

12/01/2022

Heat Loss Report

Project Reference: CHO-612 - Shiplake Lock, Mill Lane Shiplake , Henley-on-Thames, RG9 3NA

Heating Type: ASHP

Installation Address

Ms., Patricia Salbany

Shiplake Lock, Mill Lane Shiplake , Henley-on-Thames, Reading

RG9 3NA

This report has been completed by Retrofitworks, Block A, Unit 233 Riverside Business Centre, Haldane Place, 0330 123 1334



The methods used in these calculations are from the Chartered Institution of Building Services Engineers (CIBSE) The Domestic Heating Design Guide 2014 and EN 12831. The UK standards for MCS MIS 3005 and MIS 3004 have also been met ensuring heat pumps and Biomass calculations can be presented.

It's important for the relevant persons to read this report and notify Retrofitworks of any corrections that need to be made before the heating system is installed. Retrofitworks is not liable for any inaccurate calculations made due to incorrect information, therefore it's important that the information provided is to the best knowledge available from the home owner, architect or builder.

12/01/2022

Heat Loss Report

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Appendix A

Summary of Results

When the external temperature is -1.8°C

The total heat source required to heat the building must provide an output of 9.85 kW

Heating Type: ASHP

Manufacture: Mitsubishi

Model: To be confirmed

Output at designed external temperature: 10 kW

Maximum designed flow temperature: 50°C

Worst Performing Room

Room name: Toilet 2

Floor Area: 2.14 m²

Power demand: 536.75 watts

Specific room heat loss: 250.82 W/m²

Emitter type: Standard Radiators

Seasonal Performance Factor (SPF): 2.7

Temperature Star Rating: ***

Calculated Energy using Degree Day Data: The energy calculation method is worst case scenario, therefore assuming all rooms to be heated to their designed temperatures throughout the heating season. Of course most people don't use all the rooms and don't have the heating on within all rooms throughout a year at maximum. As a result, the calculated energy figure can be overestimated, therefore running costs may be higher with this calculation than actual.

Domestic RHI (Renewable Heat Incentive in the UK): It's important for a Energy Assessor to visit the property to carry out an EPC (Energy Performance Certificate). This EPC will have an energy value (kWh) for heating and hot water. It is this value which will be used to calculate your domestic RHI income. If, however the property is a new self-build then the EPC from the SAP report can be used to calculate the RHI.

Appendix B Room Features

Number of rooms: 14 and total floor area: 116.28 m²
 Approx location (Degree Day): Thames Valley (Heathrow)
 Approx City (Ext Temp): London -1.8C
 Altitude adjustment <50 meters
 Ground Temperature 11C
 Outside Temperature -1.80C
 Degree Day Data 2033
 Is property > 2006? NO
 If property has thermal bridging? NO
 Does the building have MVHR? NO

Room Names	Designed Temperature	Fireplace	Throat restriction	Year room was built	Air Changes Per Hour	Exposed Location	Intermittent Heating	Vaulted Ceiling?	Vaulted Ceiling Type	Room Below	Room Above	Emitter Type
Boot Room/Rear Lobby	18	NO	NO	1996	2	NO	NO	NO	-	None	None	Standard Radiators
Boot Room/Rear Lobby part 2	18	NO	NO	1959	2	NO	NO	NO	-	None	None	Standard Radiators
Lounge	21	NO	NO	1959	1.5	NO	NO	NO	-	None	Bedroom 2	Standard Radiators
Lounge part 2	21	NO	NO	1959	1.5	NO	NO	NO	-	None	Bedroom 3	Standard Radiators
Kitchen	18	NO	NO	1959	2	NO	NO	NO	-	None	Bedroom 1	Standard Radiators
Utility Room	18	NO	NO	1959	1	NO	NO	NO	-	None	Bedroom 1	Standard Radiators
Entrance Hall	18	NO	NO	1959	1.5	NO	NO	NO	-	None	Hall	Standard Radiators
Toilet 1	18	NO	NO	1959	2	NO	NO	NO	-	None	Bathroom 1	Standard Radiators
Bathroom 1	22	NO	NO	1959	2	NO	NO	NO	-	Entrance Hall	None	Standard Radiators

Hall	18	NO	NO	1959	1.5	NO	NO	NO	-	Entrance Hall	None	Standard Radiators
Bedroom 1	18	NO	NO	1959	1	NO	NO	NO	-	Kitchen	None	Standard Radiators
Bedroom 2	18	NO	NO	1959	1	NO	NO	NO	-	Lounge	None	Standard Radiators
Bedroom 3	18	NO	NO	1959	1	NO	NO	NO	-	Lounge	None	Standard Radiators
Toilet 2	18	NO	NO	1996	2	NO	NO	NO	-	None	None	Standard Radiators

