

ENERGY AND SUSTAINABILITY STATEMENT



PROPERTY ADDRESS

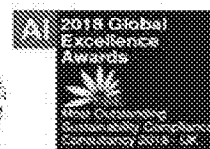
HAMPTON QUAY,
HAWTHORN RD
LITTLEHAMPTON,
BN17 5RA

DATE

August 2020

PREPARED BY

EAL Consult



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1. EXECUTIVE SUMMARY

This Sustainability statement has been prepared to support the redevelopment of a former camp site on the edge of the River Arun to provide new moorings, commercial, leisure and residential space including new public realm and riverfront walks. The strategy highlights how the Proposed Development will promote sustainability through both design and operation and summarises the relevant regulatory and planning policies applicable and how the relevant policy targets will be addressed and achieved.

The strategy responds to the UK Planning and regulatory framework, and to the Arun Local plan 2011-2031.

Energy & Carbon Reduction:

- Passive design principles including a high level of insulation and reduced air permeability to deliver Part L1A 2013 compliant Building in absence of renewable technologies.
- High-efficiency mechanical ventilation and heat recovery units to limit energy consumption.
- An air source heat pump has been proposed to take advantage of grid decarbonisation and deliver a **44.3%** reduction in regulated carbon emissions over Part L1A baseline when utilising the proposed carbon factor changes to building Regulations Part L.

Health and wellbeing:

- Air quality and acoustic assessments will be carried out to provide recommendation on achieving a healthy environment.
- An adaptive approach to the flood defence wall will be incorporated into the detailed design of the flood defence walls.
- New sustainable site drainage will be created with permeable surfaces, and wide planted swales over the parking level and alongside the access roads.
- New play areas, park space, biodiversity enhancement and protection measures to existing habitats will be created.

Material and waste management:

- Minimising the use of virgin materials during construction by recycling and reusing where feasible.
- Low waste benchmark levels will be targeted during construction with requirements identifying that the diversion of waste from landfill is to be achieved by the contractor.

Energy efficiency:

This report demonstrates that the proposed dwellings by incorporating the measures above can achieve an average carbon emission reduction of **44.3%**.

Table 1. Carbon Dioxide emissions after each stage of the Energy Hierarchy

	Carbon dioxide emissions (Tonnes CO2 per annum)		
	Regulated	Unregulated	Total
Building Regs Part L	179.46	35.89	215.35
After Energy demand Reduction	114.25	22.85	137.10
After Renewable Energy Integration	99.9	19.98	119.88

Table 2. Carbon Dioxide Savings from each stage of the Energy Hierarchy

	Regulated Carbon dioxide savings (Tonnes CO ₂)	% Reduction
Savings from energy efficiency measures	65.21	36.3%
Savings from renewable technology	14.35	8.0%
Total Cumulative savings	79.56	44.3%

