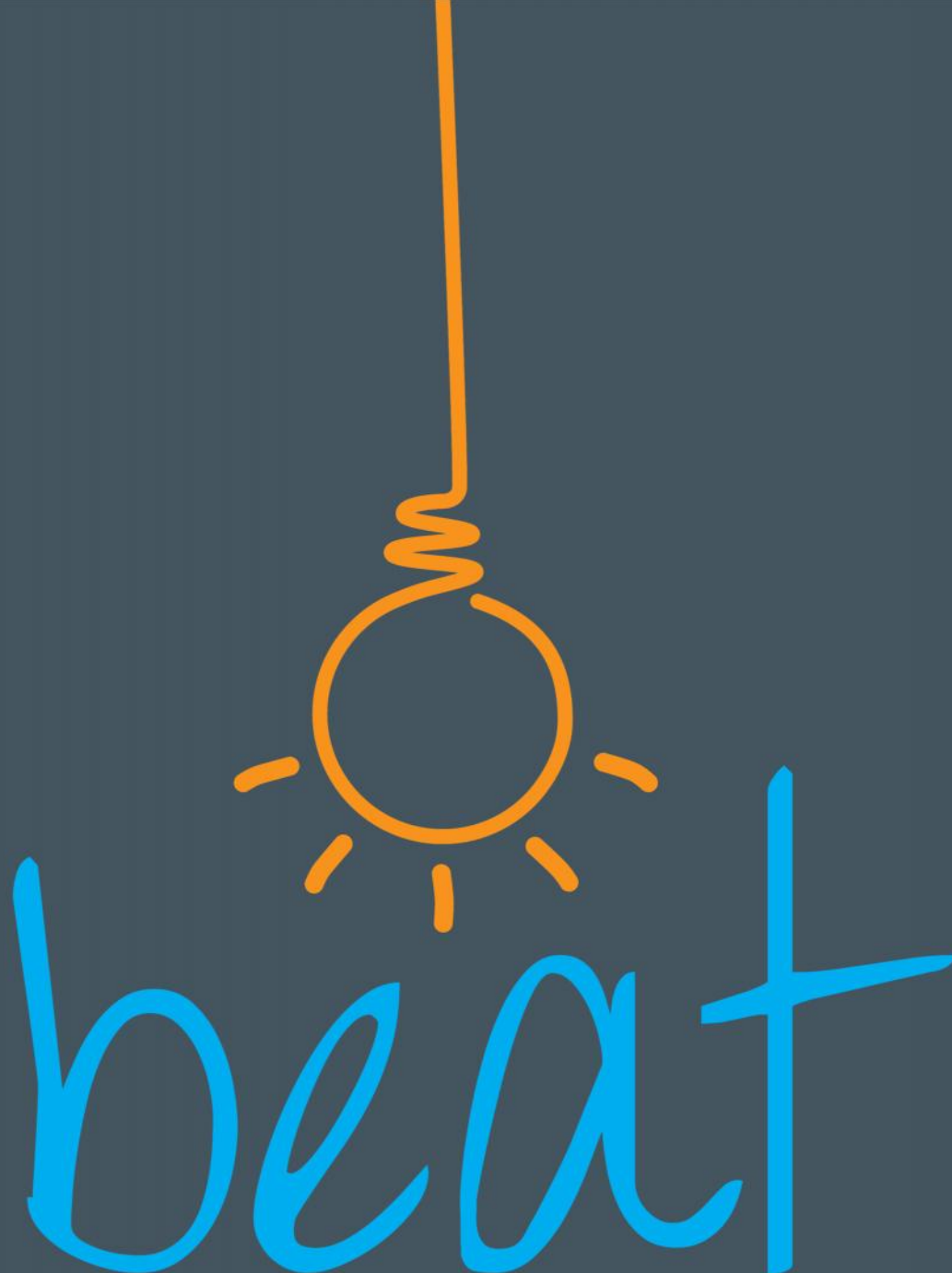




Your sustainable partner

SUSTAINABILITY STATEMENT

For

New Development, 220-222 Elgar Road, Reading

1. Project Introduction

BEAT Solutions were instructed by Maxika Homes to prepare SAP calculations and Energy Statement based on the project drawings and specification provided, together with the confirmed project particulars set out below:-

Client Name: Maxika Homes

Dwelling Address: New Development, 220-222 Elgar Road, Reading

B'Regs Version: 2013

SAP Version: SAP2012

Project Stage: Pre-Planning

2. Revision Schedule

Revision	Rev A	Rev B	Rev C
Date	25 th March 2021		
Prepared By	SS		
Checked By	DP		
Issue Date	26 th March 2021		
Notes	First Issue		
Report Reference	SAP-1180 - Sustainability Statement – 220-222 Elgar Road, Reading		

The figures within this report have been based on indicative modelling and may not represent the as built emission or energy use of the proposed development. Please contact BEAT Solutions should you have any questions about this report.

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3. Introduction

This sustainability statement has been prepared by BEAT Solutions to support the planning application for the new development at 220-222 Elgar Road, Reading. The application consists of the construction of 18 new dwellings with associated access, parking and landscaping. BEAT Solutions have been instructed by Maxika Homes to produce this report. This report has been produced using SAP2012 methodology to ascertain the relevant performances of Dwelling Emission Rate (DER) & Target Emission Rate (TER).

Site Description

A desktop survey of confirms that the site is located in outskirts of a low rise residential area within Reading.

Planning Policy Requirements

The project is required to demonstrate where possible compliance of the Sustainable Design & Construction SPD Checklist (*Table 3.1: Major New-build residential Development *10 homes and above*), which in summary requires:-

- **Energy Efficiency:**

Zero Carbon (or if unachievable, a minimum 35% improvement in the dwelling emission rate over the target emission rate, as defined in the 2013 Building Regulations and planning contribution to offset remaining carbon emissions to zero).

4. Minimum Energy Efficiency Measures

(used to meet a 35% improvement over DER/TER)

Fabric Approach:-

One of the first steps and the most important of a sustainable energy strategy is to reduce the energy demand.