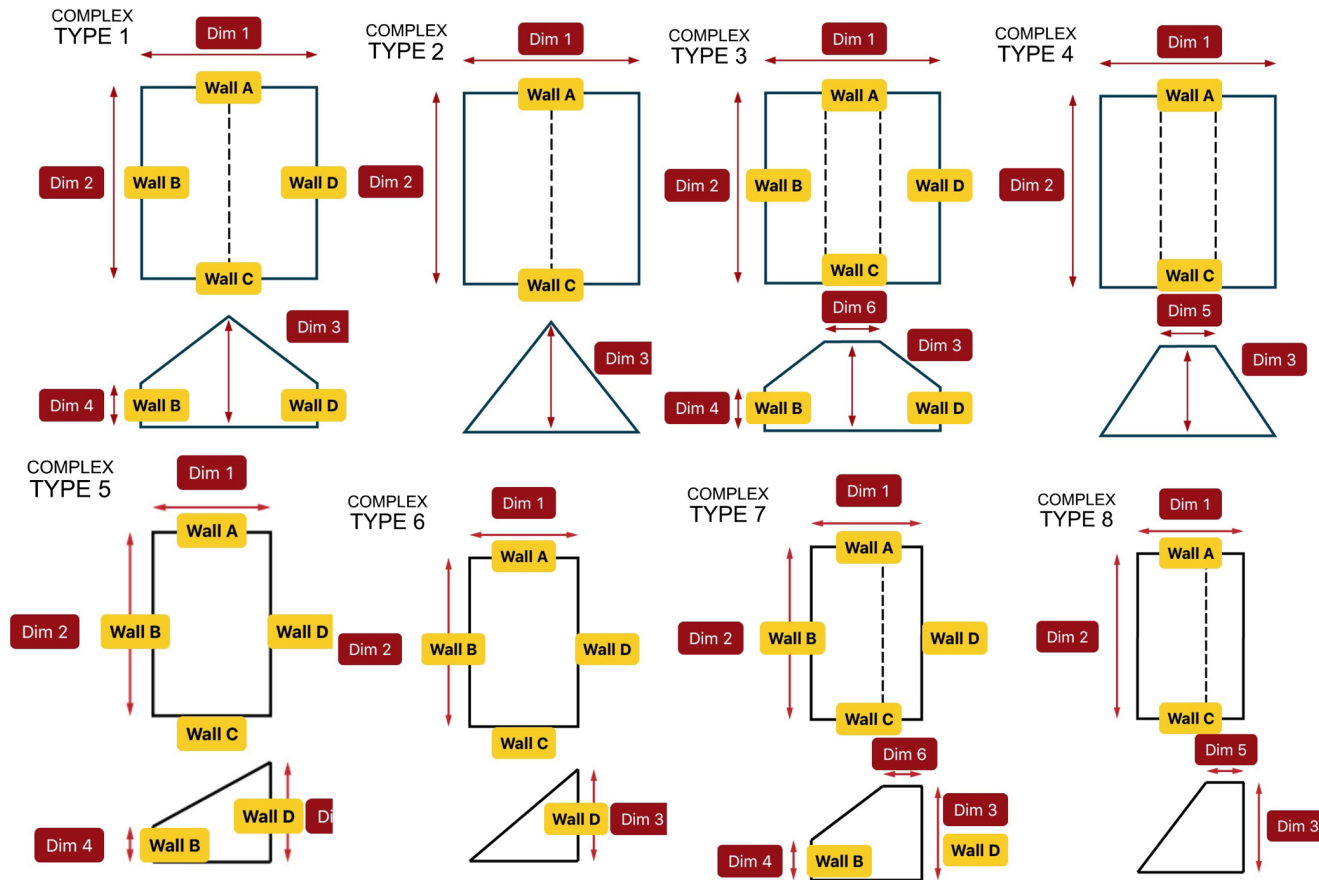
Appendix C Room Dimensions

Room Names	Floor Areas m ²	Room Height m	External wall(Type A) m	External wall(Type B) m	Window (Type A) m ²	Window (Type B) m ²	Internal Wall m	Party wall m	External Door Area m ²	Roof Glazing Area m ²	Lowest Parallel room temp	High ceiling % increase
Boot Room/Rear Lobby	5.38	2.27	5.66	0	0	0	1.29	0	3.88	0	18°C	0
Boot Room/Rear Lobby part 2	0.98	2.27	0	0	0	0	2.99	0	0	0	18°C	0
Lounge	14.86	2.28	6.87	0	3.16	0	2.93	0	0	0	18°C	0
Lounge part 2	11.79	2.28	6.96	0	3.24	0	2.91	0	0	0	18°C	0
Kitchen	18.17	2.29	6.9	0	4.13	0	8.83	0	0	0	18°C	0
Utility Room	1.3	2.28	1.01	0	0.87	0	1.01	0	0	0	18°C	0
Entrance Hall	6.73	2.28	5.23	0	0.58	0	5.23	0	1.84	0	18°C	0
Toilet 1	1.5	2.28	2.61	0	0.59	0	2.61	0	0	0	18°C	0
Bathroom 1	3.96	2.37	4.01	0	0.72	0	4.01	0	0	0	18°C	0
Hall	8.93	2.37	4.69	0	1.72	0	16.73	0	0	0	18°C	0
Bedroom 1	14.47	2.35	9.85	0	2.38	0	6.91	0	0	0	18°C	0
Bedroom 2	13.07	2.34	8.04	0	2.46	0	3.22	0	0	0	18°C	0
Bedroom 3	13	2.34	7.26	0	2.52	0	3.2	0	0	0	18°C	0
Toilet 2	2.14	2.27	4.15	0	2.53	0	2.23	0	0	0	18°C	0

Appendix D Vaulted Rooms

Room Names	Vaulted Room Type	Dimensions						Wall Type or Roof			
		Dim 1	Dim 2	Dim 3	Dim 4	Dim 5	Dim 6	Wall A	Wall B	Wall C	Wall D
Boot Room/Rear Lobby	-	0	0	0	0	0	0	-	-	-	-
Boot Room/Rear Lobby part 2	-	0	0	0	0	0	0	-	-	-	-
Lounge	-	0	0	0	0	0	0	-	-	-	-
Lounge part 2	-	0	0	0	0	0	0	-	-	-	-
Kitchen	-	0	0	0	0	0	0	-	-	-	-
Utility Room	-	0	0	0	0	0	0	-	-	-	-
Entrance Hall	-	0	0	0	0	0	0	-	-	-	-
Toilet 1	-	0	0	0	0	0	0	-	-	-	-
Bathroom 1	-	0	0	0	0	0	0	-	-	-	-
Hall	-	0	0	0	0	0	0	-	-	-	-
Bedroom 1	-	0	0	0	0	0	0	-	-	-	-
Bedroom 2	-	0	0	0	0	0	0	-	-	-	-
Bedroom 3	-	0	0	0	0	0	0	-	-	-	-
Toilet 2	-	0	0	0	0	0	0	-	-	-	-

Complex Room Types



Appendix E External Walls

Room Names	External Wall (A)	External Wall (B)	Internal Wall	Party Wall