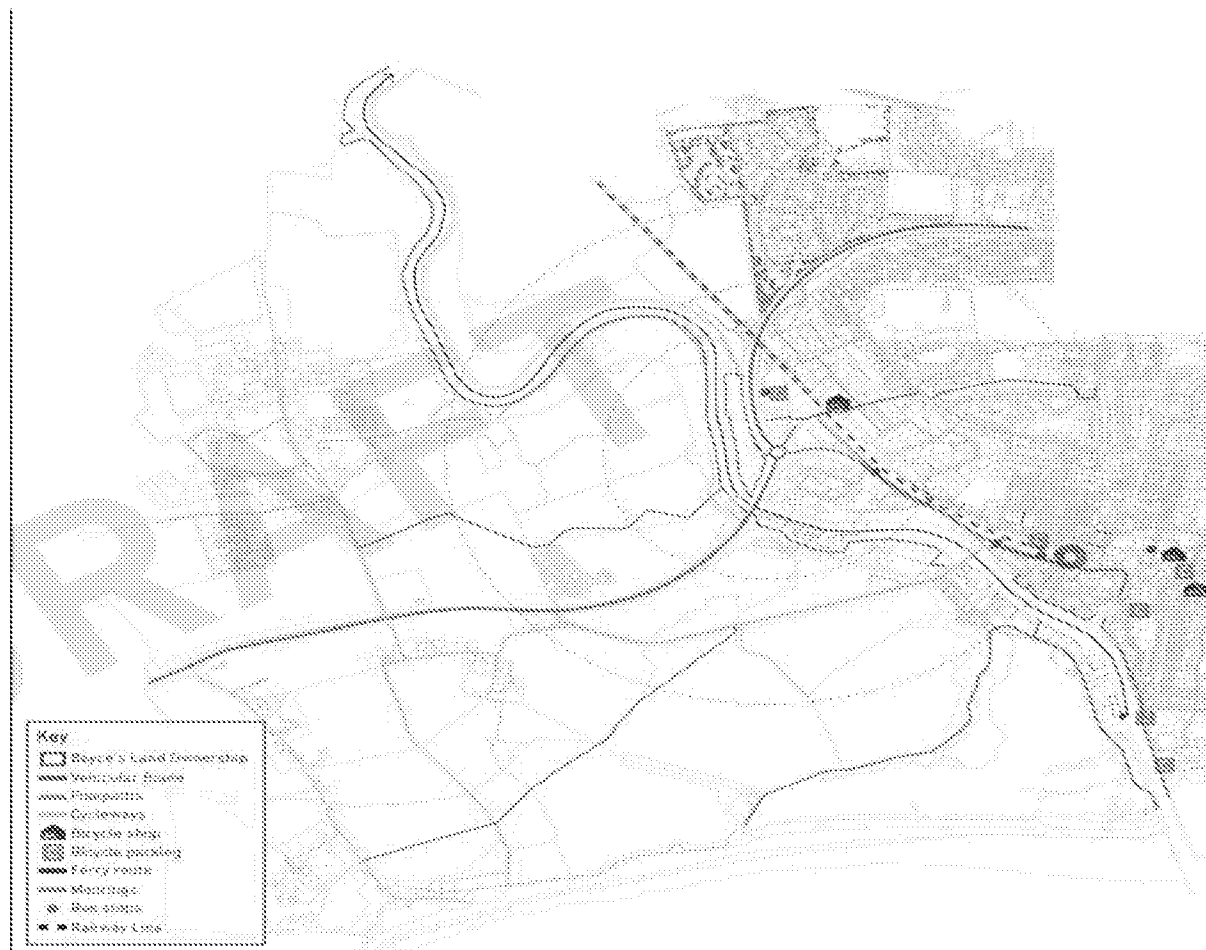
2. INTRODUCTION:

Site description:

The application site is 2.72ha and is located along the east bank of the River Arun in Littlehampton, West Sussex. An existing exit road from the Bridge Road roundabout provides vehicular access into the site. The site will also be made accessible by footpath, cycle path, by boat, water taxi and local ferry services that run between Arundel and Littlehampton.

The site is within the Littlehampton economic Growth Area (LEGA) illustrated in the Arun District Local Plan (2011-2031). It is within flood zone 3 and approx 45% is protected by recently upgraded flood defences to a 1in200 year standard of protection undertaken by the environment agency in 2014.

The site is located immediately west of the A259 and West of the Littlehampton Branch Line. Littlehampton mainline station is located approximately 15min front from the centre of the site.



METHODOLOGY

This energy assessment outlines the energy demand from the development together with the associated CO₂ emissions, using the present Building Regulations Part L as a baseline. It demonstrates how the emissions from energy use in the development will be reduced through energy efficiency measures.

The proposed scheme is required to make carbon emission reduction principles in accordance with the UK Planning and regulatory framework, and Arun Local Plan 2011-2031.

The methodology employed to determine the potential CO₂ savings is in accordance with the three-step Energy Hierarchy.

- **Be Lean** - Improve the energy efficiency of the scheme;
- **Be Clean** - Supply as much of the remaining energy requirement with low carbon; technologies such as district heating if available or combined heat and power (CHP); and
- **Be Green** - Offset a proportion of the remaining carbon dioxide emissions by using renewable technologies.

The government approved Standard Assessment Procedure (SAP) methodology software (2013) has been used to determine the CO₂ emissions and energy requirements. It compares CO₂ emissions from regulated energy use (DER) with those of an equivalent dwelling built to Part L1A 2013 (TER), a notional dwelling of the same size and shape. These calculations do not include emissions from cooking or appliances.

Opportunities for incorporating features into the development that contribute to the objectives of sustainable development were explored during the design process, to ensure that where possible, the proposals achieve best practice.

3. PLANNING POLICY CONTEXT

National Planning Policy Framework 2019 – emphasised the concept of sustainable development by encouraging local authorities to adopt proactive strategies to mitigate and adapt to climate change. It recommends the move to a low carbon future by:

- Planning new development in locations and ways, which reduce greenhouse gas emissions;
- Actively supporting energy efficiency improvements to existing buildings; and
- When setting any local requirement for a building's sustainability do so in a way consistent with the Government's zero carbon buildings policy and adopts nationally described standards.

The government's Energy Policy, including its policy on renewable energy, is set out in the Energy White Paper. This aims to put the UK on a path to cut its carbon dioxide emissions by 60% by 2025. As part of the strategy for achieving these reductions the White Paper sets out, the Government's target to generate 20% of UK Electricity from renewables by 2020.