The approaches detailed in this section form the basecase of performance for the properties. It is therefore intended to incorporate the measures detailed below into the design and build of the proposed development.

Insulation Standards

The development will incorporate insulation U-Values in the building envelope (walls, roofs, floors and glazing) in comparison to Part L1a (2013) Building Regulations – table 4 as detailed below.

Element	Notional (TER)	Proposed (DER)
Walls - W/(m ² K)	0.18	0.26
Party Walls - W/(m ² K)	0.00	0.00
Floors - W/(m ² K)	0.13	0.12
Cold Roofs - W/(m ² K)	0.13	0.10
Sloping Roofs - W/(m ² K)	0.13	0.16
Windows & Glazed Doors - W/(m ² K)	1.40	1.40
Front Doors - W/(m ² K)	1.00	N/A

Ventilation & Airtightness

It is confirmed that all dwellings will be naturally ventilated through the means of background ventilators with continually running extractor fans located in the kitchens and wet rooms (DMEV). Extractor fans to enter a boost mode when room is in use. This is known as System 3 under Approved Document F. Both background and mechanical ventilation to be designed and installed in accordance with Part F regulation requirements. Mechanical extractor fans to also be tested to ensure performance with Part F extract rates.

Air tightness standards will exceed Approved Document Part L requirements. By reducing air leakage rates within all properties to 5.00 m³/(h.m²) @ 50 Pa, instead of a default 15 m³/(h.m²) @ 50 Pa, an improvement will therefore be seen in the DER/TER. With a reduction in the air leakage rates of the properties a reduced space heating demand will be sought, therefore reducing overall carbon emissions.

Thermal Bridging

In well insulated buildings, as much as 30% of heat loss can occur through thermal bridges, which occur when highly conductive elements (such as metal and plastic) enable a low resistance escape route for heat. It is proposed that the development will be constructed using masonry construction methods. It is

proposed that the use of Accredited Construction thermal bridging details will be used.

Limiting the Risk of Summer Overheating

It is not proposed to provide any mechanical cooling to the dwellings on the proposed development. Thermal comfort will be achieved through the specification measures such as good thermal insulation, air tightness and passive ventilation via the extractor fans.

5. Possible Low/Zero Carbon Technologies

(used to achieve a 35% improvement over DER/TER)

In arriving at the project specification, a selection of low/zero carbon and renewable technologies were considered for implementation:-

Biomass Boiler:-

Biomass boilers could be used for the production of heat in buildings through combustion of bio fuels such as wood chips or pellets. Common types of biomass fuels include wood from forests, urban tree pruning, farmed coppices, farm wastes and wood waste from timber processing. For domestic heating systems, the most common fuel types are wood pellets, wood chips or logs. Wood chips can be readily available and relatively cheap with new supply routes coming into the market. Pellets are the most expensive of the fuel types but also more energy dense and therefore are less bulky to store. Pellets are also much easier to handle, simplifying the boiler and fuel handling system and potentially improving reliability for smaller scale systems. Logs are less suitable for social housing and flats because they require manual handling of fuel which is difficult to co-ordinate. One of the most appropriate uses for pelleted fuel is communal heating. However, this requires substantial plant and pellet storage space, which is uncommon on most flatted developments.

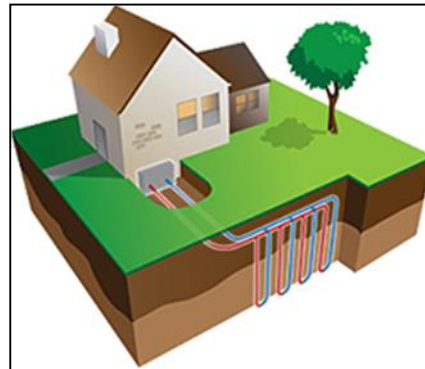


Ground Source Heat Pump: -

Ground source heat pumps (GSHPs) concentrate the heat of the sun's rays stored naturally at low temperature in the ground. The system circulates fluid through a long loop of pipe (called a 'ground loop'), which in UK housing will normally be via a vertical borehole, though there are other options, such as trenches which requires large open spaces. Heat is extracted from the water in the ground loop via the heat exchange pump, and circulated to the home using a network of radiators or under floor heating. Because heat pumps work most efficiently when providing lower temperature heat (40-50°C), slightly larger radiators are used to ensure sufficient heat transfer within rooms.



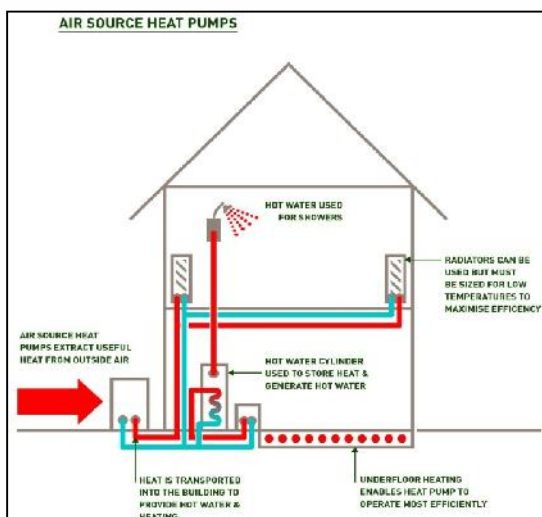
Horizontal Loop System



Vertical Loop System

Air Source Heat Pump:-

Air source heat pumps (ASHPs) use the ambient air temperature as their heat source, and thus avoid the 'ground loop' and associated drilling costs of GSHP's. However, because the temperature of air is less stable throughout the year they operate at a lower efficiency than GSHPs due to seasonal efficiencies. ASHP's could be useful in some off-gas situations where ground conditions or access issues prevent borehole drilling or trenches. Careful consideration should be given in urban areas to consider neighbouring properties as ASHP's can generate some noise and can be considered a nuisance by neighbouring properties. This can be overcome by siting the heat pumps away from nearby properties or conducting environmental noise surveys to establish acceptable levels and locations for the heat pumps.