Boot Room/Rear Lobby	Solid Brick 228mm, plaster (2.11)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Boot Room/Rear Lobby part 2	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Lounge	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Lounge part 2	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Kitchen	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Utility Room	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Entrance Hall	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Toilet 1	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Bathroom 1	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Hall	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Bedroom 1	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Bedroom 2	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Bedroom 3	Open Cavity, Brick 102mm, plaster (1.37)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-
Toilet 2	Solid Brick 228mm, plaster (2.11)	-	Plaster, Brick 102.5mm, Plaster (1.76)	-

Appendix F

Internal and Party walls, Windows and doors

Room Names	Window Type (A)	Window Type (B)	Roof Glazing	Door
Boot Room/Rear Lobby	Standard Double Glazing Wood/PVC frame (2.8)	-	-	High Quality Door 50% glazing (2.2)
Boot Room/Rear Lobby part 2	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Lounge	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Lounge part 2	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Kitchen	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Utility Room	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Entrance Hall	Standard Double Glazing Wood/PVC frame (2.8)	-	-	High Quality Door 50% glazing (2.2)
Toilet 1	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Bathroom 1	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Hall	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Bedroom 1	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Bedroom 2	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Bedroom 3	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-
Toilet 2	Standard Double Glazing Wood/PVC frame (2.8)	-	-	-

