

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

Property Reference	3573-3	Issued on Date	18/03/2021
Assessment Reference	3473-3	Prop Type Ref	
Property	FLAT 3, 379 OXFORD ROAD, READING, READING, RG30 1HA		
SAP Rating	88 B	DER	N/A
Environmental	90 B	% DER<TER	N/A
CO ₂ Emissions (t/year)	0.65	DFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A
Assessor Details	Mr. Ian Lloyd, Property and Energy Services Limited, Tel: 01367240212, ianl@propertyandenergy.co.uk		Assessor ID
			H044-0001
Client	Keen Partnership, Keen		

CALCULATION OF HEAT DEMAND 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Built) (Version 9.92, January 2014)
CALCULATION OF HEAT DEMAND 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	61.3900 (1b)	x 2.4000 (2b)	= 147.3360 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.3900		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 147.3360 (5)

2. Ventilation rate

												m3 per hour		
					main heating	+	secondary heating	+	other	=	total			
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											1 * 10 =	10.0000 (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) =											10.0000 / (5) =	0.0679 (8)		
Pressure test												No		
Measured/design AP50												15.0000		
Infiltration rate												0.8179 (18)		
Number of sides sheltered												3 (19)		
Shelter factor												(20) = 1 - [0.075 x (19)] =	0.7750 (20)	
Infiltration rate adjusted to include shelter factor												(21) = (18) x (20) =	0.6339 (21)	
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Wind factor	4.4000	4.1000	4.1000	3.9000	3.9000	3.4000	3.4000	3.3000	3.4000	3.8000	3.7000	4.0000	(22)	
Adj infilt rate	1.1000	1.0250	1.0250	0.9750	0.9750	0.8500	0.8500	0.8250	0.8500	0.9500	0.9250	1.0000	(22a)	
	0.6972	0.6497	0.6497	0.6180	0.6180	0.5388	0.5388	0.5229	0.5388	0.6022	0.5863	0.6339	(22b)	
Effective ac	0.7431	0.7111	0.7111	0.6910	0.6910	0.6451	0.6451	0.6367	0.6451	0.6813	0.6719	0.7009	(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						
W-1.6 (Uw = 1.60)			4.5100	1.5038	6.7820			(27)					
Original wall	30.6000	2.6200	27.9800	0.3000	8.3940			(29a)					
New wall	30.0700	1.8900	28.1800	0.2200	6.1996			(29a)					
Ceiling	61.3900		61.3900	0.1600	9.8224			(30)					
Total net area of external elements Aum(A, m2)			122.0600					(31)					
Fabric heat loss, W/K = Sum (A x U)			(26) ... (30) + (32) =		31.1980			(33)					
Party Wall old			30.9800	0.0000	0.0000			(32)					
Party Floor			50.3000					(32d)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K								250.0000 (35)					
Thermal bridges (Default value 0.150 * total exposed area)								18.3090 (36)					
Total fabric heat loss						(33) + (36) =		49.5070 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 36.1287	Feb 34.5720	Mar 34.5720	Apr 33.5953	May 33.5953	Jun 31.3672	Jul 31.3672	Aug 30.9582	Sep 31.3672	Oct 33.1253	Nov 32.6674	Dec 34.0776	(38)
Heat transfer coeff	85.6356	84.0790	84.0790	83.1023	83.1023	80.8741	80.8741	80.4651	80.8741	82.6322	82.1744	83.5845	(39)
Average = Sum(39)m / 12 =												82.6231	(39)

