7 St Pancras Way
London Borough of Camden
London
NW1 0DP

Sustainability and Energy Statement

Author	Issue	Rev	Date
MN	1	D	08/04/2013

Parkshot House • 5 Kew Road • Richmond • Surrey TW9 2PR • t: 020 8332 6633 Greenforde Farm • Stoner Hill Road • Froxfield • Petersfield GU32 1DY • t: 01730 710044
e: info@sre.co.uk • w: www.sre.co.uk
SRE Ltd Registered in England No. 5573851 Registered Office: Greenforde Farm, Stoner Hill Road, Froxfield, Petersfield GU32 1DY

Contents:

Tables:

Figures:

Revisions:

Ver No.	Rev No.	Date	Summary Details	Signed Off
1	-	27/03/2013	Internal	MN
1	A	27/03/2013	For Issue	MN
1	B	02/04/2013	For Issue	MN
1	C	08/04/2013	For Issue	MN
1	D	08/04/2013	For Issue	MN

Distribution of Copies:

Ver No.	Rev No.	Quantity	Issued To
1	-	-	SRE Internal
1	A	1 (PDF)	DP9 & Wells Mackereth
1	B	1 (PDF)	DP9 & Wells Mackereth
1	C	1 (PDF)	DP9 & Wells Mackereth
1	D	1 (PDF)	DP9 & Wells Mackereth

Executive Summary

This Sustainability Statement has been undertaken by SRE for the Proposed Development at 7 St Pancras Way, London Borough of Camden (Proposed Development) in order to meet the requirements of the London Borough of Camden Core Strategy and associated Development Policies, as well as the London Plan and National Planning Policy.

The Proposed Development will meet all of the relevant policies in the provision of a resource efficient, sustainable residential development.

This statement assesses the inclusion of energy efficiency measures to minimise on-site energy use compared to a building regulation compliant design, including high efficiency gas heating systems, improved insulation levels, high specification glazing and energy efficient lighting and appliances.

The availability, feasibility and suitability of connecting to a decentralised heating network, or providing on-site Combined Heat and Power is investigated in response to the planning policy requirements.

Furthermore, renewable energy solutions for the Proposed Development are assessed, taking into consideration both the technical and the economic viability of the proposals in order to meet both the **20% CO_2 emissions reduction and the 40% improvement over Building Regulations 2010 requirement for the new build house**.

The assessment of viable on-site renewable energy generation in relation to the design, site location and orientation concludes that **the installation of a Photovoltaic Array (with micro-CHP) will offset 33% of the predicted CO_2 emissions of the dwellings**, based on the energy baseline.

This report assesses in outline the Proposed Development in relation to wider Sustainability requirements for the area, relating to both local and regional planning policy.

The Proposed Development goes as far as is practical in meeting all of the relevant requirements set out within the London Borough of Camden policies and guidance.

1.0 Introduction

1.0.1 This Energy & Sustainability Statement has been prepared by SRE to accompany the planning application for the Proposed Development at 7 St Pancras Way, London Borough of Camden (the Proposed Development) for DP9 on behalf of Wells Mackereth.

1.0.2 The Statement provides a prediction of the Proposed Development's energy baseline requirement (Building Regulation compliant), which is achieved through the use of energy efficiency measures, and assesses suitable renewable energy technologies in relation to the site layout, building design, energy demand and in response to the relevant planning requirements.

1.0.3 The statement includes the relevant London Borough of Camden (LBC) planning policy and details how the Proposed Development responds to, and meets the relevant requirements as part of an overall sustainability assessment.

1.1 The Proposed Development

1.1.1 The Proposed Development at 7 St Pancras Way consists of 1 No. new build 4-bedroom house, 1 No. refurbishment of a 1-bedroom flat unit and an existing commercial unit. The latter is not included in the report as there has been no change of use for this commercial space and it does not require a BREEAM report being <500m^2 in floor area.

