Energy & Sustainability Statement

Land to Rear of 210 Hampden Way, London, N14 7LY

17th of November 2023

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Executive Summary

- Pro Sustainability Ltd has undertaken this Energy Assessment in support of the planning application being submitted by Caswell & Dainow ('The Applicant') to the Barnet Council in relation to the proposal at the land to the rear of 210 Hampden Way, London, N14 7LY ('The Site').
- The development proposal seeks permission for the erection of a 3-bed new build house on a vacant garden plot, to the rear of the existing property at 210 Hampden Way.
- This report addresses the relevant planning policies with regards to Barnet's Local Plan (Core Strategy), and London Plan, 2021. Moreover, it demonstrates compliance with Part L 2021 of the Building Regulations.
- Opportunities to connect the planned development to existing decentralised heat distribution networks have been investigated with reference to the London Heat Map. No networks exists, or are proposed, within 500m of the site. Due to that, it is unfeasible for the site to cater for a connection for decentralised future district heating network.
- Fabric improvements & energy efficiency measures in the 'be lean' stage, resulted in reducing the carbon emissions by 3% compared to the Part L 2021 notional baseline. Employing an ASHP for heating and hot water reduces CO_2 emissions by 59%. The proposed dwelling therefore achieve an overall reduction of 62% saving 0.8 Tonnes of CO_2 per annum.

	Total regulated emissions (Tonnes CO_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage savings (%)
Part L 2021 baseline	1.3		
Be lean	1.3	0.0	3%
Be clean	1.3	0.0	0%
Be green	0.5	0.8	59%
Total Savings	-	0.8	62%
	-	**CO_2 savings off-set (Tonnes CO_2)**	-
Off-set	-	**14.9**	-

Figure 1 Proposed Dwelling Energy Reductions – GLA Reporting Spreadsheet (Be Lean reduction rounded in GLA sheet)