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF HEAT DEMAND 09 Jan 2014

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.3949	1.3696	1.3696	1.3537	1.3537	1.3174	1.3174	1.3107	1.3174	1.3460	1.3386	1.3615	(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													2.0207 (42)
Average daily hot water use (litres/day)													82.1904 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	90.4095	87.1219	83.8343	80.5466	77.2590	73.9714	73.9714	77.2590	80.5466	83.8343	87.1219	90.4095	(44)
Energy content (annual)	134.0747	117.2625	121.0044	105.4946	101.2246	87.3491	80.9418	92.8819	93.9912	109.5377	119.5690	129.8441	(45)
Distribution loss (46)m = 0.15 x (45)m	20.1112	17.5894	18.1507	15.8242	15.1837	13.1024	12.1413	13.9323	14.0987	16.4307	17.9353	19.4766	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Total heat required for water heating calculated for each month	43.3165	39.1062	43.2670	41.8383	43.2089	41.7874	43.1631	43.1928	41.8152	43.2430	41.8863	43.3069	(61)
Solar input	177.3911	156.3688	164.2715	147.3329	144.4335	129.1366	124.1049	136.0747	135.8064	152.7807	161.4553	173.1511	(62)
Solar input (sum of months) = Sum (63)m =	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	177.3911	156.3688	164.2715	147.3329	144.4335	129.1366	124.1049	136.0747	135.8064	152.7807	161.4553	173.1511	(64)
Total per year (kWh/year) = Sum (64)m =													1802.3075 (64)
RHI water heating demand													1802 (64)
Heat gains from water heating, kWh/month	55.4089	48.7664	51.0507	45.5365	44.4594	39.4904	37.7039	41.6814	41.7059	47.2320	50.2283	53.9999	(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	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	48.2058	42.8160	34.8203	26.3612	19.7053	16.6360	17.9758	23.3657	31.3613	39.8204	46.4763	49.5456	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	263.3410	266.0736	259.1874	244.5275	226.0220	208.6294	197.0101	194.2775	201.1637	215.8236	234.3291	251.7217	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	(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)	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	(71)
Water heating gains (Table 5)	74.4744	72.5690	68.6166	63.2452	59.7573	54.8478	50.6773	56.0234	57.9248	63.4839	69.7615	72.5805	(72)
Total internal gains	478.5787	474.0161	455.1818	426.6914	398.0421	372.6709	358.2208	366.2241	383.0074	411.6855	443.1244	466.4053	(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
East					0.5100	23.7835	0.6300	0.7000			0.7700			3.7070 (76)
South					3.4900	54.0600	0.6300	0.7000			0.7700			57.6598 (78)
West					0.5100	23.7835	0.6300	0.7000			0.7700			3.7070 (80)
Solar gains	65.0737	94.9456	124.5724	150.2963	158.9838	164.7764	158.1820	151.4862	141.4166	111.2770	76.3721	56.2926	(83)	
Total gains	543.6524	568.9617	579.7543	576.9878	557.0260	537.4472	516.4029	517.7103	524.4240	522.9625	519.4965	522.6979	(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)													
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
alpha	49.7830	50.7046	50.7046	51.3006	51.3006	52.7139	52.7139	52.9819	52.7139	51.5924	51.8798	51.0046	
util living area	4.3189	4.3803	4.3803	4.4200	4.4200	4.5143	4.5143	4.5321	4.5143	4.4395	4.4587	4.4003	
	0.9890	0.9849	0.9748	0.9518	0.8909	0.7250	0.5175	0.5411	0.7998	0.9402	0.9801	0.9904	(86)
MIT	19.7683	19.9073	20.1369	20.4249	20.7146	20.9301	20.9886	20.9858	20.8783	20.5545	20.1487	19.7803	(87)
Th 2	19.7672	19.7867	19.7867	19.7990	19.7990	19.8272	19.8272	19.8324	19.8272	19.8050	19.8107	19.7929	(88)
util rest of house	0.9853	0.9797	0.9654	0.9313	0.8381	0.6034	0.3468	0.3752	0.7021	0.9109	0.9721	0.9871	(89)
MIT 2	18.6872	18.8397	19.0656	19.3537	19.6175	19.8011	19.8257	19.8302	19.7702	19.4827	19.0979	18.7193	(90)
Living area fraction									fLA = Living area / (4) =			0.4142	(91)
MIT	19.1350	19.2819	19.5094	19.7974	20.0719	20.2688	20.3074	20.3089	20.2292	19.9267	19.5332	19.1588	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1350	19.2819	19.5094	19.7974	20.0719	20.2688	20.3074	20.3089	20.2292	19.9267	19.5332	19.1588	(93)

