19.8699	19.8719	19.8658	19.8591	19.8544	19.8496 (88)
util rest of house	0.9896	0.9781	0.9510	0.8817	0.7467	0.5502	0.3746	0.4269	0.6994	0.9196	0.9801	0.9918 (89)
MIT 2	17.4634	17.8259	18.3741	19.0418	19.5383	19.7970	19.8570	19.8511	19.6873	19.0257	18.1274	17.4118 (90)
Living area fraction									fLA = Living area / (4) =			0.1799 (91)
MIT	17.7767	18.1187	18.6366	19.2689	19.7439	19.9956	20.0575	20.0502	19.8857	19.2514	18.4020	17.7272 (92)
Temperature adjustment												0.0000
adjusted MIT	17.7767	18.1187	18.6366	19.2689	19.7439	19.9956	20.0575	20.0502	19.8857	19.2514	18.4020	17.7272 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	697.4316	840.7785	959.5746	1025.2775	956.9757	717.8682	482.9938	503.3311	710.0443	770.6562	695.3738	654.5306 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1984.0592	1940.9684	1777.4852	1500.1321	1161.0896	770.4631	493.7102	520.1762	829.6167	1248.7722	1638.9812	1971.1950 (97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating kWh												

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

957.2509	739.3276	608.5255	341.8953	151.8608	0.0000	0.0000	0.0000	0.0000	355.7183	679.3974	979.5984 (98)
Space heating											4813.5742 (98)
Space heating per m2											(98) / (4) = 42.5754 (99)

8c. Space cooling requirement

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	90.8000 (206)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)
Space heating requirement	5301.2931 (211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	957.2509	739.3276	608.5255	341.8953	151.8608	0.0000	0.0000	0.0000	0.0000	355.7183	679.3974	979.5984 (98)
Space heating efficiency (main heating system 1)	90.8000	90.8000	90.8000	90.8000	90.8000	0.0000	0.0000	0.0000	0.0000	90.8000	90.8000	90.8000 (210)
Space heating fuel (main heating system)	1054.2411	814.2375	670.1823	376.5367	167.2475	0.0000	0.0000	0.0000	0.0000	391.7602	748.2350	1078.8528 (211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	218.7840	192.8746	202.6495	181.7848	178.2323	159.3852	153.1942	167.9337	167.5845	188.4944	199.1589	213.5617 (64)
Efficiency of water heater (217)m	88.5982	88.3579	87.8677	86.7761	84.6914	80.1000	80.1000	80.1000	80.1000	86.7846	88.1312	80.1000 (216)
Fuel for water heating, kWh/month	246.9395	218.2879	230.6303	209.4871	210.4491	198.9827	191.2537	209.6550	209.2191	217.1979	225.9800	88.6797 (217)
Water heating fuel used												240.8237 (219)
Annual totals kWh/year												2608.9060 (219)
Space heating fuel - main system												5301.2931 (211)
Space heating fuel - secondary												0.0000 (215)
Electricity for pumps and fans:												
central heating pump												30.0000 (230c)
main heating flue fan												45.0000 (230e)
Total electricity for the above, kWh/year												75.0000 (231)
Electricity for lighting (calculated in Appendix L)												435.9807 (232)
Total delivered energy for all uses												8421.1798 (238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	5301.2931	0.2160	1145.0793 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2608.9060	0.2160	563.5237 (264)
Space and water heating			1708.6030 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	435.9807	0.5190	226.2740 (268)
Total CO2, kg/year			1973.8020 (272)
Dwelling Carbon Dioxide Emission Rate (DER)			17.4600 (273)

16 CO2 EMISSIONS ASSOCIATED WITH APPLIANCES AND COOKING AND SITE-WIDE ELECTRICITY GENERATION TECHNOLOGIES

DER		17.4600 ZC1
Total Floor Area	TFA	113.0600
Assumed number of occupants	N	2.8320
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190
CO2 emissions from appliances, equation (L14)		14.4597 ZC2
CO2 emissions from cooking, equation (L16)		1.6537 ZC3
Total CO2 emissions		33.5734 ZC4
Residual CO2 emissions offset from biofuel CHP		0.0000 ZC5
Additional allowable electricity generation, kWh/m²/year		0.0000 ZC6
Resulting CO2 emissions offset from additional allowable electricity generation		0.0000 ZC7
Net CO2 emissions		33.5734 ZC8