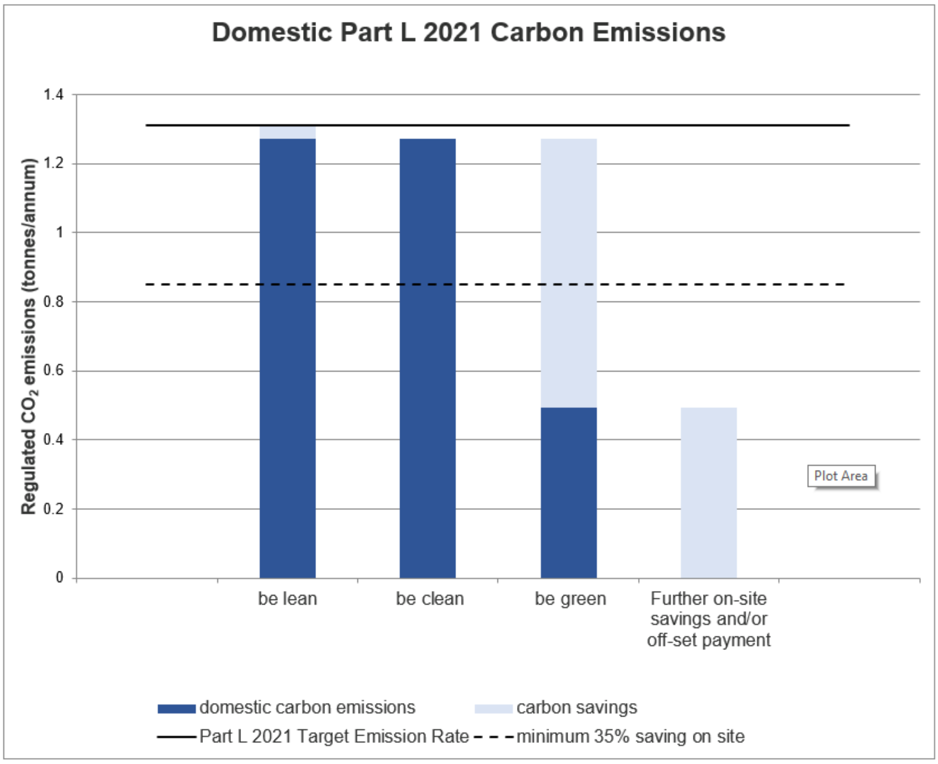

Figure 2 Proposed Dwelling Regulated Energy Reductions

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1. Introduction

This document has been prepared by Pro Sustainability Ltd on behalf of the applicant in support of a full planning application for the proposed new dwelling at the land to the rear of 210 Hampden Way, London, N14 7LY.

Figure 3 Site Location- Google Maps

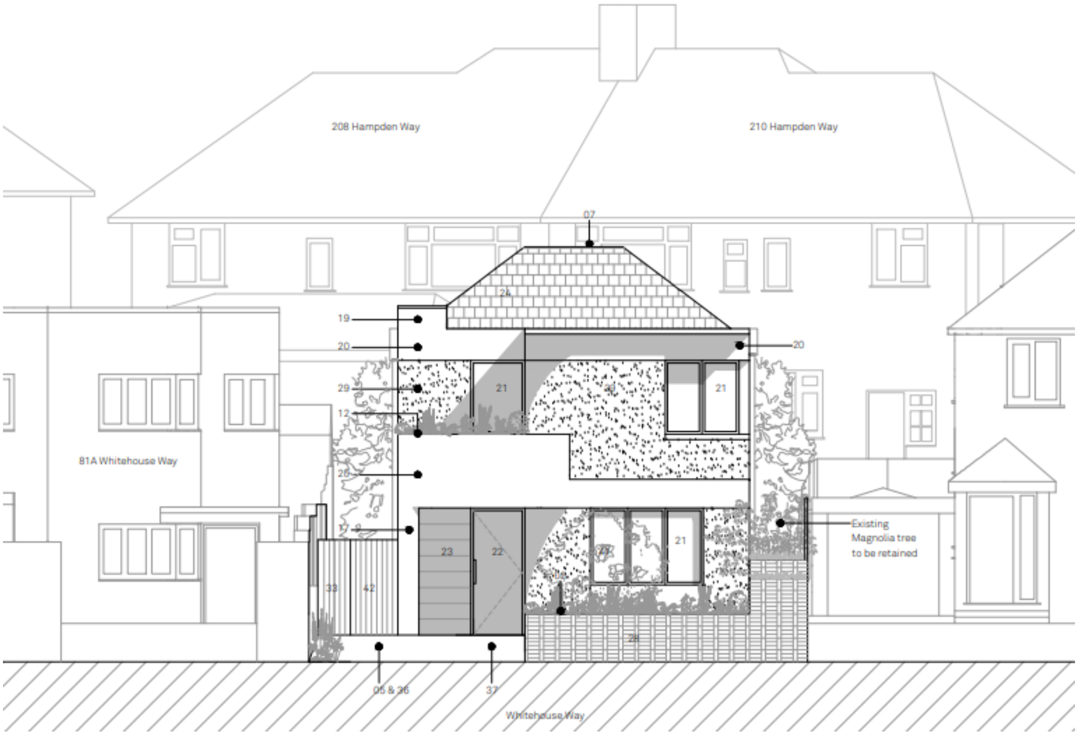

Figure 4: Proposed Front Elevation (Novak Hiles Architects)

2. Policy Context

This Energy statement will address the following documents:

Part L of the Building Regulations

To pass Part L, the proposed building DER (Dwelling Emission Rate kgCO2/m2/year) must be equal or less than the TER (Target Emission Rate kgCO2/m2/year) which is the calculated emission rate based on the regulated energy usage of a notional building with the same geometric properties, orientation and façades, but with the notional standards for building fabrics, controlled fittings and controlled services, as set out in Approved Document Part L 2021 Volume 1: Dwellings.