FULL SAP CALCULATION PRINTOUT

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CALCULATION OF HEAT DEMAND 09 Jan 2014

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9828	0.9769	0.9626	0.9313	0.8521	0.6530	0.4189	0.4452	0.7394	0.9145	0.9697	0.9849	(94)
Useful gains	534.3150	555.8331	558.0967	537.3544	474.6273	350.9671	216.3146	230.5091	387.7626	478.2348	503.7524	514.7999	(95)
Ext temp.	4.9000	5.5000	7.3000	9.7000	12.7000	15.6000	17.6000	17.4000	14.8000	11.4000	7.8000	4.9000	(96)
Heat loss rate W													
	1219.0241	1158.7699	1026.5551	839.1194	612.6245	377.5857	218.9601	234.0653	439.0856	704.5795	964.1673	1191.8145	(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													
	509.4236	405.1735	348.5331	217.2708	102.6699	0.0000	0.0000	0.0000	0.0000	168.4005	331.4988	503.6989	(98)
Space heating												2586.6689	(98)
RHI space heating demand												2587	(98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF ENERGY RATINGS 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Built) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	61.3900 (1b)	x 2.4000 (2b)	= 147.3360 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.3900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 147.3360 (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							1 * 10 =	10.0000 (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) =						10.0000 / (5) =	0.0679 (8)
Pressure test							No	
Measured/design AP50							15.0000	
Infiltration rate							0.8179	(18)
Number of sides sheltered							3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =						0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =						0.6339	(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												
Effective ac	0.8082	0.7923	0.7765	0.6972	0.6814	0.6022	0.6022	0.5863	0.6339	0.6814	0.7131	0.7448 (22b)
	0.8266	0.8139	0.8015	0.7431	0.7321	0.6813	0.6813	0.6719	0.7009	0.7321	0.7542	0.7773 (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
W-1.6 (Uw = 1.60)			4.5100	1.5038	6.7820		(27)
Original wall	30.6000	2.6200	27.9800	0.3000	8.3940		(29a)
New wall	30.0700	1.8900	28.1800	0.2200	6.1996		(29a)
Ceiling	61.3900		61.3900	0.1600	9.8224		(30)
Total net area of external elements Aum(A, m ²)			122.0600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	31.1980		(33)
Party Wall old			30.9800	0.0000	0.0000		(32)
Party Floor			50.3000				(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.150 * total exposed area)							18.3090 (36)
Total fabric heat loss						(33) + (36) =	49.5070 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	40.1881	39.5716	38.9672	36.1287	35.5976	33.1253	33.1253	32.6674	34.0776	35.5976	36.6720	37.7952 (38)
Heat transfer coeff	89.6951	89.0785	88.4742	85.6356	85.1045	82.6322	82.6322	82.1744	83.5845	85.1045	86.1789	87.3021 (39)
Average = Sum(39)m / 12 =												85.6331 (39)
HLP	1.4611	1.4510	1.4412	1.3949	1.3863	1.3460	1.3460	1.3386	1.3615	1.3863	1.4038	1.4221 (40)
HLP (average)												1.3949 (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												2.0207 (42)
Average daily hot water use (litres/day)												82.1904 (43)
Daily hot water use	90.4095	87.1219	83.8343	80.5466	77.2590	73.9714	73.9714	77.2590	80.5466	83.8343	87.1219	90.4095 (44)
Energy conte	134.0747	117.2625	121.0044	105.4946	101.2246	87.3491	80.9418	92.8819	93.9912	109.5377	119.5690	129.8441 (45)
Energy content (annual)										Total = Sum(45)m =		1293.1757 (45)
Distribution loss (46)m = 0.15 x (45)m	20.1112	17.5894	18.1507	15.8242	15.1837	13.1024	12.1413	13.9323	14.0987	16.4307	17.9353	19.4766 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF ENERGY RATINGS 09 Jan 2014

Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Total heat required for water heating calculated for each month	43.3165	39.1062	43.2670	41.8383	43.2089	41.7874	43.1631	43.1928	41.8152	43.2430	41.8863	43.3069 (61)
Solar input	177.3911	156.3688	164.2715	147.3329	144.4335	129.1366	124.1049	136.0747	135.8064	152.7807	161.4553	173.1511 (62)
Output from w/h	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)
Heat gains from water heating, kWh/month	177.3911	156.3688	164.2715	147.3329	144.4335	129.1366	124.1049	136.0747	135.8064	152.7807	161.4553	173.1511 (64)
	55.4089	48.7664	51.0507	45.5365	44.4594	39.4904	37.7039	41.6814	41.7059	47.2320	50.2283	53.9999 (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	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	48.2058	42.8160	34.8203	26.3612	19.7053	16.6360	17.9758	23.3657	31.3613	39.8204	46.4763	49.5456	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	263.3410	266.0736	259.1874	244.5275	226.0220	208.6294	197.0101	194.2775	201.1637	215.8236	234.3291	251.7217	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	(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)	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	(71)
Water heating gains (Table 5)	74.4744	72.5690	68.6166	63.2452	59.7573	54.8478	50.6773	56.0234	57.9248	63.4839	69.7615	72.5805	(72)
Total internal gains	478.5787	474.0161	455.1818	426.6914	398.0421	372.6709	358.2208	366.2241	383.0074	411.6855	443.1244	466.4053	(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	
East					0.5100	19.6403	0.6300	0.7000	0.7700		3.0612 (76)	
South					3.4900	46.7521	0.6300	0.7000	0.7700		49.8653 (78)	
West					0.5100	19.6403	0.6300	0.7000	0.7700		3.0612 (80)	

Solar gains	55.9876	93.6431	123.7524	146.3409	157.7741	153.9977	149.5622	141.3922	131.6097	102.2962	66.7412	48.1229 (83)
Total gains	534.5663	567.6592	578.9342	573.0323	555.8162	526.6685	507.7830	507.6164	514.6171	513.9817	509.8656	514.5282 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Thl (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	47.5299	47.8588	48.1857	49.7830	50.0936	51.5924	51.5924	51.8798	51.0046	50.0936	49.4691	48.8326	
alpha	4.1687	4.1906	4.2124	4.3189	4.3396	4.4395	4.4395	4.4587	4.4003	4.3396	4.2979	4.2555	
util living area	0.9912	0.9875	0.9805	0.9638	0.9243	0.8178	0.6609	0.6808	0.8581	0.9580	0.9852	0.9924	(86)
MIT	19.5985	19.7330	19.9609	20.2914	20.5927	20.8551	20.9587	20.9521	20.8009	20.4241	19.9829	19.6065	(87)
Th 2	19.7168	19.7244	19.7319	19.7672	19.7739	19.8050	19.8050	19.8107	19.7929	19.7739	19.7604	19.7464	(88)
util rest of house	0.9882	0.9832	0.9733	0.9488	0.8877	0.7254	0.5073	0.5339	0.7816	0.9376	0.9794	0.9899	(89)
MIT 2	18.4796	18.6187	18.8498	19.2006	19.4897	19.7340	19.7942	19.7971	19.6845	19.3356	18.8952	18.5106	(90)
Living area fraction	18.9431	19.0803	19.3100	19.6524	19.9466	20.1984	20.2766	20.2755	20.1469	19.7865	19.3458	18.9645	(91)
MIT	18.9431	19.0803	19.3100	19.6524	19.9466	20.1984	20.2766	20.2755	20.1469	19.7865	19.3458	18.9645	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.9431	19.0803	19.3100	19.6524	19.9466	20.1984	20.2766	20.2755	20.1469	19.7865	19.3458	18.9645	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9859	0.9804	0.9702	0.9471	0.8938	0.7597	0.5721	0.5956	0.8074	0.9379	0.9768	0.9878	(94)
Ext temp.	527.0189	556.5385	561.6961	542.6922	496.8090	400.0950	290.5148	302.3585	415.5086	482.0560	498.0548	508.2707	(95)
Heat loss rate W	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)
Month fracti	1313.4135	1263.1587	1133.3576	920.7891	701.8217	462.6065	303.8052	318.4682	505.4309	781.8109	1055.3287	1288.9756	(97)
Space heating kWh	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	585.0776	474.8487	425.3162	272.2298	152.5295	0.0000	0.0000	0.0000	0.0000	223.0177	401.2372	580.8445	(98)
Space heating per m2												3115.1012	(98)
												50.7428	(99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF ENERGY RATINGS 09 Jan 2014

