

Sustainability and Energy Statement **SRC Recycling, Fontwell Avenue, Eastergate**

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7th January 2022

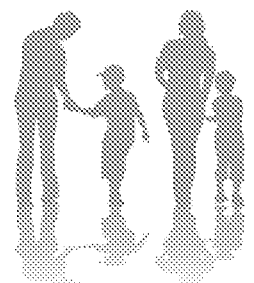


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Executive Summary

This Sustainability and Energy Statement has been prepared in support of a planning application for the construction of 80, 1 and 2-bedroom apartments and 2, 3 & 4-bedroom houses and a Co-Working building on land at SRC Recycling, Fontwell Avenue, Eastergate, West Sussex.

The Statement includes an energy strategy showing how selected energy efficiency measures have been considered and those, which have been incorporated into the scheme.

SAP calculations have been prepared for representative units based upon the construction specification set out within the report and the detailed planning drawings. These provide an accurate assessment of the carbon dioxide emissions arising from the homes and the Co-Working building and have allowed a number of different systems to be tested. The Compliance Reports for the modelled units are attached as Appendix 1.

It is proposed to enhance the fabric insulation standards of the buildings above the minimum required by the Building Regulations.

In addition, it is proposed to install a total of 100 x 300W photovoltaic panels (30.0 kW). These will be installed on the southwest, south and southeast orientated rear and non-prominent roofs of the Co-Working building and Plots 1, 2, 35-37, 39-43, 59-62, 70-75, 78 and 79 and the apartments that comprise 03-08 and 09-13 (25 installations of 4 panels each).

The panels will reduce emissions from the site by a total of **13,500 kg CO₂ per year**.

A Site Plan showing the indicative location of the photovoltaic panels is attached as Appendix 2.

The total emissions from the site and the reduction from energy efficiency measures and renewable technologies can be summarised as follows;

	Emissions	% Reduction
	kg CO ₂ per year	
Total Site Emissions (TER)	124,241	
Emissions after Energy Efficiency (DER)	118,188	4.87%
Reduction in Emissions from Photovoltaic Panels	13,500	11.42%

In addition, the water efficiency measures incorporated into the scheme will ensure a water efficiency target of 110 litres per person per day will be achieved for all homes.

1.0 Introduction

This report has been commissioned by SRC Recycling Limited and provides a Sustainability and Energy Statement for the construction of 80, 1 and 2-bedroom apartments and 2, 3 & 4-bedroom houses and a Co-Working building on land at SRC Recycling, Fontwell Avenue, Eastergate, West Sussex.

The report describes the methodology used in assessing the development and the initiatives proposed.

The buildings have been designed and will be constructed to reduce energy demand and carbon dioxide emissions. The objective is to reduce the energy demand to an economic minimum by making investments in the parts of the units that have the greatest impact on energy demand and are the most difficult and costly to change in the future, namely the building fabric.

The following hierarchy has been followed:

- Lean reduce demand and consumption
- Clean increase energy efficiency
- Green provide low carbon renewable energy sources

The report has been prepared by Ivan Ball of Bluesky Unlimited who are sustainability consultants.

2.0 Planning Policy Context

National Policy

The UK Government published its sustainable development strategy in 1999 entitled “A better quality of life: A strategy for sustainable development in the UK”. This sets out four main objectives for sustainable development in the UK:

- Social progress that recognises the needs of everyone.
- Effective protection of the environment.
- Prudent use of natural resources.
- Maintenance of high stable levels of economic growth and employment.

Sustainable Communities: Building for the Future, known colloquially as the Communities Plan was published in 2003. The Plan sets out a long-term programme of action for delivering sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in parts of the country, low demand in other parts and the quality of our public spaces. The Communities Plan describes sustainable communities as: Active, inclusive and safe, well run, environmentally sensitive, well designed and built, well connected, thriving, well served and fair for everyone.

The most relevant national planning policy guidance on sustainability is set out in:

- National Planning Policy Framework - 2021

Paragraph 152 states;

“The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.”

Local Policy

The local planning policy is provided by the **Arun Local Plan 2011-2031**, which was adopted in July 2018 and the **Aldingbourne Neighbourhood Development Plan 2019-2031**, adopted in July 2021.

Of particular relevance to our topic area are the following, which have been edited for clarity:

Arun Local Plan 2011-2031

Policy SD SP1

Sustainable development

When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will work pro-actively with applicants to jointly find solutions which mean that proposals can be approved wherever possible and to secure development that will contribute to the social, economic and environmental conditions south of the National Park through to the coast and throughout its settlements (both coastal and inland).

This presumption will not be applicable where development requires an Appropriate Assessment or where consideration of the need for one is being undertaken.

Policy ECC SP1

Adapting to climate change

The Council will support development which is located and appropriately designed to adapt to impacts arising from climate change such as the increased probability of tidal and fluvial flooding; water stress; health impacts as a result of extreme temperatures and a decline in the quality of habitats and richness of biodiversity.