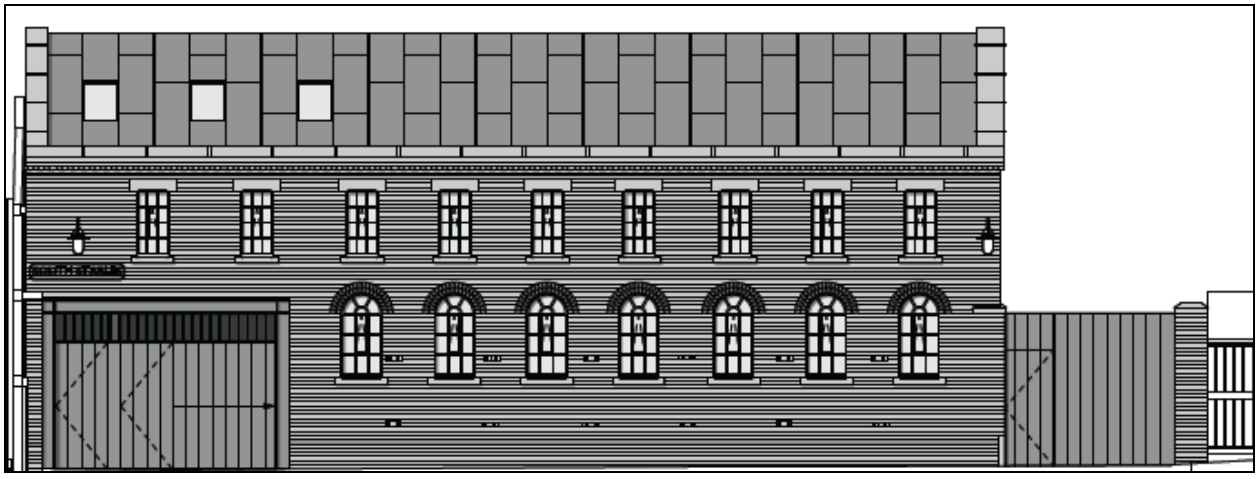

Figure 1: Proposed Development

1.1.2 Full details of the Proposed Development can be found in the supporting drawings (See Appendix A for proposed site layout plan).

2.0 Sustainability Approach

2.0.1 The World Commission on Environment and Development (WCED) report: Our Common Future, describes Sustainable Development as development that:

"meets the needs of the present without compromising the ability of future generations to meet their own needs."

2.0.2 This broad concept of Sustainable Development is taken into account within the Sustainability and Energy Statement. However, the focus is on successfully meeting the requirements of planning policy and guidance, with key documents listed below.

2.1 Sustainability Guidelines and Policy

2.1.1 The following planning policy and guidance has been used to inform the strategy and to ensure that the Proposed Development meets all requirements imposed on it through Planning Policy.

Key Policies

2.1.2 The following planning policy and guidance has been used to inform the strategy and to ensure that the Proposed Development meets all requirements imposed on it through Planning Policy.

- London Borough of Camden Core Strategy 2010 – 2025 (Adoption version 2010)
    - Policy CS13: Tackling climate change through promoting higher environmental standards
- London Borough of Camden Supplementary Planning Documents (SPDs)
    - CPG 3 Sustainability – Adopted 6th April 2009
- London Borough of Camden Local Development Framework (LDF): Camden Development Policies (Adopted version 2010)
    - Policy DP22 (Promoting sustainable design and construction)

2.2 Policy CS13: Reducing the effects of and adapting to climate change

2.2.1 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.

2.2.2 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.

Local energy generation

2.2.3 The Council will promote local energy generation and networks by:

e) working with our partners and developers to implement local energy networks in the parts of Camden most likely to support them, i.e. in the vicinity of:

- *housing estates with community heating or the potential for community heating and other uses with large heating loads;*
- *the growth areas of King's Cross, Euston; Tottenham Court Road; West Hampstead Interchange and Holborn;*
- *schools to be redeveloped as part of Building Schools for the Future programme;*
- *existing or approved combined heat and power/local energy networks and other locations where land ownership would facilitate their implementation.*

f) protecting existing local energy networks where possible (e.g. at Gower Street and Bloomsbury) and safeguarding potential network routes (e.g. Euston Road);

2.3 London Borough of Camden SPD: CPG 3 Sustainability

Section 5: Decentralised energy networks and combined heat and power

"Decentralised energy could provide 20% of Camden's heating demand by 2020."

"Combined heat and power plants can reduce carbon dioxide emissions by 30-40% compared to a conventional gas boiler."

"Where feasible and viable your development will be required to connect to a decentralised energy network or include CHP. "

Section 6: Renewable energy

"All developments are to target at least a 20% reduction in carbon dioxide emissions through the installation of on-site renewable energy technologies."

2.3.1 In addition to this 20% reduction, the London Plan requires all new build residential developments to achieve a 40% improvement over Building Regulations 2010.

"When assessing the feasibility and viability of renewable energy technology, the Council will consider the overall cost of all the measures proposed and resulting carbon savings to ensure that the most cost-effective carbon reduction technologies are implemented in line with the energy hierarchy."

2.3.2 Additionally, "Developments should achieve 50% of the un-weighted credits in the Energy category", with the same now applicable to the Water category as well.

2.4 London Borough of Camden local Development Framework: Camden Development Policies

Policy DP22: Promoting sustainable design and construction

2.4.1 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.

b) incorporate green or brown roofs and green walls wherever suitable

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.

