# Sustainable Design & Construction Statement

## Phoenix Road
## Camden
## NW1 1HB

**MARCH 2015**

**REPORT REF: SDCS/PR/20151103 - AT**

**Disclaimer**

The performances of renewable systems, especially wind and solar, are difficult to predict with any certainty. This is due to the variability of environmental conditions from location to location and from year to year. As such all budget/cost/sizings, which are based upon the best available information, are to be taken as an estimation only and should not be considered as a guarantee. This report relates to pre-planning stage therefore final specification must be provided by an M & E consultant after stage C.

NRG Consulting disclaims any responsibility to the Client and others in respect of any matters outside the scope of this report. This report is confidential to the Client and NRG Consulting accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

**TABLE OF CONTENTS**

**APPENDIX 1 – Carbon Emissions Table**

**APPENDIX 2 – Sample SAP Input Data Sheet and SAP L1a Checklist**

**APPENDIX 3 – BREEAM Domestic Refurbishment Pre-Assessment**

***Document Author:***
Alex Timperley - NRG Consulting
Studio 7, Third Floor, 138-148 Cambridge Heath Road, London, E1 5QJ
**E: alex.timperley@nrgconsulting.org**

**DOCUMENT CONTROL SHEET**

| Rev. | Issue Purpose | Author | Checked | Date |
|---|---|---|---|---|
| | For Initial Comment | AT | RT | 11/03/2015 |

## 1. INTRODUCTION

1.1 NRG Consulting has been appointed by Mark Fairhurst Architects to undertake an Energy Statement on a proposed development in Camden.

1.2 The Floor Areas in this report have been taken from the Floor Plans provided by the Architects for the scheme. The scheme comprises of 5 dwellings.

1.3 This document has been produced to satisfy:

- Policy 5.2 of the London Plan.
- Policy CS13 of the Camden Core Strategy
- Policy DP22: Promoting Sustainable Design and Construction of the Camden Local Development Framework

## 2. POLICY FRAMEWORK

2.1 With 5 residential refurbishment units proposed the development falls within the Government's "minor" category of planning applications.

## REGIONAL POLICIES

2.2 The London Plan was updated in July 2011. In this update a change of priority was initiated in that a "fabric first" approach was adopted to ensure that a development was as energy efficient as possible before renewable energy was added. This is in contradiction to the previous London Plan, Policy 4A.7 that promoted renewable energy above all else.

2.3 Policy 5.2 of The London Plan (2011) was updated in April 2014. The updated version states:

**A** Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

1 Be lean: use less energy

2 Be clean: supply energy efficiently

3 Be green: use renewable energy

**B** The Mayor will work with boroughs and developers to ensure that major developments meet the following targets for carbon dioxide emissions reduction in buildings. These targets are expressed as minimum improvements over the Target Emission Rate (TER) outlined in the national Building Regulations leading to zero carbon residential buildings from 2016:

**Residential buildings:**

Improvement on Part L 2013 Building Regulations: 2013 - 2016 - **35 percent** (as of 6th April 2014)

**C** Development proposals should include a detailed energy assessment to demonstrate how the targets for carbon dioxide emissions reduction outlined above are to be met within the framework of the energy hierarchy.

**D** As a minimum, energy assessments should include the following details:

**a**. Calculation of the energy demand and carbon dioxide emissions covered by the Building Regulations and, separately, the energy demand and carbon dioxide emissions from any other part of the development, including plant or equipment, that are not covered by the Building Regulations.

**b** Proposals to reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services

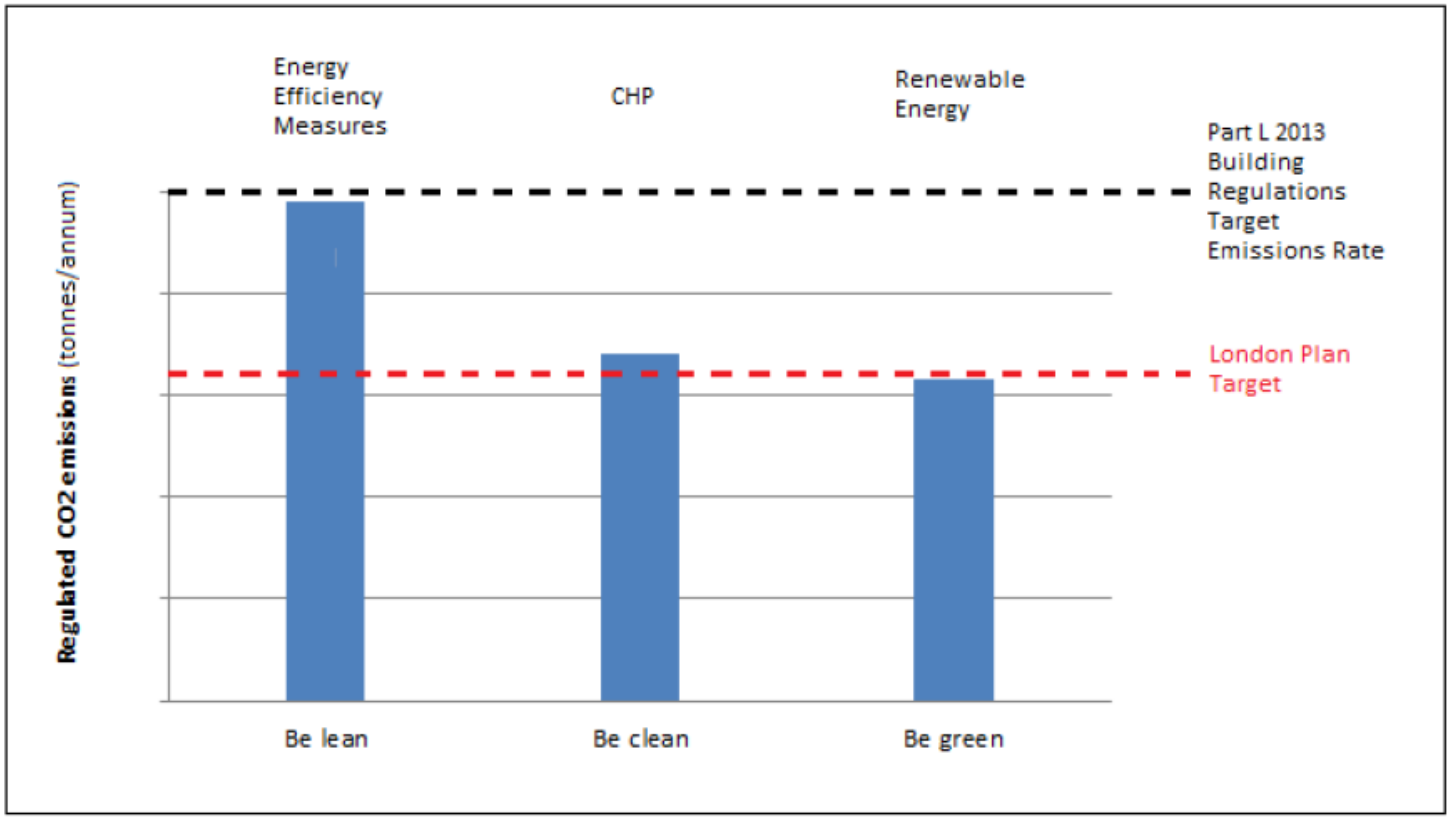
**c** Proposals to further reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP)

**d** Proposals to further reduce carbon dioxide emissions through the use of on-site renewable energy technologies.

2.4 As of 6th April 2014, The London Plan changed the targets required for major developments from 40% reduction in $CO_2$ emissions over the Part L 2010 baseline to 35% reduction in $CO_2$ emissions over the Part L 2013 baseline. Text from the GLA Website confirms this saying:

> The GLA provides guidance for developers and their advisers on preparing energy assessments to accompany strategic planning applications. Each assessment is required to demonstrate how the targets for regulated $CO_2$ emission reduction over and above 2013 Building Regulations will be met using the Mayor's energy hierarchy.
>
> As outlined in the Sustainable, Design and Construction SPG (to be published in April 2014), from 6 April 2014, the Mayor will apply a 35 per cent carbon reduction target beyond Part L 2013 of the Building Regulations - this is deemed to be broadly equivalent to the 40 per cent target beyond Part L 2010 of the Building Regulations, as set out in London Plan Policy 5.2 for 2013-2016. This target will apply to all Stage 1 applications received by the Mayor on or after 6 April 2014.

2.5 A visual representation of the GLA Target in relation to Building Regulations where feasible is:



**LOCAL POLICIES**

2.6 **London Borough of Camden Core Strategy Policy CS13** states that:

> **CS13 - Tackling climate change through promoting higher environmental standards**
>
> ***Reducing the effects of and adapting to climate change***
> The Council will require all development to take measures to minimise the effects of, and adapt to, climate change and encourage all development to meet the highest feasible environmental standards that are financially viable during construction and occupation by:
> a) ensuring patterns of land use that minimise the need to travel by car and help support local energy networks;
> b) promoting the efficient use of land and buildings;
> c) minimising carbon emissions from the redevelopment, construction and occupation of buildings by implementing, in order, all of the elements of the following energy hierarchy:
> - ensuring developments use less energy,
> - making use of energy from efficient sources, such as the King's Cross, Gower Street, Bloomsbury and proposed Euston Road decentralised energy networks;
> - generating renewable energy on-site; and
> d) ensuring buildings and spaces are designed to cope with, and minimise the effects of, climate change.
> The Council will have regard to the cost of installing measures to tackle climate change as well as the cumulative future costs of delaying reductions in carbon dioxide emissions

**London Borough of Camden Local Development Framework Policy DP22** states that:

**Policy DP22 - Promoting sustainable design and construction**

The Council will require development to incorporate sustainable design and construction measures. Schemes must:

a) demonstrate how sustainable development principles, including the relevant measures set out in paragraph 22.5 below, have been incorporated into the design and proposed implementation; and
b) incorporate green or brown roofs and green walls wherever suitable.

