FALCON ENERGY LIMITED

Energy Conservation Specialists

Former Marquis Pub
West Street
Somptiing
BN1 0AP

Energy Statement

Client: Bridge Road Developments Limited

Assessor: Neil Vanson

Tel: 01403 253439
Email: info@falconenergy.co.uk
Web: www.falconenergy.co.uk

Report By: Neil Vanson

Checked By: Neil Vanson

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Former Marquis Pub, West Street, Sompting
Energy Statement

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Energy/ Sustainability Statement

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1. Introduction

Falcon energy has been instructed by Bridge Road Developments to undertake an energy/ sustainability report as part of a planning submission for the site known as Former Marquis Pub, West Street Sompting.

The proposed works are for the demolition of the existing Pub and construction of 9 self-contained flats.

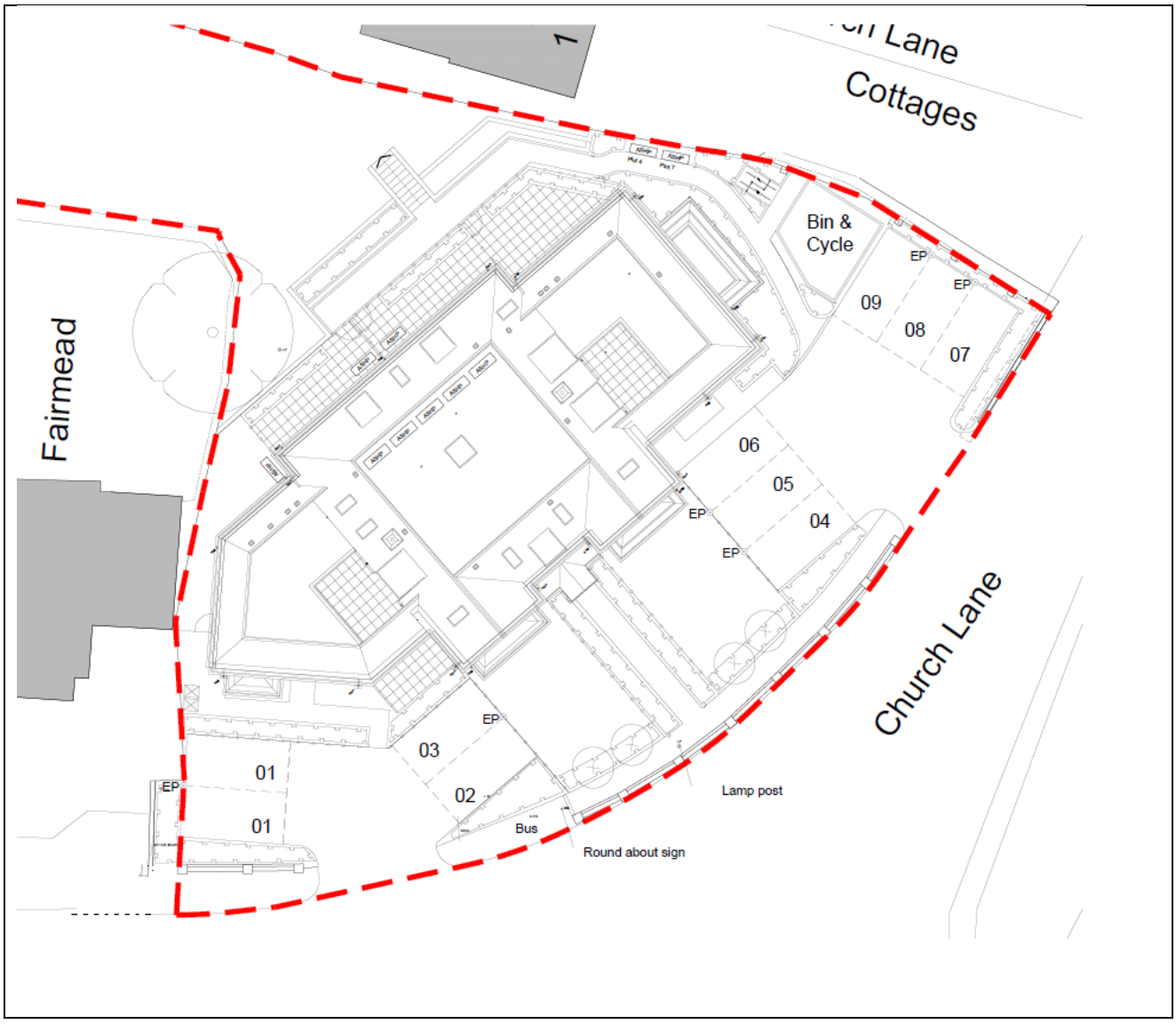


Figure 1, Site Location

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1.0 Energy Strategy.