2.4.2 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

j) not locating vulnerable uses in basements in flood-prone areas

Supporting Policies

- Mayor of London, The London Plan – Spatial Development Strategy for Greater London (July 2011)
- National Planning Policy Framework (Mar 2012)

3.0 Minimum Policy Compliance

Environmental Rating – Code for Sustainable Homes

3.0.1 The Code for Sustainable Homes Pre-Assessment Estimate shows that the new build detached house is predicted to meet the requirements for certification to Code Level 4.

3.0.2 The Code for Sustainable Homes is a nationally recognised standard used to assess the environmental performance of homes and aims to acknowledge improved environmental performance in house design.

3.0.3 The scheme considers both broad environmental concerns (e.g. climate change, resource use) as well as site specific issues (e.g. energy use, ecology etc), and these issues are balanced against the desire for high quality of life and a safe and healthy internal environment. The issues assessed are arranged into nine key categories:

• Energy	• Surface Water Run-Off	• Health & Wellbeing
• Water	• Waste	• Management
• Materials	• Pollution	• Ecology & Land-Use

Table 1: CSH Categories

3.0.4 SRE are a Code for Sustainable Homes accredited assessor organisation.

3.0.5 A summary of the key measures that are to be implemented and the final credit score for the house is provided in the full Pre-Assessment (Appendix B). Code for Sustainable homes principles are relevant to the flat refurbishment in trying to maximise the sustainability for the development as a whole.

Energy Assessment

3.0.6 The Proposed Development's predicted energy use, suitable energy efficiency measures, renewable and low carbon energy technology and associated CO_2 emissions reductions are assessed in detail in Section 4.

3.1 Energy Use and Pollution

Need for Cooling

3.1.1 The Proposed Development will not incorporate any active cooling (such as Air Conditioning).

3.1.2 The house has been designed around passive ventilation with windows on opposite elevations which enables and enhances the level of natural ventilation within the building.

3.1.3 In addition the house will incorporate a whole house mechanical ventilation system with heat recovery and summer bypass, and as such an adequate level of background ventilation will be maintained in accordance with Part F, either passively, or actively.

3.1.4 High levels of insulation will help reduce heat exiting and entering the building.

3.1.5 The final building specification is not yet confirmed, but it has been assumed that it will incorporate a met-sec frame within the traditional masonry cavity construction shell of the existing building, and a polished screeded finish to the ground floor. Therefore the external wall and roof construction is expected to feature medium thermal mass.

3.1.6 Thermal mass in the external building envelope can reduce any potential risk of overheating in south facing rooms in the summer months by absorbing solar radiation and allowing it to dissipate without being transmitted into the building itself. However, the majority of solar gain is via glazing, and this can be partially controlled with blinds.

Heat Generation

3.1.7 Heating and cooling systems and the heating system hierarchy are assessed in detail in Section 4.

Pollution: Air, Noise and Light

3.1.8 Construction site impacts will be monitored as standard practice in line with CSH requirements. This includes:

- Adopt best practice in terms of air (dust) pollution from site activities

This will include items such as:

- The use of dust sheets to limit the amount of dust being moved around.
- All electric saws, routers and planers used on site must be fitted with an extract system to minimise dust being released in to the air.
- Any machine cutting of bricks/ blocks on site will have facilities to control the dust by using water.
- All skips will be covered to reduce the dust being blown around the site

3.1.9 There will be no increase in noise levels to the surrounding area once the scheme is completed as a result of the proposed residential development.

3.1.10 Light pollution will be minimised through the careful specification and positioning of any external lighting required by the Proposed Development, ensuring that no lighting negatively impacts the surrounding residential units.

3.1.11 Under CSH guidelines of assessment, external lighting is controlled through daylight and PIR sensors and will consist of dedicated energy efficient fittings.

3.2 Biodiversity

Minimising the threat to biodiversity

3.2.1 The proposed development is to be on the site of an existing development and as such would be defined as having low ecological value in accordance with the BRE Ecology Checklist.

3.2.2 Before construction, an ecology report will be commissioned, which will include an analysis of how the ecological value of the site can be improved.

3.3 Flooding and Drainage

Reducing and mitigating the risks of flooding and other impacts of climate change

3.3.1 The application site is in an area of low flood risk based on Environment Agency Flood Risk mapping (Figure 2).

3.3.2 Therefore the Proposed Development is likely to require sustainable drainage measures to help to mitigate localised flash flooding (such as permeable paving and soft landscaping).