In order to achieve this, development must be designed to take account of the following issues:

- a. Location (in relation to flood risk and vulnerability to coastal erosion);*
- b. Water efficiency;*
- c. Shade, cooling, ventilation, solar gain;*
- d. Connectivity to the green infrastructure network;*
- e. Layout and massing;*
- f. Resilience of buildings and building materials to extreme weather events; and*
- g. Capacity of drainage systems and incorporation of Sustainable urban Drainage Systems (SuDS)*

Policy ECC SP2 - Energy and climate change mitigation

All new residential and commercial development (including conversions, extensions and changes of use) will be expected to be energy efficient and to demonstrate how they will:

- a. Achieve energy efficiency measures that reflect the current standards applicable at the time of submission;*
- b. Use design and layout to promote energy efficiency; and*
- c. Incorporate decentralised, renewable and low carbon energy supply systems, for example small scale renewable energy systems such as solar panels.*

All major developments must produce 10% of the total predicted energy requirements from renewable or low carbon energy generation on site, unless it can be demonstrated that this is unviable. Energy efficiency measures will be taken into consideration when the total predicted energy requirements are calculated. The Council will consider 'allowable solutions' where it is clearly demonstrated that the provision of on-site renewable or low carbon energy generation is unviable or not feasible.

Policy W SP1

Water

Arun District Council will encourage water efficiency measures in order to protect the District's water resources and enhance the quality of the water environment which supports a range of habitats and ecosystems. Development will be encouraged to make active use of surface water as a design feature and permitted where it identifies measures to improve and enhance waterbodies, coastal habitats or provides additional flood relief.

The Council will also support development that:

- a. is appropriately located, taking account of flood risk and promotes the incorporation of appropriate mitigation measures into new development, particularly Sustainable Drainage Systems that reduces the creation and flow of surface water and improves water quality;*
- b. reduces the risk to homes and places of work from flooding whilst increasing biodiversity;*
- c. delivers a range of community benefits including enhancing the quality of life and providing greater resistance to the impact of climate change.*

Aldingbourne Neighbourhood Plan 2019-2031

This Statement has been prepared with reference to the Neighbourhood Plan.

3.0 Assessment Methodology

The baseline carbon dioxide emissions from the buildings have been established using agreed building specifications and detailed planning drawings.

SAP calculations have been prepared for a representative range of units and a BRUKL calculation for the Co-Working building.

Emission Factors

The CO₂ emission factors, where applicable, used throughout this report have been taken from the Building Regulation Approved Document L - 2013.

	kg CO ₂ /kWh
Mains gas	0.216
Grid supplied and displaced electricity	0.519

4.0 Proposal

The proposal is for the construction of 80, 1 and 2-bedroom apartments and 2, 3 and 4-bedroom houses and a Co-Working building.

The accommodation schedule for the new dwelling in detail is;

Unit Type	Number	Area	Total Area
		m ²	m ²
Residential Accommodation			
1-Bedroom Apartment	2	50.3	100.6
1-Bedroom Apartment	1	50.7	50.7
1-Bedroom Apartment	1	53.7	53.7
1-Bedroom Apartment	4	56.8	227.2
1-Bedroom Apartment	1	57.4	57.4
1-Bedroom Apartment	1	59.0	59.0
1-Bedroom Apartment	1	65.0	65.0
2-Bedroom Apartment	1	71.9	71.9
2-Bedroom Apartment	8	72.3	578.4
2-Bedroom Apartment	1	72.9	72.9
2-Bedroom Terrace & Semi-detached house	24	79.2	1,900.8
3-Bedroom Terrace & Semi-detached house	11	95.3	1,048.3
4-Bedroom Detached house	1	107.6	107.6
3-Bedroom Detached house	4	116.2	464.8
3-Bedroom Detached house	3	117.5	352.5
3-Bedroom Semi-detached house	8	120.6	964.8
4-Bedroom Detached house	4	130.0	520.0
4-Bedroom Detached house	1	147.0	147.0
4-Bedroom Detached house	3	148.0	444.0
Sub-Total	80		7,286.6
Non-residential Accommodation			
Co-Work accommodation	1	224.6	224.6
Sub-Total	1		224.6
Total			7,511.2

5.0 Energy Efficiency

5.1 Demand Reduction (Be Lean)

Design

The energy performance of a building is affected by its design, construction and use and whilst occupant behaviour is beyond the remit of this statement, better design and construction methods can significantly reduce the life cycle emissions of a building and assist the occupant to reduce consumption.

Sustainable design is not just about incorporating renewable technologies; buildings should be designed at the outset to provide suitable environmental conditions for the occupants whilst also consuming as little energy as practical. It is possible to exceed Building Regulations requirements (Part L - 2013) through demand reduction measures alone, which typically include a combination of passive design measures (e.g. building design and efficient building fabric) and active design measures (e.g. variable speed motors).

Passive Design Measures

The passive design measures proposed include;

Passive Solar Gain

Passive measures include allowing for natural ventilation and exposed thermal mass coupled with high levels of insulation, air tightness and the control of solar gain.