The Council will promote and measure sustainable design and construction by:

c) expecting new build housing to meet Code for Sustainable Homes Level 3 by 2010 and Code Level 4 by 2013 and encouraging Code Level 6 (zero carbon) by 2016.
d) expecting developments (except new build) of 500 sq m of residential floorspace or above or 5 or more dwellings to achieve "very good" in EcoHomes assessments prior to 2013 and encouraging "excellent" from 2013;
e) expecting non-domestic developments of 500sqm of floorspace or above to achieve "very good" in BREEAM assessments and "excellent" from 2016 and encouraging zero carbon from 2019.

The Council will require development to be resilient to climate change by ensuring schemes include appropriate climate change adaptation measures, such as:

f) summer shading and planting;
g) limiting run-off;
h) reducing water consumption;
i) reducing air pollution; and
j) not locating vulnerable uses in basements in flood-prone areas.

**The referenced paragraph 22.5** states that:

22.5 When a building is constructed, the accessibility of its location; its density and mix of uses; its detailed design taking into account the orientation of the site; and the mechanical services and materials chosen can all have a major impact on its energy efficiency. The Council will require all schemes to consider these general sustainable development principles, along with the detailed elements identified in the table below, from the start of the design process. Developments of 5 or more dwellings or 500sqm of any floorspace should address sustainable development principles in their Design

and Access statements or in a separate Energy Efficiency Statement, including how these principles have contributed to reductions in carbon dioxide emissions. When justifying the chosen design with regards to sustainability the following appropriate points must be considered:

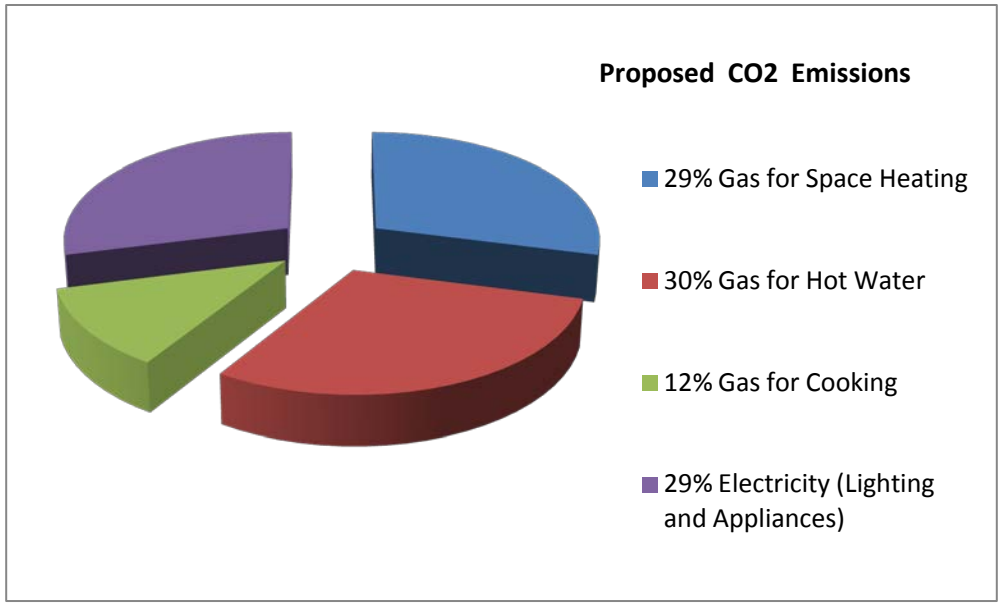
| **Design** | **Fabric/ Services** |
|---|---|
| • the layout of uses<br>• floorplates size/depth<br>• floor to ceiling heights<br>• location, size and depth of windows<br>• limiting excessive solar gain<br>• reducing the need for artificial lighting<br>• shading methods, both on or around the building<br>• optimising natural ventilation<br>• design for and inclusion of renewable energy technology<br>• impact on existing renewable and low carbon technologies in the area<br>• sustainable urban drainage, including provision of a green or brown roof<br>• adequate storage space for recyclable material, composting where possible<br>• bicycle storage<br>• measures to adapt to climate change (see below)<br>• impact on microclimate | • level of insulation<br>• choice of materials, including - responsible sourcing, re-use and recycled content<br>• air tightness<br>• efficient heating, cooling and lighting systems<br>• effective building management system<br>• the source of energy used<br>• metering<br>• counteracting the heat expelled from plant equipment<br>• enhancement of / provision for biodiversity<br>• efficient water use<br>• re-use of water<br>• educational elements, for example visible meters<br>• on-going management and review |

Therefore, this document will demonstrate how the development is designed and constructed in a sustainable way. A BREEAM Domestic Refurbishment Assessment has also been undertaken and is included in Appendix 3.

## 3. PREDICTED ANNUAL CARBON DIOXIDE EMISSIONS

3.1 Full SAP calculations have been carried out on all refurbishment dwellings using the NHER Plan Assessor Version 6.1.1 (SAP v9.92) to gain the regulated emissions for the site. A licensed and OCDEA accredited SAP Assessor has carried out the calculations.

3.2 Typical $CO_2$ emissions for housing developments is broken down as follows



3.3 A table can be found in the Appendices which:

- Sets out the floor area of the dwellings,
- Shows the Target Emission Rate (TER) and Dwelling Emission Rate (DER) in terms of kg/$m^2$/year
- Highlights the percentage difference between the Pre-Refurbishment Development over the Proposed Development.
- Displays the $CO_2$ saved through the proposed use of energy efficient measures.

3.4 Based upon the figures as set out in the Appendices, with a total gross internal floor area of **388$m^2$,** the Pre-Refurbishment Development has carbon emissions of **25.4 tonnes $CO_2$/year.**

3.5

| | **$CO_2$ Emissions - (Tonnes per Annum)** |
|---|---|
| | **Regulated** |
| Pre-Refurbishment Development | **25.4** |
| Proposed Development | |
| After Decentralised/CHP Feasibility | |
| After Renewable Energy | |

## 4. ENERGY EFFICIENT DESIGN MEASURES

4.1 Construction Details have been selected to ensure that all fabric U-values exceed the requirements of Part L of the Building Regulations (2013). The proposed construction details for the refurbishment dwellings are as follows:

| Elements | U Value | Further Information / Comment |
|---|---|---|
| Upper floors | 0.25 w/m2/k | |
| New external Wall (new, flat 2) | 0.28 w/m2/k | |
| New external Wall (dormers) | 0.29 w/m2/k | |
| Party Walls Between Dwellings | 0 w/m2/k | |
| Corridor walls (existing) | 0.3 w/m2/k | |
| Sheltered Walls (new) Flats to Common Areas | 0.28 w/m2/k | |
| Roof (sloping, existing) | 0.18 w/m2/k | |
| Roof (insulation at joists) | 0.16 w/m2/k | |
| Roof (flat, above flat 2) | 0.18 w/m2/k | |
| Roof (dormers) | 0.25 w/m2/k | |
| New Windows | 1.6 w/m2/k | |
| Doors | 1.4 w/m2/k | |
| Air Permeability | N/A | Existing building |
| Ventilation | System 1 – natural ventilation | Intermittent Extract Fans and Trickle Ventilation |
| Heating | Gas Boiler | Individual Combi Boilers – Mains Gas - 89% SEDBUK 2009 efficiency |
| Controls | Programmer/TRVS/Thermostat | |
| Emitters | Radiators | |
| Thermal Bridging | N/A | Existing building |
| Low Energy Lighting | 100% | Low Energy **Bulbs** with a minimum luminous efficacy of greater than 45 lumens per circuit watt required. |

4.3 The U-Values of all glazed elements will exceed Building Regulations standards, and incorporate low emissivity coating, resulting in an efficient balance between passive solar gain and the thermal losses from each room.

Daylight levels are high throughout and are supplemented with low energy light bulbs. The orientation of the building reduces peak solar gain while ensuring optimum levels of daylight both morning and evening.

4.4 When taking into account proposed construction details and U Values, but excluding the imposition of renewable energy technologies gives the development emissions of **11.8 tonnes $CO_2$/year**; a **55.33%** decrease in $CO_2$ emissions over the Pre-Refurbishment Development.

| | **$CO_2$ Emissions - (Tonnes per Annum)** |
|---|---|
| | **Regulated** |
| Pre-Refurbishment Development | **25.4** |
| Proposed Development | **11.8** |
| After Decentralised/CHP Feasibility | |
| After Renewable Energy | |

The building is Grade 2 Listed, making many alterations impossible to implement. **Camden Core Strategy policy CS13 (paragraph 13.9)** includes the following guidance with regards to a Listed Building:

4.3 Camden Core Strategy Policy CS13, paragraph 13.9 expects development or alterations to existing buildings to include proportionate measures to be taken to improve their environmental sustainability, where possible.

**WHAT DOES THE COUNCIL EXPECT?**

- All buildings, whether being updated or refurbished, are expected to reduce their carbon emissions by making improvements to the existing building. Work involving a change of use or an extension to an existing property is included. As a guide, at least 10% of the project cost should be spent on the improvements.
- Where retro-fitting measures are not identified at application stage we will most likely secure the implementation of environmental improvements by way of condition. Appendix 1 sets out a checklist of retro fit improvements for applicants.
- Development involving a change of use or a conversion of 5 or more dwellings or 500sq m of any floorspace, will be expected to achieve 60% of the un-weighted credits in the Energy category in their EcoHomes or BREEAM assessment, whichever is applicable. (See the section on Sustainability assessment tools for more details).
- Special consideration will be given to buildings that are protected e.g. listed buildings to ensure that their historic and architectural features are preserved.