3.3.3 Compliance is assessed as part of the mandatory Sur 1 section of the CSH Assessment.

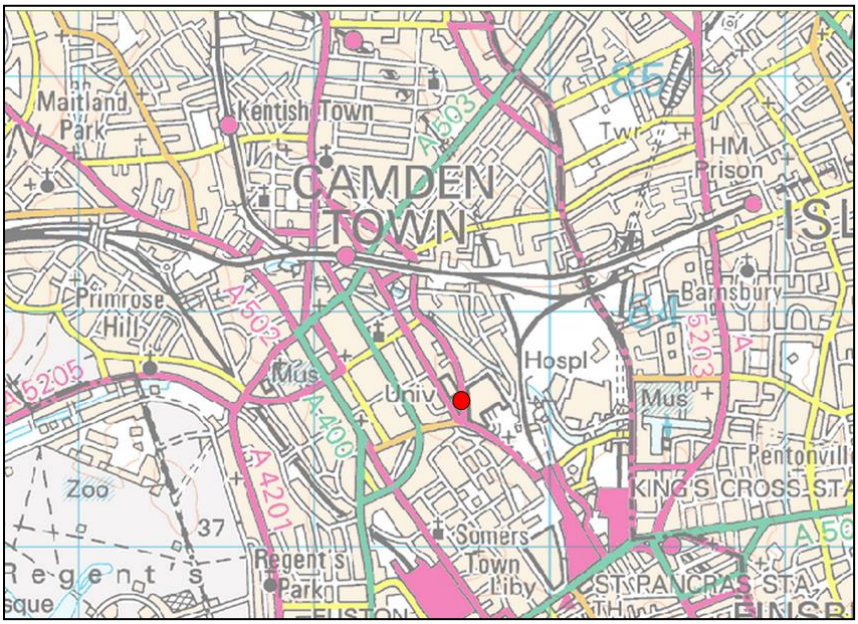

Figure 2: EA Flood Risk Map

3.4 Improving Resource Efficiency

Reduce waste generated and amount disposed of by landfill

3.4.1 A Site Waste Management Plan (SWMP) will be established before construction work commences on site to monitor, report and set targets for the level of waste being re-used and recycled. This process will also be applicable for assessment as part of the CSH standards.

3.4.2 Appropriate monthly monitoring and waste targets will be set by the main contractor to minimise waste during the construction process – this is assessed under the Management section of the CSH.

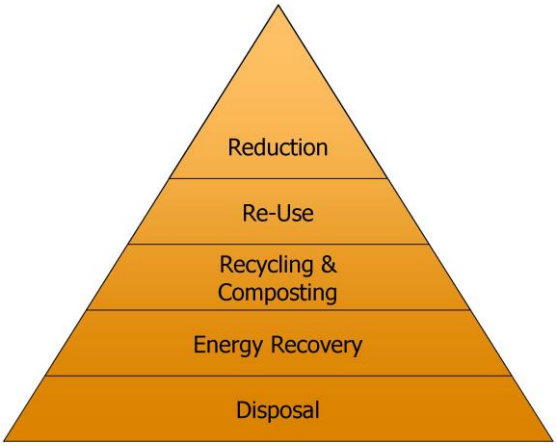

Figure 3: Waste Hierarchy

3.4.3 Environment Agency data indicates that the site is not expected to be considered as contaminated – there are no reported 'major' pollution incidences on the site or in the surrounding area. The map shows that there is radioactive waste in the vicinity, but as this is from the neighbouring hospital, it will not pose a threat (Figure 4).

3.4.4 There are no landfill sites in the surrounding area (Figure 5).

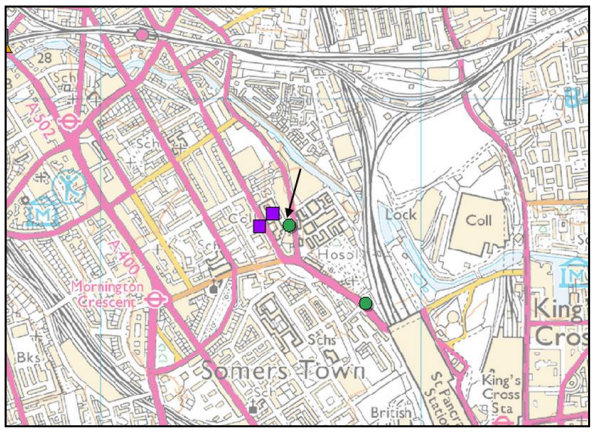

Figure 4: EA Pollution Map

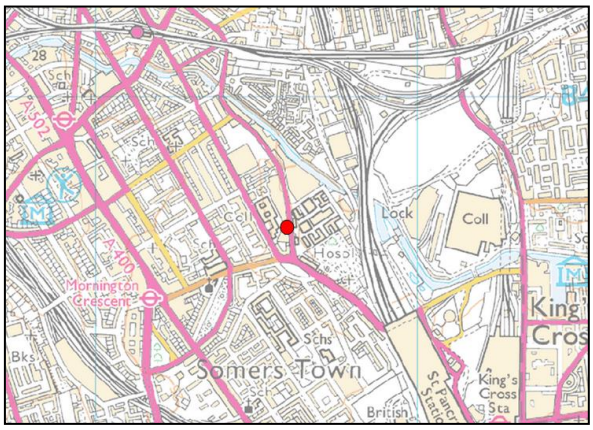

Figure 5: EA Landfill Map

Reducing levels of water waste

3.4.5 The aim of incorporating internal water conservation measures is to reduce overall water usage to a maximum of 105L/person/day, in-line with the requirements of a Code for Sustainable Homes Level 4 development.