The arrangement of the dwellings is in the context of the shape of the site and the logical location of the site access and the water main that crosses the site and surrounding development but the homes have been arranged with orientations generally towards the northwest/ southeast and northeast/ southwest or north/northeast/ south/southwest and west/northwest/ east/southeast.

All apartments have been designed with dual aspects.

All units benefit from access to direct sunlight throughout the day and there are no homes with a solely northerly aspect.

Natural Daylighting

The orientation and the size of the windows have been optimised to maximise the amount of natural daylight and therefore reduce the demand for artificial lighting.

Efficient Building Fabric

Building Envelope

U-values of the building envelope must meet Building Regulations Part L standards and further improvements to U-values will reduce the building's heating requirements.

Ground floors will be insulated with 150mm of PIR insulation.

It is assumed that the external walls will be built in traditional cavity wall construction with 103mm facing brick (or 100mm dense concrete block as a backing to the locations with flint elevations), 100mm fully-filled cavity and 100mm insulating blockwork internally (or a 150mm fully filled cavity). The cavity will be filled with 100mm PIR insulation or mineral wool insulation depending on the width of the cavity specified.

The (cold) roofs will be insulated with 400mm of mineral wool insulation and sloping ceilings will be insulated with 100mm of PIR insulation between rafters and finished with insulated plasterboard at 62.5mm (12.5mm pb/50mm PIR) underneath.

Windows are proposed as double glazed with Low 'e' soft coat and argon filled.

It is proposed to set maximum limits for the elemental U-values as follows:

Element	Part L Limiting U-values	Proposed U-values	Proposed Improvement
	Wmk	Wmk	
Ground Floors	0.25	0.13	48%
External Walls	0.30	0.18	40%
Roofs (cold)	0.20	0.10	50%
Dormer Roofs/ Dormer Cheeks	0.20	0.15	25%
Sloping Ceilings	0.20	0.15	25%
Windows	2.00	1.20	40%
External Doors	-	1.00	-

Air Leakage

Large amounts of heat are lost in winter through air leakage from a building (also referred to as infiltration or air permeability) often through poor sealing of joints and openings in the building

The Building Regulations set a minimum standard for air permeability in new buildings of 10 m³ of air per hour per m² of envelope area, at 50Pa. It is proposed to achieve a 50% improvement over Building Regulations and the buildings will target a permeability of less than 5.0 m³/hr/m².

Thermal Bridging

The significance of Thermal Bridging, as a potentially major source of fabric heat losses, is increasingly understood.

Improving the U-values for the main building fabric without accurately addressing the Thermal Bridging is no longer an option and will not achieve the fabric energy efficiency and energy and CO₂ reduction targets set out in this strategy.

Accredited Construction Details (ACD's) have been developed to provide the performance standards required to achieve the higher energy efficiency requirements of the Building Regulations. The bridging losses for the new homes have been based upon the use of the ACDs and calculated using SAP Appendix K Table 1.

Ventilation

As a result of increasing thermal efficiency and air tightness, Building Regulations Approved Document F was also revised in 2006 to address the possibility of overheating and poor air quality.

Active Design Measures will include;

Efficient Lighting and Controls

Throughout the scheme natural lighting will be optimised.

Approved Document L1A requires three in four light fittings (75%) to be dedicated low energy fittings. The homes will exceed this and all light fittings will be of a dedicated energy efficient type.

External lighting will be fitted with time controls and light sensors to ensure illumination is restricted to required times. External lighting will be limited to a maximum fitting output of 150w.

Space Heating and Hot Water

It is proposed to install high efficiency gas boilers into each unit to meet the space heating and hot water demand.

5.2 Establishing Carbon Dioxide Emissions

Residential Accommodation

There are 21 apartments divided between 11, 1-bedroom units varying from 50.3 m² to 65.0 m² and 10, 2-bedroom units varying from 71.9 m² to 72.9 m². Calculations have therefore been prepared for a 2-bedroom unit at 72.3 m², which is modelled as a ground, mid and top-floor apartment. These are presented as representative of all apartments.

There are 24, 2-bedroom terrace/ semi-detached houses and 11, 3-bedroom terrace/ semi-detached units of 79.2 m² and 95.3 m² respectively and a calculation has therefore been prepared for one of the 3-bedroom houses, which is modelled as a mid-terrace and end-terrace unit and is presented as representative of mid-terrace and end-terrace/ semi-detached houses of these floor areas.

SAP calculations have been prepared for a 3-bedroom semi-detached house at 120.6 m², which is presented as representative of the eight units at this floor area.

There are 16, detached units with floor areas between 107.6 m² and 148.0 m². SAP calculations have been prepared for a unit at 148.0 m², which is presented as representative of all.