Appendix G

Floors, Ceilings and Roof

Room Names	Floor	Roof or Ceiling
Boot Room/Rear Lobby	Ground Floor No Insulation (1.15)	Pitched roof with tiles, 50mm Insulation (0.6)
Boot Room/Rear Lobby part 2	Ground Floor No Insulation (1.15)	Pitched roof with tiles, 100mm Insulation (0.35)
Lounge	Ground Floor No Insulation (1.15)	Intermediate Floor Timber without insulation (1.73)
Lounge part 2	Ground Floor No Insulation (1.15)	Intermediate Floor Timber without insulation (1.73)
Kitchen	Ground Floor No Insulation (1.15)	Intermediate Floor Timber without insulation (1.73)
Utility Room	Ground Floor No Insulation (1.15)	Intermediate Floor Timber without insulation (1.73)
Entrance Hall	Ground Floor No Insulation (1.15)	Intermediate Floor Timber without insulation (1.73)
Toilet 1	Ground Floor No Insulation (1.15)	Intermediate Floor Timber without insulation (1.73)
Bathroom 1	Ground Floor No Insulation (1.15)	Pitched roof with tiles, 100mm Insulation (0.35)
Hall	Ground Floor No Insulation (1.15)	Pitched roof with tiles, 100mm Insulation (0.35)
Bedroom 1	Ground Floor No Insulation (1.15)	Pitched roof with tiles, 100mm Insulation (0.35)
Bedroom 2	Ground Floor No Insulation (1.15)	Pitched roof with tiles, 100mm Insulation (0.35)
Bedroom 3	Ground Floor No Insulation (1.15)	Pitched roof with tiles, 100mm Insulation (0.35)
Toilet 2	Ground Floor No Insulation (1.15)	Pitched roof with tiles, 50mm Insulation (0.6)

Appendix H

Review of Heat Loss Part 1

Room Names	W/m ²	Floor (watts)	External wall Type A (watts)	External wall Type B (watts)	Window Type A (watts)	Window Type B (watts)	Internal Wall (watts)	Party Wall (watts)	External Door (watts)	Roof Glazing (watts)	Roof or Ceiling (watts)
Boot Room/ Rear Lobby	135.47	49.5	374.67	0	0	0	0	0	169.01	0	63.91
Boot Room/ Rear Lobby part 2		9.02	0	0	0	0	0	0	0	0	6.79
Lounge	91	187.98	390.56	0	201.73	0	35.27	0	0	0	77.12
Lounge part 2		149.14	394.47	0	206.84	0	35.03	0	0	0	61.19
Kitchen	70.62	167.16	316.59	0	228.97	0	0	0	0	0	0
Utility Room		11.96	38.87	0	48.23	0	0	0	0	0	0
Entrance Hall	86.55	61.92	257.82	0	32.16	0	0	0	80.15	0	0
Toilet 1	150.83	13.8	145.42	0	32.71	0	0	0	0	0	-10.38
Bathroom 1	151.49	18.22	286.4	0	47.98	0	66.91	0	0	0	32.99
Hall	69.38	0	254.86	0	95.36	0	0	0	0	0	61.88
Bedroom 1	70.33	0	563.34	0	131.95	0	0	0	0	0	100.28
Bedroom 2	63.14	-45.09	443.61	0	136.38	0	0	0	0	0	90.58
Bedroom 3	59.71	-44.85	392.47	0	139.71	0	0	0	0	0	90.09
Toilet 2	250.82	19.69	287.87	0	140.26	0	0	0	0	0	25.42

Review of Heat Loss Part 2

Room Names	High Ceiling Increase (watts)	Amount of Air Heated per hour (m³/hour)	Ventilation (watts)	Exposed Location (watts)	Intermittent Heating (watts)	Thermal Bridges (watts)	Total Watts	Total kWh
Boot Room/Rear Lobby	0	24.43	159.63	0	0	0	861.61	2591.97
Boot Room/Rear Lobby part 2	0	4.45	29.08	0	0	0		143.38
Lounge	0	50.82	382.37	0	0	0	2425.07	2919.59
Lounge part 2	0	40.32	303.37	0	0	0		2597.57
Kitchen	0	83.22	543.76	0	0	0	1374.88	3703.87
Utility Room	0	2.96	19.34	0	0	0		335.24
Entrance Hall	0	23.02	150.41	0	0	0	582.46	1783.35
Toilet 1	0	6.84	44.69	0	0	0	226.24	633.24
Bathroom 1	0	18.77	147.42	0	0	0	599.92	1055.36
Hall	0	31.75	207.45	0	0	0	619.55	1526.73
Bedroom 1	0	34	222.16	0	0	0	1017.73	2507.91
Bedroom 2	0	30.58	199.81	0	0	0	825.29	2144.82
Bedroom 3	0	30.42	198.76	0	0	0	776.18	2023.22
Toilet 2	0	9.72	63.51	0	0	0	536.75	1394.26