Arun Local Plan 2011-2031:

Arun Local Plan was adopted in 2011 and contains the following sustainability policies :

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:

- Achieve energy efficiency measures that reflect the current standards in Part L of the Building Regulations (or any documentation which supersedes this), or the level of the Code for Sustainable Homes or appropriate BREEAM rating, applicable at the time of submission;
- Use design and layout to promote energy efficiency; and
- 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.

Where planning permission is required to retrofit energy efficiency measures into existing development, schemes will be permitted, subject to the Design and Built Heritage policies.

In assessing the achievement of these standards the Council will consider: Site constraints; Technical viability; Financial viability; and Delivery of additional benefits.

Policy ECC DM1: Renewable energy

The Council will support renewable energy development subject to the criteria in this Policy. Schemes will be expected to contribute to the social, economic and environmental development and overall regeneration of the District.

Within areas of protected or sensitive landscapes, areas or buildings, development should generally be small scale or community based.

The Council will support proposals for appropriately located renewable energy development, and their ancillary development where they meet the following criteria:

- a. The proposal is located and designed to minimise adverse impacts to landscape, habitats, the historic environment and residential amenity including visual, noise and odour impacts;
- b. The location and design of proposals will need to take account of the Council's landscape assessment and landscape sensitivity studies (or successor documents) and proposals for large scale renewable energy projects will need to be supported by a zone of theoretical visibility and viewpoint assessment;
- c. Priority should be given to proposals that integrate with existing or new development where appropriate to do so having regard to (a);
- d. All proposals will need to demonstrate a suitable connection to the electricity distribution network, or appropriate energy storage facility, and provide evidence to demonstrate that the connection will not result in unacceptable impacts upon the landscape, natural and historic environment or visual and residential amenity.

4. ENERGY STRATEGY

The Energy strategy for the proposed flats is based on the Building Regulations Part L1A; it adopts a set of principles to guide design and decisions regarding energy, balanced with the need to optimise environmental and economic benefits. It seeks to incorporate energy efficiency through the approach detailed below.

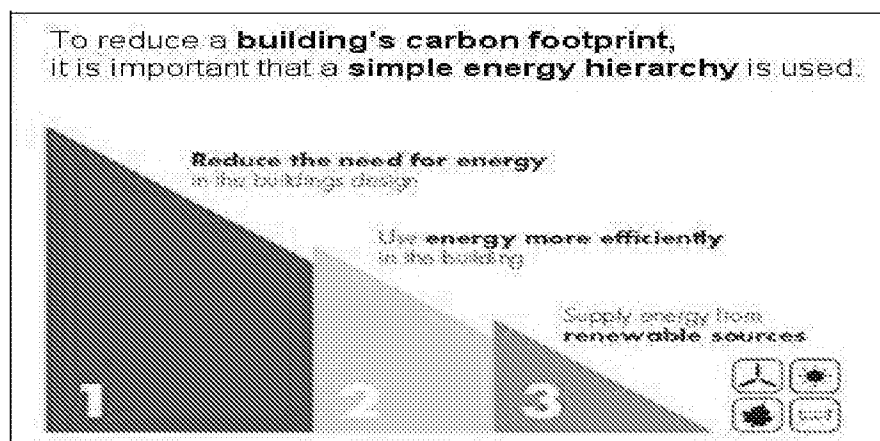


Figure 1. Energy Hierarchy

Be 'Lean' - Demand Reduction

The building fabric performance and engineering systems have been optimised in order to use less energy prior to the inclusion or consideration of Low and Zero Carbon (LZC) Technology.

Passive Design Measures:

Fabric Performance - The fabric performance values aim to reduce unwanted heat loss and heat gains, whilst maintaining a comfortable internal environment.

Table 3. Fabric energy Efficiency Standard

Thermal element	Part L1A Minimum Standard
Wall	0.16 W/m ² k
Roof	0.11 W/m ² k
Floor	0.11 W/m ² k
Glazing	1.1 W/m ² k
Doors	1.1 W/m ² k

The heat loss of different building elements is dependent upon their U –value. A building with low U values provides better levels of insulation and reduced heating demand.

The development will incorporate high levels of insulation and efficient glazing; thereby reduce demand for space heating. The table below shows the U values for the development and the associated improvements over Building Regulations.