Principles of designing an ASHP



ASHP Installed on a new dwelling

Solar Photovoltaic:-

Solar photovoltaic (PV) systems generate electricity from sunlight. The direct current (DC) power that is produced via the panels is converted via an inverter into alternating current (AC) power, which can be used to power the normal range of domestic appliances and/or be exported to the local electricity network to offset electricity costs. A range of systems are available, from roof-mounted panels to PV tiles which look similar to conventional tiles. The amount of power that a PV panel will deliver is proportional to the amount of sunlight that falls upon it; therefore PV panels are best placed so that they face broadly south and are unshaded for the major part of the day. The cost of installation has been driven down in the last year due to the government lowering the feed-in-tariff (FIT) which pays property owners who generate electric for a fixed 25 year period.



Photovoltaic Panels (in roof system)

Solar Hot Water:-

Solar hot water systems (SHW) use the sun's energy to heat domestic hot water. The heat from the solar collector is used to heat water in a cylinder, where it can be stored until it is needed. A secondary heating source (such as an electric immersion heater, or a heating coil from a gas boiler) is usually used to bring the water up to the required temperature (typically 60°C) when necessary. In summer, SHW systems can provide most of a household's hot water demand, subject to the correct sizing of the solar thermal store. In winter this proportion is considerably less but averaged over the year the typical contribution to annual hot water demand is around 50%.



Solar Evacuated Tubes



Flat Panel System

Wind Turbines:-

A wind turbine is a machine for converting the kinetic energy in the wind into mechanical energy which is then converted into electrical energy. Wind turbines are usually 'horizontal axis' machines with a tower, nacelle (the enclosure for the workings), hub and three blades, although any number of blades are possible, as are 'vertical axis' turbines (which can also look visually impressive). It is generally considered that three bladed turbines are the most aesthetically pleasing horizontal axis turbine and they are usually coloured a white grey colour. Turbines are often categorised as small, medium and large, with small usually referring to turbines with rated power up to 50kW. Medium turbines range from around 250-300kW, but with the size of turbines having increased dramatically in the last ten years, a medium turbine could be referred to as anything below 800kW. The largest onshore turbines currently in the UK are 3MW (3,000kW). Large turbines in exposed areas are cost effective. The smaller the turbine, the more turbulent the airflow (such as in urban areas), the lower the economic benefit and the longer the 'payback'.



Horizontal Wind Turbine



Vertical Wind Turbine

6. Proposed Project Specification

(used to achieve a 35% improvement over DER/TER)

The table below details the proposed specification against the notional specification used in calculating the DER and TER. Using a traffic light system we have highlighted main changes when compared to the notional values, as below:-

Worse Than Notional

Same as Notional

Better Than Notional

Element	Notional (TER)	Proposed (DER)
External Walls (W/m ² K)	0.18	0.26
Party Walls (W/m ² K)	0.00	0.00
Ground Floors (W/m ² K)	0.13	0.12
Exposed Floors (W/m ² K)	0.13	0.25
Cold Roofs (W/m ² K)	0.13	0.10
Sloping Roofs (W/m ² K)	0.13	0.16
Windows (W/m ² K)	1.40	1.40
Rooflights (W/m ² K)	1.40	1.40
Front Entrance Doors (W/m ² K)	1.00	N/A Corridors to be heated
Air Tightness - m ³ /(hr/m ²) @ 50pa	5.00	5.00
Thermal Bridging	0.15 W/(m ² K)	Accredited Construction Details
Ventilation Type	Intermittent Extract Fans	System 3 – Background Ventilators and continuous running extract fans
Air-Conditioning	None	None
Heating System	Mains Gas Combi Boiler 89.5% Efficient via Radiators (room sealed & fan assisted)	Mains Gas Combi Boiler 89.5% Efficient via Radiators (room sealed & fan assisted)
Heating Controls	Time & Temperature Zone Control w/c Weather Compensation	Programmer, roomstat/s & TRV's
Hot Water	Via Main Heating Boiler	Via Main Heating System
Secondary Heating	None	None
Low Energy Lighting	100%	100%
Thermal Mass Parameter	Medium = 250	Precise Calculation
Renewables	None	Apportioned Solar PV array

7. Proposed Energy Strategy

After considering the above technologies, a choice has been made to use mains gas combination boilers for the heating and hot water demand. All properties will be fitted with high efficiency gas combination boilers serving radiators with a central programmer, roomstat/s and TRV's fitted to the radiators.

SAP Modelling

SAP Calculations have been modelled for all dwellings on the site. The DER/TER values shown in Appendix 1 have been extracted directly from SAP Calculations produced for each plot as well as an apportioned site (block) average. This document also details the expanded specification from the summary detailed in section 6.

Renewables

Photovoltaic Panels have been used for energy generation which helps achieve the required 35% improvement over DER/TER.

A Solar PV array with an annual yield of 13,500 kWh is required in order to meet compliance with the 35% improvement required when adopting the full project specification which can be found in Section 6 or Appendix 1.

Following a review of the elevation drawings, reference A4080-2201-P1 & A4080-2201-P1 we believe that 45no panels can be sited on the southern roof slope. A simple mark-up of the drawings showing the potential for 45 solar panels can be found in Appendix 3. The roof slope has potential to accommodate a few more solar PV panels if the rooflights located on this elevation can be adjusted or removed. However, this is not required based on the current proposal.

The PV array has been assumed to have little or no shading which equates to <20%. A full overshadowing assessment will need to be carried out by a competent person to ensure this assumption is correct. Should there be greater than 20% shading on the array, amendments may be required to the array size to ensure compliance is met.

The PV array will be connected to the landlord's supply where the benefit can be used for lighting and heating within the communal areas and external spaces. The yield will also be apportioned within the SAP Calculations for each flats, as accepted using a standard methodology. A copy of the apportioned Solar PV schedule can be found within Appendix 2.

8. Water Efficiency

Internal water consumption will be significantly reduced from the national average of 125 litres per person per day set by building regulations. This will be done through the use of practical and hygienic water saving measures.

