2 CANAL SIDE STUDIO FLATS

ENERGY STATEMENT

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Rev A	01/09/2014	Updated to current Regs
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CONTENTS

1.0 Executive Summary

This energy statement relates to a FULL planning submission.

The project involves the construction of a new floor to add 3 new 1 bed flats to an already existing bulding.

The energy strategy is to provide very high insulation, Exhaust Air Heat Pumps (EAHP) and Photo Voltaics for the 3 flats. The resulting regulated emissions are summarised below. We have maximised reductions in carbon dioxide through energy efficiency measures and the technology that has been installed on this site.

We will also provide the infrastructure to enable connection to the proposed community heating scheme in the future. Connections would be provided for future use to the heating scheme to provide thermal top up and back up.

A 20.57% Renewable Target is achieved by using Exhaust Air Heat Pumps and Photo Voltaics across the 3 flats.

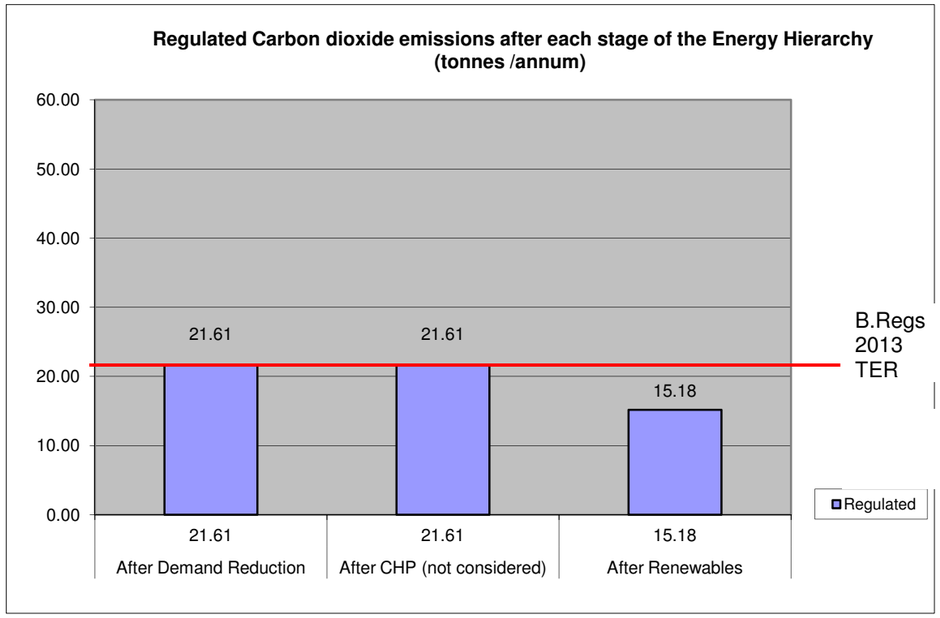


Table1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy

	Carbon dioxide emissions (Tonnes per annum)	
	Regulated	**Unregulated**
B. Regs Compliant	21.61	20.32
After Demand Reduction	21.61	20.32
After CHP (not considered)	21.61	20.32
After Renewables	15.18	20.32

The resulting percentage reductions in regulated carbon dioxide emissions are given in the table below

Table 2: Regulated Carbon dioxide savings from each stage of the Energy Hierarchy

	Regulated Carbon dioxide savings	
	Tonnes CO^2 / annum	**%**
Savings from demand reduction	0.00	0.0%
Savings from CHP	0.00	0.0%
Savings from renewable energy	6.44	29.8%
Total Cumulative Savings	6.44	29.8%

Lastly; the percentage reductions in total (unregulated + regulated) carbon dioxide emissions are given in the table below.

Table 3: Total Carbon dioxide savings for percentage renewables

	Total Carbon dioxide savings Regulated + unregulated
Baseline Crabon Emmissions	18.65
Savings from renewable energy	3.84
%ge Renewable	20.57%

2.0 Energy Hierarchy

2.1 Demand Reduction

The "regulated" CO2 Emissions were calculated using recognised SAP software, Stroma SAP 2012 v.1.0.3.4 for the residential units (See Appendix 1 for SAP worksheets)

The calculations take into account a number of "energy demand reduction" measures, which are summarised in the table opposite.

2.2 Efficient Infrastructure

2.2.1 District Heating (future provision)

Having established the CO2 emissions after applying demand reduction measures, the next step was to investigate the use of efficient heating and cooling networks. The Exisiting and Emerging Map for Camden's community heating schemes (see below) indicates that in the future a link to the Royal Free Distict Heating network would be likely. Therefore provision has been made to enable connection in the future.

2.2.2 Sitewide Heating (not proposed)

It is very difficult to make community heating viable for small numbers of dwellings - particularly where they are arranged along a street of terraced houses or low-rise apartmment buildings as opposed to a single high-rise block.

2.2.3 CHP(Not proposed)

CHP needs at least 100 dwellings (ideally 500 or more) to be economically viable.