Due to the building's Listed status, the "proportionate measure" available on this development are very limited.

The original specification for the Pre-Refurbishment Development building is as follows:

| Elements | U Value | Further Information / Comment |
|---|---|---|
| Existing external walls | 1.54 w/m2/k | 350mm brick walls with no insulation |
| Party Walls Between Dwellings | 0 w/m2/k | |
| Corridor walls (existing) | 0.67 w/m2/k | Timber lath and plaster |
| Upper floors (corridor below) | 0.25 w/m2/k | Assumed |
| Roof (insulation at joists) | 2.3 w/m2/k | No insulation |
| Windows | 4.8 w/m2/k | Single glazing |
| Doors (existing) | 1.6 w/m2/k | Wood framed |
| Air Permeability | n/a | Refurbishment project |
| Ventilation | System 1 | Natural ventilation with intermittent extract fans |
| Heating | Gas Boiler | Information not available |
| Controls | Programmer, room thermostat and TRVs | |
| Emitters | Radiators | |
| Thermal Bridging | n/a | Refurbishment project |
| Low Energy Lighting | 0% | Low Energy **Bulbs** with a minimum luminous efficacy of greater than 45 lumens per circuit watt required. |

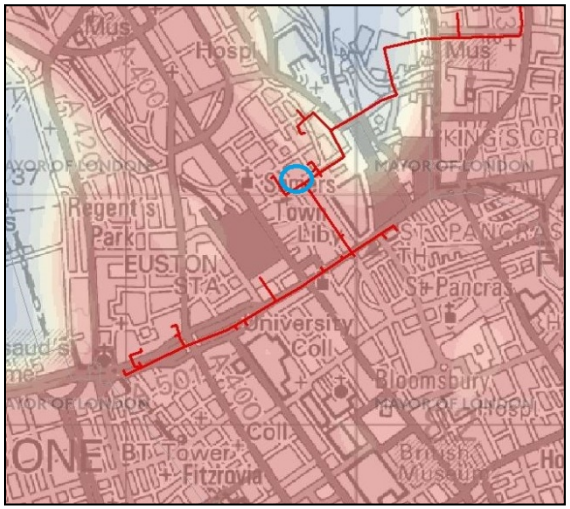
As can be seen, all "proportionate measures" have been taken based on the original specification of the building.

## 5. FEASIBILITY OF RENEWABLE ENERGY

### Decentralised Energy

5.1.1 Pursuant to Policy 5.5 of the London Plan, to the knowledge of the authors, there are no existing large scale CCHP/CHP distribution networks to connect into for the development.

5.1.2 The London Heat Map has been checked and no viable local connections are available. The BLUE shape in the centre of the Picture is the Site. The Map picture is:




The red line is a planned District heating Network which does not exist yet. When completed it will still not be a viable option as this scheme comprises of a small number of individually heated units.

**Communal Heat and Power**

5.2 A CHP is not a feasible technology for the development due to the number of units as per the latest GLA Guidance (April 2014):

*"By way of general guidance, it is not expected that small purely residential developments (for example, less than 300 dwellings) include on-site CHP. Due to the small landlord electricity supplies, CHP installed to meet the base heat load would require the export of electricity to the grid. It is recognised that the administrative burden of managing CH electricity sales at this small scale, where energy services companies (EXCOs) are generally not active, is too great for operators of residential developments to bear. If CHP is installed but does not operate because arrangements for CHP electricity sales are not concluded, the projected CO2 savings will not materialise."*

5.3 Therefore it has been proposed that the scheme reverts to high efficiency Gas boilers. These systems will be complemented with modern controls to reduce the bills of the tenants to the lowest possible level.

5.4 The potential renewable energy applicable to this development is:

- Solar PV
- Solar Hot Water
- Ground Source Heat Pump
- Air Source Heat Pump
- Biomass Boilers

The feasibility of these items is investigated below:

## 5.3 Photovoltaic Panels

| Advantages | Disadvantages | Overall Feasibility |
|---|---|---|
| Can have significant impact on carbon by offsetting electricity which has a high carbon footprint. Low maintenance<br>No noise issues associated with PV<br>No additional land use from the installation of PV panels | High capital investment required<br>Needs unobstructed space on roof | The development incorporates a pitched roof which is perfectly suited to PV.<br>However as the development is a Grade II Listed Building it is not feasible to install PV on the roof; therefore this option has been discarded |

## 5.4 Solar Thermal Collectors

| Advantages | Disadvantages | Feasibility |
|---|---|---|
| No noise issues associated with Solar thermal collectors<br>No additional land use from the installation of solar thermal collectors<br>Low maintenance and easy to manage<br>Low capital cost | The hot water cylinder will need to be larger than a traditional cylinder. Consideration will need to be given to the space required especially as combination boilers are planned.<br>Needs unobstructed space on roof. | Solar thermal collectors are feasible for the development, although it is not possible to meet a 25% carbon saving as the maximum demand that solar thermal collectors can be designed to meet can be no greater than 50% of the hot water demand.<br>In addition the same concerns regarding the listed status of the building apply.<br>Solar thermal collectors have therefore not been investigated further. |

## 5.5 Biomass Heating

| Advantages | Disadvantages | Feasibility |
|---|---|---|
| Potential to reduce large component of the total $CO_2$<br><br>A biomass boiler would replace a standard gas heating system so some of the cost may be offset through money saved on a traditional boiler. | Regular maintenance will be required<br><br>Reliability of fuel may become a problem, therefore limited cost saving for residents<br><br>A plant room and fuel store will be required which may take additional land from the proposed development or surroundings<br><br>The fuel will need to be delivered, which can cause issues with access etc.<br><br>Biomass is often not a favoured technology in new development due to the potential local impacts of NOx emissions and delivery vehicles. | This is a small tight site in an urban area.<br><br>Biomass is not considered feasible for such a development due to the need for space to accommodate fuel storages, access for delivery vehicles and local $NO_x$ emissions. |

## 5.6 Ground Source Heat Pumps

| Advantages | Disadvantages | Feasibility |
|---|---|---|
| Low maintenance and easy to manage<br><br>Optimum efficiency with under- floor heating systems<br><br>As heat pumps would replace standard heating systems, some of the cost may offset through money saved on a traditional boiler. | The heat pump has a noise level around 45-60dB so some attenuation may be required and it should be sensibly located<br><br>Relatively high capital cost<br><br>Requires electricity to run the pump, therefore limited carbon savings in most cases<br>For communal systems plant room required which may take additional land from the proposed development/surroundings<br><br>High payback. | Limited Space on site and large communal infrastructure needed would remove and reduce amenity space.<br><br>For this reason, GSHP has not been investigated further. |

## 5.7 Air Source Heat Pumps

| Advantages | Disadvantages | Feasibility |
|---|---|---|
| ASHP systems are generally cheaper than ground source as there is no requirement for long lengths of buried piping.<br><br>Low maintenance and easy to manage<br><br>Optimum efficiency with under- floor heating systems<br><br>As heat pumps would replace standard heating systems, some of the cost may offset through money saved on a traditional boiler. | The heat pump has a noise level around 50-60dB so some attenuation may be required and it should be sensibly located. The potential noise from the external unit may mean there is local opposition to their installation.<br><br>Requires electricity to run the pump, therefore limited carbon savings in most cases<br>For communal systems plant room required which may take additional land from the proposed development/surroundings<br><br>Potential noise issues | With the cost of electricity increasing, the payback of ASHPs may be too great |

## 6. RENEWABLE ENERGY MEASURES

6.1 Following the above feasibility, there is no feasible renewable technology for this development, and therefore none has been recommended for installation. The 55.33% improvement through energy efficiency measures represents a significant improvement.

| | **$CO_2$ Emissions - (Tonnes per Annum)** |
|---|---|
| | **Regulated** |
| Pre-Refurbishment Development | **25.4** |
| Proposed Development | **11.8** |
| Reduction via Energy Efficiency | **0** |
| Amount Offset by Renewable Energy | **0** |
| Final $CO_2$ Emissions after Renewable Energy | **11.8** |

## 7. WATER EFFICIENCY & RECYCLING

7.1 This development will meet and exceed a water efficiency target of 105 ltrs/person/day in line with Part G of the Building Regulations:

| | | | |
|---|---|---|---|
| | House Type: | Type 1 | |
| | Description: | Phoenix Road | |
| Installation Type | Unit of measure | Capacity/ flow rate | Litres/ person/ day |
| Is a dual or single flush WC specified? | | Dual | |
| WC | Full flush | 6 | 8.76 |
| | Part flush volume | 4 | 11.84 |
| Taps (excluding kitchen and external taps) | Flow rate (litres / minute) | 6 | 11.06 |
| Are both a Bath & Shower | | Bath & Shower | |
| Bath | Capacity to overflow | 156 | 17.16 |
| Shower | Flow rate (litres / minute) | 7 | 30.59 |
| Kitchen sink taps | Flow rate (litres / minute) | 8 | 13.88 |
| Has a washing machine been specified? | | Yes | |
| Washing Machine | Litres / kg | 8.17 | 17.16 |
| Has a dishwasher been | | Yes | |
| Dishwasher | Litres / place setting | 1.25 | 4.50 |
| Has a waste disposal unit been specified? | | No | 0.00 |
| Water Softener | Litres / person / day | | 0.00 |
| | | Calculated Use | 114.9 |
| | | Normalisation factor | 0.91 |
| Code for Sustainable Homes | Total Consumption | | 104.6 |
| | Mandatory level | | Level 3/4 |
| Building Regulations 17.K | External use | | 5.0 |
| | Total Consumption | | 109.6 |
| | 17.K Compliance? | | Yes |

For full Part G compliance document visit here: www.planningportal.gov.uk/uploads/br/**water_efficiency_calculator**.pdf

**a. WCs**
i. Flushing capacity for the WC suite including consumption at full and part flush for dual flush WCs.

**b. Taps**
i. Flow rate of each tap, at full flow rate in litres per minute measured at a dynamic pressure of 3±0.2 bar (0.3±0.02 MPa) for high pressure (Type 1) taps, or at a dynamic pressure of 0.1±0.02 bar (0.01±0.002 MPa) for low pressure (Type 2) taps (BS EN 200:2008)
ii. For 'click taps' and other taps with a 'water break', the manufacturer's stated full flow rate should be used to perform calculations (measured as described above). Do not use the flow rate at the break point. A factor for percentage of flow rate is already assumed within the use factor for taps.
iii. Taps on baths should not be included in the calculation as the water consumption from bath taps is taken account of in the use factor for baths.