The Regulation Compliance Reports are attached as Appendix 1 but the target dwelling emissions rate (TER), dwelling emissions rate (DER) can be summarised as follows;

2-Bedroom Ground-floor apartment – 72.3 m ²	CO ₂ TER	CO ₂ DER
	kWh/m ² /yr	kWh/m ² /yr
Space heating	6.35	5.75
Water heating	6.94	5.71
Electricity for pumps, fans and lighting	3.05	3.05
Total	16.34	14.51

2-Bedroom Mid-floor apartment – 72.3 m ²	CO ₂ TER	CO ₂ DER
	kWh/m ² /yr	kWh/m ² /yr
Space heating	4.16	3.79
Water heating	7.00	5.73
Electricity for pumps, fans and lighting	3.05	3.05
Total	14.21	12.57

2-Bedroom Top-floor apartment – 72.3 m ²	CO ₂ TER	CO ₂ DER
	kg/m ² /yr	kg/m ² /yr
Space heating	6.38	6.03
Water heating	6.94	5.70
Electricity for pumps, fans and lighting	3.05	3.05
Total	16.37	14.78

3-Bedroom Mid-terrace house – 85.3 m ²	CO ₂ TER	CO ₂ DER
	kg/m ² /yr	kg/m ² /yr
Space heating	7.10	7.10
Water heating	5.69	4.74
Electricity for pumps, fans and lighting	2.60	2.60
Total	15.39	14.44

3-Bedroom End-terrace house – 85.3 m ²	CO ₂ TER	CO ₂ DER
	kg/m ² /yr	kg/m ² /yr
Space heating	8.23	8.45
Water heating	5.67	4.74
Electricity for pumps, fans and lighting	2.59	2.59
Total	16.49	15.77

3-Bedroom Semi-detached – 120.0 m ²	CO ₂ TER	CO ₂ DER
	kg/m ² /yr	kg/m ² /yr
Space heating	8.60	8.79
Water heating	4.63	3.87
Electricity for pumps, fans and lighting	2.29	2.29
Total	15.52	14.95

4-Bedroom Detached house – 145.0 m ²	CO ₂ TER	CO ₂ DER
	kg/m ² /yr	kg/m ² /yr
Space heating	11.88	12.25
Water heating	3.79	3.20
Electricity for pumps, fans and lighting	2.02	2.02
Total	17.69	17.47

Non-residential Accommodation

As part of the development, it is proposed to construct a Co-working hub.

The operation of the building will determine the energy use and carbon emissions but it is assumed the emissions from the Co-Work building will be similar to an office use.

Co-Work Building	CO ₂ TER	CO ₂ BER
	kg/m ² /yr	kg/m ² /yr
Emissions	16.8	14.1

Total Site Carbon Dioxide Emissions

The above results can be aggregated across similar unit types to calculate the total site emissions;

	Area	TER CO ₂ Emissions	BER CO ₂ Emissions
	m ²	kg CO ₂ /yr	kg CO ₂ /yr
Residential Accommodation			
Ground-floor apartments	519.9	8,495	7,544
Mid-floor apartments	342.5	4,867	4,305
Top-floor apartments	474.4	7,766	7,012
2 & 3-Bedroom Mid-terrace houses (79.2 & 95.3)	253.7	3,904	3,663
2 & 3-Bedroom End-terrace houses (79.2 & 95.3)	2,695.4	44,447	42,506
3-Bedroom Semi-detached houses (120.6)	964.8	14,974	14,424
Detached houses	2,035.9	36,015	35,567
	7,286.6	120,468	115,021
Non-residential Accommodation			
Co-Work building	224.6	3,773	3,167
Totals		124,241	118,188

The emissions are reduced as a result of the energy efficiency measures incorporated into the scheme by 6,053 kg CO₂ per year, which equates to a reduction of 4.87%.

5.3 Low-Carbon and Renewable Technologies (Be Clean and Be Green)

The carbon dioxide emissions established above have been used to test the viability of various renewable and low-carbon technologies as follows.

The Government's Renewable Obligation defines renewable energy in the UK. The identified technologies are;

- Small hydro-electric
- Landfill and sewage gas
- Onshore and offshore wind
- Biomass
- Tidal and wave power
- Geothermal power
- Solar

The use of landfill or sewage gas, offshore wind or any form of hydroelectric power is not suitable for the site due to its location. The remaining technologies are considered below;

Wind

Wind turbines are available in various sizes from large rotors able to supply whole communities to small roof or wall-mounted units for individual dwellings.

The Government wind speed database predicts local wind speeds at Fontwell Avenue to be 4.7 m/s at 10m above ground level and 5.5 m/s at 25m above ground level. This is below the level generally required for commercial investment in large wind turbines. In addition, the land take, potential for noise and signal interference make a large wind turbine unsuitable for this development.

Roof mounted turbines could be used at the development to generate small but valuable amounts of renewable electricity but the small output and contribution to total emissions means any investment would be small and purely tokenism. The use of wind turbines will also have a detrimental aesthetic impact on the appearance of the development and the technology is not proposed.

Combined Heat and Power and Community Heating

Combined heat and power (CHP) also called co-generation is a de-centralised method of producing electricity from a fuel and 'capturing' the heat generated for use in buildings. The plant is essentially a small-scale electrical power station. The production and transportation of electricity via the National Grid is very inefficient with over 65% of the energy produced at the power station being lost to the atmosphere and through transportation.