3.4.6 The planning requirements state that at least 50% of the un-weighted credits in the water category should be achieved. Minimising water use and providing rainwater butts in the central garden area will achieve 4 out of 6 credits. Please see the CSH pre-assessment for further details.

4.0 Energy Approach

4.0.1 The outline approach for the Proposed Development in addressing energy issues, and responding to guidance listed in Section 2.0, is through minimising the building's overall environmental impact and reducing its resource use to exceed the performance standards required by Building Regulations.

4.0.2 The approach adopts the following standard energy strategy (in-line with general national energy policy) by seeking to:

- Use Less Energy (Be Lean) – minimise the overall environmental impact and energy use through energy efficiency measures - e.g. improved insulation and glazing.
- Use Clean Energy (Be Clean) – ensure that energy systems on-site (heat and power) are efficient and produce minimal CO_2 emissions - e.g. high efficiency boilers/heat pumps
- Use Renewable Energy (Be Green) – implement the use of suitable technologies to provide renewable and emission free energy sources.

4.0.3 The design has sought to greatly enhance the building envelope specification to minimise the overall energy demand and implementing good passive solar design where practicable.

4.0.4 The CO_2 Conversion Factors have been taken from Building Regulations 2010:

Fuel Source	CO_2 Conversion Factor ($kgCO_2/kWh$)	Approx. Unit Cost (£/kWh)
Electricity (mains)	0.517	£0.133
Electricity (offset)	-0.529	~£0.30-40 (feed-in)
Gas (mains)	0.198	£0.041
Heating Oil	0.274	£0.044
Biodiesel	0.047	£0.044
Wood Pellets	0.028	£0.039

Table 2: CO_2 Conversion Factors

4.0.5 Carbon Dioxide (CO_2) is the main greenhouse gas[1] that is deemed responsible for anthropogenic climate change[2]. Although by mass it does not have as high radiative forcing effect as other gases (namely CH4 – Methane), the sheer quantity released through combustion means that, overall, it has the most effect. It is also one of the more controllable – it can be directly controlled through reductions in fossil energy use.

4.0.6 It is also equally important in an era of ever increasing total energy consumption to increase energy efficiency in order to minimise dependency on, and conserve existing supplies of fossil oil and gas, which are estimated to be at, or close to, their peak of supply[3]. After this

[1] Joint Science Academies' statement, 2005: Global response to climate change

[2] IPCC, 2007: Summary for Policymakers & Technical Summary. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*

[3] More information, references and peer-reviewed articles at http://www.peakoil.net & http://www.odac-info.org

peak, production, and therefore availability, is expected to steadily decline resulting in a constant increase in fuel cost.

4.1 Energy Conservation Measures (be lean)

4.1.1 The overall energy strategy for the Proposed Development, as highlighted later in the report, will be to use less energy, use clean energy and use renewable energy and to, where possible, design an energy conscious building to positively influence the overall predicted energy demand.

4.1.2 A number of energy conservation measures will be incorporated by the Client to reduce the overall energy load for the Proposed Development. This is in-line with both the guidance listed above as well as general national 'Best Practice' guidance for delivering energy efficient buildings.

Passive Solar Design

4.1.3 The Proposed Development is orientated with its rear elevation facing west. There may be a slight decrease in the space heating load due to the passive solar warming provided by the south facing windows, however this is not likely to be significant.

4.1.4 The use of positive thermal mass in the building structure as part of the external wall and roof construction will minimise any other overheating issues by maintaining a constant temperature throughout the year.

Insulation and Air Tightness

4.1.5 All elements will incorporate high performance insulation in the building envelope (walls, roofs and windows) to ensure that the space heating load will be reduced over that of a Building Regulations (Part L1A and L1B) compliant design.

Element	Proposed U-Value
Roof	0.151
External Walls	0.27
Sheltered Walls	0.291
Windows	1.5
Ground Floor	0.133
Upper Floor	0.25

Table 3: Proposed U-Values

4.1.6 Air tightness has been estimated as achieving a rate of ≤5m^3/hr/m2, and will be tested as part of Building Regulation compliance and to inform final As-Built SAP.

Energy Efficient Lighting and Appliances

4.1.7 The Proposed Development will make use of low energy lighting in-line with BRE methodology and in excess of Building Regulation requirements. All lighting is assumed as being energy efficient and is included as such within SAP modelling.