It is important to highlight that Part L 2021 adopts a 30% uplift in CO2 emission standards compared with Part L 2013.

Barnet's Local Plan- Core Strategy

The current Local Plan, Core Strategy, document, has been adopted in September 2012.

Core Strategy – Policy CS13 Ensuring the efficient use of natural resources

Barnet's council seeks to minimize its contribution to climate change by:

- Promoting the highest environmental standards for development and through the SPDs on Sustainable Design and Construction
- Expecting all development to be energy efficient and seek to minimise any wasted heat or power.
- Minimising Carbon Dioxide Emissions in line with London Plan Policy 5.2

The policy refers to the London Plan and seeks to mimise carbon emissions from new development in accordance with the energy hierarchy of be lean, be clean and be green.

SPD- Sustainable Design and Construction

This document has been released in October 2016, and although it refers to the previous 2016 London Plan and the 2013 Building Regulations, the principles of energy efficiency and carbon reduction can still be applied to the current building regulations and the new London Plan.

The document emphasizes the importance of reducing energy demand in new buildings. Referring to the London Plan energy hierarchy:

1. Be Lean: Using Less Energy – Ensure that the buildings within the development are as energy efficient as technically possible using passive and active design measures.
2. Be Clean: Supply Energy Efficiently – Ensure that all opportunities are taken for local generation and microgeneration of energy and recycling of heat and cooling.
3. Be Green: Using Renewable Energy – Ensure that opportunities are harnessed for deriving renewable energy from the local environment around buildings.

The SPD also highlights the importance of eliminating the risk of overheating in buildings. In line with the London Plan building design should also consider overheating and cooling to reduce the impact of the urban heat island effect. Major development proposals will be expected to demonstrate compliance with the cooling hierarchy.

Measures that are proposed to reduce the demand for cooling should be set out under the following categories:

1. Minimising internal heat generation through energy efficient design: For example, heat distribution infrastructure within buildings should be designed to minimise pipe lengths, particularly lateral pipework in corridors of apartment blocks, and adopting pipe configurations which minimise heat loss e.g. twin pipes.
2. Reducing the amount of heat entering the building in summer: For example, through use of carefully designed shading measures, including balconies, louvres, internal or external blinds, shutters, trees and vegetation.
3. Use of thermal mass and high ceilings to manage the heat within the building: Increasing the amount of exposed thermal mass can help to absorb excess heat within the building.
4. Passive ventilation: For example, through the use of openable windows, shallow floorplates, dual aspect units, designing in the „stack effect‟
5. Mechanical ventilation: Mechanical ventilation can be used to make use of „free cooling‟ where the outside air temperature is below that in the building during summer months. This will require a by-pass on the heat recovery system for summer mode operation.

London Plan, Policy SI.2, Published March 2021

The main emphasis within all policies has been given to the Energy Hierarchy for reducing carbon dioxide emissions as shown in Figure 5.

The energy hierarchy should inform the design, construction and operation of new buildings. The priority is to minimise energy demand, and then address how energy will be supplied and renewable technologies incorporated. An important aspect of managing demand will be to reduce peak energy loadings.

To meet the zero-carbon target, an on-site reduction of at least 35 per cent beyond the baseline of Part L of the current Building Regulations is required. The minimum improvement over the Target Emission Rate (TER) will increase over a period of time in order to achieve the zero-carbon London ambition and reflect the costs of more efficient construction methods. This will be reflected in future updates to the London Plan.