**c. Baths**
i. Total capacity of the bath to overflow, in litres (excluding displacement, this is already included in the use factor for baths).

**d. Showers**
i. Flow rate of each shower at the outlet using cold water (T ≤ 30˚ C), in litres per minute measured at a dynamic pressure of 3±0.2 bar (0.3±0.02 MPa) or high pressure (Type 1) supply systems, or at a dynamic pressure of 0.1±0.05 bar (0.01±0.005 MPa) for low pressure (Type 2) supply systems (BS EN 1112:2008)

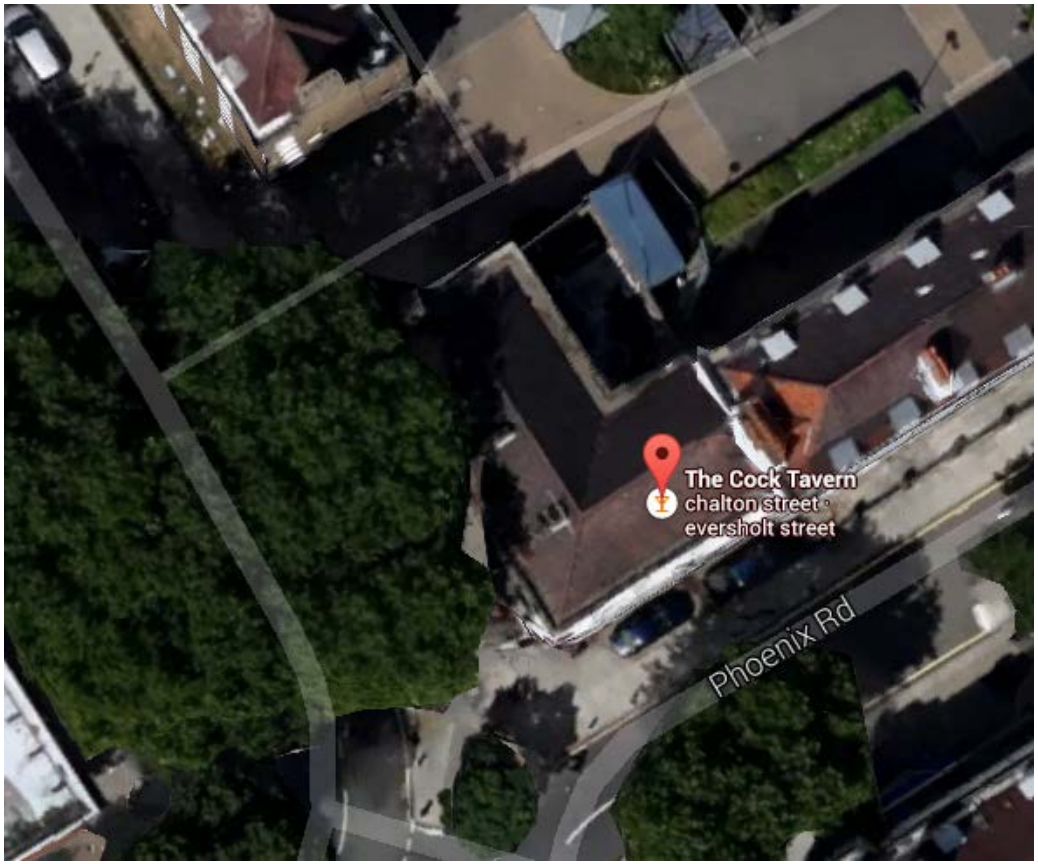
**e Dishwashers**
i. Litres per place setting derived from the figures quoted on the EU Energy Label.
ii. Where no dishwasher is to be provided and therefore consumption figures are unknown, a figure of 1.25 litres per place setting must be assumed.

**f. Washing machines**
i. Litres per kilogram of dry load derived from the figure quoted on the EU Energy Label.
ii. Where no washing machine is to be provided and therefore consumption figures are unknown, a figure of 8.17 litres per kilogram must be assumed.

7.2 Rainwater Harvesting has been considered but is not a practical measure due to the tight, urban Site which does not offer sufficient space to install the required systems.

## 8. BIODIVERSITY & ADAPTION TO CLIMATE CHANGE

8.1 The development is a refurbishment of a pre-existing property (a Public House) which does not include any features of ecological value which would need protecting during construction:



8.2 Efforts can be made to improve the ecological value of the development through the installation of bird or bat boxes on the finished dwelling and the planting of bee friendly flowers where possible.

8.3 There is, unfortunately, little or no soft landscaping which can be utilised, but the development as a whole will have a neutral impact on the ecological value of the Site.

8.4 As a further consequence of the development being a refurbishment rather than a new build, the existing surface water run-off levels will not be increased as the footprint of the building is not changing. As with the Ecology considerations, the position of the Site, and the fact that the footprint of the existing building is not changing, means that the run-off levels cannot actually be reduced through soft landscaping, a green roof, or more permeable paving.

# Appendix 1

# Phoenix Road - Carbon Emissions Table

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| **PLOT** | **AREA** | **Pre-Refurbishment** | **TER** | **Regulated Part L** | **DER** | **Total** |
| **NUMBER** | | **DER** | | **Baseline** | | **$kg/CO_2/yr$** |
| | | | | | | **Regulated Only** |
| | | **$kg/CO_2/m2/yr$** | **$kg/CO_2/m2/yr$** | **$kg/CO_2/yr$** | **$kg/CO_2/m2/yr$** | |
| | | | | | | |
| Unit 1 | 74.00 | 34.27 | 14.96 | 1,107 | 28.97 | 2,144 |
| Unit 2 | 51.00 | 35.75 | 21.86 | 1,115 | 30.52 | 1,557 |
| Unit 3 | 76.00 | 45.18 | 26.42 | 2,008 | 32.22 | 2,449 |
| Unit 4 | 84.00 | 49.23 | 16.79 | 1,410 | 35.65 | 2,995 |
| Unit 5 | 103.10 | 65.32 | 15.96 | 1,645 | 26.06 | 2,687 |
| | | | | | | |
| **Total** | **388.10** | | | **7,286** | | **11,830** |
| | | | | | | |
| **Total Residential (m2)** | 388 | | | **1m2 TER** | | **1m2 DER** |
| | | | | ***18.77*** | | ***30.48*** |
| | | **TOTAL CURRENT CO2** | | | | |
| **Total Site (m2)** | **388** | **25,351** | | | **TOTAL DER CO2** | **11,830** |

| | | |
|---|---|---|
| **Pre-Refurb** | **25,351** | **$kg/CO_2/yr$** |
| **Post-Refurb** | **11,830** | **$kg/CO_2/yr$** |
| **CO2 Offset** | **13,520** | **$kg/CO_2/yr$** |
| **% Improvement** | **-53.33** | **$kg/CO_2/yr$** |

# Appendix 2

# Data Input Report
## Design - Draft

This design submission has been carried out using Approved SAP software. It has been prepared from plans and specifications and may not reflect the property as constructed.

| | | | |
|---|---|---|---|
| Assessor name | Mr Neil Rothon | Assessor number | 4282 |
| Client | | Last modified | 11/03/2015 |
| Address | 3 Phoenix Road, London, NW1 | | |

### Dwelling

| | | | |
|---|---|---|---|
| Development: | N/A | House type: | |
| Property type: | Flat | | |
| Flat type: | Mid floor | Year built: | 1930 |
| Tariff: | Standard | Assess summer overheating: | Yes |
| Thermal mass: | Medium | Thermal mass parameter: | 250.00 |
| Separated heated conservatory: | No | Degree day region: | Thames |
| Sheltered sides: | 2 | Terrain: | Dense Urban |

**Storeys:**

| Name | Area (m²) | Height (m) |
|---|---|---|
| Lowest occupied | 76.00 | 2.60 |

### Floors

| Ref - Name | Type | Construction | Storey Location | Living Area (m²) | Area (m²) | U-value (W/m²K) |
|---|---|---|---|---|---|---|

Living area that has no heat loss: 26.30

### Walls

| Ref - Name | Type | Construction | Gross Area (m²) | U-value (W/m²K) |
|---|---|---|---|---|
| Wall 1 - external wall | External | Brick | 45.50 | 1.54 |
| Wall 2 - party | Party | Solid | 27.45 | 0.00 |
| Wall 3 - sheltered existing | Sheltered | Brick | 5.00 | 0.67 |
| Wall 4 - sheltered wall new | Sheltered | Brick | 25.40 | 0.28 |

### Roofs

| Ref - Name | Construction | Gross Area (m²) | U-value (W/m²K) |
|---|---|---|---|
| Roof 1 - Roof | Pitched (joists) | 15.80 | 2.30 |
| Roof 2 - Roof under rafters | Flat | 10.58 | 1.66 |

### Openings

**Opening Ref: 1 Door to corridor, N/A, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 4 | Source: | From Manufacturer | Orientation: | North East |
| Overshading: | N/A | Width (m): | 0.90 | Height (m): | 2.10 |
| Frame: | Wood | Transmittance factor: | N/A | U-value (W/m²K): | 1.40 |