Table 4. Energy Efficient design Specification

Element	Standard	Specification
Wall	0.16 W/m ² k	0.15 W/m ² k
Floor	0.11 W/ m ² k	0.10W/m ² k
Roof	0.11 W/ m ² k	0.09 W/ m ² k
Glazing	1.10 W/ m ² k	1. W/ m ² k
Air Permeability	5 m ³ /hr.m ² @ 50Pa	3.9 m ³ /hr.m ² @ 50Pa

Air-tightness and Thermal Bridging - Air tightness of a building is important in reducing heat loss, but also in the prevention of drafts that can ultimately mean warm temperatures feel uncomfortably cold. The development has been designed so that air permeability will be significantly below the target set in Building Regulations as shown in Table 4.

Space Heating & Cooling - Space heating is provided via underfloor piping. As the general circulation and stairwells have limited external exposure and the external fabric will significantly limit heat loss, it is not proposed to include any heating within these areas.

Efficient Lighting and Controls - Throughout the development natural lighting will be optimised. The development will also incorporate low energy light fittings throughout. All light fittings will be specified as low energy lighting and will accommodate compact fluorescent (CFLs) or fluorescent luminaries only. Internal areas that are not frequently used will be fitted with occupant sensors.

Ventilation - The use of high efficiency mechanical ventilation with heat recovery units are proposed for each dwelling.

Domestic hot water (DHW) system – domestic hot water is supplied to each dwelling via heat pump.

Be 'Clean' – Supply Energy Efficiently

The Be Clean step of the energy hierarchy refers to the use of 'Clean energy supply'. This includes, but is not limited to, the use of Combined Heat and Power (CHP) and District Heat Networks. Policy TP1 seeks for new development to promote the use of CHP and district heating.

Community heating and Combined Heat and Power (CHP system)

Clean Measures ensures that energy is supplied and used efficiently within a property. Local Heat and power sources minimise distribution losses and achieve greater efficiencies when compared to separate energy systems, thus reducing CO₂ emissions.

Combined heat and power (CHP) is classified as a clean measure within the London Plan Energy Hierarchy. CHP systems are usually specified for large schemes due to the need to have a large enough heat demand to supply from the CHP system. Plant room space is also required on site.

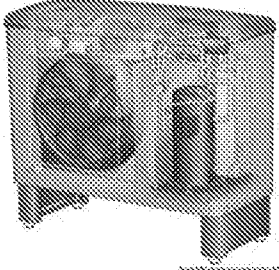
Although the thermal demand generated by the concept stage Part L modelling is sufficient to consider CHP as a viable option, considering that the proposed scheme is proposed to utilise an all-electric approach i.e. Electric heating and hot water. Therefore, CHP has not been considered further for this scheme bases upon the current strategy.

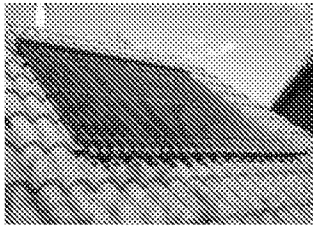
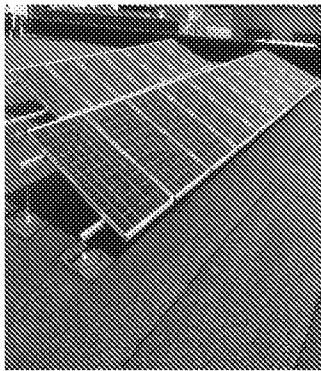
Be 'Green' - Renewable Energy

Once energy demand reduction measures have been applied, methods for generating low and -zero carbon energy can be assessed. The renewable technologies considered for the development are:

- Biomass
- Ground/water source heat pump
- Air source heat pump
- Wind energy
- Solar thermal panels
- Photovoltaic panels

Table 5. Renewable Technologies

Technology	Pros	Cons
Biomass Heating A biomass system designed for wood pellets, which have a high-energy content, would fuel this development. 	• Less volume of storage • Less maintenance and produce considerably less ash residue	• Nox Emissions which may impacts • High Costs
Ground Source Heat Pump It circulates a mixture of water and antifreeze around a loop of pipe, called a ground loop, which is buried in the garden. Heat from the ground is absorbed into the fluid and then passes through a heat exchanger into the heat pump. 	• Use all the year	• High Costs
Air Source Heat Pump They are an efficient and environmentally-friendly way of heating using air drawn freely from the atmosphere. They operate rather like a refrigerator in reverse, absorbing heat from the air into a working fluid which is passed into a compressor where its temperature is increased before it is transferred	• Can generates less CO₂ than conventional heating systems. • Cheaper • Provides heating and hot water • Less maintenance • Can be used as air-conditioning in the summer	• Needs electricity • Can be noisy

into the heating and hot water circuits of the building.		
Wind Turbines 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. 	• Cheaper • Less CO₂	• Local wind speeds in the area is likely to be below the level generally required for investment in large wind turbines. • Noise and signal interference. • Detrimental aesthetic impact
Solar Thermal Solar hot water systems (also known as Solar Thermal) harness heat from sunlight by capturing energy which is radiated by the sun within solar panels or collectors. 	• Cheaper	• Not enough reduction
Photovoltaic Panels (PV) Photovoltaic panels extract the energy of the sun to generate electricity. They operate most efficiently when oriented to the south and are inclined to about 35 degrees. 	• Cheaper • Less CO₂ • No input power in order to generate electricity	• Not enough space • Not suitable for conservative areas