Consequently, CHP can demonstrate significant CO₂ savings and although not necessarily classed as renewable energy (depending on the fuel used) the technology is low carbon.

For a CHP plant to be economic it needs to operate for as much of the time as possible (usually deemed to be in excess of 14 hours per day) and therefore the size of the unit is usually based upon the hot water load of the building (s) with additional boilers meeting the peak space heating demand.

Whilst the site as a whole may generate sufficient demand the site is insufficiently dense to justify a site wide system. In addition, with the emerging change in the carbon factors the emissions from Grid electricity are due to drop to below those for mains gas. Therefore, using main gas to generate electricity on site will increase emissions comparing with the use of main electricity.

CHP is not proposed.

Ground Source Heat Pumps

Sub soil temperatures are reasonably constant and predictable in the UK, providing a store of the sun's energy throughout the year. Below London the groundwater in the lower London aquifer is at a fairly constant temperature of 12° C. Ground source heat pumps (GSHP) extract this low-grade heat and convert it to usable heat for space heating.

GSHP operates on a similar principle to refrigerators, transferring heat from a cool place to a warmer place. They operate most efficiently when providing space heating at a low temperature, typically via under floor heating or with low temperature radiators.

Whilst the houses all have private garden areas it is unlikely there will be sufficient external ground area to sustain a horizontal collection system for each unit and the installation of a ground source heat pump is likely to require the use of a bore hole collection system. The installation of ground source heat pumps to the apartments is not appropriate.

The use of ground source heat pumps with bore-hole collection systems to the houses would be cost prohibitive and there are other systems which could achieve similar emissions reductions for significantly lower cost.

The use of ground source heat pump solutions is not proposed.

Air Source Heat Pumps (ASHP)

Air sourced heat pumps operate using the same reverse refrigeration cycle as ground source heat pumps; however, the initial heat energy is extracted from the external air rather than the ground. These heat pumps can be reversed to provide cooling to an area although this reduces the coefficient of performance of the pumps.

ASHP tend to have a lower coefficient of performance (CoP) than GSHP but are considerably less costly to install. They work well where there is a larger low temperature demand but the efficiency can be impacted on, for example where there is a high hot water demand relative to the space heating load.

The use of air source heat pumps is not proposed.

Solar

(i) Solar Water Heating

Solar hot water panels use the sun's energy to directly heat water circulating through panels or pipes. The technology is simple and easily understood by purchasers.

Solar hot water heating panels are based generally around two types, which are available being 'flat plate collectors' and 'evacuated tubes'. Flat plate collectors can achieve an output of up to 1,124 kWh/annum (Schuco) and evacuated tubes can achieve outputs up to 1,365 kWh/annum (Riomay).

Panels are traditionally roof mounted and for highest efficiencies should be mounted plus or minus 30 degrees of due south. Evacuated tubes can be laid horizontally on flat roofs but flat plate collectors are recommended for installation at an incline of 30 degrees.

The use of solar hot water panels, whilst feasible would require the use of conventional gas boilers with hot water cylinders. The majority of the homes are suited to the use of gas combination boilers and the introduction of cylinders would impact on internal space planning and lead to additional costs.

(ii) Photovoltaics

Photovoltaic panels (PV) provide clean silent electricity. They generate electricity during most daylight conditions although they are most efficient when exposed to direct sunlight or are orientated to face plus or minus 30 degrees of due south.

PV panels can be integrated into many different aspects of a development including roofs, walls, shading devices or architectural panels. The panels typically have an electrical warranty of 20-25 years and an expected system lifespan of 25-40 years.

It is proposed to install a total of 100 x 300W panels on the rear and non-prominent side roofs the Co-Working building and Plots 1, 2, 35-37, 39-43, 59-62, 70-75, 78 and 79 and the apartments that comprise 03-08 and 09-13 (25 installations of 4 panels each). The installations will reduce emissions by a total of **13,500 kg CO₂ per year**, which equates to a reduction of **11.42%** of the total DER emissions.

5.4 Summary of Calculations and Proposals for Low-Carbon and Renewable Technologies

The total emissions for the site based upon the maximum permissible by the Building Regulations (TER) are calculated as **124,241 kg CO₂ per year**, with DER emissions calculated as **118,188 kg CO₂ per year**.

Various technologies have been considered above and whilst wind turbines, combined heat and power, ground source and air source heat pumps and the use of solar hot water heating panels are not considered appropriate the preferred technology is to use photovoltaic panels.

Be Lean

The construction standards for the fabric of the buildings proposes U-values, which demonstrate good practice and improve upon those required by the Building Regulations. Air tightness standards are targeted at a 50% improvement upon the minimum required by the Building Regulations. In addition, it is proposed to install energy efficiency mechanical and electrical services.

The emissions are reduced through energy efficiency measures from the maximum by **6,053 kg CO₂ per year**, which equates to a reduction of **4.87%**.