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF TARGET EMISSIONS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	56.5300 (1b)	x 2.4000 (2b)	= 135.6720 (1b) - (3b)
First floor	56.5300 (1c)	x 2.6200 (2c)	= 148.1086 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	113.0600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 283.7806 (5)

2. Ventilation rate

										main	secondary	other	total	m3 per hour			
										heating	heating						
Number of chimneys										0	+	0	+	0	=	0 * 40 =	0.0000 (6a)
Number of open flues										0	+	0	+	0	=	0 * 20 =	0.0000 (6b)
Number of intermittent fans																4 * 10 =	40.0000 (7a)
Number of passive vents																0 * 10 =	0.0000 (7b)
Number of flueless gas fires																0 * 40 =	0.0000 (7c)
										Air changes per hour							
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =										40.0000 / (5) =							0.1410 (8)
Pressure test										Yes							
Measured/design AP50																	5.0000
Infiltration rate																	0.3910 (18)
Number of sides sheltered																	1 (19)
Shelter factor										(20) = 1 - [0.075 x (19)] =							0.9250 (20)
Infiltration rate adjusted to include shelter factor										(21) = (18) x (20) =							0.3616 (21)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)				
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)				
	0.4611	0.4520	0.4430	0.3978	0.3888	0.3436	0.3436	0.3345	0.3616	0.3888	0.4068	0.4249	(22b)				
Effective ac	0.6063	0.6022	0.5981	0.5791	0.5756	0.5590	0.5590	0.5559	0.5654	0.5756	0.5828	0.5903	(25)				