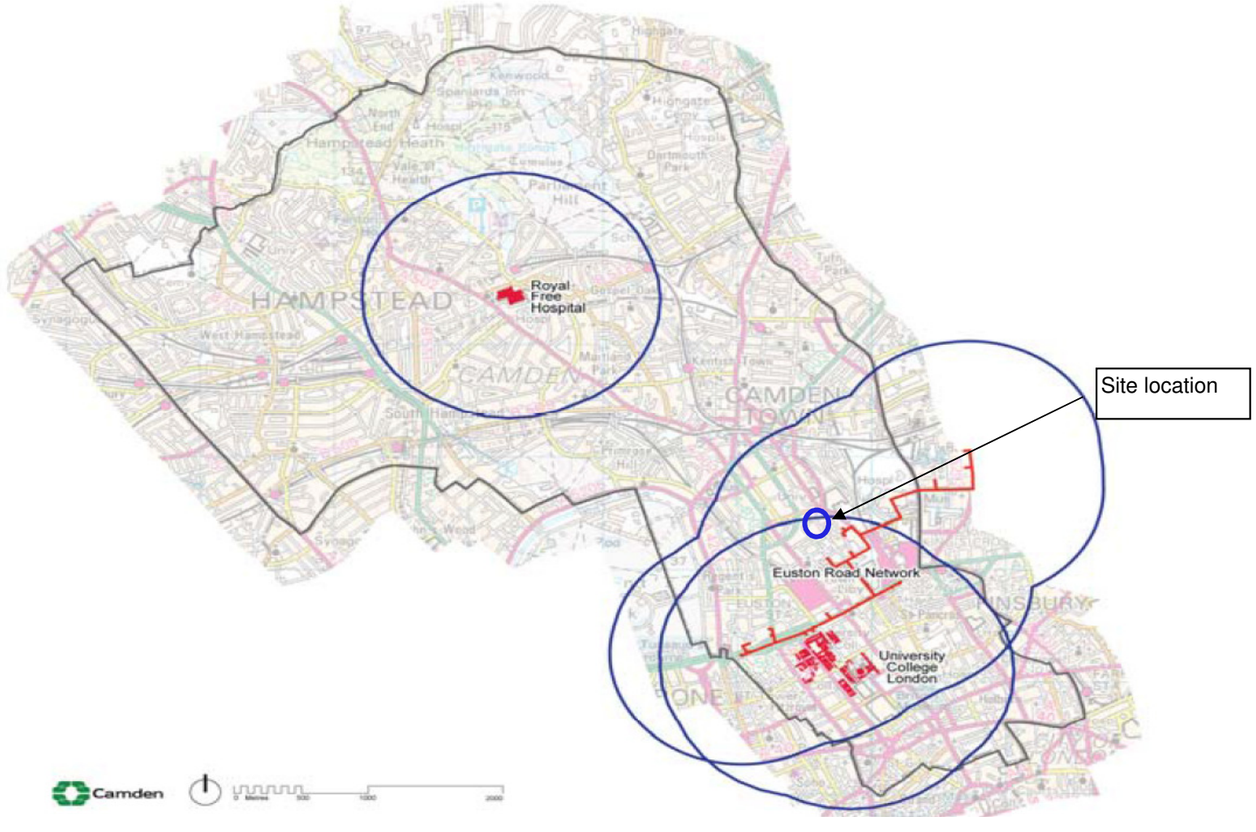
2.3 On-site Renewables (proposed)

Our proposed strategy is to use Exhaust Air heat Pumps and Photo Voltaic panels for the flats.
An exhaust air heat pump extracts heat from the exhaust air of a building and transfers the heat to the supply air, hot tap water system, radiators and/or underfloor heating.
Photo Voltaics system is a method of converting solar energy into direct current electricity.
This is described in more detail in section 3.

Table 4: Energy Efficiency Measures - "Be Lean"

Element or System	Reference value	Proposal	Comment
Wall U-Values	0.35	0.15	Requires 120 mm P.U. insulation
Floor U-Values	0.25	0.15	Requires 150 mm P.U. insulation
Roof U-Values	0.16	0.1	Requires 200 mm P.U. insulation
Opaque Door	2	1.4	Requires extra 10 mm P.U. insulation
Thermal Bridging	Default	Default	
Windows	All East or West Facing		
U- Values (W/m2K) Frame Factor Solar Energy Trans. Light Trans.	1.8 0.7 0.51 0.67	1.4 0.8 0.65 0.75	Low-e, double-glazed units with soft coating
Ventilation system	Natural Ventilation with Intermittent extract fans	Continous Mechanical extract through EAHP	
Extract Fans	2 Fans per flat	from main ventilation system	
Hot Water Cylinder	150l Cylinders with 35mm factory foam	170l Cylinders with 75mm factory foam	
Primary Losses	Primary pipework not insulated, cylinder temp controlled by thermostat	Primary and secondary pipework fully insulated. Time and temperature control of cylinder.	
Low-e light fittings	70% of fixed outlets	100% of fixed outlets	
Heating Fuel	Natural Gas	Electric	
Heating System	Boiler – SEDBUK 78% efficient room-sealed fanned flue appliance	EAHP - NIBE fighter F370	
Heating Controls	Programmer + room thermostat + TRVs + boiler interlock	Time & Temperature control	
Hot Water System	Stored water, heated by boiler, separate timers for HTG and DHW	From main heating system	

Figure 4. Developments within 1km radius of an existing or emerging network.