Be Green

It is proposed to install a total of 100 x 300W photovoltaic panels. These will be installed on the southwest, south and southeast orientated roofs of the Co-Working building and Plots 1, 2, 35-37, 39-43, 59-62, 70-75, 78 and 79 and the apartments that comprise 03-08 and 09-13 (25 installations of 4 panels each).

The arrays will reduce emissions by a total of **13,500 kg CO₂ per year**, which equates to a reduction in the DER emissions of **11.42%**.

A Site Plan showing the indicative location of the panels is attached as Appendix 2.

6.0 Climate change adaption and Water resources

Sustainable Drainage Systems (SUDS)

The site lies within Flood Zone 1 and is classified as being of low risk. It is understood that surface water run-off will be dealt with on site and will discharge to infiltration trenches or soakaways.

Surface Water Management

The houses have private gardens and discretely located rainwater butts will be provided to store rainwater for use with landscaping maintenance.

Consideration has been given to the use of grey water recycling. However, customer's resistance to the appearance of the recycled water and the cost of the systems does not currently make them a viable option. They have therefore not been included in the proposals.

Water efficiency measures

In excess of 20% of the UK's water is used domestically with over 50% of this used for flushing WCs and washing (source: Environment Agency). The majority of this comes from drinking quality standard or potable water.

The water efficiency measures included will ensure that the water use target of 110 litres per person per day is achieved.

Water efficient devices will be fully evaluated, and installed, wherever possible. The specification of such devices will be considered at detailed design stage and each will be subject to an evaluation based on technical performance, cost and market appeal, together with compliance with the water use regulations.

The following devices will be incorporated within the apartments and houses:

- water efficient taps;
- water efficient toilets;
- low output showers;
- low volume baths
- flow restrictors to manage water pressures to achieve optimum levels and
- water meters.

Below is a typical specification, which would achieve the 110 Litres per person per day target.

Schedule of Appliance Water Consumption		
Appliance	Flow rate or capacity	Total litres
WC	6/36 litres dual flush	17.64
Basin	2.0 litres/min.	4.74
Shower	9.0 litres/min	39.33
Bath	175 litres	19.25
Sink	5.0 litres/min	12.56
Washing Machine	6.75 litres/kg	14.18
Dishwasher	1.25 litres/places	4.50
		112.20
	Normalisation Factor	0.91
External Water Use		5.00
		117.11

7.0 Materials and Waste

The BRE Green Guide to Specification is a simple guide for design professionals. The guide provides environmental impact, cost and replacement interval information for a wide range of commonly used building specifications over a notional 60-year building life. The construction specification will prioritise materials within ratings A+, A or B.

Preference will be given to the use of local materials & suppliers where viable to reduce the transport distances and to support the local economy. A full evaluation of these suppliers will be undertaken at the next stage of design.

In addition, timber would be sourced, where practical, certified by PEFC or an equivalent approved certification body and all site timber used within the construction process would be recycled.

All insulation materials to will have a zero ozone depleting potential

Construction waste

Targets will be set to promote resource efficiency in accordance with guidance from WRAP, Envirowise, BRE and DEFRA.

The overarching principle of waste management is that waste should be treated or disposed of within the region where it is produced.

Construction operations generate waste materials as a result of general handling losses and surpluses. These wastes can be reduced through appropriate selection of the construction method, good site management practices and spotting opportunities to avoid creating unnecessary waste.

The Construction Strategy will explore these issues, some of which are set out below:

- Proper handling and storage of all materials to avoid damage.
- Efficient purchasing arrangements to minimise over ordering.
- Segregation of construction waste to maximise potential for reuse/recycling.
- Suppliers who collect and reuse/recycle packaging materials.

Appendix 1 – Regulations Compliance Reports for Modelled Units

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 30 January 2022 at 14:44:19

Project Information

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details

NEW DWELLING DESIGN STAGE

Total Floor Area: 71m²

Site Reference : SRC Recycling, Eastergate

Plot Reference: 2BF GND 72

Address :

Client Details

Name: SRC Recycling

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

16.34 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

14.51 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

37.4 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

31.2 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

0.13 (max. 0.25)

0.13 (max. 0.70)

OK

Roof

(no roof)

Openings

1.20 (max. 2.00)

1.20 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 017958):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Vaillant

Model: ecoFIT sustain 825

Model qualifier: VUW 256/6-3 (H-GB)

(Combi)

Efficiency 89.3 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database OK

Hot water controls: No cylinder thermostat

No cylinder

Boiler interlock: Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%

Minimum 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summer time temperature

Overheating risk (South East England): Not significant OK

Based on:

Overshading: Average or unknown

Windows facing: South 2.44m²

Windows facing: East 2.44m²

Windows facing: South 4.41m²

Ventilation rate: 8.00

Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Photovoltaic array

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 30 January 2022 at 14:42:37

Project Information

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details

NEW DWELLING DESIGN STAGE

Total Floor Area: 71m²

Site Reference : SRC Recycling, Eastergate

Plot Reference: 2BF MID 72

Address :

Client Details

Name: SRC Recycling

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

14.21 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

12.57 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

26.4 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

22.7 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

(no roof)

Openings

1.20 (max. 2.00)