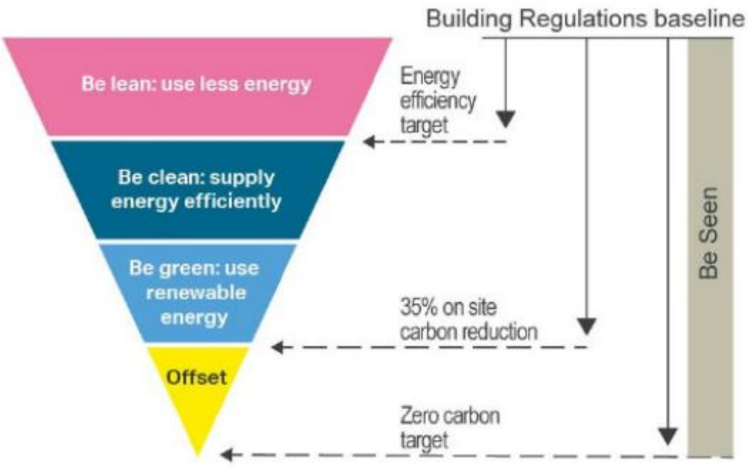

Figure 5 Energy Hierarchy

3. Energy Benchmarking

In order to benchmark the proposed dwelling, estimated energy demands, and CO2 emissions data have been calculated. These estimated energy consumptions shown are relevant only to this stage. They demonstrate the percentage of the building's total energy consumption and CO2 emissions in accordance with the Energy Hierarchy.

In accordance with London Plan guidance, it is prudent for this report to reflect the benchmark data derived from approved Standard Assessment Procedure (SAP) software, and the GLA carbon emissions reporting spreadsheet.

Part L Baseline Case

The overall aim is to improve the building fabric and energy efficiency, provide the highest standards within the new build elements and building services, with a target to achieve the greatest possible reduction in carbon.

Therefore, in order to benchmark the proposed new dwelling, the estimated notional energy demand and resulting CO2 emissions data (known as the Target Emissions Rate [TER] have been calculated. The TER is used as the benchmark to assess the percentage of the building's total regulated CO2 emissions that could be reduced or offset in accordance with the Energy Hierarchy. Standard Assessment Procedure (SAP 10.2) software has been used to produce figures representing the Carbon Dioxide Emissions after each stage of the Energy Hierarchy in order to see the savings procured from changes to the MEP strategies.

According to the London Plan guidance, the baseline for the dwelling will be based on the Target Emission Rate (TER) within the baseline calculations. The results are outputs extracted through the use of the GLA carbon emissions reporting spreadsheet, submitted separately as part of this application. The carbon factors for gas and electricity used are as per the SAP 10.2 values below:

Table 1 Carbon Factors

Fuel Type	Fuel Carbon Factors (kgCO2/kWh)
	SAP 10.2
Natural Gas	0.210
Grid Electricity	0.136

Table 2 Baseline Predicted CO_2 Emissions for the Proposed

	Baseline: Part L 2021	
	Regulated Emissions tCO_2/Yr	Unregulated Emissions tCO_2/Yr
Proposed Dwelling	1.3	0.7

4. Be Lean: Energy Efficiency

In order to deliver an environmentally responsible building, an exemplar approach is being proposed based on low energy design principles. In summary, this approach involves energy demand minimisation through effective floor layout and zonal orientation, good envelope design and proficient use of services; such that the building itself is being used as the primary environmental modifier.

Long term energy benefits are best realised by reducing the inherent energy demand of the dwelling in the first instance before introducing Low and Zero Carbon (LZC) technology solutions to decarbonise the energy supply.

Energy Efficient Building Design

Several efficiency measures have been incorporated into the proposed design, those are summarised as follows:

- High performance insulating materials
- Thermally efficient glazing
- Improved air tightness
- 100% low energy LED lighting
- Efficient and appropriate lighting controls
- Efficient space and water heating controls
- 'Low Flow' shower fittings

The new building elements are targeting new fabric requirements as per Part L 2021 enhanced U-values. The following table (Table 3) describes the proposed targeted building envelope thermal performance criteria.