**Opening Ref: 2 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 1.15 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

**Opening Ref: 3 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 0.95 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

**Opening Ref: 4 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 0.85 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

**Opening Ref: 5 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 0.85 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

**Opening Ref: 6 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 1.15 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

## Thermal Bridging

| | | | |
|---|---|---|---|
| Thermal bridge specification: | Default y value | y-value: | 0.15 |

## Ventilation

| | | | |
|---|---|---|---|
| Air permeability entered: | No | Draught lobby: | N/A |

| Number of... | Open fireplaces | Open flues | Flueless gas fires | Extract fans | Passive vents |
|---|---|---|---|---|---|
| | 0 | 0 | 0 | 3 | 0 |

Mechanical ventilation: Not present (natural)

## Space heating

| | | | |
|---|---|---|---|
| Main heating category: | Individual system/s | Number of systems: | 1 |
| Secondary heating: | No | Open flue or chimney: | No |
| Unconnected gas point: | N/A | Smoke control area: | Not Known |
| Type: | Boiler | Efficiency source: | SAP table |
| Product index: | N/A | | |
| Product details: | N/A N/A N/A | | |
| Boiler type: | N/A | Fuel: | Mains gas |
| Condensing: | Yes | Flue type: | Balanced |
| Fan assisted flue: | Yes | | |
| Combi type: | Instantaneous | Uses electricity: | N/A |
| Keep hot power rating: | N/A | | |
| System: | Condensing combi with automatic ignition (1998 or later) | | |
| Controls: | Programmer, room thermostat and TRVs | | |
| Interlock: | Yes | Delayed start thermostat: | No |
| Compensation: | None | Burner control: | N/A |
| Emitter: | Radiators | Pump in heated space: | Yes |
| Flow Temp: | Unknown | | |
| Installed 2013 or later: | Yes | | |
| FGHRS: | No | | |

## Water heating

| | | | |
|---|---|---|---|
| Type: | From main | Fuel: | Mains gas |
| Water separately timed: | N/A | Water use ≤125 litres/person/day: | No |
| Heat pump uses immersion: | N/A | Summer immersion: | N/A |
| Thermal store type: | N/A | | |

**Store details:**

| | | | |
|---|---|---|---|
| Cylinder volume (litres): | N/A | | |
| Thermostat: | N/A | In heated space: | N/A |
| Primary pipework insulated: | N/A | | |

**WWHRS:**

WWHRS: N/A

## Renewables

No renewables present

## Other

**Internal lighting**

| | | | | | |
|---|---|---|---|---|---|
| Standard fittings: | 1 | Low energy fittings: | 0 | Total fittings: | 1 |

**Summer overheating**

| | | | |
|---|---|---|---|
| Thermal mass parameter (TMP): | 250.00 | | |
| User defined air change rate: | No | Air change rate (ach): | N/A |
| Cross ventilation on most floors: | No | Window ventilation: | Fully open half the time |
| Source of user defined values: | N/A | | |
| Curtains closed in daylight hours: | No | Fraction curtains closed: | N/A |
| Blind/curtain type: | N/A | | |

**Special features (Appendix Q)**

No Appendix Q special features present

**Cooling details**

No space cooling present

# L1A 2013 - Regulations Compliance Report
## Design - Draft

This design draft submission provides evidence towards compliance with Part L of the Building Regulations, in accordance with Appendix C of AD L1A. It has been carried out using Approved SAP software. It has been prepared from plans and specifications and may not reflect the 'as built' property. This report covers only items included within the SAP and is not a complete report of regulations compliance.

| | | | |
|---|---|---|---|
| Assessor name | Mr Neil Rothon | Assessor number | 4282 |
| Client | | Last modified | 11/03/2015 |
| Address | 3 Phoenix Road, London, NW1 | | |

| Check | Evidence | Produced by | OK? |
|---|---|---|---|
| **Criterion 1: predicted carbon dioxide emission from proposed dwelling does not exceed the target** | | | |
| TER (kg $CO_2/m^2.a$) | Fuel = N/A<br>Fuel factor = 1.00<br>TER = 16.42 | Authorised SAP Assessor | |
| DER for dwelling as designed (kg $CO_2/m^2.a$) | DER = 45.18 | Authorised SAP Assessor | |
| Are emissions from dwelling as designed less than or equal to the target? | DER 45.18 > TER 16.42<br>Excess emissions = 28.76 kg/m² (175.15%) | Authorised SAP Assessor | Failed |
| Is the fabric energy efficiency of the dwellling as designed less than or equal to the target? | DFEE 129.56 > TFEE 38.95<br>Variance = 90.61 kWh/m² (232.63%) | Authorised SAP Assessor | Failed |
| **Criterion 2: the performance of the building fabric and the heating, hot water and fixed lighting systems should be no worse than the design limits** | | | |
| **Fabric U-values** | | | |
| Are all U-values better than the design limits in Table 2? | **Element** / **Weighted average** / **Highest**<br>Wall: 1.02 (max 0.30) / 1.54 (max 0.70)<br>Party wall: 0.00 (max 0.20) / N/A<br>Floor: (no floor)<br>Roof: 2.04 (max 0.20) / 2.30 (max 0.35)<br>Openings: 4.18 (max 2.00) / 4.80 (max 3.30) | Authorised SAP Assessor | Failed |
| **Thermal bridging** | | | |
| How has the loss from thermal bridges been calculated? | Thermal bridging calculated using default y-value of 0.15 | Authorised SAP Assessor | |
| **Heating and hot water systems** | | | |
| Does the efficiency of the heating systems meet the minimum value set out in the Domestic Heating Compliance Guide? | Main heating system:<br>Mains gas, Combi boiler<br>Condensing combi with automatic ignition (1998 or later)<br>Efficiency = SAP default efficiency<br><br>Secondary heating system: None | Authorised SAP Assessor | Failed |
| Does the insulation of the hot water cylinder meet the standards set out in the Domestic Heating Compliance Guide? | No hot water cylinder | Authorised SAP Assessor | |
| Do controls meet the minimum controls provision set out in the Domestic Heating Compliance Guide? | Space heating control:<br>Programmer, room thermostat and TRVs<br><br>Hot water control:<br>No hot water cylinder<br>Boiler interlock (main system 1) | Authorised SAP Assessor | Passed |

| Check | Evidence | Produced by | OK? |
|---|---|---|---|
| **Fixed internal lighting** | | | |
| Does fixed internal lighting comply with paragraphs 42 to 44? | Schedule of installed fixed internal lighting<br>Standard lights = 1<br>Low energy lights = 0<br><br>Percentage of low energy lights = 0%<br>Minimum = 75 % | Authorised SAP Assessor | Failed |
| Criterion 3: the dwelling has appropriate passive control measures to limit solar gains | | | |
| Does the dwelling have a strong tendency to high summertime temperatures? | Overheating risk (June) = Not significant<br>Overheating risk (July) = Slight<br>Overheating risk (August) = Slight<br>Region = Thames<br>Thermal mass parameter = 250.00<br>Ventilation rate in hot weather = 2.00 ach<br>Blinds/curtains = None | Authorised SAP Assessor | Passed |
| Criterion 4: the performance of the dwelling, as designed, is consistent with the DER | | | |
| Design air permeability ($m^3/(h.m^2)$ at 50Pa) | No air permeability rate entered | Authorised SAP Assessor | |
| Mechanical ventilation system Specific fan power (SFP) | Not applicable | Authorised SAP Assessor | |
| Have the key features of the design been included (or bettered) in practice? | The following party walls have a U-value less than $0.2W/m^2K$:<br>• party (0.00) | Authorised SAP Assessor | |

# Data Input Report
## Design - Draft

This design submission has been carried out using Approved SAP software. It has been prepared from plans and specifications and may not reflect the property as constructed.

| | | | |
|---|---|---|---|
| Assessor name | Mr Neil Rothon | Assessor number | 4282 |
| Client | | Last modified | 11/03/2015 |
| Address | 3 Phoenix Road, London, NW1 | | |

### Dwelling

| | | | |
|---|---|---|---|
| Development: | N/A | House type: | |
| Property type: | Flat | | |
| Flat type: | Mid floor | Year built: | 1930 |
| Tariff: | Standard | Assess summer overheating: | Yes |
| Thermal mass: | Medium | Thermal mass parameter: | 250.00 |
| Separated heated conservatory: | No | Degree day region: | Thames |
| Sheltered sides: | 2 | Terrain: | Dense Urban |

**Storeys:**

| Name | Area (m²) | Height (m) |
|---|---|---|
| Lowest occupied | 76.00 | 2.60 |

### Floors

| Ref - Name | Type | Construction | Storey Location | Living Area (m²) | Area (m²) | U-value (W/m²K) |
|---|---|---|---|---|---|---|

Living area that has no heat loss: 26.30

### Walls

| Ref - Name | Type | Construction | Gross Area (m²) | U-value (W/m²K) |
|---|---|---|---|---|
| Wall 1 - external wall | External | Brick | 45.50 | 1.54 |
| Wall 2 - party | Party | Solid | 27.45 | 0.00 |
| Wall 3 - sheltered existing | Sheltered | Brick | 5.00 | 0.30 |
| Wall 4 - sheltered wall new | Sheltered | Brick | 25.40 | 0.28 |

### Roofs

| Ref - Name | Construction | Gross Area (m²) | U-value (W/m²K) |
|---|---|---|---|
| Roof 1 - Roof | Pitched (joists) | 15.80 | 0.16 |
| Roof 2 - Roof under rafters | Flat | 10.58 | 0.13 |