4.1.8 If white goods are chosen to be fitted: 'A' or 'A+' white goods (will be used where possible). Based on the BRE calculation methodology these measures will reduce electrical demand by ~10% - although it is not possible to calculate any reductions at this stage or through the Standard Assessment Procedure.

4.1.9 The building as a whole will ensure that any external lighting is positioned, controlled and focused to provide efficient safe and secure access without using excessive energy. This will

comprise dedicated energy efficient luminaires or in the case of any specified security lighting, a maximum lamp capacity of 150W per fitting, supported by infrared, sensor and time controls as standard.

Whole House Mechanical Ventilation with Heat Recovery

4.1.10 The Proposed Development will utilise a centralised whole house extract. This system will ensure that the building ventilation is adequate and managed within an air tight design.

High Efficiency Gas Condensing Boiler

4.1.11 In the Predicted Energy Baseline the units will be specified with a high efficiency gas combination boiler system (SEDBUK A rated) to provide all the space heating and hot water supply. Therefore the heat source is able to deliver greater CO_2 savings, as well as reduced NOx emissions.

Influence Energy Behaviour

4.1.12 The Proposed Development will be provided with a Home/Building User Guide which will detail how to effectively use all the appliances and fittings installed and thereby minimise associated energy use and CO_2 emissions. This information will inform the residents on how to gain maximum benefit from the appliances and energy systems provided and will help to positively influence their long term energy behaviour.

4.1.13 Energy meters will also be provided so the resident/tenant can monitor the amount of energy used within the dwelling – energy meters can log the electricity and gas usage of a building, provide cost breakdowns and indicate if excessive energy is being used at any point. These systems allow the end user to take control of their energy use, allowing them to cut their costs and CO_2 emissions.

4.1.14 All major utilities now offer a 'green energy tariff' to business and domestic customers from either their own renewable sources (such as offshore wind farms) or are purchasing power from such sources for their green energy tariff. Although this does not qualify as a renewable energy technology, it is recommended that the Proposed Development be connected to a green electricity tariff as standard.

4.2 Baseline Energy Prediction

4.2.1 The following energy baseline has been calculated taking into consideration the positive impact of the energy efficiency measures listed above.

4.2.2 SAP 2009 and Building Regulations 2010 have been used to generate the energy baseline. The unregulated 'Appliances and Cooking' load is drawn from BRE Methodology.

Unit	Proposed Floor Area (m^2)	*Electrical Demand (kWh/yr)*	*Fossil Heating & Hot Water (kWh/yr)*	*Appliances & Cooking (kWh/yr)*	Baseline Energy (kWh/yr)	Baseline CO_2 emissions ($kgCO_2/yr$)
House	403.3	2,785	32,288	6,136	41,209	11,206
Flat (Proposed)	79.9	649	5,462	1,474	8,614	2,891

Table 4: Baseline Energy Prediction

4.3 Energy Supply (be clean)

Decentralised Heat and Power

4.3.1 An initial scoping assessment of local decentralised heat and power options has been undertaken using the London Heat Map[4].

4.3.2 The Heat Map indicates that there are currently no existing district heat networks near to the site.

4.3.3 As such, there is not expected to be any practical scope for connecting the site to a decentralised heating network.

Combined Heat and Power

4.3.4 The use of Micro-CHP has been considered for the site as a heating system, with the added benefit of on-site electrical generation. The installation of a CHP unit (such as the Baxi Ecogen[5]) has been proposed, as it limits the amount of PV that is required to meet the CO_2 offset policies.

4.3.5 Without a micro-CHP unit, the development will require a larger PV array to offset the required amount of CO_2 to achieve the 40% improvement over building regulations.

The use of Heat Pump Technology

4.3.6 The use of heat pumps (HP) in place of a gas heating system can be feasible in terms of CO_2 emissions, but only if the system is well sized and ground conditions (for GSHPs) are such that a high Co-efficient of Performance can be achieved on average.

4.3.7 Heat pumps will only deliver low grade heat (~50°C) efficiently, and therefore HP systems are generally inefficient in providing Domestic Hot Water (DHW), as this requires additional electrical use (immersion or increased compressor use), unless a treated hot water system is used, or hot water provided via a separate system.

4.3.8 There is also the issue of 'future-proofing' a building – gas is a finite resource which is decreasing in availability and therefore increasing in cost. To maintain energy security it

[4] www.londonheatmap.org.uk/
[5] Examples only and do not constitute product endorsements

may be wise to ensure that, even if a building is specified with a gas system, there is the capability to move it to a heat pump based system at a later date.

4.4 Renewable Energy Assessment (be green)

4.4.1 In order to meet the required 40% DER improvement target and the 20% CO_2 off set from renewable target, the following technologies have been assessed for their feasibility at the Proposed Development.