1.20 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 017958):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Vaillant

Model: ecoFIT sustain 825

Model qualifier: VUW 256/6-3 (H-GB)

(Combi)

Efficiency 89.3 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls: Time and temperature zone control by device in database OK

Hot water controls: No cylinder thermostat

No cylinder

Boiler interlock: Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%

Minimum 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summer time temperature

Overheating risk (South East England): Not significant OK

Based on:

Overshading: Average or unknown

Windows facing: South 2.44m²

Windows facing: East 2.44m²

Windows facing: South 4.41m²

Ventilation rate: 8.00

Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Photovoltaic array

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 30 January 2022 at 14:40:59

Project Information

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details

NEW DWELLING DESIGN STAGE

Total Floor Area: 71m²

Site Reference : SRC Recycling, Eastergate

Plot Reference: 2BF TOP 72

Address :

Client Details

Name: SRC Recycling

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

16.37 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

14.78 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

37.6 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

32.4 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.10 (max. 0.20)

0.10 (max. 0.35)

OK

Openings

1.20 (max. 2.00)

1.20 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 017958):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Vaillant

Model: ecoFIT sustain 825

Model qualifier: VUW 256/6-3 (H-GB)

(Combi)

Efficiency 89.3 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls: Time and temperature zone control by device in database OK
 Hot water controls: No cylinder thermostat
 No cylinder
 Boiler interlock: Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%
 Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summer time temperature

Overheating risk (South East England): Not significant OK

Based on:

Overshading: Average or unknown
 Windows facing: South 2.44m²
 Windows facing: East 2.44m²
 Windows facing: South 4.41m²
 Ventilation rate: 8.00
 Blinds/curtains: None

10 Key features

Roofs U-value: 0.1 W/m²K
 Party Walls U-value: 0 W/m²K
 Photovoltaic array

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 30 January 2022 at 14:39:40

Project Information

Assessed By: Bluesky Unlimited

Building Type: Mid-terrace House

Dwelling Details

NEW DWELLING DESIGN STAGE

Total Floor Area: 95.3m²

Site Reference : SRC Recycling, Eastergate

Plot Reference: 3BH MID 95

Address :

Client Details

Name: SRC Recycling

Address :

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

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER) 15.39 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER) 14.44 kg/m² OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) 40.8 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE) 35.5 kWh/m² OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.18 (max. 0.30)	0.18 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.13 (max. 0.25)	0.13 (max. 0.70)	OK
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	OK
Openings	1.17 (max. 2.00)	1.20 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

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

4 Heating efficiency

Main Heating system: Database: (rev 464, product index 017960):
Boiler systems with radiators or underfloor heating - mains gas
Brand name: Vaillant
Model: ecoFIT sustain 835
Model qualifier: VUW 356/6-3 (H-GB)
(Combi)
Efficiency 89.3 % SEDBUK2009
Minimum 88.0 % OK

Secondary heating system: None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database OK
 Hot water controls: No cylinder thermostat
 No cylinder
 Boiler interlock: Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%
 Minimum 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summer time temperature

Overheating risk (South East England): Not significant OK

Based on:

Overshading: Average or unknown
 Windows facing: North East 1.42m²
 Windows facing: North East 0.63m²
 Windows facing: South West 3.15m²
 Windows facing: South West 1.62m²
 Windows facing: North East 2.43m²
 Windows facing: North East 0.54m²
 Windows facing: South West 1.62m²
 Windows facing: South West 2.43m²
 Ventilation rate 8.00
 Blinds/curtains: None

10 Key features

Doors U-value 1 W/m²K
 Roofs U-value 0.1 W/m²K
 Party Walls U-value 0 W/m²K
 Photovoltaic array

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 30 January 2022 at 14:38:41

Project Information

Assessed By: Bluesky Unlimited

Building Type: End-terrace House

Dwelling Details

NEW DWELLING DESIGN STAGE

Total Floor Area: 95.3m²

Site Reference : SRC Recycling, Eastergate

Plot Reference: 3BH END 95

Address :

Client Details

Name: SRC Recycling

Address :

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

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

16.49 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

15.77 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

46.6 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

41.5 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

0.13 (max. 0.25)

0.13 (max. 0.70)

OK

Roof

0.10 (max. 0.20)

0.10 (max. 0.35)

OK

Openings

1.17 (max. 2.00)

1.20 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 017960):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Vaillant

Model: ecoFIT sustain 835

Model qualifier: VUW 356/6-3 (H-GB)
(Combi)

Efficiency 89.3 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls: Time and temperature zone control by device in database OK
 Hot water controls: No cylinder thermostat
 No cylinder
 Boiler interlock: Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%
 Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (South East England): Not significant OK

Based on:

Overshading: Average or unknown
 Windows facing: North East 1.42m²
 Windows facing: North East 0.63m²
 Windows facing: South West 3.15m²
 Windows facing: South West 1.62m²
 Windows facing: North East 2.43m²
 Windows facing: North East 0.54m²
 Windows facing: South West 1.62m²
 Windows facing: South West 2.43m²
 Windows facing: South East 0.63m²
 Ventilation rate: 8.00
 Blinds/curtains: None