Appendix I

Summary of U values (W/m²K) Part 1

Room Names	Floor	External Wall Type A	External Wall Type B	Window Type A	Window Type B	Internal Wall	Party Wall	External Door
Boot Room/Rear Lobby	1.15	2.11	0	2.8	0	1.76	0	2.2
Boot Room/Rear Lobby part 2	1.15	1.37	0	2.8	0	1.76	0	0
Lounge	1.15	1.37	0	2.8	0	1.76	0	0
Lounge part 2	1.15	1.37	0	2.8	0	1.76	0	0
Kitchen	1.15	1.37	0	2.8	0	1.76	0	0
Utility Room	1.15	1.37	0	2.8	0	1.76	0	0
Entrance Hall	1.15	1.37	0	2.8	0	1.76	0	2.2
Toilet 1	1.15	1.37	0	2.8	0	1.76	0	0
Bathroom 1	1.15	1.37	0	2.8	0	1.76	0	0
Hall	1.15	1.37	0	2.8	0	1.76	0	0
Bedroom 1	1.15	1.37	0	2.8	0	1.76	0	0
Bedroom 2	1.15	1.37	0	2.8	0	1.76	0	0
Bedroom 3	1.15	1.37	0	2.8	0	1.76	0	0
Toilet 2	1.15	2.11	0	2.8	0	1.76	0	0

Summary of U values (W/m²K) Part 2

Room Names	Roof Glazing	Roof or Ceiling	Exposed Location	Intermittent Heating	Thermal Bridges	Room Temp Below (If none then average Ground temp)	Room Temp Above (through Ceiling or Roof)
Boot Room/Rear Lobby	0	0.6	0	0	0	10	-1.80
Boot Room/Rear Lobby part 2	0	0.35	0	0	0	10	-1.80
Lounge	0	1.73	0	0	0	10	18.00
Lounge part 2	0	1.73	0	0	0	10	18.00
Kitchen	0	1.73	0	0	0	10	18.00
Utility Room	0	1.73	0	0	0	10	18.00
Entrance Hall	0	1.73	0	0	0	10	18.00
Toilet 1	0	1.73	0	0	0	10	22.00
Bathroom 1	0	0.35	0	0	0	18	-1.80
Hall	0	0.35	0	0	0	18	-1.80
Bedroom 1	0	0.35	0	0	0	18	-1.80
Bedroom 2	0	0.35	0	0	0	21	-1.80
Bedroom 3	0	0.35	0	0	0	21	-1.80
Toilet 2	0	0.6	0	0	0	10	-1.80

Appendix J

DHW (Domestic Hot Water)

Number of bedrooms: 3
Number of occupants per bedroom: 1
Flow temperature for hot water (DHW): 0
Hot water per occupant: 45 litres (if heat pump use 45, if other use 35)
η efficiency pipework loss to cylinder: 70 %
Electricity Cost: 14 pence per kWh
SHC Water: 4187 J/kgK
J to kWh: 3600000
water mains input temp: 10 C
kg to litres water: 1
Hot water energy demand per day: 0