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 %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													3442.1008 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	585.0776	474.8487	425.3162	272.2298	152.5295	0.0000	0.0000	0.0000	0.0000	223.0177	401.2372	580.8445	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	646.4946	524.6947	469.9626	300.8064	168.5409	0.0000	0.0000	0.0000	0.0000	246.4284	443.3560	641.8171	(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	177.3911	156.3688	164.2715	147.3329	144.4335	129.1366	124.1049	136.0747	135.8064	152.7807	161.4553	173.1511	(64)
Efficiency of water heater (217)m	89.7347	89.6856	89.5851	89.3499	88.9148	87.3000	87.3000	87.3000	87.3000	89.1712	89.5581	87.3000	(216)
Fuel for water heating, kWh/month	197.6839	174.3521	183.3693	164.8943	162.4403	147.9227	142.1591	155.8703	155.5629	171.3342	180.2800	192.9377	(219)
Water heating fuel used												2028.8068	(219)
Annual totals kWh/year													
Space heating fuel - main system												3442.1008	(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)													340.5317 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 1.30 * 1068 * 1.00) =										-1110.7933		-1110.7933	(233)
Total delivered energy for all uses												4775.6459	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	3442.1008	3.4800	119.7851 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	2028.8068	3.4800	70.6025 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	340.5317	13.1900	44.9161 (250)
Additional standing charges			120.0000 (251)
Energy saving/generation technologies			
PV Unit	-1110.7933	13.1900	-146.5136 (252)
Total energy cost			218.6826 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.8633 (257)
SAP value		87.9569
SAP rating (Section 12)		88 (258)
SAP band		B

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	3442.1008	0.2160	743.4938 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2028.8068	0.2160	438.2223 (264)
Space and water heating			1181.7160 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	340.5317	0.5190	176.7360 (268)
Energy saving/generation technologies			
PV Unit	-1110.7933	0.5190	-576.5017 (269)
Total kg/year			820.8753 (272)
CO2 emissions per m2			13.3700 (273)
EI value			89.6609
EI rating			90 (274)
EI band			B