Table 3: Building Fabric

Reference	Design Criteria
External Wall- Brick and Zinc	0.15 W/m²K
Roof	0.13 W/m²K
Ground Floor	0.11 W/m²K
Glazed windows and doors	1.1 W/m²K
Air Permeability	$3m^3/h.m^2$ @ 50Pa
Ventilation	Natural with extracts
Lighting	Minium efficacy of 125lm/W

Daylight:

High levels of natural daylight will be provided, wherever possible, through effective window design. The glazing specification for the proposed development will be optimised to ensure that the glazed elements provide excellent thermal performance combined with optimum solar reflectance to minimise summer solar heat gains along with high daylight transmittance factors to maximise daylight factors. Encouraging the correct quality and quantity of daylight to penetrate the building is key to reducing the amount of light required from artificial sources and hence energy requirements.

High Performance Lighting:

It is imperative that the lighting design philosophy provides the correct quality of lighting with minimum energy input and hence reduce internal heat gains. The latest low energy lighting technology will be employed throughout, including LED's, where appropriate. External lighting will be designed with consideration for security requirements and minimising nuisance, glare and light pollution to the surrounding area.

Table 4 demonstrates the output of the SAPs and GLA reporting spreadsheet values at the BE LEAN stage for the proposed dwelling.

Table 4 Regulated CO2 Savings from Be Lean

	Base Regulated Emissions tCO_2 /Yr	Be Lean Regulated Emissions tCO_2 /Yr	Regulated Emissions Savings
Proposed Dwelling	1.3	1.3 (rounded)	**3%**

5. Be Clean: Decentralised Energy

Opportunities to connect the proposed to existing decentralised heat distribution networks, including those featuring Combined Heat and Power (CHP) plant, have been investigated with reference to the London Heat Map.

There are no close existing heat networks within the site area, and the future proposed network is also more than 500m away from the site, therefore no proposal is made for a connection at this time (Figure 6).

Table 5: Regulated CO2 Savings from Be Clean

	Be Lean Regulated Emissions tCO_2 /Yr	Be Clean Regulated Emissions tCO_2 /Yr	Regulated Emissions Savings
Proposed Dwelling	1.3	1.3	0

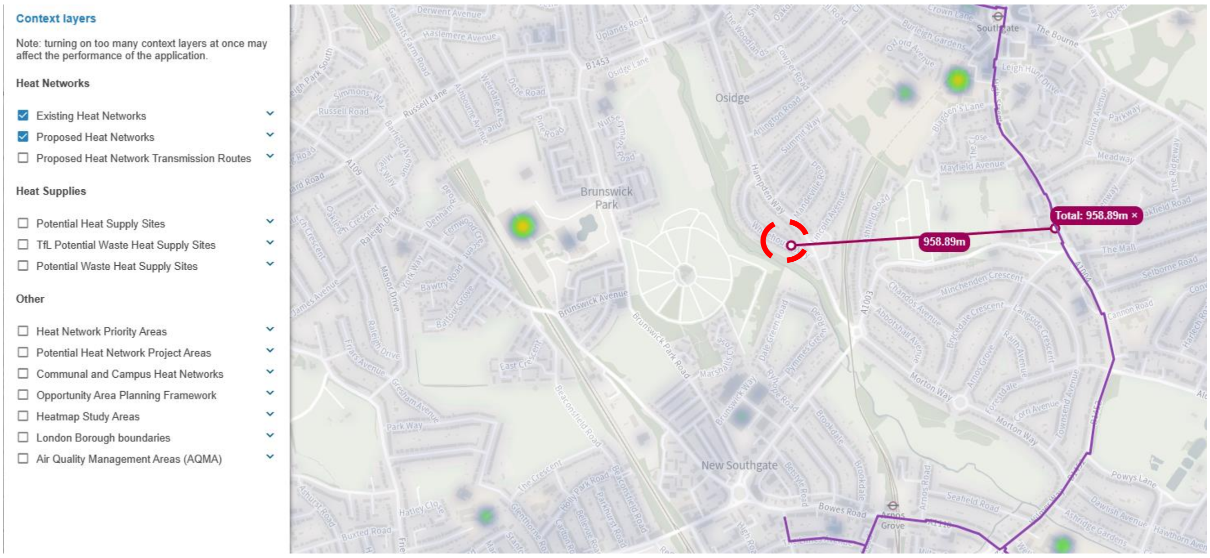

Figure 6 London Heat Map of the site showing Proposed Heat Networks

6. Be Green: Appraisal of Renewable and Low Carbon Technology

The technical feasibility and economic viability of installing LZC technologies at the proposed dwelling has been assessed in order to discount any unsuitable options at an early stage and aid in deciding the most appropriate technology to proceed with on the proposed development. Details are shown in Appendix A.