The aim is to achieve a sustainable construction by looking at the following criteria to clear:

Condition 20 (Details of energy efficiency measures) *'No development above slab level shall commence until details of energy efficiency measures to reduce carbon emissions from the development have been submitted to and approved in writing by the Local Planning Authority. The development shall not be occupied until the approved measures have been fully implemented in accordance with the approved details'.*

- Energy efficient design, insulation, and ventilation.
- Energy Efficient fixtures and fittings
- Renewable energies
- Innovative waste facilities
- Water saving devices
- Sustainable urban design system
- Biodiversity enhancement
- Sustainable materials and construction
- 19%+ CO2 reduction calculations

1.1 Energy efficient design, insulation, and ventilation.

The table below highlights the fabric first approach to the build.

Construction	Reduction Specification (U Value)	Baseline SAP Specification (U Value)
External wall	0.18	0.20
Floor	0.12	0.16
Roof	0.14	0.14
Window	1.4	1.4
Door	1	1
Air Test	5	n/a
Boiler	Midea ASHP	Gas Combi
Lighting	100% low energy	75%
Renewable	None	None

The Flats will be insulated with materials that will have a Global Warming Potential (GWP) of less than 5 and an Ozone Depletion Potential (ODP) of zero. This will include all insulation specified within the building elements, hot water stores and piping.

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1.2 Energy Efficient fixtures and fittings.

All internal lights will be 100% low energy.

All external space lighting will be dedicated energy efficient, having a luminous efficacy greater than 40 lumens per circuit watt. Lighting will be controlled either through a time witch and/or PIR.

White goods will be provided. The fridges and freezers will be A+ rated and washing machines and dishwashers will be A rated under the EU Energy Efficiency Labelling Scheme.

1.3 Renewable Energies.

The following low and zero carbon technologies have been considered for the scheme:

Ground Source Heat Pumps

A ground sourced heat pump (GSHP) is a device for extracting heat from the ground to provide space heating and domestic hot water for buildings. Water or another fluid is circulated through pipes buried in the ground and passes through a heat exchanger in the heat pump that extracts heat from the fluid. The heat pump then raises the temperature of the fluid via the compression cycle to supply hot water to the building as from a normal boiler.
Providing the space heating requirement only using ground source heat pumps would provide 20.7% CO2 reduction over the lean building. This would require approximately 12 boreholes across the site, spaced between 25m to 50m centres, or horizontal coils would require an area of approximately 7,400m2.
Using GSHP for 100% of the space heating will only provide a 17.9.8% reduction in predicted CO2 emissions, due to the high CO2 emissions associated with grid supplied electricity. This is an expensive technology with low CO2 reductions that will not meet the requirements without additional LZC technologies. **Therefore, this is not considered to be viable for this project.**

Air Source Heat Pumps

Air Source Heat Pumps extracts heat from the outside air using an external condenser unit and transfers it, through refrigeration pipework to the indoor unit which then conveys that heat to the heating emitters and hot water cylinder. This system is capable of providing 100% of heating within a building. Providing air source heat pumps to the building for the space heating would reduce the carbon dioxide emissions by 19% from the Lean building. This system would require 1 condenser unit to be located external to each plot, the units proposed are the following. The Midea 4-6 kw, They have been designed specifically for residential applications, these models offer superb, market-leading energy efficiency and sound levels and enable almost any home to benefit from high performance, renewable heating.