OIL RESULTS

Oil hot water demand per day 18 kWh
Annual Demand 6570 kWh

LPG RESULTS

LPG hot water demand per day 18 kWh
Annual Demand 6570 kWh

DIRECT ELECTRIC RESULTS

Electric hot water demand per day 18 kWh
Annual Demand 6570 kWh

MAIN GAS RESULTS

Main gas hot water demand per day 18 kWh
Annual Demand 6570 kWh

Appendix K

Emitters and Performance

Room Names	Type of Emitter	Current Emitter watts (70°C)	Current Rad Oversize %	Flow Temperature °C	W/m²	Room Heat Loss watts	Oversize Factor based on heat pump flow temp	MCS Heat emitter guide watts1	Underfloor Heating Details			Likely SPF	Star Rating
									Floor Type	Floor Surface	Max Pipe Spacing	ASHP	
Boot Room/Rear Lobby	Standard Radiators	672	-67.5%	50	135.47	861.61	2.4	2067.86	0	0	N/A	2.7	***
Boot Room/Rear Lobby part 2													
Lounge	Standard Radiators	3712	-36.22%	50	91	2425.07	2.4	5820.17	0	0	N/A	2.7	***
Lounge part 2													
Kitchen	Standard Radiators	1408	-57.33%	50	70.62	1374.88	2.4	3299.71	0	0	N/A	2.7	***
Utility Room													
Entrance Hall	Standard Radiators	1015	-27.39%	50	86.55	582.46	2.4	1397.9	0	0	N/A	2.7	***
Toilet 1	Standard Radiators	394	-27.44%	50	150.83	226.24	2.4	542.98	0	0	N/A	2.7	***
Bathroom 1	Standard Radiators	514	-64.3%	50	151.49	599.92	2.4	1439.81	0	0	N/A	2.7	***
Hall	Standard Radiators	0	-%	50	69.38	619.55	2.4	1486.92	0	0	N/A	2.7	***
Bedroom 1	Standard Radiators	1445	-40.84%	50	70.33	1017.73	2.4	2442.55	0	0	N/A	2.7	***
Bedroom 2	Standard Radiators	883	-55.42%	50	63.14	825.29	2.4	1980.7	0	0	N/A	2.7	***
Bedroom 3	Standard Radiators	883	-52.6%	50	59.71	776.18	2.4	1862.83	0	0	N/A	2.7	***
Toilet 2	Standard Radiators	0	-%	50	250.82	536.75	2.4	1288.2	0	0	N/A	2.7	***

Appendix L Current Radiators

Room Temperature °C	Room Names	Radiator Type	Height (mm)	Length (mm)	Output at 50K MW-Air delta T	Mean (Flow/Return) Water Temperature and Outputs					
					70°C Watts	35°C Output Watts	40°C Output Watts	45°C Output Watts	50°C Output Watts	55°C Output Watts	60°C Output Watts
18	Boot Room/ Rear Lobby	K1	600	700	672	165	231	302	376	454	536
				Total Output:	672	165	231	302	376	454	536
21	Lounge	P+	600	1280	1856	355	528	715	914	1124	1344
				Total Output:	3712	355	528	715	914	1124	1344
21	Lounge part 2	P+	600	1280	1856	355	528	715	914	1124	1344
				Total Output:	3712	355	528	715	914	1124	1344
18	Kitchen	K2	600	800	1408	346	484	632	788	952	1122
				Total Output:	1408	346	484	632	788	952	1122
18	Utility Room	0	0	0	0	-	-	-	-	-	-
				Total Output:	1408	0	0	0	0	0	0
18	Entrance Hall	P+	600	700	1015	250	349	456	568	686	809
				Total Output:	1015	250	349	456	568	686	809
18	Toilet 1	K1	600	410	394	97	136	177	221	266	314
				Total Output:	394	97	136	177	221	266	314
22	Bathroom 1	Double panel no fins	590	480	514	89	136	187	242	299	360
				Total Output:	514	89	136	187	242	299	360
		Double panel no fins	590	1350	1445	355	497	649	809	977	1152

18	Bedroom 1										
				Total Output:	1445	355	497	649	809	977	1152
18	Bedroom 2	P1	600	1280	883	217	304	396	494	597	704
				Total Output:	883	217	304	396	494	597	704
18	Bedroom 3	P1	600	1280	883	217	304	396	494	597	704
				Total Output:	883	217	304	396	494	597	704

Appendix M Fuel Comparison

Heating Type	Efficiency %	Annual Energy Demand kWh			Number of kWh in unit				Price per Tonne	Price per unit	Pence per kWh	£ / kWh	Total annual running cost	CO2 emissions	
		Hot water	Heating	Total										factor (kg/kWh)	Total kg
Oil	85%	6570	25360.51	31930.51	10.35			0	65	Pence/Litre	6.28	0.06	£2203.2	0.314	10026.18
Mains Gas	85%	6570	25360.51	31930.51	1			0	4.5	Pence/Litre	4.5	0.04	£1468.8	0.227	7248.23
LPG	90%	6570	25360.51	31930.51	7.11			0	50	Pence/Litre	7.03	0.07	£2458.65	0.259	8270
Direct Electric	100%	6570	25360.51	31930.51	1			0	14	Pence/kWh	14	0.14	£4470.27	0.233	7439.81
Biomass Wood Pellets	90%	6570	25360.51	31930.51	4.8			250	25	Kg	5.21	0.05	£1756.18	0.08	2554.44
Biomass Logs	90%	6570	25360.51	31930.51	4.1			150	15	Kg	3.66	0.04	£1404.94	0.018	574.75
Biomass Chips	90%	6570	25360.51	31930.51	3.5	DHW SPF	Heating SPF	100	10	Kg	2.86	0.03	£1053.71	0.018	574.75
Air Source Heat Pump	see SPF	0	25360.51	25360.51	see SPF	2.71	2.7	0	14	Pence/kWh	14	0.14	£1314.99	0.233	2188.52
Ground Source Heat Pump	see SPF	0	25360.51	25360.51	see SPF	2.71	3.7	0	14	Pence/kWh	14	0.14	£959.59	0.233	1597.03