The developer has committed to achieve a maximum water usage of 110 litres/person/day for this project in order to comply with the local authorities' requirements. Part G Water Calculations have been produced for all house

types. A copy of a Part G Water Calculation for this development can be found within Appendix 4. However it can be confirmed that the developer has committed to meet the specification detailed below:-

All Taps: 6 litres/minute
 All Baths: 185 litres to overflow
 All Showers (including over baths): 7 litres/minute
 All Dishwashers: 1.25 litres/place/setting
 All Washing Machines: 8.17 litres/kg dry load
 All W/C's: 6/3 litres flushes
 All Kitchen & Utility Taps: 6 litres/minute
 No Waste Disposal Equipment Installed
 No Water Softeners Installed

The proposed specification above will deliver 109.00 litres/person/day as seen in Appendix 4.

9. Conclusion

A Zero Carbon specification has not been sought on this development. The easiest route to facilitate a zero carbon development is to have a Biomass community heating supply all flats. This is not possible to facilitate with the current development proposal. This is due to the lack of substantial plant room space required to site the biomass boilers and associate fuels. Therefore, a DER/TER improvement of 35% with a Section 106 offset contribution has been sought. A detailed breakdown of the Section 106 contribution can be found further on in this conclusion.

It can be seen from the results of Appendix 1, that the proposed development specification achieves a 35% improvement in DER/TER as a site (block) average. We consider the proposed specification, detailed in Appendix 1, to be sufficient evidence that the development has incorporated a comprehensive set of energy efficiency and renewable energy measures in order to meet the required DER/TER improvement. This will be supplemented by a Section 106 contribution which has been broken down below:

Section 106 Contribution Calculation:

Site Average TER as defined in the Building Regulations 2013 (fuel factor = 1.00)	17.21 kgCO ₂ /m ² /yr
Site Average TER Improvement achieved on-site (35.91%)	6.181 kgCO ₂ /m ² /yr
Site Average TER to be offset through S106 contribution (64.09%)	11.029 kgCO ₂ /m ² /yr
64.09% of TER x total square meters (1,216.71m ²) = total excess CO2 emissions annually	13,419.09 kgCO ₂ /m ² /yr = 13.419 tonnes CO2/yr
Annual excess CO2 emissions x £1800 = S106 contribution	£ 24,154.20

This report accurately identifies the proposed construction and mechanical specification along with its performance for the scheme. This development will offer 18 energy efficient flats with 35% CO2 reduction as required by Sustainable Design & Construction SPD Checklist (Table 3.1: Major New-build

residential Development *10 homes and above). As well as a Section 106 contribution to offset the remaining 65% carbon reduction required.

We therefore confirm the proposed development complies with the Local Plan and Sustainable Design & Construction SPD Checklist Table 3.1.

This report has been produced by:



Scott Spearing | Energy & Sustainability Specialist | BEAT Solutions
Accredited OCDEA Assessor

Other Services Include:-

Air Permeability Testing
Acoustic Testing
Ventilation Extract Testing & Commissioning (Part F)
Water Efficiency Calculations (Part G)
SBEM Calculations
Passive House Design Reports (PHPP)
Condensation Risk Analysis Reports
PSI Value Calculations (ψ)

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APPENDIX 1: SAP Calculation Specification & SAP Block Performance Summary



Appendix 1 - SAP Calculation Summary

Client Name: Maxika Homes

Project Name: New Development @ 220-222 Elgar Road, Reading

SAP Ref: SAP-1103

SAP Version: SAP 2012

DER/TER % Improvement Required: 35.0 %

Target FEE Score: None



Plot No.	SAP 2012						Special Features		Solar PV*			Air Permeability Rating	
	DER	TER	%	DFEE	TFEE	%	Wood Burner	Ventilation Type	No. Panels	kW Peak	Proposed Facing		
1	15.02	20.76	27.65	51.54	51.12	-0.82	✗	System 3	See "Renewables" section below along with the "Apportioned Solar PV Schedule" detailed within Appendix 2.			5.00	
2	11.43	18.07	36.75	37.51	39.39	4.77	✗	System 3				5.00	
3	11.90	18.10	34.25	44.49	45.97	3.22	✗	System 3				5.00	
4	11.01	17.06	35.46	46.21	49.06	5.81	✗	System 3				5.00	
5	12.97	18.83	31.12	48.61	50.30	3.36	✗	System 3				5.00	
6	11.98	18.31	34.57	40.67	40.85	0.44	✗	System 3				5.00	
7	9.00	15.92	43.47	29.16	30.67	4.92	✗	System 3				5.00	
8	9.91	16.36	39.43	37.92	39.16	3.17	✗	System 3				5.00	
9	10.12	16.48	38.59	37.22	38.62	3.63	✗	System 3				5.00	
10	9.11	16.12	43.49	28.96	30.72	5.73	✗	System 3				5.00	
11	13.52	18.86	28.31	49.98	49.10	-1.79	✗	System 3				5.00	
12	13.13	19.17	31.49	45.32	45.19	-0.29	✗	System 3				5.00	
13	9.74	16.47	40.86	32.21	33.46	3.74	✗	System 3				5.00	
14	9.79	15.79	38.00	44.50	47.46	6.24	✗	System 3				5.00	
15	10.48	17.02	38.43	34.60	35.26	1.87	✗	System 3				5.00	
16	10.63	17.04	37.62	38.20	39.89	4.24	✗	System 3				5.00	
17	10.10	15.89	36.44	41.38	42.55	2.75	✗	System 3				5.00	
18	10.78	16.62	35.14	43.28	44.42	2.57	✗	System 3				5.00	
Site (Block) Average			35.91	Site (Block) Average			3.13						

Revision Date	25/03/2021
Revision Reference	Rev -
Revision Comments	Finalised revision for submission alongside the energy statement to the local authority.