3. Heat losses and heat loss parameter

Element	Gross m2		Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K				
TER Semi-glazed door				4.2900	1.2000	5.1480			(26a)			
TER Opening Type (Uw = 1.40)				23.4300	1.3258	31.0625			(27)			
Main Floor				56.5300	0.1300	7.3489			(28a)			
Main Wall	152.9600		27.7200	125.2400	0.1800	22.5432			(29a)			
Main Roof	56.5300			56.5300	0.1300	7.3489			(30)			
Total net area of external elements Aum(A, m2)				266.0200					(31)			
Fabric heat loss, W/K = Sum (A x U)				(26) ... (30) + (32) =		73.4515			(33)			
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K									250.0000 (35)			
Thermal bridges (Sum(L x Psi) calculated using Appendix K)									12.5976 (36)			
Total fabric heat loss							(33) + (36) =		86.0491 (37)			
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan 56.7784	Feb 56.3918	Mar 56.0129	Apr 54.2333	May 53.9003	Jun 52.3503	Jul 52.3503	Aug 52.0632	Sep 52.9473	Oct 53.9003	Nov 54.5739	Dec 55.2781 (38)
Heat transfer coeff	142.8275	142.4409	142.0620	140.2824	139.9494	138.3994	138.3994	138.1123	138.9964	139.9494	140.6230	141.3272 (39)
Average = Sum(39)m / 12 =												140.2808 (39)
HLP	Jan 1.2633	Feb 1.2599	Mar 1.2565	Apr 1.2408	May 1.2378	Jun 1.2241	Jul 1.2241	Aug 1.2216	Sep 1.2294	Oct 1.2378	Nov 1.2438	Dec 1.2500 (40)
HLP (average)												1.2408 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.8320 (42)
Average daily hot water use (litres/day)												101.4600 (43)
Daily hot water use	Jan 111.6060	Feb 107.5476	Mar 103.4892	Apr 99.4308	May 95.3724	Jun 91.3140	Jul 91.3140	Aug 95.3724	Sep 99.4308	Oct 103.4892	Nov 107.5476	Dec 111.6060 (44)
Energy conte	165.5084	144.7547	149.3739	130.2278	124.9567	107.8281	99.9186	114.6580	116.0274	135.2188	147.6019	160.2861 (45)
Energy content (annual)												Total = Sum(45)m = 1596.3605 (45)
Distribution loss (46)m = 0.15 x (45)m												
	24.8263	21.7132	22.4061	19.5342	18.7435	16.1742	14.9878	17.1987	17.4041	20.2828	22.1403	24.0429 (46)
Water storage loss:												
Store volume												210.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7016 (48)
Temperature factor from Table 2b												0.5400 (49)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Enter (49) or (54) in (55)												0.9188 (55)
Total storage loss	28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842 (56)
If cylinder contains dedicated solar storage	28.4842	25.7277	28.4842	27.5653	28.4842	27.5653	28.4842	28.4842	27.5653	28.4842	27.5653	28.4842 (57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	217.2550	191.4936	201.1205	180.3051	176.7033	157.9055	151.6652	166.4046	166.1048	186.9654	197.6792	212.0327 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Output from w/h	217.2550	191.4936	201.1205	180.3051	176.7033	157.9055	151.6652	166.4046	166.1048	186.9654	197.6792	212.0327 (64)
Heat gains from water heating, kWh/month	96.4288	85.5220	91.0641	83.3626	82.9454	75.9147	74.6202	79.5211	78.6410	86.3575	89.1395	94.6924 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	141.5999	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	24.6870	21.9268	17.8321	13.5000	10.0914	8.5196	9.2057	11.9660	16.0607	20.3927	23.8013	25.3732	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	275.8811	278.7439	271.5298	256.1718	236.7851	218.5643	206.3917	203.5289	210.7430	226.1010	245.4877	263.7085	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	37.1600	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	-113.2800	(71)
Water heating gains (Table 5)	129.6086	127.2649	122.3980	115.7814	111.4857	105.4371	100.2960	106.8832	109.2236	116.0719	123.8049	127.2747	(72)
Total internal gains	498.6568	496.4156	480.2398	453.9332	426.8422	401.0010	384.3734	390.8580	404.5073	431.0457	461.5739	484.8364	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W			
North				8.3200	10.6334	0.6300	0.7000	0.7700	27.0375 (74)			
East				0.4800	19.6403	0.6300	0.7000	0.7700	2.8811 (76)			
South				6.6600	46.7521	0.6300	0.7000	0.7700	95.1583 (78)			
West				7.9700	19.6403	0.6300	0.7000	0.7700	47.8385 (80)			
Solar gains	172.9155	306.7332	449.7172	603.7056	715.8402	727.3551	694.3566	608.6399	502.9795	347.3307	209.3907	146.4747 (83)
Total gains	671.5723	803.1489	929.9571	1057.6388	1142.6824	1128.3561	1078.7300	999.4979	907.4868	778.3763	670.9647	631.3111 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)	
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	54.9711	55.1203	55.2673	55.9685	56.1016	56.7299	56.7299	56.8478	56.4863	56.1016	55.8329	55.5547	
alpha	4.6647	4.6747	4.6845	4.7312	4.7401	4.7820	4.7820	4.7899	4.7658	4.7401	4.7222	4.7036	
util living area	0.9981	0.9952	0.9866	0.9569	0.8749	0.7146	0.5479	0.6071	0.8486	0.9754	0.9958	0.9986	(86)
MIT	19.6042	19.7833	20.0691	20.4400	20.7532	20.9349	20.9853	20.9766	20.8453	20.4307	19.9493	19.5773	(87)
Th 2	19.8697	19.8724	19.8751	19.8875	19.8899	19.9007	19.9007	19.9028	19.8965	19.8899	19.8851	19.8802	(88)
util rest of house	0.9974	0.9935	0.9817	0.9403	0.8270	0.6185	0.4194	0.4762	0.7740	0.9628	0.9940	0.9981	(89)
MIT 2	18.0173	18.2803	18.6969	19.2330	19.6490	19.8579	19.8955	19.8934	19.7727	19.2304	18.5323	17.9852	(90)
Living area fraction	18.3028	18.5507	18.9438	19.4501	19.8477	20.0516	20.0916	20.0882	fLA = Living area / (4) = 19.9657	19.4463	18.7872	18.2716	(91)
MIT	18.3028	18.5507	18.9438	19.4501	19.8477	20.0516	20.0916	20.0882	19.9657	19.4463	18.7872	18.2716	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3028	18.5507	18.9438	19.4501	19.8477	20.0516	20.0916	20.0882	19.9657	19.4463	18.7872	18.2716	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	668.8211	795.5416	907.6322	985.5634	942.6105	714.0746	477.4446	499.2927	707.4254	743.9478	665.1548	629.3565	(94)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1999.9835	1944.4209	1767.7897	1479.9967	1140.2612	754.5032	483.2332	509.3918	815.3049	1238.0388	1643.4905	1988.7002	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	990.3849	772.0469	639.9572	355.9920	147.0521	0.0000	0.0000	0.0000	0.0000	367.6038	704.4017	1011.3517	(98)
Space heating												4988.7902	(98)
Space heating per m ²												44.1252	(99)