Potential renewable technologies were assessed in conjunction with the Energy Efficiency and Carbon Compliance measures discussed in previous sections of the report. To determine the appropriate technology for the site, the following factors were considered.

- CO₂ savings
- Their compatibility with the site and site constraints
- Installation and maintenance costs

The table 6 presents a comparative analysis for the different renewable technologies:

Table 6. Criteria Analysis for Renewable Technologies

Renewable technology	Criteria		
	CO2 Savings	Compatibility with the site	Cost
Biomass Heating	✓	✗	✗
Ground Source heat Pump	✓	✗	✗
Air Source Heat Pump	✓	✓	✓
Wind Turbines	✓	✗	✓
Solar Thermals	✓	✗	✓
Photovoltaic	✓	✓	✓

It appears that Air source heat pump and Photovoltaic Panels are the most suitable for this development.

Air source heat pump has been proposed for this project which achieve 44.3% reduction in carbon emission compared to Part L baseline.

Table 7. Carbon emissions reduction

	Energy Efficiency Measures			After Renewable Technology – Air source heat pump		
	TER	BER	&CO2 Reduction	TER	BER	&CO2 Reduction
Hampton Quay	126.97	114.25	10%	179.46	99.9%	44.3%

SAP methodology and Building regulations Part L 2013 have been used in the assessment

5. SUSTAINABLE DESIGN

The proposed development incorporates sustainable design and construction measures capable of mitigating and adapting to climate change to meet future needs. This section details site-specific initiatives which demonstrate how the conversion helps to meet the sustainability objectives set out in the UK Planning and regulatory framework, and to the Arun Local plan 2011-2031.

Energy Use and Pollution

The design of the development has taken into consideration day lighting to habitable spaces to improve the wellbeing of occupants. Good levels of daylight will offer occupants a pleasant and highly valued connection to the outdoors and plenty of natural light. It will also reduce the use of artificial lighting and therefore energy use. All light fittings will be specified as low energy lighting. The location and orientation of windows help to create a design that avoids overheating in the summer.

Pollution: Air, Noise and Light

The layout of the flats can provide good internal air quality for habitable areas but not too much so as to waste heat. The use of openable windows will create horizontal airflow. By achieving a good naturally ventilated building the energy demand for air conditioning and mechanical ventilation will thereby be eliminated within the development.

The development will not increase the air pollution of the area by reducing as a start, its energy consumption, which in turn will reduce emissions that lead to air pollution.

Other measures will include:

- a. Use of eco-friendly building materials
- b. Non-toxic paints
- c. Installation of energy efficient appliances and devices
- d. Use of renewable technologies

Light pollution can best be described as artificial light that is allowed to illuminate or intrude upon areas not intended to be lit. Light in the wrong place at the wrong time can be intrusive.

Intrusive light is over bright or poorly directed lights shining onto neighbouring property which affect the neighbours' right to enjoy their property. Therefore, the proposal will incorporate lighting measures in order to avoid causing a nuisance.

Materials

Materials can have a significant impact on environmental performance, both in construction but also ongoing use. Materials used for the flats will have lower environmental impacts over their lifecycle. This applies to the materials used in the external walls, roof, ground floor and upper floors and windows and extends to elements of the materials category such as the basic building materials (internal walls, upper floors) and the finishing elements (fascias, skirting, furniture).

It is expected that all timber used in the development will come from a legal Source (FSC Scheme). At least 80% of the building materials will be responsibly sourced and will use suppliers who can provide an EMS certificate or equivalent. Materials rated with an A or B in the BRE Green Guide to Specification will be preferred.

Water: Water Efficiency

In domestic buildings, the demand for water can be reduced as much as 50% using a variety of simple and innovative strategies that are integrated into the plumbing and mechanical systems. In order to reduce water consumption the proposed development will include efficient fixtures with low flow rates. Total internal water consumption will not exceed 105 litres/person/day.