Fabric	External Walls	U-Value = 0.26	U-Value achieved through masonry construction. External finish, 100mm Cavity filled with Knauf Earthwool Dritherm 32, 100mm medium dense concrete blocks, 12.5mm plasterboard on dabs with skim finish.
	Party Walls	U-Value = 0.00	Party walls to have a filled cavity with edge sealing. Based on dense concrete blockwork with plasterboard on dabs on both sides.
	Ground Floors	U-Value = 0.12	Block & Beam Floors, 150mm Celotex XR4000, 75mm Screed.
	Exposed Floors	U-Value = 0.25	Construction currently unknown. Construction of this element not to exceed a U-Value of 0.25 W/m²K.
	Party Floors & Ceilings	U-Value = -	Based on precast concrete plank floors with screed laid on insulation. Floors & Ceiling to be designed and installed to meet Part E acoustic standards.
	Pitched Roofs	U-Value = 0.10	400mm mineral wool quilt insulation to all loft spaces.
Openings	Sloping Roofs	U-Value = 0.16	100mm Celotex GA4000 between rafters, 50mm Celotex GA4000 fixed internally, 12.5mm plasterboard with skim finish.
	Front Doors	U-Value = N/A	Front door U-Values not applicable due to corridors being heated.
	Windows	U-Value = 1.40	U-Value not to exceed 1.40 W/m²K. Based on Double glazed units.
HW & Heating	Rooflights	U-Value = 1.40	U-Value not to exceed 1.40 W/m²K. Based on Double glazed units.
	Heating System	All Plots: Based on Ideal Logic Combi ESP1 24kW Mains Gas Combination Boilers.	
	Emitter Type	Radiators throughout all plots.	
	Controls	Programmer, roomstats & TRV's	
	Cylinder Size	N/A - Due to the use of combination boilers to all plots.	
Misc.	Standing Loss	N/A - Due to the use of combination boilers to all plots.	
	Secondary Heating	None currently specified.	
	Thermal Bridging	Calculated using Accredited Construction Details.	
	Ventilation Type	System 3 - Background ventilators with continually running extract fans located in the kitchens and wet rooms. Extractor fans to enter a boost mode when room is in use. Ventilation to be designed, installed and tested in accordance with Part F regulations.	
	Renewables*	The block is to have a Solar PV array which is capable of generating 13,500 kwh/year. We have provided a rough mark up of the south elevation drawings to detail the potential space for 45 panels. This can be seen in Appendix 3 of the full report.	
	Lighting	100% low energy lighting throughout all properties.	
	Showers	Non Electric only.	
	Water Usage	Water usage not to exceed 125 litres/person/day.	
	Other	All communal corridors and stairwells to be heated.	

This revision schedule should be read in conjunction with your full SAP report, as this schedule only provides a brief overview of the project or plot.

This revision schedule should be read in conjunction with your full SAP report, as this schedule only provides a brief overview of the project or plot, every effort has been made to ensure this summary is correct. However in no event shall BEAT Solutions be liable for any incidental, indirect, consequential or special damages of any kind, or any damages whatsoever, including, without limitation, those resulting from loss of profit, loss of contracts, goodwill, data, information, income, expected savings or business relationships, whether or not advised of the possibility of such damage, arising out of or in connection with the use of this document.

* kW Peak from proposed PV files/panels to be confirmed by specialist engineer taking into account site specific facings, overshadowing and elevations.

BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)

Block Reference	SAP-1180 (Elgar Road)	Issued on Date	
Block Name	Elgar Road, Reading		
Assessor Details	Mr. Scott Spearing, Scott Spearing, Tel: 01489 565920, scott@beatsolutions.co.uk		Assessor ID p775-0001
Client	Maxika Homes, MAXIKA HOMES		

Block Compliance Report - DER

Block Reference: SAP-1180 (Elgar Road)		Block Name: Elgar Road, Reading			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DER (kgCO ₂ /m ²)	TER (kgCO ₂ /m ²)	% DER/TER
SAP-1180 - Flat 1-Rev -	1	50.26	15.02	20.76	27.64 %
SAP-1180 - Flat 2-Rev -	1	55.24	11.43	18.07	36.74 %
SAP-1180 - Flat 3-Rev -	1	71.86	11.90	18.10	34.27 %
SAP-1180 - Flat 4-Rev -	1	89.8	11.01	17.06	35.46 %
SAP-1180 - Flat 5-Rev -	1	66.76	12.97	18.83	31.14 %
SAP-1180 - Flat 6-Rev -	1	50.26	11.98	18.31	34.57 %
SAP-1180 - Flat 7-Rev -	1	55.24	9.00	15.92	43.45 %
SAP-1180 - Flat 8-Rev -	1	71.86	9.91	16.36	39.41 %
SAP-1180 - Flat 9-Rev -	1	67.84	10.12	16.48	38.57 %
SAP-1180 - Flat 10-Rev -	1	52.39	9.11	16.12	43.50 %
SAP-1180 - Flat 11-Rev -	1	64.98	13.52	18.86	28.31 %
SAP-1180 - Flat 12-Rev -	1	50.26	13.13	19.17	31.51 %
SAP-1180 - Flat 13-Rev -	1	55.24	9.74	16.47	40.86 %
SAP-1180 - Flat 14-Rev -	1	110.02	9.79	15.79	37.98 %
SAP-1180 - Flat 15-Rev -	1	52.39	10.48	17.02	38.44 %
SAP-1180 - Flat 16-Rev -	1	64.98	10.63	17.04	37.60 %
SAP-1180 - Flat 17-Rev -	1	97.44	10.10	15.89	36.43 %
SAP-1180 - Flat 18-Rev -	1	89.89	10.78	16.62	35.15 %
Totals:	18	1216.71	200.62	312.86	
Average DER = 11.03 kgCO ₂ /m ²		% DER/TER	PASS		
Average TER = 17.21 kgCO ₂ /m ²		35.91 %			

BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)