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													93.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													5335.6045 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	990.3849	772.0469	639.9572	355.9920	147.0521	0.0000	0.0000	0.0000	0.0000	367.6038	704.4017	1011.3517	(98)
Space heating efficiency (main heating system 1)	93.5000	93.5000	93.5000	93.5000	93.5000	0.0000	0.0000	0.0000	0.0000	93.5000	93.5000	93.5000	(210)
Space heating fuel (main heating system)	1059.2351	825.7186	684.4462	380.7401	157.2750	0.0000	0.0000	0.0000	0.0000	393.1591	753.3709	1081.6596	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	217.2550	191.4936	201.1205	180.3051	176.7033	157.9055	151.6652	166.4046	166.1048	186.9654	197.6792	212.0327	(64)
Efficiency of water heater (217)m	88.3684	88.1510	87.6885	86.5962	84.3286	79.8000	79.8000	79.8000	79.8000	86.5859	87.9167	88.4446	(216)
Fuel for water heating, kWh/month	245.8515	217.2337	229.3580	208.2136	209.5413	197.8765	190.0566	208.5271	208.1513	215.9305	224.8482	239.7350	(219)
Water heating fuel used												2595.3235	(219)
Annual totals kWh/year													
Space heating fuel - main system												5335.6045	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
central heating pump												30.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												75.0000	(231)
Electricity for lighting (calculated in Appendix L)												435.9807	(232)
Total delivered energy for all uses												8441.9086	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	5335.6045	0.2160	1152.4906 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2595.3235	0.2160	560.5899 (264)
Space and water heating			1713.0804 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	435.9807	0.5190	226.2740 (268)
Total CO2, kg/m2/year			1978.2794 (272)
Emissions per m2 for space and water heating			15.1520 (272a)
Fuel factor (mains gas)			1.0000
Emissions per m2 for lighting			2.0014 (272b)
Emissions per m2 for pumps and fans			0.3443 (272c)
Target Carbon Dioxide Emission Rate (TER) = (15.1520 * 1.00) + 2.0014 + 0.3443, rounded to 2 d.p.			17.5000 (273)

U-VALUE CALCULATOR REPORT

Property Reference	000649	Issued on Date	27/03/2022
Assessment Reference	Plot 59 As Design	Prop Type Ref	Plot 59 - Doveridge
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	DER	17.46	TER	17.50
Environmental	85 B	% DER<TER	0.21		
CO ₂ Emissions (t/year)	1.76	DFEE	50.31	TFEE	58.59
General Requirements Compliance	Pass	% DFEE<TFEE	14.14		

Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com	Assessor ID	H883-0001
Client	Redmile Homes, Redmile Homes		

Building Elements

Roof 000004 - 300mm Mineral Wool

Roof Type: Pitched Roof, insulated flat ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Mineral wool				
	Main construction	300	0.0400	7.5000	100.00
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 2	Mineral wool				
	Main construction	100	0.0400	2.5000	88.89
	Main construction	100	0.1300	0.7692	11.11
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 3	Plasterboard, standard				
	Main construction	12.5	0.2100	0.0595	100.00
Layer 4	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1000	

Total resistance: Upper limit = 9.981 m² K/W Lower limit = 9.707 m² K/W Average = 9.844 m² K/W
Total correction = 0.0000 m² K/W U-value (unrounded) = 0.1 W/m² K

Unheated space: None

Total thickness: 416 mm

U-value: 0.10 W/m² K

Kappa: n/a

U-VALUE CALCULATOR REPORT

Property Reference	000649	Issued on Date	27/03/2022
Assessment Reference	Plot 59 As Design	Prop Type Ref	Plot 59 - Doveridge
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	DER	17.46	TER	17.50
Environmental	85 B	% DER<TER	0.21		
CO ₂ Emissions (t/year)	1.76	DFEE	50.31	TFEE	58.59
General Requirements Compliance	Pass	% DFEE<TFEE	14.14		

Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com	Assessor ID	H883-0001
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Client	Redmile Homes, Redmile Homes
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Building Elements

Wall 000001 - Newlay with Supafil 34

Wall Type: Standard Wall

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	Brick, outer leaf				
	Main construction	102.5	0.7700	0.1331	82.81
	Main construction	102.5	0.9407	0.1090	17.19
Layer 2	Supafil 34				
	Main construction	100	0.0340	2.9412	100.00
	Corrections - Air Gap: Level 0, Fasteners: None or plastic				
Layer 3	Newlay, Newlite				
	Main construction	100	0.4300	0.2326	100.00
Layer 4	airspace/plaster dabs				
	Main construction	15	0.0882	0.1700	80.00
	Main construction	15	0.0882	0.1700	20.00
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 5	Plaster, standard				
	Main construction	12.5	0.4000	0.0313	100.00
Layer 6	Plaster, standard				
	Main construction	3	0.4000	0.0075	100.00
Int surface				0.1300	

Total resistance:	Upper limit = 3.681 m ² K/W	Lower limit = 3.681 m ² K/W	Average = 3.681 m ² K/W
	Total correction = 0.0000 m ² K/W	U-value (unrounded) = 0.27 W/m ² K	

Unheated space: None

Total thickness: 333 mm

U-value: 0.27 W/m² K

Kappa: n/a

U-VALUE CALCULATOR REPORT

Property Reference	000649	Issued on Date	27/03/2022
Assessment Reference	Plot 59 As Design	Prop Type Ref	Plot 59 - Doveridge
Project	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	DER	17.46	TER	17.50
Environmental	85 B	% DER<TER	0.21		
CO ₂ Emissions (t/year)	1.76	DFEE	50.31	TFEE	58.59
General Requirements Compliance	Pass	% DFEE<TFEE	14.14		

Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com	Assessor ID	H883-0001
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Client	Redmile Homes, Redmile Homes
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Building Elements

Floor 000005 - Floor - suspended beam-and-block floor

Floor Type: Suspended Floor

Area = 56.53 m², Perimeter = 30.47 m, Wall thickness = 300.00 mm, Soil: Clay

Depth of underfloor space below ground: 0.200 m Floor wind shielding: Average (suburban)

Floor height above ground: h = 0.000 m

U-value of walls above ground: U_w = 1.500 m

Ventilation openings per perimeter length: e = 0.0015 %

Mean wind speed: v = 5.000 m/s

Resistance on solum: R_g = 0.000 m²K/W

Layer	Description	Thickness (mm)	Conductivity (W/m ² K)	Resistance (m ² K/W)	Fraction (%)
Ext surface				0.1700	
Layer 1	AAC (600 kg/m ³)/ concrete				
	Main construction	100	0.1800	0.5556	86.30
	Main construction	100	1.3500	0.0741	13.70
Layer 2	Kooltherm K3 Floorboard (45mm +)				
	Main construction	100	0.0200	5.0000	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	Screed				
	Main construction	65	1.1500	0.0565	100.00
Int surface				0.1700	

Total resistance: Upper limit = 5.881 m² K/W Lower limit = 5.690 m² K/W Average = 5.786 m² K/W

Total correction = 0.0075 m² K/W

U-value (unrounded) = 0.14 W/m² K

Unheated space: None

Total thickness: 265 mm

U-value: 0.14 W/m² K

Kappa: n/a

ASSESSMENT NOTES

Calculation Type: New Build (As Designed)

Property Reference	000649	Issued on Date	27/03/2022
Assessment Reference	Plot 59 As Design	Prop Type Ref	Plot 59 - Doveridge
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		

SAP Rating	84 B	DER	17.46	TER	17.50
Environmental	85 B	% DER<TER	0.21		
CO ₂ Emissions (t/year)	1.76	DFEE	50.31	TFEE	58.59
General Requirements Compliance	Pass	% DFEE<TFEE	14.14		

Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com	Assessor ID	H883-0001
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Client	Redmile Homes, Redmile Homes
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ASSESSMENT NOTES - Last time updated on: 27.03.2022

SUMMARY:-

- Walls to be Brick outer 100mm Knauf Crown Supafil 34 Insulation with 100mm Newlay Block or similar
- Min. 100mm Kingspan insulation above beam and block floors with 65mm Screed floor finish.
- Roof to be insulated with min 400mm Mineral Wool Insulation.
- Doors, Windows and Patio Doors to achieve min 1.4W/m2K or better
- 100% Low E-Lighting
- Air Test of 5.0 or lower.
- Assumed Boiler to be a Vaillant ecoFIT sustain 615 Condensing Gas Boiler with full Zone Controls or similar, Delay Start and Boiler Interlock, 210Lt unvented foam insulated cylinder.
- CBA Accredited Thermal Bridging details to be used.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	000649	Issued on Date	27/03/2022
Assessment Reference	Plot 59 As Design	Prop Type Ref	Plot 59 - Doveridge
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	84 B	DER	17.46
Environmental	85 B	TER	17.50
CO ₂ Emissions (t/year)	1.76	% DER<TER	0.21
General Requirements Compliance	Pass	DFEE	50.31
		TFEE	58.59
		% DFEE<TFEE	14.14
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com		Assessor ID
			H883-0001
Client	Redmile Homes, Redmile Homes		

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	17.50	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.46	kgCO ₂ /m ²	Pass
	-0.04 (-0.2%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	58.59	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	50.31	kWh/m ² /yr	
	-8.3 (-14.2%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.27 (max. 0.30)	0.27 (max. 0.70)	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoFIT sustain 615 VU 156/6-3 (H-GB) Efficiency: 89.8% SEDBUK2009 Minimum: 88.0%	Pass
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Secondary heating system

None

5 Cylinder insulation

Hot water storage

Nominal cylinder loss: 1.79 kWh/day
Permitted by DBSCG 2.30

Pass

Primary pipework insulated

Yes

Pass

6 Controls

Space heating controls

Time and temperature zone control

Pass

Hot water controls

Cylinderstat

Pass

Independent timer for DHW

Pass

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100

%

Minimum

75

%

Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (East Pennines)

Slight

Pass

Based on:

Overshading

Average

Windows facing North

8.32 m², No overhang

Windows facing East

0.48 m², No overhang

Windows facing South

6.66 m², No overhang

Windows facing West

7.97 m², No overhang

Air change rate

4.00 ach

Blinds/curtains

None

Criterion 4 – Building performance consistent with DER and DFEE rate

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

Pass

10 Key features

Roof U-value

0.10

W/m²K

Thermal bridging y-value

0.023

W/m²K

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	000649	Issued on Date	27/03/2022
Assessment Reference	Plot 59 As Design	Prop Type Ref	Plot 59 - Doveridge
Property	Goldthorpe Road, Goldthorpe, Barnsley, S63 9		
SAP Rating	84 B	DER	17.46
Environmental	85 B	TER	17.50
CO ₂ Emissions (t/year)	1.76	% DER<TER	0.21
General Requirements Compliance	Pass	DFEE	50.31
		TFEE	58.59
		% DFEE<TFEE	14.14
Assessor Details	Mr. Peter Edwards, ESAP Energy Consultants Arch Des & Surv, Tel: 01455883250, esapenquiry@gmail.com		Assessor ID
			H883-0001
Client	Redmile Homes, Redmile Homes		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	West						
Property Tenure	Owner-occupied						
Transaction Type	New dwelling						
Terrain Type	Suburban						
1.0 Property Type	House, Detached						
2.0 Number of Storeys	2						
3.0 Date Built	2020						
4.0 Sheltered Sides	1						
5.0 Sunlight/Shade	Average or unknown						
6.0 Measurements							
			Heat Loss Perimeter	Internal Floor Area	Average Storey Height		
		Ground Floor:	30.47 m	56.53 m ²	2.40 m		
		1st Storey:	30.47 m	56.53 m ²	2.62 m		
7.0 Living Area	20.34			m ²			
8.0 Thermal Mass Parameter	Precise calculation						
Thermal Mass	181.88			kJ/m ² K			
9.0 External Walls							
Description	Type	Construction		U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Main Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure		0.27	60.00	152.96	125.24
9.2 Internal Walls							
Description	Construction					Kappa (kJ/m ² K)	Area (m ²)
Block Walls	Dense block, plasterboard on dabs					75.00	63.26
Stud Walls	Plasterboard on timber frame					9.00	168.93
10.0 External Roofs							
Description	Type	Construction		U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Main Roof	External Plane Roof	Plasterboard, insulated at ceiling level		0.10	9.00	56.53	56.53
10.2 Internal Ceilings							
Description	Construction					Kappa (kJ/m ² K)	Area (m ²)
Ground Floor Ceiling	Plasterboard ceiling, carpeted chipboard floor					9.00	56.53