### Openings

**Opening Ref: 1 Door to corridor, N/A, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 4 | Source: | From Manufacturer | Orientation: | North East |
| Overshading: | N/A | Width (m): | 0.90 | Height (m): | 2.10 |
| Frame: | Wood | Transmittance factor: | N/A | U-value (W/m²K): | 1.40 |

**Opening Ref: 2 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 1.15 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

**Opening Ref: 3 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 0.95 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

**Opening Ref: 4 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 0.85 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

**Opening Ref: 5 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 0.85 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

**Opening Ref: 6 Window, Single glazed, ' N/A', master: No, linked to: 0**

| | | | | | |
|---|---|---|---|---|---|
| Location: | Wall 1 | Source: | From Manufacturer | Orientation: | South West |
| Overshading: | Average / Unknown | Width (m): | 1.15 | Height (m): | 1.70 |
| Frame: | Wood | Transmittance factor: | 0.85 | U-value (W/m²K): | 4.80 |

## Thermal Bridging

| | | | |
|---|---|---|---|
| Thermal bridge specification: | Default y value | y-value: | 0.15 |

## Ventilation

| | | | |
|---|---|---|---|
| Air permeability entered: | No | Draught lobby: | N/A |

| Number of... | Open fireplaces | Open flues | Flueless gas fires | Extract fans | Passive vents |
|---|---|---|---|---|---|
| | 0 | 0 | 0 | 3 | 0 |

Mechanical ventilation: Not present (natural)

## Space heating

| | | | |
|---|---|---|---|
| Main heating category: | Individual system/s | Number of systems: | 1 |
| Secondary heating: | No | Open flue or chimney: | No |
| Unconnected gas point: | N/A | Smoke control area: | Not Known |
| Type: | Boiler | Efficiency source: | Manufacturer declared |
| Product index: | N/A | | |
| Product details: | N/A N/A N/A | | |
| Boiler type: | N/A | Fuel: | Mains gas |
| Condensing: | Yes | Flue type: | Balanced |
| Fan assisted flue: | Yes | | |
| Combi type: | Instantaneous | Uses electricity: | N/A |
| Keep hot power rating: | N/A | | |
| System: | Condensing combi with automatic ignition (1998 or later) | | |
| Controls: | Programmer, room thermostat and TRVs | | |
| Interlock: | Yes | Delayed start thermostat: | No |
| Compensation: | None | Burner control: | Modulating |
| Emitter: | Radiators | Pump in heated space: | Yes |
| Flow Temp: | Unknown | | |
| Installed 2013 or later: | Yes | | |
| Efficiency Type: | 2009 SEDBUK | Efficiency (%): | 89.00 |
| Manufacturer efficiency description: | a | | |
| FGHRS: | No | | |

## Water heating

| | | | |
|---|---|---|---|
| Type: | From main | Fuel: | Mains gas |
| Water separately timed: | N/A | Water use ≤125 litres/person/day: | Yes |
| Heat pump uses immersion: | N/A | Summer immersion: | N/A |
| Thermal store type: | N/A | | |

**Store details:**

| | | | |
|---|---|---|---|
| Cylinder volume (litres): | N/A | | |
| Thermostat: | N/A | In heated space: | N/A |
| Primary pipework insulated: | N/A | | |

**WWHRS:**

WWHRS: N/A

## Renewables

No renewables present

## Other

**Internal lighting**

| | | | | | |
|---|---|---|---|---|---|
| Standard fittings: | 0 | Low energy fittings: | 1 | Total fittings: | 1 |

**Summer overheating**

| | | | |
|---|---|---|---|
| Thermal mass parameter (TMP): | 250.00 | | |
| User defined air change rate: | No | Air change rate (ach): | N/A |
| Cross ventilation on most floors: | No | Window ventilation: | Fully open half the time |
| Source of user defined values: | N/A | | |
| Curtains closed in daylight hours: | No | Fraction curtains closed: | N/A |
| Blind/curtain type: | N/A | | |

**Special features (Appendix Q)**

No Appendix Q special features present

**Cooling details**

No space cooling present

# L1A 2013 - Regulations Compliance Report
## Design - Draft

This design draft submission provides evidence towards compliance with Part L of the Building Regulations, in accordance with Appendix C of AD L1A. It has been carried out using Approved SAP software. It has been prepared from plans and specifications and may not reflect the 'as built' property. This report covers only items included within the SAP and is not a complete report of regulations compliance.

| | | | |
|---|---|---|---|
| Assessor name | Mr Neil Rothon | Assessor number | 4282 |
| Client | | Last modified | 11/03/2015 |
| Address | 3 Phoenix Road, London, NW1 | | |

| Check | Evidence | Produced by | OK? |
|---|---|---|---|
| **Criterion 1: predicted carbon dioxide emission from proposed dwelling does not exceed the target** | | | |
| TER (kg $CO_2/m^2.a$) | Fuel = N/A<br>Fuel factor = 1.00<br>TER = 16.42 | Authorised SAP Assessor | |
| DER for dwelling as designed (kg $CO_2/m^2.a$) | DER = 32.22 | Authorised SAP Assessor | |
| Are emissions from dwelling as designed less than or equal to the target? | DER 32.22 > TER 16.42<br>Excess emissions = 15.80 kg/m² (96.22%) | Authorised SAP Assessor | Failed |
| Is the fabric energy efficiency of the dwellling as designed less than or equal to the target? | DFEE 97.25 > TFEE 38.95<br>Variance = 58.30 kWh/m² (149.68%) | Authorised SAP Assessor | Failed |
| **Criterion 2: the performance of the building fabric and the heating, hot water and fixed lighting systems should be no worse than the design limits** | | | |
| **Fabric U-values** | | | |
| Are all U-values better than the design limits in Table 2? | **Element** / **Weighted average** / **Highest**<br>Wall: 0.99 (max 0.30) / 1.54 (max 0.70)<br>Party wall: 0.00 (max 0.20) / N/A<br>Floor: (no floor)<br>Roof: 0.15 (max 0.20) / 0.16 (max 0.35)<br>Openings: 4.18 (max 2.00) / 4.80 (max 3.30) | Authorised SAP Assessor | Failed |
| **Thermal bridging** | | | |
| How has the loss from thermal bridges been calculated? | Thermal bridging calculated using default y-value of 0.15 | Authorised SAP Assessor | |
| **Heating and hot water systems** | | | |
| Does the efficiency of the heating systems meet the minimum value set out in the Domestic Heating Compliance Guide? | Main heating system:<br>Mains gas, Combi boiler<br>a<br>Data from manufacturer<br>Efficiency = 89.00% 2009 SEDBUK<br>Minimum = 88.00%<br><br>Secondary heating system: None | Authorised SAP Assessor | Passed |
| Does the insulation of the hot water cylinder meet the standards set out in the Domestic Heating Compliance Guide? | No hot water cylinder | Authorised SAP Assessor | |
| Do controls meet the minimum controls provision set out in the Domestic Heating Compliance Guide? | Space heating control:<br>Programmer, room thermostat and TRVs<br><br>Hot water control:<br>No hot water cylinder<br>Boiler interlock (main system 1) | Authorised SAP Assessor | Passed |

| Check | Evidence | Produced by | OK? |
|---|---|---|---|
| **Fixed internal lighting** | | | |
| Does fixed internal lighting comply with paragraphs 42 to 44? | Schedule of installed fixed internal lighting<br>Standard lights = 0<br>Low energy lights = 1<br><br>Percentage of low energy lights = 100%<br>Minimum = 75 % | Authorised SAP Assessor | Passed |
| Criterion 3: the dwelling has appropriate passive control measures to limit solar gains | | | |
| Does the dwelling have a strong tendency to high summertime temperatures? | Overheating risk (June) = Not significant<br>Overheating risk (July) = Slight<br>Overheating risk (August) = Slight<br>Region = Thames<br>Thermal mass parameter = 250.00<br>Ventilation rate in hot weather = 2.00 ach<br>Blinds/curtains = None | Authorised SAP Assessor | Passed |
| Criterion 4: the performance of the dwelling, as designed, is consistent with the DER | | | |
| Design air permeability ($m^3/(h.m^2)$ at 50Pa) | No air permeability rate entered | Authorised SAP Assessor | |
| Mechanical ventilation system Specific fan power (SFP) | Not applicable | Authorised SAP Assessor | |
| Have the key features of the design been included (or bettered) in practice? | The following party walls have a U-value less than $0.2W/m^2K$:<br>• party (0.00) | Authorised SAP Assessor | |