The chosen viable technology is an Air Source Heat Pump (ASHP), incorporating an acoustic enclosure to minimise any potential impact. The calculations incorporated a Vaillant Group ASHP- aroTHERM Plus -AI, with 3.04% efficiency.

Employing an ASHP system would achieve a large carbon reduction. ASHP's take full advantage of the new carbon emission factors as they are powered by electricity, this technology has assisted the energy performance of the building and is required to comply with the Planning Policy set out by the London Plan. Not only would it provide an electric heat source, it will also supply the domestic hot water demand.

The ASHP will be positioned within an acoustic enclosure to be located within the alley space along the eastern side of the building, Fig 7.

Table 7 demonstrates the output of the SAPs, and GLA reporting spreadsheet values at the BE GREEN stage for the dwelling. The carbon reduction from applying an ASHP is 59%, compared to the BE LEAN/ BE CLEAN stage.

Table 6 Regulated CO2 Savings from Be Green

	Be Clean Regulated Emissions tCO_2 /Yr	Be Green Regulated Emissions tCO_2 /Yr	Regulated Emissions Savings
Proposed Dwelling	1.3	0.5	59%

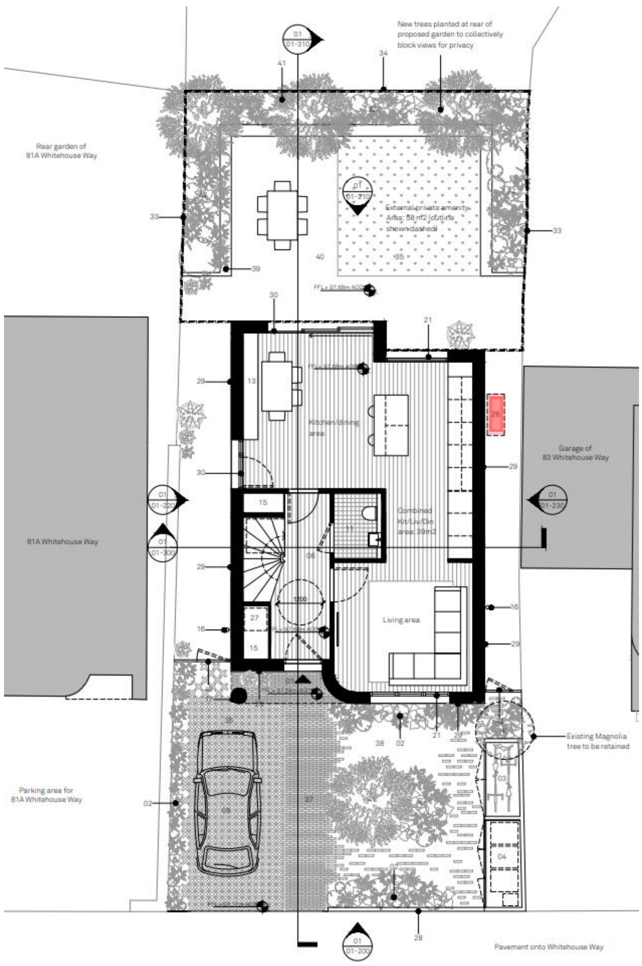

Figure 7 Ground Floor Plan with ASHP Location (Novak Hiles Architects)