Appendix N Heat Pump Summary

SPACE HEATING

101		Demand:	25360.51 kWh/yr
102	Heat supplied by HP, excluding auxiliary heaters:		25360.51 kWh/yr
103		SPF(2):	2.7
	Electricity consumed by HP, excluding auxiliary		
104		heaters:	9392.78 kWh/yr
105	Renewable heat supplied by HP:		15967.73 kWh/yr
	Remaining heat to be supplied by auxiliary heaters		
106		and other heat sources:	0
107	Remaining heat, supplied by other heat sources:		0
108	Remaining heat, supplied by auxiliary heaters:		0
	Electricity consumed by HP, including auxiliary		
109		heaters:	9392.78 kWh/yr

WHERE OTHER HEAT SOURCES ARE USED

110		Fuel used:	0
111	Efficiency of other heat sources:		N/A
112	Consumed by other heat sources:		N/A

WATER HEATING

	No. of bedrooms:	3 Rooms
	No of occupants / bedroom:	1 Person/s
	HP flow temperature in DHW mode:	0
	Hot water / occupant:	45 Litres/day
	Final HP secondary HW temperature:	0
201	Demand:	0
202	Heat supplied by HP, excluding immersion heater:	0
203	SPF(2):	0
	Electricity consumed by HP, excluding immersion	
204	heater:	0
205	Renewable heat supplied by HP:	0
	Remaining heat to be supplied by immersion heater	
206	and other heat sources:	0.00 kWh/yr
207	Remaining heat, supplied by other heat sources:	0
208	Remaining heat, supplied by immersion heater:	0.00 kWh/yr
	Electricity consumed by HP, including immersion	
209	heater:	0

WHERE OTHER HEAT SOURCES ARE USED

210		Fuel used:	0
211	Efficiency of other heat sources:		0
212	Consumed by other heat sources:		0

PROPORTIONS, ENERGY CONSUMPTION, AND PERFORMANCE

	Proportion of space heating and water heating		
	demand provided by heat pump (excluding		
301	auxiliary/immersion heaters):	100%	
302	Renewable heat:	15967.73 kWh/yr	
	Electricity consumed by HP (excluding auxiliary/		
303	immersion heaters):	9392.78 kWh/yr	

304 Electricity consumed by auxiliary/immersion
heaters (supplied as part of HP): 0
305 Fuel consumed by other heat sources: N/A
306 HP combined performance SPF(4): N/A

RUNNING COST

401 Cost per unit of electricity for HP: 14 pence/kWh
402 Cost per unit of fuel for other heat sources: N/A
Cost of electricity for HP (including auxiliary/
403 immersion heaters): 1314.99 £ / year
404 Cost of fuel for other heat sources: N/A

RHI CALCULATIONS

501 Annual space heating demand: 0
502 Annual water heating demand: 0
503 Is space heating supplied by the hp? 0 = no, 1 = yes: NO
504 Is water heating supplied by the HP? 0 = no, 1 = yes: NO
505 Maximum qualifying heat supplied by the HP: 0
506 SPF for RHI purposes: 2.7
507 Maximum qualifying renewable heat: 0

Disclaimer:

'The performance of Microgeneration heat pump systems is impossible to predict with certainty due to the variability of the climate and its subsequent effect on both heat supply and demand. This estimate is based upon the best available information but is given as guidance only and should not be considered as a guarantee.'