10 Key features

Doors U-value: 1 W/m²K
 Roofs U-value: 0.1 W/m²K
 Party Walls U-value: 0 W/m²K
 Photovoltaic array

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 30 January 2022 at 14:37:59

Project Information

Assessed By: Bluesky Unlimited

Building Type: Semi-detached House

Dwelling Details

NEW DWELLING DESIGN STAGE

Total Floor Area: 120.6m²

Site Reference : SRC Recycling, Eastergate

Plot Reference: 3BTH SEMI 121

Address :

Client Details

Name: SRC Recycling

Address :

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

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

15.52 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

14.95 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

48.1 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

42.0 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.17 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

0.13 (max. 0.25)

0.13 (max. 0.70)

OK

Roof

0.12 (max. 0.20)

0.15 (max. 0.35)

OK

Openings

1.18 (max. 2.00)

1.20 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 017960):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Vaillant

Model: ecoFIT sustain 835

Model qualifier: VUW 356/6-3 (H-GB)
(Combi)

Efficiency 89.3 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database OK
 Hot water controls: No cylinder thermostat
 No cylinder
 Boiler interlock: Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%
 Minimum 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (South East England): Not significant OK

Based on:

Overshading: Average or unknown
 Windows facing: South East 1.42m²
 Windows facing: North West 7.56m²
 Windows facing: South East 2.43m²
 Windows facing: South East 1.08m²
 Windows facing: South East 1.62m²
 Windows facing: North West 2.84m²
 Windows facing: North West 1.62m²
 Windows facing: South West 1.26m²
 Ventilation rate 8.00
 Blinds/curtains: None

10 Key features

Doors U-value 1 W/m²K
 Roofs U-value 0.1 W/m²K
 Party Walls U-value 0 W/m²K
 Photovoltaic array

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 30 January 2022 at 19:16:52

Project Information

Assessed By: Bluesky Unlimited

Building Type: Detached House

Dwelling Details

NEW DWELLING DESIGN STAGE

Total Floor Area: 148m²

Site Reference : SRC Recycling, Eastergate

Plot Reference: 4BH 148

Address :

Client Details

Name: SRC Recycling

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

17.69 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

17.47 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

62.7 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

55.9 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Floor

0.13 (max. 0.25)

0.13 (max. 0.70)

OK

Roof

0.11 (max. 0.20)

0.15 (max. 0.35)

OK

Openings

1.19 (max. 2.00)

1.20 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

5.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 017960):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Vaillant

Model: ecoFIT sustain 835

Model qualifier: VUW 356/6-3 (H-GB)

(Combi)

Efficiency 89.3 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls: Time and temperature zone control by device in database OK
 Hot water controls: No cylinder thermostat
 No cylinder
 Boiler interlock: Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%
 Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (South East England): Not significant OK

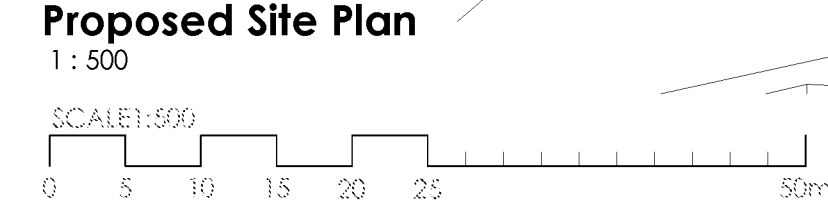
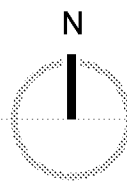
Based on:

Overshading: Average or unknown
 Windows facing: South East 2.43m²
 Windows facing: South East 0.81m²
 Windows facing: South West 3.6m²
 Windows facing: North West 0.81m²
 Windows facing: South West 2.43m²
 Windows facing: North West 6.3m²
 Windows facing: North West 2.16m²
 Windows facing: North East 2.43m²
 Windows facing: South East 0.81m²
 Windows facing: South East 2.43m²
 Windows facing: South East 2.43m²
 Windows facing: South East 0.72m²
 Windows facing: South West 1.44m²
 Windows facing: South West 1.26m²
 Windows facing: North West 3.15m²
 Windows facing: North West 1.44m²
 Ventilation rate: 8.00
 Blinds/curtains: None

10 Key features

Doors U-value: 1 W/m²K
 Roofs U-value: 0.1 W/m²K

Appendix 2 – Site Plan showing Indicative Location of Photovoltaic Panels



● = Approximate Location of
4 x 300W Photovoltaic
Panels

Rev	Date	Comments
PLANNING		

CLIENT
SRC RECYCLING LTD

PROJECT
Land At SRC Recycling
Fontwell Avenue
Eastergate, West Sussex
PO20 3RU

TITLE
Proposed Site Plan

PROJECT NO.	DATE
7334	Sept 21
DRAWING NO.	REVISION
7334 - PD20	
SCALE	DRAWN TH
1 : 500@ A1	CHECKED DA