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8875 = 3.921$, stars = 4
Water heating environmental impact	$0.216 / 0.8875 = 0.2434$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Built) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	61.3900 (1b)	x 2.4000 (2b)	= 147.3360 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.3900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 147.3360 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ 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					1 * 10 = 10.0000 (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) =				10.0000 / (5) = 0.0679 (8)
Pressure test					No
Measured/design AP50					15.0000
Infiltration rate					0.8179 (18)
Number of sides sheltered					3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =				0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =				0.6339 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.4000	4.1000	4.1000	3.9000	3.9000	3.4000	3.4000	3.3000	3.4000	3.8000	3.7000	4.0000 (22)
Wind factor	1.1000	1.0250	1.0250	0.9750	0.9750	0.8500	0.8500	0.8250	0.8500	0.9500	0.9250	1.0000 (22a)
Adj infilt rate	0.6972	0.6497	0.6497	0.6180	0.6180	0.5388	0.5388	0.5229	0.5388	0.6022	0.5863	0.6339 (22b)
Effective ac	0.7431	0.7111	0.7111	0.6910	0.6910	0.6451	0.6451	0.6367	0.6451	0.6813	0.6719	0.7009 (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
W-1.6 (Uw = 1.60)			4.5100	1.5038	6.7820		(27)
Original wall	30.6000	2.6200	27.9800	0.3000	8.3940		(29a)
New wall	30.0700	1.8900	28.1800	0.2200	6.1996		(29a)
Ceiling	61.3900		61.3900	0.1600	9.8224		(30)
Total net area of external elements Aum(A, m ²)			122.0600				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		31.1980		(33)
Party Wall old			30.9800	0.0000	0.0000		(32)
Party Floor			50.3000				(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.150 * total exposed area)							18.3090 (36)
Total fabric heat loss						(33) + (36) =	49.5070 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	36.1287	34.5720	34.5720	33.5953	33.5953	31.3672	31.3672	30.9582	31.3672	33.1253	32.6674	34.0776 (38)
Heat transfer coeff	85.6356	84.0790	84.0790	83.1023	83.1023	80.8741	80.8741	80.4651	80.8741	82.6322	82.1744	83.5845 (39)
Average = Sum(39)m / 12 =												82.6231 (39)
HLP	1.3949	1.3696	1.3696	1.3537	1.3537	1.3174	1.3174	1.3107	1.3174	1.3460	1.3386	1.3615 (40)
HLP (average)												1.3459 (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												2.0207 (42)
Average daily hot water use (litres/day)												82.1904 (43)
Daily hot water use	90.4095	87.1219	83.8343	80.5466	77.2590	73.9714	73.9714	77.2590	80.5466	83.8343	87.1219	90.4095 (44)
Energy conte	134.0747	117.2625	121.0044	105.4946	101.2246	87.3491	80.9418	92.8819	93.9912	109.5377	119.5690	129.8441 (45)
Energy content (annual)										Total = Sum(45)m =		1293.1757 (45)
Distribution loss (46)m = 0.15 x (45)m	20.1112	17.5894	18.1507	15.8242	15.1837	13.1024	12.1413	13.9323	14.0987	16.4307	17.9353	19.4766 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Total heat required for water heating calculated for each month	43.3165	39.1062	43.2670	41.8383	43.2089	41.7874	43.1631	43.1928	41.8152	43.2430	41.8863	43.3069 (61)
Solar input	177.3911	156.3688	164.2715	147.3329	144.4335	129.1366	124.1049	136.0747	135.8064	152.7807	161.4553	173.1511 (62)
	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	177.3911	156.3688	164.2715	147.3329	144.4335	129.1366	124.1049	136.0747	135.8064	152.7807	161.4553	173.1511 (64)
Heat gains from water heating, kWh/month	55.4089	48.7664	51.0507	45.5365	44.4594	39.4904	37.7039	41.6814	41.7059	47.2320	50.2283	53.9999 (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	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	121.2390	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	48.2058	42.8160	34.8203	26.3612	19.7053	16.6360	17.9758	23.3657	31.3613	39.8204	46.4763	49.5456	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	263.3410	266.0736	259.1874	244.5275	226.0220	208.6294	197.0101	194.2775	201.1637	215.8236	234.3291	251.7217	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	49.1446	(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)	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	-80.8260	(71)
Water heating gains (Table 5)	74.4744	72.5690	68.6166	63.2452	59.7573	54.8478	50.6773	56.0234	57.9248	63.4839	69.7615	72.5805	(72)
Total internal gains	478.5787	474.0161	455.1818	426.6914	398.0421	372.6709	358.2208	366.2241	383.0074	411.6855	443.1244	466.4053	(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			
East				0.5100	23.7835	0.6300	0.7000	0.7700	3.7070 (76)			
South				3.4900	54.0600	0.6300	0.7000	0.7700	57.6598 (78)			
West				0.5100	23.7835	0.6300	0.7000	0.7700	3.7070 (80)			