Table 8. Water Fittings Standards

Schedule Appliance Water Consumption		
Appliance	Flow rate or Capacity	Total Litres
WC	Dual flush WC 4/2.6 litre	14.72
Basin	1.7 litres/min	5.98
Shower	8 litres/minute flow	24.00
Bath	160 litres	25.60
Sink	4 litres/min	14.13
W/machine	Default used	16.66
Dish Washer	Default used	3.90
		104.99

Waste Management

Adequate external storage for bins with applicable disabled access will be on site; level threshold, gentle approach and a hard surface with adequate turning circle have been specified in the design. The maximum bin collection distance is 28m from the street so bin collections will be accessed off the street via appropriate industrial size storage bins (1100 litres)

Pollution

All contractors would be required to sign up to the nationally recognised Considerate Constructors Scheme which requires, amongst other things that dust emissions, potential noise pollution, impacts on water quality and the potential for ground contamination are minimised during demolition and construction. The Contractor would also be obliged to adhere to a site specific Code of Construction Practice to reduce potential nuisance effects.

Sustainable Transport

A strong emphasis is placed on walking and cycling ahead of car use. Good design helps to promote community cohesion and discourage antisocial behaviour. The following will be provided:

- Car parking above minimum standards
- Electric vehicle charging points in excess of minimum standards.
- 25 visitor parking spaces and disabled people parking consistent with guidance.
- Cycle and motorcycle parking above minimum standards.
- Water taxi, ferry services and moorings for boat owners.

Flood Risk

The development site is located in a high Flood Risk Area on the Environment Agency Flood Risk Map (Flood zone 3a) with a high probability of greater than 1in100 (1%) of river flooding or a high probability of greater than 1in200 (0.5%) of tidal flooding in any year. The site benefits from existing

flood defences upgraded by the Environment Agency in 2014/2015 and is protected to a 1 in 200 year standard including allowing for sea level rise.

New sustainable site drainage will be created with permeable surfaces, and wide planted swales over the parking level and alongside the access roads. The swales will discharge into the drainage ditch system via the play park area. The play park area is designed to attenuate and slow the flows helping to emulate Greenfield run-off rates.

Biodiversity

The proposed development will incorporate measures to support and enhance the environment through consideration of the existing site, including measures to mitigate the impact of the development and enhance site biodiversity.

A tree survey and arboriculture impact assessment has been undertaken. Any trees to be removed should be replaced by a tree replacement ratio of 2:1. The tree selection is chosen from a species palette in accordance with local tree planting policies.

6. CONCLUSION

The development has been designed to exceed Part L1A building regulations requirements. In line with the national and local policies, regulated CO₂ emissions from the development will be reduced by **44.3%** once energy efficiency measures and clean measures are taken into account.

In order to achieve the required carbon emissions reduction, the report concludes and proposes the use of energy efficient measures and air source heat pump.

An appraisal of the proposed development has been undertaken against key sustainability objectives identified from relevant policy guidance. The framework for the appraisal was guided by the UK Planning and regulatory framework, and to the Arun Local plan 2011-2031. This process has ensured that the development responds to the sustainable development objectives that are relevant to the area. Key sustainability initiatives in ecology, waste management, water, health and wellbeing, materials, pollution and Surface water management have been incorporated in the design of the proposed Development.

7. APPENDIX

- SAPs calculations.

Project Information

Building type Ground-floor flat

Reference

Date 18 August 2020

Email: none Project GF - 1 BED (Ground Floor)
Hampton Quay
Littlehampton
West Sussex
BN17 5RA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.04a1, printed on 26/8/2020 at 17:08:47

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate

TER = 24.39

Dwelling Carbon Dioxide Emission Rate

DER = 13.55

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 35.1

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 21.6

OK

2a Thermal bridgingThermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.10 (max. 0.25)	0.10 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:

3.90

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric
Daikin Altherma EGSAH06UD9W

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls	2207 Time and temperature zone control	OK
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Hot water controls	No cylinder	
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Boiler Interlock	No	OK
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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):		OK
	Not significant	OK

Based on:

Thermal mass parameter : 294.36

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.00 W/m²K

Ground floors U-value 0.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Ground-floor flat

Reference

Date 18 August 2020

Email: none Project GF - 2 BED (Ground Floor)
Hampton Quay
Littlehampton
West Sussex
BN17 5RA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.04a1, printed on 26/8/2020 at 17:08:47

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate

TER = 28.24

Dwelling Carbon Dioxide Emission Rate

DER = 16.59

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 50.3

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 33.8

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.10 (max. 0.25)	0.10 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:

3.90

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric
Daikin Altherma EGSAH06UD9W

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls	2207 Time and temperature zone control	OK
------------------------	--	----