Roof Layout

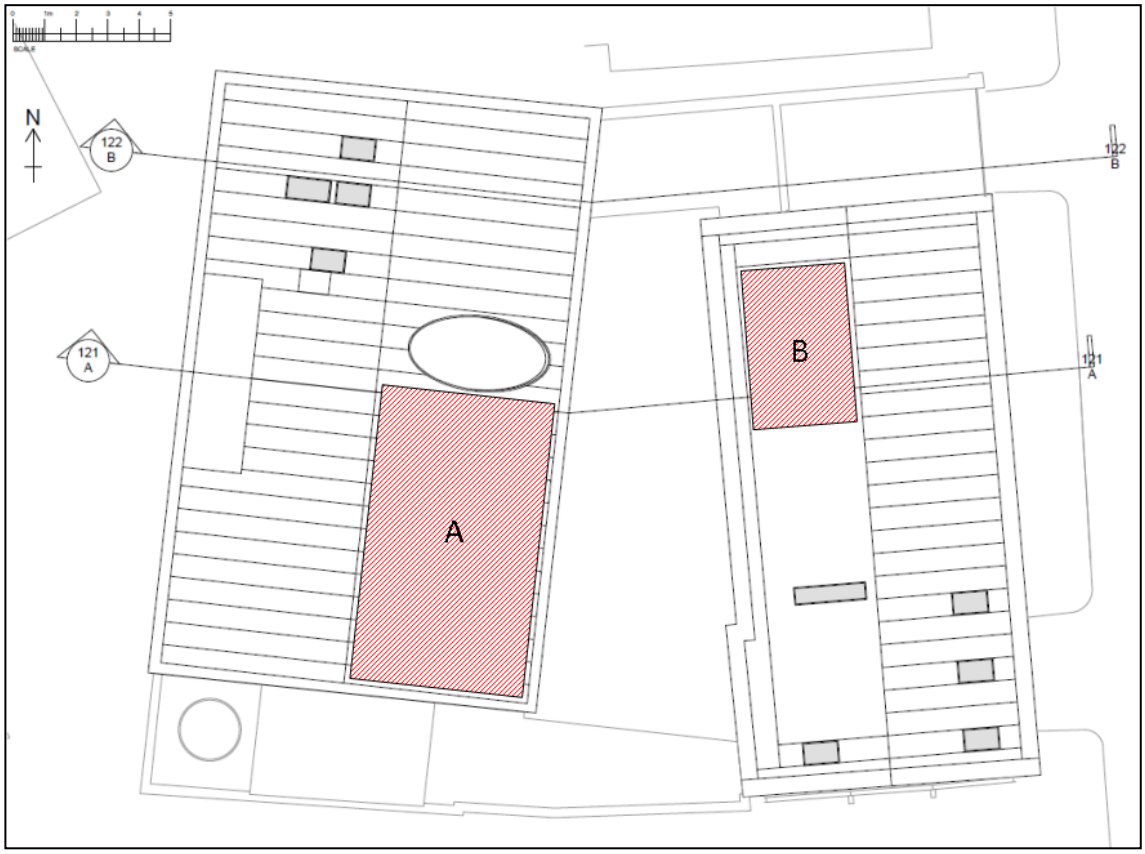

Figure 6: Available Roof Areas

Array	Usable Area Available (m^2)	Pitch
A	~50m^2	~30 degrees
B	~20m^2	Horizontal

Table 5: Roof Areas – Key

4.4.2 Shading to the East facing roof, where the PV is proposed, is likely to have minimal shading and is not on a street facing elevation thus limiting any aesthetic impact.

4.5 Viable Energy Technologies

4.5.1 Based on the size of the development, available roof area and the LBC 20% offset requirement, the most suitable renewable technology for offsetting CO_2 emissions is a PV array (either with or without the installation of a micro-CHP unit).

Photovoltaics

4.5.2 The installation of Photovoltaics (PV) will be used to offset electrical demand within the Proposed Development. The Photovoltaic array will be connected into the electrical system via an inverter or series of inverters, depending on system size.

4.5.3 The pitched roof facing the central courtyard allows for the PV array to be orientated in an easterly direction at a ~30° inclination maximising the efficiency of the system.

4.5.4 Should a PV only solution be adopted (without the installation of a micro-CHP unit) the east facing pitched roof is unlikely to be large enough to solely support the required PV array, and as such the flat roof above the office unit will also be required for PV installation.