# Appendix 3

# Cock Tavern
# BREEAM Domestic Refurbishment – Pre-Assessment
# March 2015

| Section | | Credits Awarded | *Out of* | Evidence to be provided |
|---|---|---|---|---|
| | | | | |
| **MAN 1** | HOME USER GUIDE | **3** | *3* | To all dwellings a simple guide that covers information relevant to the 'non-technical' occupant on the operation and environmental performance of the dwelling as well as information on the Site and Surrounding Area will be supplied.<br><br>Full content requirement of the Home User Guide can be found here. |
| **MAN 2** | RESPONSIBLE CONSTRUCTION PRACTICES | **2** | 2 | The Considerate Constructors Scheme (2013) is to be followed on this development and a Beyond Best Practice score is to be achieved.<br><br>To achieve 2 Credits, a score of 35 will be required with a minimum of 7 to be achieved in each section. |

| | | | | |
|---|---|---|---|---|
| **MAN 3** | CONSTRUCTION SITE IMPACTS | **1** | 1 | The project is a Large scale project so 2 items from Checklist A-4 are to be complied with. These will be:<br>a. Site Water and CO2 consumption data is to be recorded, including targets for use.<br>b. Environmental materials policies (Air & Water) must be provided.<br>In addition, Chain of Custody Certificates for all timber used on Site are to be provided. |
| **MAN 4** | SECURITY | **1** | *2* | The new doors and windows being installed as part of the refurbishment will not meet the following standards due to the Site's listed status; therefore the first Credit cannot be achieved.<br>- Doors – PAS-24<br>- Windows – BS7950<br>The requirements of Secure by Design section 2 are to be complied with and the recommendations of the Secure by Design Officer are to be incorporated into the development; therefore, the second Credit in this section is achieved. |
| **MAN 5** | PROTECTION OF ECOLOGICAL FEATURES | **0** | *1* | No Site Survey/Ecology Report is to be commissioned on this development; therefore no Credits can be awarded in this section. |

| | | | | |
|---|---|---|---|---|
| **MAN 6** | PROJECT MANAGEMENT | **2** | *2* | The Design team is to ensure that all members of the project team will be involved in project decision making and individual/shared roles and responsibilities will be assigned across the following key design and refurbishment stages:<br>• Planning and Building Control notification;<br>• Design;<br>• Refurbishment;<br>• Commissioning and handover;<br>• Occupation.<br>In addition, the design team is to hold a handover meeting and undertake at least two of the following three items to evaluate project success:<br>• A site inspection within three months of occupancy;<br>• Post-occupancy interviews with building occupants within three months of occupation;<br>• A commitment to providing longer term aftercare, e.g a helpline or other system to support building users for at least the first 12 months of occupation.<br>An **Innovation credit** has also been awarded for employing a BREEAM Domestic Assessor at an early stage, prior to the production of a refurbishment specification. |
| **HEA 1** | DAYLIGHTING | **1** | *2* | A preliminary inspection shows that the development should result in a neutral impact on the dwellings daylight levels in the Kitchen, Living Room, Dining Room and Study, meaning that 1 Credit can be taken in this section.<br>The second Credit has been withheld for now until full Daylight Calculations are completed at Design Stage but it looks unlikely that this credit will be achieved due to project constraints. |

| | | | | |
|---|---|---|---|---|
| **HEA 2** | SOUND INSULATION | **4** | *4* | As the development is a listed building, it comes under the classification of Historic Buildings, as defined by Approved Document E fulfilling the requirements of Paragraph 0.8.<br><br>4 Credits have been awarded based on a Pre-completion testing being carried out before and after refurbishment, achieving 4 dB improvements in both Airborne and Impact sound insulation than before refurbishment.<br><br>Pre-Completion Sound Testing before and after refurbishment to be carried out by a Suitably Qualified Acoustician. |
| **HEA 3** | VOLATILE ORGANIC COMPOUNDS | **0** | *1* | Credit not currently sought due to the complicated nature of achieving this Credit. Can be sought at a later date if extra Credits become necessary.<br><br>If the Client wishes to achieve this Credit, then the standards contained in Table 16 must be met. |
| **HEA 4** | INCLUSIVE DESIGN | **0** | *2* | Retention of existing staircase means that residential Flats cannot achieve this Credit.<br><br>Checklist A-8 is to be completed at Design Stage in order to confirm this. |

| | | | | |
|---|---|---|---|---|
| **HEA 5** | VENTILATION | **1** | *2* | For 1 Credit, the ventilation must comply with the following standards:<br>- **Background** – all habitable rooms should have a minimum 5000 $mm^2$ equivalent area (Section 7, Building Regulations Approved Document Part F (2010))<br>- **Extract** – wet rooms should have a minimum intermittent extraction rate of 60 l/s for kitchens, 30l/s utility rooms 15l/s bathrooms and 6 l/s for sanitary accommodation – Section 5, Building Regulations Approved Document Part F (2010)<br>- **Purge** – where all habitable rooms & wet rooms should not be made less satisfactory as a result of the refurbishment - Section 7, Building Regulations Approved Document Part F (2010) –<br>- For habitable rooms, minimum purge ventilation should be capable of providing 4 air changes per hour per room directly to outside (e.g. openable windows) equivalent to an openable window area 5% of the floor area of each room in accordance with table 5.2a of Part F. Part F also says windows that open less than 15% are not suitable for purge ventilation.<br>**These standards are mandatory under Building Regulations.**<br>For the second credit to be achieved the ventilation for the dwelling must comply with all standards of Section 5 of Building Regulations Part F in full i.e. through MVHR. |
| **HEA 6** | SAFETY | **1** | *1* | Written confirmation that a fire detection and alarm systems will be installed be in accordance with BS 5839–6:2004 and to at least a Grade D Category LD3 standard.<br>Furthermore, a Carbon Monoxide detector and alarm system will be installed in accordance with and positioned in accordance to BS EN 50291–1:2001 and BS EN 50292:2002 and should carry a British or European approval mark.<br>**These standards are mandatory under Building Regulations.** |

# Cock Tavern
# BREEAM Domestic Refurbishment – Pre-Assessment
# March 2015

| | | | | |
|---|---|---|---|---|
| **ENE 1** | IMPROVEMENT IN ENERGY EFFICIENCY RATING | **1** | *6* | An average improvement of 12 has been achieved to the development's Energy Efficiency Rating. This achieves 1 Credits.<br><br>**Full SAP Calculations confirm this score** |
| **ENE 2** | ENERGY EFFICIENCY RATING POST-REFURBISHMENT | **3** | *4* | The average Energy Efficiency Rating of the dwellings Post-Refurbishment is to be 76.2.<br><br>This meets and exceeds the minimum standards for an 'Excellent' rating, scoring 3 Credits.<br><br>**Full SAP Calculations confirm this score** |
| **ENE 3** | PRIMARY ENERGY DEMAND | **4** | *7* | The average primary energy demand of the dwellings post-refurbishment is 160.9 kWh/$m^2$/year for a score of 5.5 Credits.<br><br>**Full SAP Calculations confirm this score** |
| **ENE 4** | RENEWABLE TECHNOLOGIES | **0** | *2* | It is currently unknown whether renewable energy is to be installed on Site; therefore this Credit has been withheld for now.<br><br>This section can be revisited at Design Stage if necessary. |

| | | | | |
|---|---|---|---|---|
| **ENE 5** | ENERGY LABELLED WHITE GOODS | **2** | *2* | The following White Goods are to be provided as part of the development:<br>• A+ rated Fridge Freezer;<br>• A + rated Dishwasher;<br>• A++ Washing machine;<br>In addition, an EU Energy Efficiency Labelling Scheme Information Leaflet is to be provided to achieve 2 credits for the section. |
| **ENE 6** | DRYING SPACE | **1** | *1* | A Tidy Drier of at least 6m in length is to be installed in the Bathroom of each dwelling.<br>This will be an internal heated space with adequate, controlled ventilation, complying with Building Regulations Approved Document F Ventilation 2006. |

| | | | | |
|---|---|---|---|---|
| **ENE 7** | LIGHTING | **2** | *2* | The following Lighting is to be provided:<br><br>**External Lighting**<br><br>**Space Lighting** – All to be equipped with fluorescent fittings. Lobby, entrance and steps or pathway lighting to be controlled by a time clock or daylight sensor. Hallway, landing, stairwell, internal corridor and garage lighting to be controlled with push button timers/PIR sensors. Communal room lighting to be controlled by manual switches or occupant sensors.<br><br>**Security Lighting** – To have a maximum wattage of 150 W and movement control devices (PIR) and daylight-cut off sensors.<br><br>**Internal Lighting**<br><br>**Internal Lighting** is also to be supplied to a maximum average wattage across the total floor area of **9 watts/m2** is to be installed in order to achieve the second Credit. |

| | | | | |
|---|---|---|---|---|
| **ENE 8** | ENERGY DISPLAY DEVICE | **2** | *2* | An Energy Display Device (EDD) is to be installed in order to achieve 2 Credits. The device must be fixed to either the electricity AND primary fuel consumption supply and be capable of displaying the following:<br>• Local time<br>• Current (real time) energy consumption (kiloWatts and kiloWatt hours)<br>• Current (real time) estimated emissions (g/kg $CO_2$)<br>• Current (real time) tariff<br>• Current (real time) cost (per hour)<br>• Visual presentation of data (i.e. non-numeric) to allow consumers to easily identify high and low level of usage<br><br>In addition, an **Innovation Credit** is available if the device is also capable of **recording** consumption data in addition to all criteria above.<br><br>The Ewgeco H300 achieves all Credits, as well as a Credit for **WAT 3** should this exact unit be specified.<br><br>As an alternative, certain energy companies such as E.ON and British Gas also supply compliant devices as part of service arrangements. |

| | | | | |
|---|---|---|---|---|
| **ENE 9** | CYCLE STORAGE | **2** | *2* | Cycle Storage to achieve 2 Credits is to be supplied. This consists of 16 spaces across the Flats. Storage is to have a secure lock and a secure fixing, which is defined as the following:<br><br>**Secure Lock:** A permanent mortice deadlock or mortice sash lock that conforms to BS 3621:2007 can be used where the door is at least 44mm thick and is locked to the doorframe.<br><br>**Secure Fixing:** A stand which allows both wheel and frame to be locked and must, as a minimum, be of galvanised steel bar construction (with a minimum thickness of 30mm and have a minimum foundation depth of 300mm with a welded anchor T-bar set in concrete to prevent it being easily removed from the ground.<br><br>We confirm the cycle store is weatherproof, accessible only to the residents and has direct access to the Highway. |
| **ENE 10** | HOME OFFICE | **1** | *1* | A Home Office is to be provided in the Master/Second Bedroom (for 3 bed dwellings) of each dwelling. This is to consist of:<br><br>- Two double power sockets,<br>- A telephone point,<br>- A Window of a width and height of at least 450mm.<br>- 1.8m of wall space is to be provided in order to fit in a desk, a chair, and a filing cabinet or bookcase. |