Hot water controls	No cylinder	
--------------------	-------------	--

Boiler Interlock	No	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):		OK
	Not significant	OK

Based on:

Thermal mass parameter : 255.45

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.00 W/m²K

Ground floors U-value 0.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Ground-floor flat

Reference

Date 18 August 2020

Email: none Project GF - 3 BED (Ground Floor)
Hampton Quay
Littlehampton
West Sussex
BN17 5RA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.04a1, printed on 26/8/2020 at 17:08:47

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate

TER = 25.91

Dwelling Carbon Dioxide Emission Rate

DER = 13.12

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 51.5

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 33.8

OK

2a Thermal bridgingThermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.10 (max. 0.25)	0.10 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:

3.90

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric
Daikin Altherma EGSAH06UD9W

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls	2207 Time and temperature zone control	OK
------------------------	--	----

Hot water controls	No cylinder	
--------------------	-------------	--

Boiler Interlock	No	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):		OK
	Slight	OK

Based on:

Thermal mass parameter : 228.06

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.00 W/m²K

Ground floors U-value 0.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Mid-floor flat

Reference

Date 18 August 2020

Email: none Project FF - 1 BED (Mid Floor)
Hampton Quay
Littlehampton
West Sussex
BN17 5RA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.04a1, printed on 26/8/2020 at 17:08:48

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate

TER = 20.99

Dwelling Carbon Dioxide Emission Rate

DER = 11.65

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 23.4

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 15.1

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element	Average	Highest	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:

3.90

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric
Daikin Altherma EGSAH06UD9W

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls	2207 Time and temperature zone control	OK
------------------------	--	----

Hot water controls	No cylinder	
--------------------	-------------	--

Boiler Interlock	No	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):		OK
	Slight	OK

Based on:

Thermal mass parameter :	224.36
--------------------------	--------

Overshading :	Average or unknown (20-60 % sky blocked)
---------------	--

Orientation : East

Ventilation rate :	6.00
--------------------	------

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.00 W/m²K

Walls U-value 0.14 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Mid-floor flat

Reference

Date 18 August 2020

Email: none Project FF - 2 BED (Mid Floor)
Hampton Quay
Littlehampton
West Sussex
BN17 5RA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.04a1, printed on 26/8/2020 at 17:08:48

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate

TER = 24.53

Dwelling Carbon Dioxide Emission Rate

DER = 14.80

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 38.0

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 25.9

OK

2a Thermal bridgingThermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:

3.90

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric
Daikin Altherma EGSAH06UD9W

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls	2207 Time and temperature zone control	OK
------------------------	--	----

Hot water controls	No cylinder	
--------------------	-------------	--

Boiler Interlock	No	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):		OK
	Slight	OK

Based on:

Thermal mass parameter : 185.45

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.00 W/m²K

Walls U-value 0.14 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Mid-floor flat

Reference

Date 18 August 2020

Email: none Project FF - 3 BED (Mid Floor)
Hampton Quay
Littlehampton
West Sussex
BN17 5RA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.04a1, printed on 26/8/2020 at 17:08:47

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate

TER = 22.34

Dwelling Carbon Dioxide Emission Rate

DER = 11.84

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 39.8

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 26.7

OK

2a Thermal bridgingThermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:

3.90

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric
Daikin Altherma EGSAH06UD9W

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls	2207 Time and temperature zone control	OK
------------------------	--	----

Hot water controls	No cylinder	
--------------------	-------------	--

Boiler Interlock	No	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):		OK
	Slight	OK

Based on:

Thermal mass parameter : 158.06

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.00 W/m²K

Walls U-value 0.14 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Top-floor flat

Reference

Date 18 August 2020

Email: none Project FF - 1 BED (Top Floor)
Hampton Quay
Littlehampton
West Sussex
BN17 5RA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.04a1, printed on 26/8/2020 at 17:08:47

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate

TER = 23.37

Dwelling Carbon Dioxide Emission Rate

DER = 12.55

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 31.6

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 17.8

OK

2a Thermal bridgingThermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.08 (max. 0.20)	0.08 (max. 0.35)	OK
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:

3.90

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric
Daikin Altherma EGSAH06UD9W

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls	2207 Time and temperature zone control	OK
------------------------	--	----

Hot water controls	No cylinder	
--------------------	-------------	--

Boiler Interlock	No	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):		OK
	Slight	OK

Based on:

Thermal mass parameter : 192.19

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.00 W/m²K

Pitched roofs with integrated insulation U-value 0.08 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Top-floor flat