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Main Floor	Ground Floor - Solid	Suspended concrete floor, carpeted	0.14	75.00	56.53

11.2 Internal Floors

Description	Construction	Kappa (kJ/m²K)	Area (m²)
First Floor	Plasterboard ceiling, carpeted chipboard floor	18.00	56.53

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Entrance Door	Manufacture	Half Glazed Door	Double glazed			0.76		0.70	1.40
Windows	Manufacture	Window	Double glazed			0.76		0.70	1.40
Patio Doors	Manufacture	Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Front Elevation	Half Glazed Door	[1] Main Wall	West							2.15	
Front Elevation	Window	[1] Main Wall	West	None	0.00					7.97	
Side Elevation	Window	[1] Main Wall	South	None	0.00					6.66	
Side Elevation	Window	[1] Main Wall	North	None	0.00					4.52	
Rear Elevation	Half Glazed Door	[1] Main Wall	East							2.14	
Rear Elevation	Window	[1] Main Wall	East	None	0.00					0.48	
Side Elevation	Window	[1] Main Wall	North	None	0.00					3.80	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	20.74	0.030	No
Independently assessed	E3 Sill	18.70	0.015	No
Independently assessed	E4 Jamb	42.30	0.010	No
Independently assessed	E5 Ground floor (normal)	30.47	0.056	No
Independently assessed	E6 Intermediate floor within a dwelling	30.47	0.001	No
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	13.93	0.060	No
Independently assessed	E12 Gable (insulation at ceiling level)	16.54	0.055	No
Independently assessed	E16 Corner (normal)	20.08	0.059	No

Y-value 0.023 W/m²K

18.0 Pressure Testing

Designed AP ₅₀	Yes	
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Windows half open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	4.00

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Mechanical Ventilation

Mechanical Ventilation System Present

No

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings	14	
Total number of L.E.L. fittings	14	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

0 Main Heating 1	Database	
Description	Condesning Boiler	
Percentage of Heat	100	%
Database Ref. No.	18403	
Fuel Type	Mains gas	
Main Heating	BGB	
SAP Code	102	
In Winter	90.8	
In Summer	80.1	
Controls	CBI Time and temperature zone control	
PCDF Controls	0	
Delayed Start Stat	No	
Sap Code	2110	
Flue Type	Balanced	
Fan Assisted Flue	Yes	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	Normal (> 45°C)	

25.0 Main Heating 2

None

Community Heating

None

28.0 Water Heating

Water Heating	HWP From main heating 1
Flue Gas Heat Recovery System	Main Heating 1
Waste Water Heat Recovery	No
Instantaneous System 1	No

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	901

29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	100 mm
Cylinder Volume	210.00 L
Pipes insulation	Fully insulated primary pipework

31.0 Thermal Store	None
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Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£37	B 85	
	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar photovoltaic panels, 2.5 kWp	£3,500 - £5,500	£318	A 94	

DWELLING SIGN OFF REPORT

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode	S63 9	
Street	Goldthorpe Road	
Locality	Goldthorpe	
Town	Barnsley	
County		

Dwelling Orientation West (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type House, Detached