7. Sustainability Standards

Water consumption

The dwelling will aim to meet the higher water efficiency standards within the 2013 Building Regulations Part G2 water consumption target of 110 litres per person per day. This will be achieved by:

- Dual flush WCs
- Spray and aerating taps
- Water efficient appliances
- Low flow showers

Building Materials

Construction materials are selected in a way to reduce the environmental impact, key issues during selection are:

- Use of sustainably sourced materials
- Low embodied energy materials
- The use of recycled and reclaimed materials where possible, as well as materials with high recycled content

Construction Waste

The aim will be to reduce construction waste by encouraging reuse, recovery and best practice waste management practices to minimise waste going to landfill.

Measures will include:

- Sorting of waste materials into separate key waste groups (bricks, concrete, insulation, timber, tiles, etc.), either on site or through a licensed contractor for recovery.
- Return packaging for reuse
- Design to use fewer materials

Operational Waste

The proposal aims to encourage the recycling of operational waste through the provision of dedicated storage facilities and space.

Managing Heat Risk

With climate change already meaning that the country is experiencing higher than average temperatures and more severe hot weather events it is imperative that developments are designed to minimise overheating.

The proposed dwelling will aim to improve the fabric performance to reduce the heat gains through the fabric, along with high specification glazing to reduce the solar transmission through the glazed areas. Further analysis to meet Approved Document O will be carried out to insure selecting the most suitable window types, to insure sufficient air flow through the occupied areas.

8. Part L 2021 GLA Spreadsheet Output

	Carbon Dioxide Emissions for residential buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	1.3	0.7
After energy demand reduction (be lean)	1.3	0.7
After heat network connection (be clean)	1.3	0.7
After renewable energy (be green)	0.5	0.7

Figure 8 GLA output- Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy

	Regulated residential carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	0.0	3%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.8	59%
Cumulative on site savings	**0.8**	**62%**
Annual savings from off-set payment	0.5	-
	(Tonnes CO_2)	

Figure 9: GLA output: Table 2 Regulated Carbon Dioxide Savings from each stage of the Energy Hierarchy

	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development total	48.60	45.50	6%

Figure 10: GLA output- Fabric Energy Efficiency Improvement

8. Summary and Conclusions

Pro Sustainability Ltd has undertaken this Energy & Sustainability Assessment in support of the planning application being submitted in relation to the proposal at the land to rear of 210 Hampden Way, London, N14 7LY. The development proposal seeks permission for the erection of 3-bed new build dwelling.

This report addresses the relevant planning policies with regards to Barnet's Council Local Plan, and London Plan. Moreover, it demonstrates compliance with Part L 2021 of the Building Regulations. All calculations were carried out under Part L 2021.

Fabric improvements & energy efficiency measures in the 'be lean' stage, resulted in reducing the carbon emissions by 3% compared to the notional baseline. Employing an ASHP for heating and hot water reduces CO2 emissions by 59%. Achieving an overall reduction of 62% saving 0.8Tonnes of CO_2.

There are no close existing nor proposed heat networks within the site area, therefore no proposal is made for a connection at this time.