Reference

Date 18 August 2020

Email: none Project TF - 2 BED (Top Floor)
Hampton Quay
Littlehampton
West Sussex
BN17 5RA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.04a1, printed on 26/8/2020 at 17:08:47

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate

TER = 27.05

Dwelling Carbon Dioxide Emission Rate

DER = 15.96

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 46.3

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 30.9

OK

2a Thermal bridgingThermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.15 (max. 0.30)	0.16 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.08 (max. 0.20)	0.08 (max. 0.35)	OK
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:

3.90

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric
Daikin Altherma EGSAH06UD9W

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls	2207 Time and temperature zone control	OK
------------------------	--	----

Hot water controls	No cylinder	
--------------------	-------------	--

Boiler Interlock	No	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):		OK
	Slight	OK

Based on:

Thermal mass parameter : 176.76

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.00 W/m²K

Pitched roofs with integrated insulation U-value 0.08 W/m²K

Walls U-value 0.14 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Mid-floor flat

Reference

Date 18 August 2020

Email: none Project TF - 3 BED (Top Floor)
Hampton Quay
Littlehampton
West Sussex
BN17 5RA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England

assessed by program JPA Designer version 6.04a1, printed on 26/8/2020 at 17:08:47

New dwelling as designed

1 TER and DER

Fuel for main heating system: Standard tariff (fuel factor = 1.55)

Target Carbon Dioxide Emission Rate

TER = 24.79

Dwelling Carbon Dioxide Emission Rate

DER = 12.70

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

TFEE = 47.8

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = 31.3

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

<u>Element</u>	<u>Average</u>	<u>Highest</u>	
Wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.08 (max. 0.20)	0.08 (max. 0.35)	OK
Openings	1.00 (max. 2.00)	1.00 (max. 3.30)	OK

3 Air permeability

Air permeability at 50 pascals:

3.90

OK

Maximum :

10.00

4 Heating efficiency

Main heating system:

Air source heat pump, underfloor, electric
Daikin Altherma EGSAH06UD9W

Source of efficiency: from boiler database

Secondary heating system:

None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

Space heating controls	2207 Time and temperature zone control	OK
------------------------	--	----

Hot water controls	No cylinder	
--------------------	-------------	--

Boiler Interlock	No	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):		OK
	Slight	OK

Based on:

Thermal mass parameter : 129.91

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.00 W/m²K

Pitched roofs with integrated insulation U-value 0.08 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Project name

Hampton Quay

As designed

Date: Thu Aug 20 15:47:38 2020

Administrative information

Building Details

Address: Commercial Space, Hampton Quay,
Littlehampton, West Sussex, BN17 5RA

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.a.1

Interface to calculation engine: Lifespan SBEM

Interface to calculation engine version: v5.6.a

BRUKL compliance check version: v5.6.a.1

Owner Details

Name: Information not provided by the user

Telephone number: Information not provided by the user

Address: Information not provided by the user, Information not provided by the user, Information not provided by the user

Certifier details

Name: Mark Simons

Address: 17 Dobree Avenue, London, NW10 2AD

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	21.8
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	21.8
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	20.9
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.27	0.27	g/01 offices/East/Wall-External
Floor	0.25	0.17	0.17	g/01 offices/Floor-External
Roof	0.25	-	-	"No heat loss roofs"
Windows***, roof windows, and rooflights	2.2	1	1	g/01 offices/East/Wall-External/Glazing
Personnel doors	2.2	-	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]

U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

*** Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	10

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Air Con

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.29	3.5	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Instantaneous

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
g/01 offices		123	-	-	250

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
g/01 offices	YES (+10.7%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	49	49
External area [m ²]	97	97
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	10	5
Average conductance [W/K]	38.68	49.01
Average U-value [W/m ² K]	0.4	0.51
Alpha value* [%]	31.18	22.05

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est /Takeaways
100	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	4.01	10.71
Cooling	17.79	10.91
Auxiliary	0	0
Lighting	15.49	19.29
Hot water	2.89	3.34
Equipment*	42.18	42.18
TOTAL **	40.17	44.25

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	349.55	235.13
Primary energy* [kWh/m ²]	123.34	126.12
Total emissions [kg/m ²]	20.9	21.8

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	57.7	291.9	4	17.8	0	4	4.56	4.29	6.42
Notional	93.7	141.4	10.7	10.9	0	2.43	3.6	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.27	g/01 offices/East/Wall-External
Floor	0.2	0.17	g/01 offices/Floor-External
Roof	0.15	-	"No heat loss roofs"
Windows, roof windows, and rooflights	1.5	1	g/01 offices/East/Wall-External/Glazing
Personnel doors	1.5	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	10