Appendix O New Radiators

Room Temperature °C	Room Names	Room Heat Loss	Radiator Type	Height (mm)	Length (mm)	Output at 50K MW-Air delta T	Custom defined MWT °C	Mean (Flow/Return) Water Temperature and Outputs					
						70°C Watts	46.5°C Output Watts	35°C Output Watts	40°C Output Watts	45°C Output Watts	50°C Output Watts	55°C Output Watts	60°C Output Watts
18	Boot Room/Rear Lobby	816.72	K1	600	700	672		165	231	302	376	454	536
					Total Output:	672		165	231	302	376	454	536
18	Boot Room/Rear Lobby	816.72	K3	700	700	1897	913	467	652	851	1062	1283	1512
					Total Output:	1897	913	467	652	851	1062	1283	1512
21	Lounge	1275.03	P+	600	1280	1856		355	528	715	914	1124	1344
					Total Output:	3712		355	528	715	914	1124	1344
21	Lounge	1275.03	P+	600	2100	3045	1269	582	866	1173	1500	1844	2205
			-	-	-	-	-	-	-	-	-	-	-
					Total Output:	3045	1269	582	866	1173	1500	1844	2205
21	Lounge part 2	1150.04	P+	600	1280	1856		355	528	715	914	1124	1344
					Total Output:	3712		355	528	715	914	1124	1344
21	Lounge part 2	1150.04	P+	600	2000	2900	1208	554	824	1117	1428	1757	2100
			-	-	-	-	-	-	-	-	-	-	-
					Total Output:	2900	1208	554	824	1117	1428	1757	2100
18	Kitchen	1256.48	K2	600	800	1408		346	484	632	788	952	1122
					Total Output:	1408		346	484	632	788	952	1122
Survey reference: CHO-612 - Shiplake Lock, Mill Lane Shiplake , Henley-on-Thames, RG9 3NA 2022-01-06 18:03:26 (ASHP)													

18	Kitchen	1256.48	K2	600	800	1408	678	346	484	632	788	952	1122
			K2	600	400	704	173	339	242	316	394	476	561
			K2	600	500	880	216	424	303	395	493	595	702
					Total Output:	2992	1441	735	1029	1343	1675	2023	2385
18	Utility Room	118.4	0	0	0	0		-	-	-	-	-	-
					Total Output:	1408		0	0	0	0	0	0
18	Utility Room	118.4	0	0	0	0	0	-	-	-	-	-	-
					Total Output:	-	-	0	0	0	0	0	0
18	Entrance Hall	582.46	P+	600	700	1015		250	349	456	568	686	809
					Total Output:	1015		250	349	456	568	686	809
18	Entrance Hall	582.46	P+	750	700	1232	593	303	424	553	690	833	982
					Total Output:	1232	593	303	424	553	690	833	982
18	Toilet 1	226.24	K1	600	410	394		97	136	177	221	266	314
					Total Output:	394		97	136	177	221	266	314
18	Toilet 1	226.24	K1	600	500	480	231	118	165	215	269	325	383
					Total Output:	480	231	118	165	215	269	325	383
22	Bathroom 1	599.92	Double panel no fins	590	480	514		89	136	187	242	299	360
					Total Output:	514		89	136	187	242	299	360
22	Bathroom 1	599.92	P+	450	1400	1582	626	275	419	576	744	922	1107
					Total Output:	1582	626	275	419	576	744	922	1107
					Total Output:	-		-	-	-	-	-	-
18	Hall	619.55	K1	700	1200	1332	641	328	458	598	746	901	1062
					Total Output:	1332	641	328	458	598	746	901	1062
Survey reference: CHO-612 - Shiplake Lock, Mill Lane Shiplake , Henley-on-Thames, RG9 3NA 2022-01-06 18:03:25 (ASHP)													

18	Bedroom 1	1017.73	Double panel no fins	590	1350	1445		355	497	649	809	977	1152
					Total Output:	1445		355	497	649	809	977	1152
18	Bedroom 1	1017.73	Double panel no fins	590	1350	1445	696	355	497	649	809	977	1152
			P+	500	600	696	171	335	239	312	390	471	555
					Total Output:	2141	1031	526	736	961	1199	1448	1707
18	Bedroom 2	825.29	P1	600	1280	883		217	304	396	494	597	704
					Total Output:	883		217	304	396	494	597	704
18	Bedroom 2	825.29	P+	600	1200	1740	838	428	598	781	974	1176	1387
					Total Output:	1740	838	428	598	781	974	1176	1387
18	Bedroom 3	776.18	P1	600	1280	883		217	304	396	494	597	704
					Total Output:	883		217	304	396	494	597	704
18	Bedroom 3	776.18	P1	600	1280	883	425	217	304	396	494	597	704
			P1	600	1100	759	187	365	261	341	425	513	605
					Total Output:	1642	790	404	565	737	919	1110	1309
					Total Output:	-		-	-	-	-	-	-
18	Toilet 2	536.75	K1	700	1100	1221	588	300	420	548	684	825	973
					Total Output:	1221	588	300	420	548	684	825	973