Block Compliance Report - DFEE

Block Reference: SAP-1180 (Elgar Road)		Block Name: Elgar Road, Reading			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DFEE (kWh/m ² /yr)	TFEE (kWh/m ² /yr)	% DFEE/TFEE
SAP-1180 - Flat 1-Rev -	1	50.26	51.54	51.12	-0.82 %
SAP-1180 - Flat 2-Rev -	1	55.24	37.51	39.39	4.79 %
SAP-1180 - Flat 3-Rev -	1	71.86	44.49	45.97	3.21 %
SAP-1180 - Flat 4-Rev -	1	89.8	46.21	49.06	5.81 %
SAP-1180 - Flat 5-Rev -	1	66.76	48.61	50.30	3.37 %
SAP-1180 - Flat 6-Rev -	1	50.26	40.67	40.85	0.45 %
SAP-1180 - Flat 7-Rev -	1	55.24	29.16	30.67	4.92 %
SAP-1180 - Flat 8-Rev -	1	71.86	37.92	39.16	3.18 %
SAP-1180 - Flat 9-Rev -	1	67.84	37.22	38.62	3.62 %
SAP-1180 - Flat 10-Rev -	1	52.39	28.96	30.72	5.73 %
SAP-1180 - Flat 11-Rev -	1	64.98	49.98	49.10	-1.80 %
SAP-1180 - Flat 12-Rev -	1	50.26	45.32	45.19	-0.30 %
SAP-1180 - Flat 13-Rev -	1	55.24	32.21	33.46	3.72 %
SAP-1180 - Flat 14-Rev -	1	110.02	44.50	47.46	6.23 %
SAP-1180 - Flat 15-Rev -	1	52.39	34.60	35.26	1.88 %
SAP-1180 - Flat 16-Rev -	1	64.98	38.20	39.89	4.24 %
SAP-1180 - Flat 17-Rev -	1	97.44	41.38	42.55	2.74 %
SAP-1180 - Flat 18-Rev -	1	89.89	43.28	44.42	2.57 %
Totals:	18	1216.71	731.76	753.18	
Average DFEE = 41.17 kWh/m ² /yr		% DFEE/TFEE	PASS		
Average TFEE = 42.50 kWh/m ² /yr		3.13 %			

APPENDIX 2: Apportioned Solar PV Schedule

Apportioned Solar PV Schedule

Client Name: Maxika Homes

Project Name: Elgar Road, Reading

SAP Reference: SAP-1180

CODE Reference: N/A

Project Requirement:



Rev Date: 22/03/2021

Rev Ref: Rev -

IMPORTANT NOTE

The Total PV Yield (kWh/yr) specified below is the minimum amount required to demonstrate compliance with the projects requirements detailed above. Please note the PV Yield (kWh/yr) is different from the PV Peak (kW) therefore it is important that when seeking quotations for the supply and installation it should be noted that there are often detailed in PV Peak (kW). In such case, the client is responsible for ensuring with the supplier that the required PV Yield (kWh/yr) can be met with the quoted system. This will often require a full site survey by the supplier to confirm site specific factors such as; orientation, elevation and overshadowing. Once this survey has been completed we suggest the client request in writing confirmation of the total Yield (kWh/yr) so as to ensure the requirements are still met upon installation. Should the Yield (kWh/yr) not meet the requirement below we must be notified immediately in writing.

Plot No.	Floor Area	Apportioned PV (Per Plot)
1	50.26	557.66
2	55.24	612.92
3	71.86	797.32
4	89.80	996.38
5	66.76	740.74
6	50.26	557.66
7	55.24	612.92
8	71.86	797.32
9	67.84	752.72
10	52.39	581.29
11	64.98	720.99
12	50.26	557.66
13	55.24	612.92
14	110.02	1220.73
15	52.39	581.29
16	64.98	720.99
17	97.44	1081.15
18	89.89	997.37

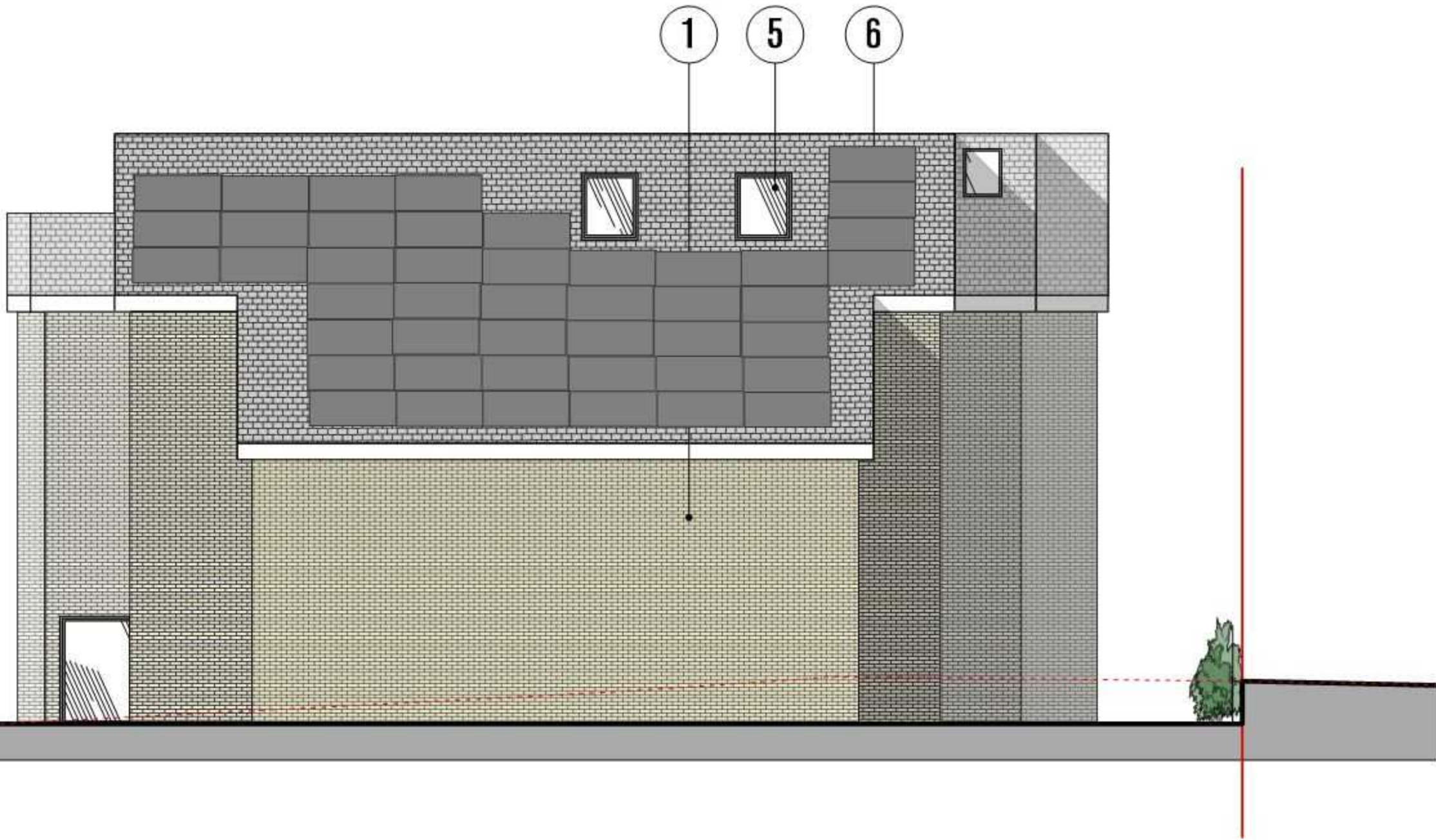
Plot No.	Floor Area	Apportioned PV (Per Plot)