Solar gains	65.0737	94.9456	124.5724	150.2963	158.9838	164.7764	158.1820	151.4862	141.4166	111.2770	76.3721	56.2926 (83)
Total gains	543.6524	568.9617	579.7543	576.9878	557.0260	537.4472	516.4029	517.7103	524.4240	522.9625	519.4965	522.6979 (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	49.7830	50.7046	50.7046	51.3006	51.3006	52.7139	52.7139	52.9819	52.7139	51.5924	51.8798	51.0046	
alpha	4.3189	4.3803	4.3803	4.4200	4.4200	4.5143	4.5143	4.5321	4.5143	4.4395	4.4587	4.4003	
util living area	0.9890	0.9849	0.9748	0.9518	0.8909	0.7250	0.5175	0.5411	0.7998	0.9402	0.9801	0.9904	(86)
MIT	19.7683	19.9073	20.1369	20.4249	20.7146	20.9301	20.9886	20.9858	20.8783	20.5545	20.1487	19.7803	(87)
Th 2	19.7672	19.7867	19.7867	19.7990	19.7990	19.8272	19.8272	19.8324	19.8272	19.8050	19.8107	19.7929	(88)
util rest of house	0.9853	0.9797	0.9654	0.9313	0.8381	0.6034	0.3468	0.3752	0.7021	0.9109	0.9721	0.9871	(89)
MIT 2	18.6872	18.8397	19.0656	19.3537	19.6175	19.8011	19.8257	19.8302	19.7702	19.4827	19.0979	18.7193	(90)
Living area fraction	19.1350	19.2819	19.5094	19.7974	20.0719	20.2688	20.3074	20.3089	20.2292	19.9267	19.5332	19.1588	(91)
MIT	19.1350	19.2819	19.5094	19.7974	20.0719	20.2688	20.3074	20.3089	20.2292	19.9267	19.5332	19.1588	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1350	19.2819	19.5094	19.7974	20.0719	20.2688	20.3074	20.3089	20.2292	19.9267	19.5332	19.1588	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9828	0.9769	0.9626	0.9313	0.8521	0.6530	0.4189	0.4452	0.7394	0.9145	0.9697	0.9849	(94)
Ext temp.	534.3150	555.8331	558.0967	537.3544	474.6273	350.9671	216.3146	230.5091	387.7626	478.2348	503.7524	514.7999	(95)
Heat loss rate W	4.9000	5.5000	7.3000	9.7000	12.7000	15.6000	17.6000	17.4000	14.8000	11.4000	7.8000	4.9000	(96)
Month fracti	1219.0241	1158.7699	1026.5551	839.1194	612.6245	377.5857	218.9601	234.0653	439.0856	704.5795	964.1673	1191.8145	(97)
Space heating kWh	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	509.4236	405.1735	348.5331	217.2708	102.6699	0.0000	0.0000	0.0000	0.0000	168.4005	331.4988	503.6989	(98)
Space heating per m2												2586.6689	(98)
												42.1350	(99)