<table>
<tr>
<td>WAT 1</td>
<td>INTERNAL WATER USE</td>
<td>2.5</td>
<td>3</td>
<td>Internal Water Usage will be kept to a maximum of 106.9 litres/person/day to meet and exceed the minimum standards for an Excellent Assessment and achieve 2.5 Credits.<br><br>
<table>
<tr><th><u>≤107ltrs/person/day (2.5 credits)</u></th><th>Option 1</th></tr>
<tr><td>W/C</td><td>6/4</td></tr>
<tr><td>Basin Taps (Litres Per Min)</td><td>6</td></tr>
<tr><td>Kitchen Taps (Litres Per Min)</td><td>8</td></tr>
<tr><td>Shower (Litres Per Min)</td><td>7</td></tr>
<tr><td>Bath (Litres to Overflow)</td><td>156</td></tr>
<tr><td>TOTAL</td><td>104.6</td></tr>
</table>
</td>
</tr>
<tr>
<td>WAT 2</td>
<td>EXTERNAL WATER USE</td>
<td>1</td>
<td>1</td>
<td>According to current Drawings no dwellings have Private Space; therefore, this Credit can be awarded by default.<br><br>The External Terrace on the Third Floor level qualifies for this Credit automatically and requires no further action.</td>
</tr>
</table>

| | | | | |
|---|---|---|---|---|
| **WAT 3** | WATER METER | **1** | *1* | If the Energy Display Device specified in ENE 08 (the Ewgeco H300) is installed to measure and record water consumption then this credit can be achieved.<br><br>If the Ewgeco model is not installed, the Water Meter must be capable of the following:<br>- Recording and displaying historic water consumption<br>- Monitor water consumption over time<br>- Displaying current consumption levels either instantaneously or at half hourly intervals |
| **MAT 1** | ENVIRONMENTAL IMPACT OF MATERIALS | **12** | *25* | Based on the SAP Calculations, 12 Credits have been preliminarily awarded.<br><br>Full Construction Notes detailing the following elements should be provided to NRG to confirm this:<br>- Roof<br>- External Walls<br>- Internal Walls<br>- Upper & Ground Floors<br>- Windows |

| | | | | |
|---|---|---|---|---|
| **MAT 2** | RESPONSIBLE SOURCING OF MATERIALS | **8** | *12* | The following Materials will be responsibly sourced where applicable (i.e. FSC, PEFC, EMS certification) so as to achieve 8 credits:<br>- Brick<br>- Concrete<br>- Concrete blocks<br>- Glass<br>- Metals (Steel, Aluminium etc)<br>- Plasterboard & Plaster<br>- Timber<br>- Stone & Aggregate<br>- Bituminous Materials (Roofing Membranes, Asphalt etc)<br><br>The product manufacturers as well as Types/Models of Materials are to be provided. In addition, all new Timber products are to be legally sourced.<br><br>It is not currently known whether a 'sustainable procurement plan' will be put in place for materials on this development, therefore the corresponding 3 credits have been withheld at this point. |

# Cock Tavern
# BREEAM Domestic Refurbishment – Pre-Assessment
# March 2015

| | | | | |
|---|---|---|---|---|
| **MAT 3** | INSULATION | **8** | *8* | 4 credits can be awarded where >80% of the insulation in the following areas is responsibly sourced:<br>- External Walls<br>- Ground Floor<br>- Roof<br>- Building Services<br>**Certificates are to be supplied to confirm this**.<br>The second 4 credits can be awarded by, ensuring the Insulation Index for new insulation is >2, where the Green Guide Ratings are determined using the Green Guide tool.<br>The product Manufacturers as well as Types/Models of Materials are to be provided in all cases. |
| **WAS 1** | HOUSEHOLD WASTE | **2** | *2* | The Local Authority provides a pre-collection sorting recycling service. Internal Recycling Facilities comprising of 3 bins of at least 7ltrs each and at least 30ltrs in total are to be supplied in the Kitchen of each dwelling. The bins are to be placed in a fixed location and be in addition to the normal refuse bin.<br>The second Credit can also be achieved as the Local Authority provides a Food Waste Collection Service. A 7ltr caddy is to be supplied in the kitchen of each dwelling. |

# Cock Tavern
# BREEAM Domestic Refurbishment – Pre-Assessment
# March 2015

| | | | | |
|---|---|---|---|---|
| **WAS 2** | REFURBISHMENT SITE WASTE MANAGEMENT | **3** | *3* | A full Level 2 Site Waste Management Plan (SWMP) which abides by Compliance Notes 4, 7, 8 & 10 is being provided on this development.<br><br>In addition, the amount of waste generated against £100,000 of project value is also to be recorded in the SWMP |
| **POL 1** | NOX EMISSIONS | **3** | *3* | A Gas boiler which emits <40 mg/kWh @ 0% Oxygen is to be installed to the dwelling in order to achieve 3 credits in this section.<br><br>The Make and Model of the Boiler will be confirmed at As-Built Stage. |
| **POL 2** | SURFACE WTER MANAGEMENT | **1** | *3* | 1 Credit can be awarded as there will be no increase in the impermeable area of this development following construction works.<br><br>Further Credits are unavailable as no SUDS are to be included on this development. |
| **POL 3** | FLOODING | **2** | *2* | A Flood Risk Assessment is to be provided and is expected to confirm that the site is in a Low Flood Risk area for 2 credits.<br><br>**A Flood Risk Assessment is mandatory to achieve an 'Excellent' rating.** |

# Cock Tavern
# BREEAM Domestic Refurbishment – Pre-Assessment
# March 2015

| | | | | |
|---|---|---|---|---|
| **INN** | INNOVATION | **2** | *10* | Innovation credits have been achieved in the following sections:<br>- **MAN 06** – Project Management<br>- **ENE 08** – Energy Display Device |

FINAL SCORE: **72.72%**

**BREEAM EXCELLENT**

NRG CONSULTING

# Cock Tavern
# BREEAM Domestic Refurbishment – Pre-Assessment
# March 2015

**BREEAM Domestic Refurbishment**
**Summary Score Sheet**

**Site:** Domestic Refurbishment - Phoenix Road

| | | | Score | Credits available | Score assessment Sub-total | Credits available | % achiev'd | Weighting factor | Credits Score |
|---|---|---|---|---|---|---|---|---|---|
| **Management** | **Man 1** | Home User Guide | 3 | 3 | 9 | 11 | 81.8 | 0.12 | 9.82 |
| | **Man 2** | Responsible Construction Practices | 2 | 2 | | | | | |
| | **Man 3** | Construction Site Impacts | 1 | 1 | | | | | |
| | **Man 4** | Security | 1 | 2 | | | | | |
| | **Man 5** | Protection & Enhancement of Ecolgoical Features | 0 | 1 | | | | | |
| | **Man 6** | Project Management | 2 | 2 | | | | | |
| **Health & Wellbeing** | **Hea 1** | Daylighting | 1 | 2 | 7 | 12 | 58.3 | 0.17 | 9.92 |
| | **Hea 2** | Sound Insulation | 4 | 4 | | | | | |
| | **Hea 3** | Volatile Organic Compounds | 0 | 1 | | | | | |
| | **Hea 4** | Inclusive Design | 0 | 2 | | | | | |
| | **Hea 5** | Ventilation | 1 | 2 | | | | | |
| | **Hea 6** | Safety | 1 | 1 | | | | | |
| **Energy** | **Ene 1** | Improvement in Energy Efficiency Rating | 1 | 6 | 19.5 | 29 | 67.2 | 0.43 | 28.91 |
| | **Ene 2** | Energy Efficiency Rating Post Refurbishment | 3 | 4 | | | | | |
| | **Ene 3** | Primary Energy Demand | 5.5 | 7 | | | | | |
| | **Ene 4** | Renew able Technologies | 0 | 2 | | | | | |
| | **Ene 5** | Energy Labelled White Goods | 2 | 2 | | | | | |
| | **Ene 6** | Drying Space | 1 | 1 | | | | | |
| | **Ene 7** | Lighting | 2 | 2 | | | | | |
| | **Ene 8** | Energy Display Device | 2 | 2 | | | | | |
| | **Ene 9** | Cycle Storage | 2 | 2 | | | | | |
| | **Ene 10** | Home Office | 1 | 1 | | | | | |
| **Water** | **Wat 1** | Internal Water Usage | 2.5 | 3 | 4.5 | 5 | 90.0 | 0.11 | 9.90 |
| | **Wat 2** | External Water Usage | 1 | 1 | | | | | |
| | **Wat 3** | Water Meter | 1 | 1 | | | | | |
| **Materials** | **Mat 1** | Environmental Impact of Materials | 12 | 25 | 28 | 48 | 58.3 | 0.08 | 4.67 |
| | **Mat 2** | Responsible Sourcing of Materials | 8 | 15 | | | | | |
| | **Mat 3** | Insulation | 8 | 8 | | | | | |
| **Waste** | **Was 1** | Household Waste | 2 | 2 | 5 | 5 | 100.0 | 0.03 | 3.00 |
| | **Was 2** | Refurbishment Site Waste Managment | 3 | 3 | | | | | |
| | **Pol 1** | Nitrogen Oxide Emissions | 3 | 3 | 6 | 8 | 75.0 | 0.06 | 4.50 |
| **Pollution** | **Pol 2** | Surface Water Run Off | 1 | 3 | | | | | |
| | **Pol 3** | Flooding | 2 | 2 | | | | | |
| **Innovation** | **Inn 1** | Innovation and Exemplary | 2 | 10 | 2 | 10 | 20.0 | 0.1 | 2.00 |
| | | | | | Total | 125 | | **Score:** | **72.72** |
| | | | | | | | | **Rating:** | **Excellent** |

| **Rating** | **Score** |
|---|---|
| Good | 45 |
| Very Good | 55 |
| Excellent | 70 |

NRG CONSULTING