Input and Results Information

Total Floor Area (m ²)	1216.71
Total PV Yield (kWh/yr)	13,500
kWh/yr/m ²	11.10

APPENDIX 3: Annotated Elevations Showing Solar PV Feasibility

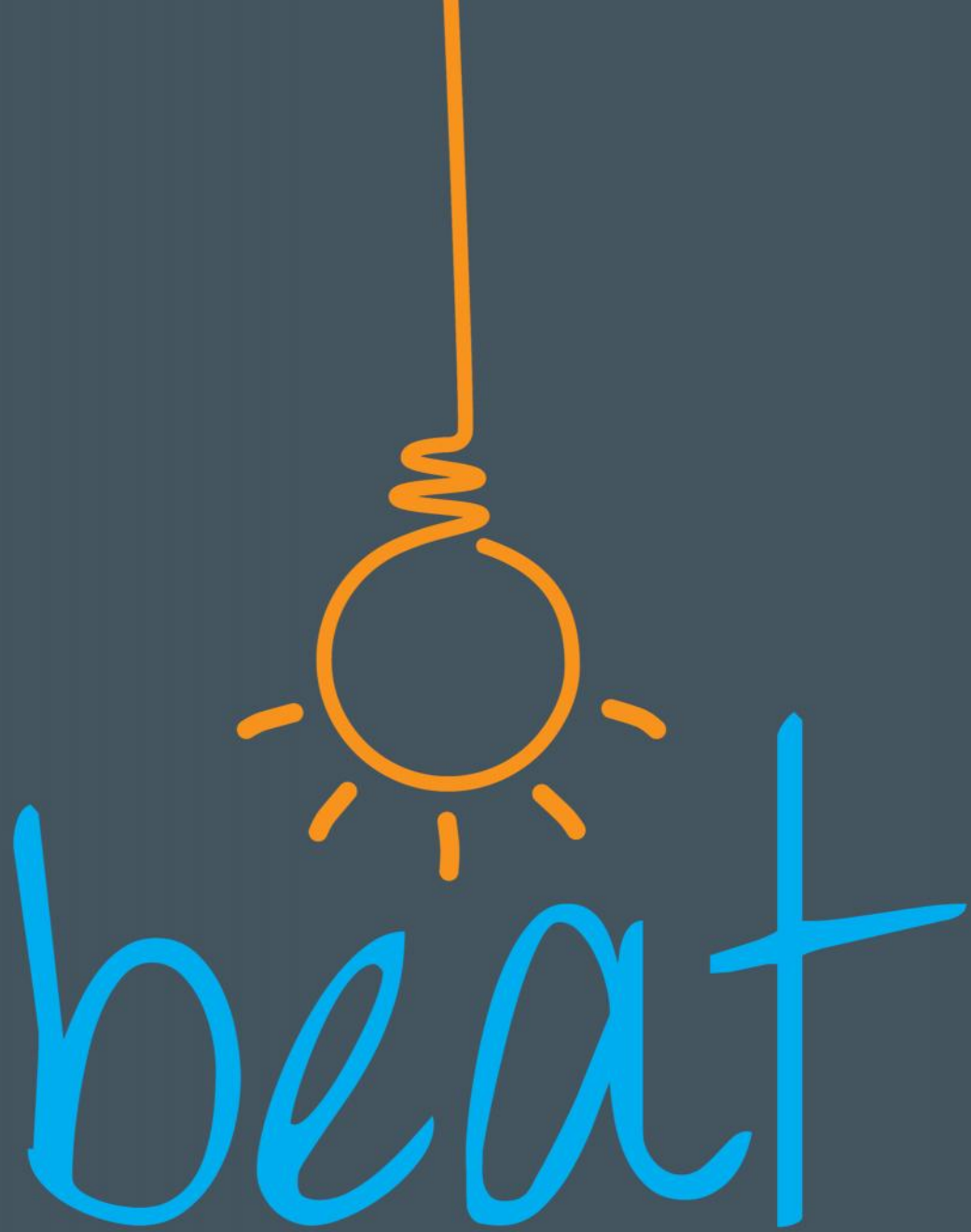




Proposed South Elevation

APPENDIX 4: Part G Water Efficiency Calculation





Your sustainable partner

**WATER EFFICIENCY
AS DESIGNED STAGE
CALCULATION REPORT**

For

Plot 1, 220-222 Elgar Road, Reading, RG2 0BW

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1. Executive Summary

This report has been produced by BEAT Solutions Ltd on 26th March 2021 for Maxika Homes to demonstrate compliance with Building Regulation Part G Regulation 17K. This report confirms the water usage for the dwelling to be 109.00 litres/person/day.