8c. Space cooling requirement

Not applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

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 %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2858.1977 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	509.4236	405.1735	348.5331	217.2708	102.6699	0.0000	0.0000	0.0000	0.0000	168.4005	331.4988	503.6989	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	562.8990	447.7055	385.1194	240.0782	113.4474	0.0000	0.0000	0.0000	0.0000	186.0778	366.2970	556.5733	(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	177.3911	156.3688	164.2715	147.3329	144.4335	129.1366	124.1049	136.0747	135.8064	152.7807	161.4553	173.1511	(64)
Efficiency of water heater	89.6512	89.5856	89.4497	89.1791	88.6017	87.3000	87.3000	87.3000	87.3000	88.9491	89.4264	87.3000	(216)
(217)m													89.6593 (217)
Fuel for water heating, kWh/month	197.8680	174.5468	183.6468	165.2102	163.0144	147.9227	142.1591	155.8703	155.5629	171.7620	180.5455	193.1212	(219)
Water heating fuel used													2031.2300 (219)
Annual totals kWh/year													
Space heating fuel - main system													2858.1977 (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)													340.5317 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV Unit 0 (0.80 * 1.30 * 1148 * 1.00) =										-1194.0767		-1194.0767	(233)
Total delivered energy for all uses													4110.8827 (238)

10a. Fuel costs - using BEDF prices (473)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2858.1977	3.8700	110.6123 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	2031.2300	3.8700	78.6086 (247)
Pumps and fans for heating	75.0000	18.9000	14.1750 (249)
Energy for lighting	340.5317	18.9000	64.3605 (250)
Additional standing charges			93.0000 (251)
Energy saving/generation technologies			
PV Unit	-1194.0767	18.9000	-225.6805 (252)
Total energy cost			135.0759 (255)

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	2858.1977	0.2160	617.3707 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2031.2300	0.2160	438.7457 (264)
Space and water heating			1056.1164 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	340.5317	0.5190	176.7360 (268)
Energy saving/generation technologies			
PV Unit	-1194.0767	0.5190	-619.7258 (269)
Total kg/year			652.0515 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2858.1977	1.2200	3487.0012 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	2031.2300	1.2200	2478.1006 (264)
Space and water heating			5965.1017 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	340.5317	3.0700	1045.4323 (268)
Energy saving/generation technologies			
PV Unit	-1194.0767	3.0700	-3665.8154 (269)
Primary energy kWh/year			3574.9687 (272)
Primary energy kWh/m2/year			58.2337 (273)

SAP 2012 EPC IMPROVEMENTS

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Current energy efficiency rating: B 88
Current environmental impact rating: B 90

(For testing purposes):	
A	Not considered
B	Not considered
C	Not considered
D	Not considered
E Low energy lighting	Already installed
F	Not considered
G	Not considered
H	Not considered
I	Not considered
J	Not considered
K	Not considered
M	Not considered
N Solar water heating	Not applicable
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Not applicable
A2	Not considered
A3	Not considered
T2	Not considered
W	Not considered
X	Not considered
Y	Not considered
J2	Not considered
Q2	Not considered
Z1	Not considered
Z2	Not considered
Z3	Not considered
Z4	Not considered
Z5	Not considered
V2 Wind turbine	Not applicable
L2	Not considered
Q3	Not considered
O3	Not considered

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0		0.00 kg/m²

Potential energy efficiency rating: B 88
Potential environmental impact rating: B 90

Fuel prices for cost data on this page from database revision number 473 TEST (26 Feb 2021)
Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, Thames Valley):			
	Current	Potential	Saving
Electricity	£79	£79	£0
Mains gas	£282	£282	£0
Space heating	£218	£218	£0
Water heating	£79	£79	£0
Lighting	£64	£64	£0
Generated (PV)	-£226	-£226	£0
Total cost of fuels	£135	£135	£0
Total cost of uses	£135	£135	£0
Delivered energy	67 kWh/m²	67 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m²	11 kg/m²	11 kg/m²	0 kg/m²
Primary energy	58 kWh/m²	58 kWh/m²	0 kWh/m²

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Built) (Version 9.92, January 2014)
CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable

FULL SAP CALCULATION PRINTOUT

Calculation Type: Conversion (As Built)



Property and Energy
Services Ltd.

CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR Conversion (As Built) (Version 9.92, January 2014)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

No improvements selected / applicable