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This also hits the required 20% reduction and is inline with the change over to Electric Mains heating while still being extremely efficient. **Therefore, this was felt viable.**

Biomass

Waste timber, in the form of wood chips and pellets, is used as fuel in boilers providing heating to buildings. Biomass generates about the same amount of carbon dioxide as fossil fuels, however, with new plant/tree growth this carbon dioxide is actually removed from the atmosphere making the Biomass system carbon neutral. Wood chips and pellets present no risk if accidentally released into the environment and there are no harmful by-products. The flue gas is smoke-free and the ash content of between 0.5% and 3% by volume (depending on material), is minimal.
When sizing biomass is standard practice the biomass boilers would meet a significant proportion of the heating load and gas condensing boilers would assist with providing load trimming to reduce the amount of on/off cycling of the biomass boilers. The provision of biomass boilers to meet all the domestic hot water demand and 30% of the annual energy demand for space heating only would reduce the carbon emissions of the building by 40%.

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The provision of biomass boilers for this site would require a central energy centre to be provided sized to allow for at least one biomass boiler and gas backup boiler(s). The number of boilers would be dependent upon detailed analysis of the demand load profiles during detail design stage. Storage of the biomass fuel is required on site, sized to accommodate at least one peak month of heating. Based on the predicted domestic hot water and 30% heating requirements, this would require 30m3 storage for wood pellets or 135m3 of woodchip, depending upon the boiler selection. The store would need to be easily accessed by a large delivery vehicle, similarly, sized to a petrol tanker and therefore there may be issues surrounding vehicular access to the site.
The space and access requirements for the energy centre and biomass store are unlikely to be viable on this site. Furthermore, the biomass boiler(s) would require a large flue and careful consideration of its sizing, location and the potential impact of local air quality would be required in this residential area. **Therefore, this was felt not viable.**

Solar thermal

Solar water heating systems use the energy from the sun to heat water, most commonly in the UK for hot water needs. The systems use a heat collector, generally mounted on the roof in which a fluid is heated by the sun. This fluid is passed through a heat exchanger and used to heat up water which is stored in either a separate hot water cylinder or a twin coil hot water cylinder inside the building. There are two types of collectors used for solar water heating applications - flat plate collectors and evacuated tube collectors. Evacuated tube collectors are generally more expensive due to a more complex manufacturing process (to achieve the vacuum) but manufacturers generally claim better winter performance. **Due to the number of panels required this was felt not viable.**

Photovoltaics

Solar photovoltaic (PV) technology is a semi-conductor-based technology that converts the energy in sunlight into electricity. The term describes a solid-state electronic cell that produces direct current electrical energy from the radiant energy of the sun. When sunlight strikes the surface of a PV cell, this electrical field provides momentum and direction to light-stimulated electrons, resulting in a flow of current when the solar cell is connected to an electrical load. The PV systems should be unshaded. Shading even over a small area of the panel, can significantly reduce performance. Excess energy can be exported to the grid; and feed-in tariffs are available. **This was not felt viable due to the aesthetics of Solar P.V and the small amount of space available to split the system between the 9 flats.**

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1.4 Innovative waste facilities.

Recycling storage will comply with the local authority requirements for recycling externally and internally. External storage areas will be in compliance with disabled access and volumes will be in line with BS5906.

The separation for recyclables will be provided in a fixed position in the kitchen with 30 litres to be provided for waste and minimum 30 litres for recyclables. A recycling bin with a 44-litre capacity will be provided.