2. Introduction

BEAT Solutions have been instructed to calculate the predicted water usage for the dwelling based on the proposed specification. This report has been produced by Scott Spearing a certified BRE assessor.

The methodology used to calculate the water usage is the national approved BRE water efficiency calculation procedure.

A copy of this report should be submitted to the Building Control Officer with 24hrs.

3. Compliance Summary

BEAT Solutions Ltd received from the client sufficient information to enable the internal water usage to be calculated. The client confirmed the required target water usage as below. The schedule below confirms the following:-

Building Type:	New Dwelling
Targeted Water Usage:	110.00 litres/person/day
Proposed Water Usage:	109.00 litres/person/day
Building Regulation Compliant?:	Pass
Code Score (if applicable):	Code Level 4

This certificate confirms the following dwelling, based on the proposed specification included within this report which has been provided by the client is targeted to score the following water usage. This report and certificate is to be submitted to your building control officer within 24hrs.

Calculation for

Maxika Homes

For the following

Plot 1, 220-222 Elgar Road, Reading, RG2 0BW

A

New Dwelling

Which is required to achieve less than

110.00 litres/person/day

Calculated by

Scott Spearing

On

26th March 2021

Is predicted to achieve

109.00 litres/person/day and Passed Building Regulations

Which has scored under Code for Sustainable Homes

Code Level 4

This certificate has been produced by:



Scott Spearing | Energy & Sustainability Consultant | BEAT Solutions Ltd

Office Address:

Unit 2, Barley Business Park, Duncan Road, Park Gate
Southampton, Hampshire, SO31 1ZT

www.beatsolutions.co.uk

T: 01489 565920 | F: 01489 589738 | E: info@beatsolutions.co.uk



Job no:	SAP-1180
Date:	26/03/2021
Assessor name:	Scott Spearing
Registration no:	N/A
Development name:	Plot 1, 220-222 Elgar Road, Reading, RG2 0BW
Issue Date:	26/03/2021

Rainwater

Greywater

Results

WATER EFFICIENCY CALCULATOR FOR NEW DWELLINGS

(for use with the Code for Sustainable Homes issues Wat 1 for the May 2009 and subsequent versions)

Dwelling Description	New Dwelling
-----------------------------	--------------

1st step - Select from options below:

Is a Rain and/or Greywater system specified?	No
Is a shower AND bath present?	Yes
Has a washing machine been specified?	No
Has a dishwasher been specified?	No

2nd step - Build spreadsheet (click button below)

BUILD SPREADSHEET

As soon as this button is pressed the spreadsheet will change according to the options selected previously in the 1st step. Scroll down to see the changes.

3rd step - Enter consumption details for the specified fittings

TAPS (excluding kitchen taps)	Fitting type	Flow rate (litres/min)	Number of fittings
1	Not to exceed	6.00	1
2			
3			
4			
	Proportionate flow rate (litres/min)		4.20
	Consumption / person / day (Litres)		11.06

BATHS		Fitting type	Capacity to overflow (litres)	Number of fittings
	1	Not to exceed	185.00	1
	2			
	3			
	4			
	Proportionate capacity to overflow (litres)			129.50
		Consumption / person / day (Litres)		20.35
SHOWERS		Fitting type	Flow rate (litres/min)	Number of fittings
	1	Not to exceed	7.00	1
	2			
	3			
	4			
	Proportionate flow rate (litres/min)			4.90
		Consumption / person / day (Litres)		30.59
DISHWASHER				
Where no dishwasher is specified, a default consumption figure of 1.25 litres per place setting is used.				
		Consumption / person / day (Litres)		4.50
WASHING MACHINES				Number of fittings
Where no washing machine is specified, a default consumption figure of 8.17 litres per kilogram of dry load is				

used.				
Where no washing machines have been specified but plumbing for future supply of grey/rainwater was installed, please enter details:				
		Consumption / person / day (Litres)	17.16	
WC's				
	Fitting Type	Flush Type	Volume**	Number of fittings
1	Not to exceed	Full Flush	6.00	1
		Part Flush	3.00	
2		Full Flush		
		Part Flush		
3		Full Flush		
		Part Flush		
4		Full Flush		
		Part Flush		
		Average effective flushing volume (litres)		3.99
		Consumption / person / day (Litres)	17.64	
KITCHEN SINK TAPS		Fitting Type	Flow rate (litres/minute)	Number of fittings
	1	Not to exceed	6.00	1
	2			
	3			
	4			
		Proportionate flow rate (litres/min)		4.20
		Consumption / person / day (Litres)		13.00
WASTE DISPOSAL UNIT				
Is a waste disposal unit specified for the dwelling?		No		
		Consumption / person / day (Litres)		0.00
WATER SOFTENER				
Water Softener in use?		No		
Total capacity used per regeneration (%)				

Water consumed per regeneration (litres)	
Average number of regeneration cycles per day (No.)	
Number of occupants served by the system (No.)	
Water consumed beyond 4% person / day (Litres)	0.00

4th step - Analyse Results[Go to Start](#)**INTERNAL WATER CONSUMPTION**

NET INTERNAL WATER CONSUMPTION	(litres/person/day)	114.30
RAINWATER ONLY COLLECTION SAVING	(litres/person/day)	0.00
GREYWATER ONLY RECYCLING SAVING	(litres/person/day)	0.00
RAIN/GREYWATER COLLECTION SAVING (combined system)	(litres/person/day)	0.00
NORMALISATION FACTOR	(litres/person/day)	0.91
TOTAL WATER CONSUMPTION	(litres/person/day)	104.0
CSH CREDITS ACHIEVED		3
CSH MANDATORY LEVEL:		Level 3/4

17. K COMPLIANCE

EXTERNAL WATER USE	(litres / person / day)	5.00
TOTAL WATER CONSUMPTION	(litres / person / day)	109.0
17. K COMPLIANCE?		Yes

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