3.0 Detailed Proposal

Our proposal is to install a NIBE F370 Exhaust Air heat pump in each flat to provide the space heating and domestic hot water needs for each flat.

A total of 1.5KWp of PV panels - 6 No 250Wp panels across the 3 flats i.e. 2 Panels for each flat - can be installed on the roof facing Southeast.

Also an additional 6No X 250Wp Panels have also been allowed to serve the Landlords. This 6No Panels are exempt from the SAP calculations.

Exhaust Air Heat Pump

It is proposed that each flat is installed with a NIBE F370 Exhaust Air Heat Pump (EAHP).

This technology recovers heat from the exhaust air for hot water and heating loads alongside the use of an electric immersion for top up when required.

These units are compact and can to be located in the kitchen. They are made up of an Exhaust Fan extracting air from the wet rooms (bathroom and kitchen), plate heat exchanger, hot water cylinder and associated pumps and controls.

An exhaust air heat pump would use the heat that is in the building's ventilation air to heat up the building. The conversion of the extract air's energy to heating occurs in three different circuits. From the exhaust air, free heating energy is retrieved from the accommodation and transported to the heat pump. In the refrigerant circuit, the heat pump increases the retrieved heat's low energy to a high temperature. In the heating medium circuit, the heat is distributed round the dwelling.

The heat pump can be connected to an optional low temperature distribution system e.g. radiators, convectors or underfloor heating. Also it can be connected in several different ways e.g. to solar panels, gas boiler or to an extra electric hot water heater.

Nibe Exhaust Air Heat Pump - Fighter F370

Photo Voltaic

It is also proposed to install Photovoltaic system on the roof of the apartments.

Photo voltaic system converts solar radiation into direct current (DC) electricity. Using an inverter this direct current is then converted into alternating current (AC) for typical energy use. Photovoltaic cells are made up of semi-conducting material, so when the sun strikes, it is converted into electricity.

PV cells are usually mounted on a high surface like a roof of a building where it is exposed to constant solar radiation.

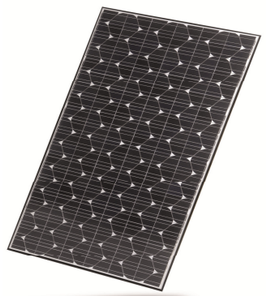


Photo Voltaic Panel

Appendix I

Energy Calculations

Establishing the targets - SAP calculations

The calculation procedure was as follows:

1. We used registered SAP software (Stroma FSAP 2012 Version 1.0.3.4) for claculating the 3 flats using the thermal properties described in section 2 in order to calculate the overall amount of PV required to meet the 20% Renewable Target.

The calculations indicate that a total of 1.5kWp of PV's and a NiBE F370 Exhaust Air Heat Pump in each flat is to achieve the 20% Renewable Target across the 3 Flats.

This would require a total of 6 Panels at 250W capacity.

2. In addition to the 6No X 250Wp Panels required across the 3 flats to meet the 20% Renewable Target, an extra 6No X 250Wp Panels have been allowed for other Landlord areas. This 6No Panels for Landlords are exempt from the SAP calculations.

Copies of the SAP calculations are available.

CALCULATE RENEWABLES ACHIEVED

	Area	Regulated Loads			Regulated + Unregulated Loads			TER x	DER x	Standard Case	Actual Case	Renewable
	m2	TER	DER	DER (Improved)	Standard Case	Actual Case	% Renewables	Area	Area	x Area	x Area	Contribution
Flat 1	50	22.08	15.55	22.08	45.08	35.79	20.60780834	1104.00	777.50	2254.00	1789.50	464.50
Flat 2	50	20.68	14.32	20.68	43.37	34.48	20.49804012	1034.00	716.00	2168.50	1724.00	444.50
Flat 3	50	22.08	15.66	22.08	45.08	35.79	20.60780834	1104.00	783.00	2254.00	1789.50	464.50
		21.61333	15.1767	21.6133333								
Totals	**150**							**3242.00**	**2276.50**	**6676.50**	**5303.00**	**1373.50**

Building Regulations target =		TER x Area	=	3242.00
Regulated CO2 emissions after efficiency improvements and renewables =		DER x Area	=	2276.50
Renewables Contribution =			=	1373.50
Regulated CO2 emissions after efficiency improvements and before renewables =	2276.50 +	1373.50	=	3650.00
Total CO2 emissions (regulated + unregulated) before renewables =		6676.50		
Renewables contribution =				1373.50
%ge Renewables =				20.57%