4.5.5 The flat roof above the office building allows for a shallow pitched PV array to be installed.

4.5.6 Noise will not be an issue – A PV system does not feature moving parts and is silent during operation.

4.5.7 For the purposes of this study a standard PV module specification will be used as an example PV system. Each panel covers an area of ~1.5m^2 and has a peak output of 250W. Based on the roof areas highlighted in Figure 6, the following PV arrays are feasible:

Array	No. of Modules	Array Size (kWp)	Energy Generated (kWh/yr)	CO_2 Offset ($kgCO_2$/yr)	% Energy Offset	% CO_2 Offset
A+B	37	9.25	6,756	3,574	13.6%	25.4%

Table 6: PV - Predicted Performance - Module

4.5.8 The analysis in Table 6 indicates that the LBC target for 20% offset of total predicted CO_2 emissions can be achieved solely through the use of PV.

4.5.9 The use of this PV array will also lead to an improvement in CO_2 emissions compared with a building regulation compliant design by 41.85% for the new build house, which is Code for Sustainable Homes Level 4 compliant as well as meeting the 40% improvement required by the London Plan.

Solar Water Heating

4.5.10 The installation of solar water heating (SWH) is technically viable with collectors on the east orientated pitched roof. The SWH system would work with a standard gas condensing boiler and would be suitable to supplement the hot water demand.

4.5.11 Noise will not be an issue with SWH – the only moving part is the circulation pump, which is inside the property and should not be noticeable.

4.5.12 The installation of Solar Water Heating (SWH) although feasible is not suitable as it does not achieve the required 20% CO_2 offset.

4.6 Renewable Energy Summary

4.6.1 SRE proposes the following renewable energy technology solution as technically viable for the Proposed Development in order to achieve the LBC requirement of a 20% CO_2 offset/reduction through the use of on-site renewable technologies, as well as achieving a 40% CO_2 improvement over a 2010 Building Regulations compliant design in line with the London Plan requirements for the new build house.

4.6.2 The proposed PV array also means the development meets the required 50% of Code for Sustainable Homes energy credits.

4.6.3 Further offset is not deemed practical at this stage:

- The building envelope performance has been improved as far as is practical.
- Energy efficient heating, ventilation and lighting systems are used throughout.
- Mechanical ventilation with Heat Recovery will be utilised.
- Final specification will be undertaken at detailed design stage.

Renewable Energy Technology Solution

Technology	Details	Energy Offset (kWh/yr)	% CO_2 improvement over 2010 Building Regulations	CO_2 Offset ($kgCO_2/yr$)
Photovoltaics (Module)	Total of 6.75 kWp with a micro-CHP unit	-	41.91%	33%
	OR			
	Total of 9.25 kWp without a micro-CHP unit	6,756 13.6%	41.85%	3,547 25.4%

Table 7: Proposed Renewable Energy Solution

4.6.4 SWH is not proposed as it is not able to offset the 20% of CO_2 emissions required and PV on its own is more cost-effective to use to achieve the requirements, than PV and SWH.

4.6.5 ASHP is not considered a feasible technology as an ASHP is predicted to generate negligible CO_2 emissions savings against a gas boiler baseline. In addition space would be required to accommodate a thermal store, however neither of the dwellings have plant rooms in which to accommodate one.

5.0 Summary

5.0.1 The Proposed Development at 7 St Pancras Way, London Borough of Camden will comprise 1 No. new build 4-bedroom house, 1 No. refurbishment of a 1-bedroom flat unit.

5.0.2 The development will deliver energy efficiency measures throughout and, will comply not only with the sustainability requirements outlined in the London Borough of Camden Core Strategy, SPDs and LDF, but also with the London Plan requirements.

5.0.3 Overall, the Proposed Development will provides two modern, resource efficient, sustainable residential dwellings which comply with all the relevant planning policy, and include the following measures:

- Resource Efficient Heating
- Passive Solar Design
- Energy Efficient Lighting and Appliances
- Water Conserving Fittings
- Either 6.75 kWp (with a micro-CHP unit) or 9.25 kWp of Solar Photovoltaic Panels (without a micro-CHP unit).

5.0.4 Through this approach the Proposed Development has gone as far as is practical in attaining compliance with all relevant environmental sustainability Planning Policy.

6.0 Appendix A – Site Layout Plan

7.0 Appendix B – CSH Summary Sheet

Code for Sustainable Homes
PRE ASSESSMENT ESTIMATOR TOOL

breglobal

Results

Development Name:	7 St Pancras Way
Dwelling Description:	1 New House
Name of Company:	SRE
Code Assessor's Name:	Malcolm Maclean
Company Address:	SRE Greenforde farm, Stoner Hill Road, Froxfield, petersfield
Notes/Comments:	

PREDICTED RATING - CODE LEVEL: 4

Mandatory Requirements: All Levels

% Points:	68.72%	- Code Level: 4
Breakdown:	Energy	- Code Level: 4
	Water	- Code Level: 4

Graph 1: Predicted contribution of individual sections to the total score and percentage of total achievable score