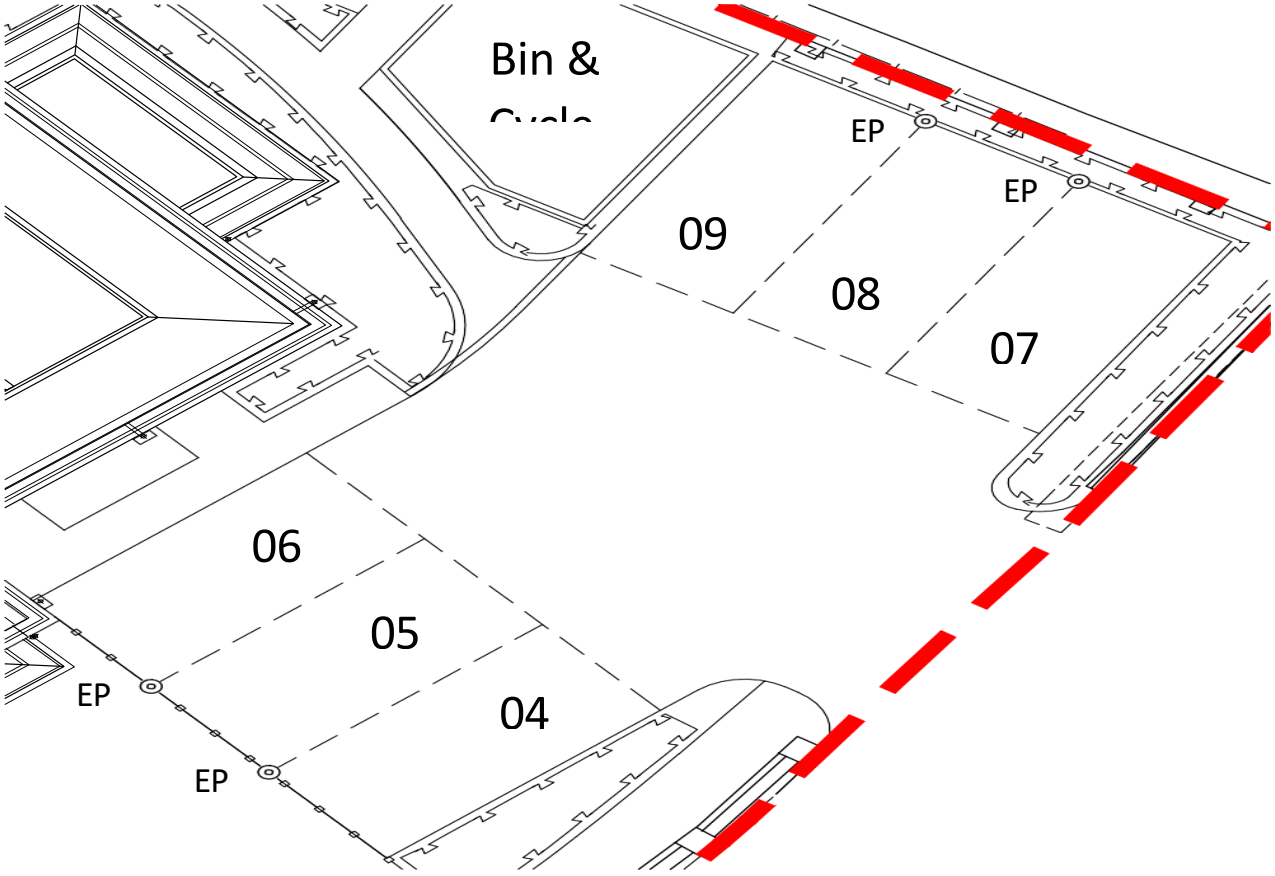


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1.5 Electric Vehicle Provision

The site will have 9 dedicated electric vehicle charging spaces to serve every apartment.



1.6 Water Saving devices

Mains water usage shall be significantly reduced through water efficient products in line with the mandatory requirements. An indicative specification for the development is:

Shower of 6 litres/minute
Bath sizes to be 160 litres to overflow
Washbasin taps to be flow limited to 6 litres/minute
Dual Flush WCs at 6/4 litre
Low water use white goods
The above specifications will give a usage of below 105 litres/person/day

See Part G calculation and the end of this document.

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1.7 Sustainable materials and construction

The design team are committed to ensuring that at least 5 elements build are A rated under the BRE Green Guide.

All concrete used within the development will have BES:6001 certification under an environmental management system (EMS) such as ISO14001. All timber used within the development will be wither PEFC or FSC certified.

Building Elements all skirting, stairs, doors and other timber finishing elements will be sourced from FSC or PEFC certified timber.

1.8 Summary of carbon reduction

Flat	Base line	Proposed
1	16.64	9.02
2	17.83	12.05
3	16.70	11.33
4	16.68	12.95
5	14.00	11.49
6	14.00	11.49
7	14.00	11.49
8	14.94	13.14
9	14.94	14.15
Totals	**139.73 CO^2 emissions per m^2 Box 273**	**107.11 CO^2 emissions per m^2 Box 273**

The baseline CO2 emission for the site is: 139.73 CO^2 emissions per m^2 Box 273
The reduction CO2 emission for the site is: 107.11 CO^2 emissions per m^2 Box 273
The site achieves an 23.34% reduction in Co2 emissions by enhancing the building Fabric and introducing an ASHP.

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1.9 Compliant Baseline dwelling SAPs (See Zip Folder)