Comments

Overshading (called Sunlight/shade in assessment) Average or unknown

Comments

Section 2: Dwelling Construction Details

Thermal Mass Parameter Precise calculation

Thermal Mass 181.88 kJ/m²K

Comments

External Walls

Type Cavity Wall

Construction Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure

U-value 0.27 W/m²K

Gross Area 152.96 m²

Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m ² K/W)	Bridging
Brick, outer leaf	102.5	0.7700	0.1331	82.81 Mortar
Supafil 34	100	0.0340	2.9412	100.00
Newlay, Newlite	100	0.4300	0.2326	100.00
airspace/plaster dabs	15	0.0882	0.1700	80.00 Mortar
Plaster, standard	12.5	0.4000	0.0313	100.00
Plaster, standard	3	0.4000	0.0075	100.00

Comments

External Roofs

Type External Plane Roof

Construction Plasterboard, insulated at ceiling level

DWELLING SIGN OFF REPORT

U-value W/m²K

Gross Area m²

Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m²K/W)	Bridging
Mineral wool	300	0.0400	7.5000	100.00
Mineral wool	100	0.0400	2.5000	88.89 Timber
Plasterboard, standard	12.5	0.2100	0.0595	100.00
Plaster, standard	3	0.4000	0.0075	100.00

Comments

Heat Loss Floors

Type

Construction

U-value W/m²K

Area m²

Layer Name	Thickness (mm)	Conductivity (W/m.K)	Resistance (m²K/W)	Bridging
AAC (600 kg/m³)/ concrete	100	0.1800	0.5556	86.30 Mortar
Kooltherm K3 Floorboard (45mm +)	100	0.0200	5.0000	100.00
Screed	65	1.1500	0.0565	100.00

Comments

Opening Types

Description	Type	Glazing	Frame Type	U Value (W/m²K)
Entrance Door	Half Glazed Door	Double glazed		1.40
Windows	Window	Double glazed		1.40
Patio Doors	Window	Double glazed		1.40

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
Front Elevation	Half Glazed Door	[1] Main Wall	West	2.15
Front Elevation	Window	[1] Main Wall	West	7.97
Side Elevation	Window	[1] Main Wall	South	6.66
Side Elevation	Window	[1] Main Wall	North	4.52
Rear Elevation	Half Glazed Door	[1] Main Wall	East	2.14
Rear Elevation	Window	[1] Main Wall	East	0.48
Side Elevation	Window	[1] Main Wall	North	3.80

Comments

DWELLING SIGN OFF REPORT

Thermal Bridging

Calculate Bridges

List of Bridges

Bridge Type	Source Type	Length (m)	Psi (W/mK)	Reference
E1 Steel lintel with perforated steel base plate	Independently assessed	20.74	0.030	
E3 Sill	Independently assessed	18.70	0.015	
E4 Jamb	Independently assessed	42.30	0.010	
E5 Ground floor (normal)	Independently assessed	30.47	0.056	
E6 Intermediate floor within a dwelling	Independently assessed	30.47	0.001	
E10 Eaves (insulation at ceiling level)	Table K1 - Approved	13.93	0.060	
E12 Gable (insulation at ceiling level)	Independently assessed	16.54	0.055	
E16 Corner (normal)	Independently assessed	20.08	0.059	

Y-value W/m²K

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing

Yes

As Built AP₅₀ m³/(h.m²) @ 50 Pa

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

Comments

Internal Lighting

Total number of light fittings	14	
Total number of L.E.L. fittings	14	
Percentage of L.E.L. fittings	100.00	%

Comments

External Lighting

External lights fitted

DWELLING SIGN OFF REPORT

Light and motion sensor
Comments

Electricity Tariff
Comments

Main Heating 1
Fuel Type
Main Heating
Efficiency (Split Efficiencies) %
Brand, Model
Flue Type
Fan Assisted Flue
Heat Emitter
Flow Temperature
Comments

Heating Controls

Description
Boiler Interlock
Delayed Start Stat
Compensator
Comments

Main Heating 2
Comments

Water Heating System
Water Heating
Supplementary Immersion
Comments

Hot Water Cylinder
Independent Time Control

DWELLING SIGN OFF REPORT

Cylinder Stat	Yes	
Insulation Type	Foam	
Insulation Thickness	100 mm	
Cylinder Volume	210.00	L
Measured Loss		kWh/day
Pipes insulation	Fully insulated primary pipework	
Comments		

Section 4: Dwelling Renewable Energy

Section 5: Declaration

I confirm that all details provided above are accurate to the best of my knowledge.

Signed

Date