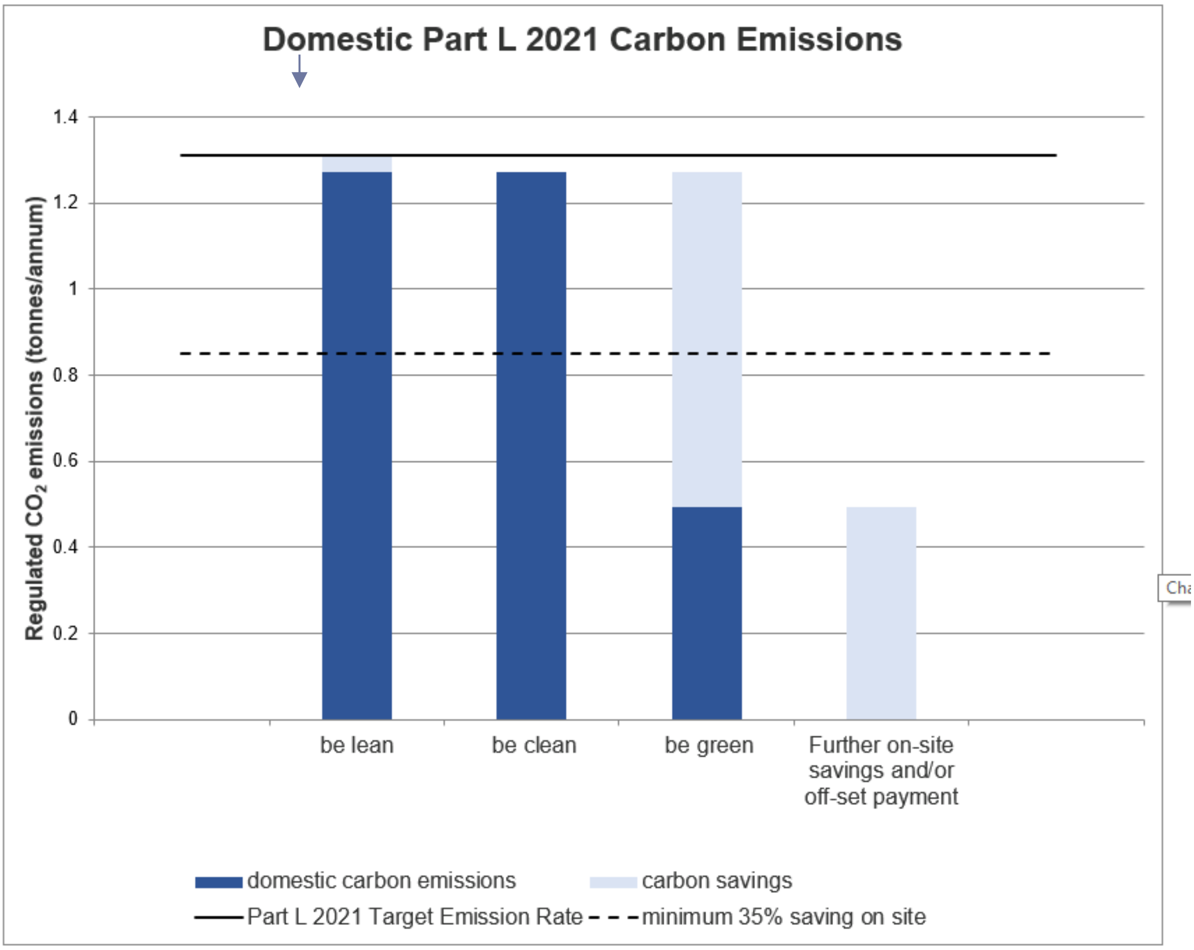

Figure 11 Carbon Dioxide Emissions after each stage of the Energy Hierarchy

Appendix A: Renewable and Low Carbon Technology Energy Options Appraisal

1. Solar Photovoltaic

Solar photovoltaic panels convert solar radiation into electrical energy through semi conductor cells

Benefits:

- Low maintenance/ no moving parts
- Ability to integrate into the building design

Limitations:

- Overshadowing reduces panel performance
- Panels ideally need to be inclined at 30˚ to the horizontal facing a southerly direction

Feasibility for site: No

2. Solar Thermal

Solar thermal energy can be used to contribute towards space heating and hot water requirements. The two common forms of collector are panel and evacuated tube.

Benefits:

- Low maintenance/ no moving parts

Limitations:

- Must be sized for the building hot water requirements

Feasibility for site: No

3. Ground Source Heat Pump (GSHP)

GSHP systems tap into the earth's considerable energy store to provide both heating and cooling to buildings. A number of installation methods are possible including horizontal trench, vertical boreholes, piled foundations (energy piles) or plates/pipe work submerged in a large body of water. The design, installation and operation of GSHPs is well established.

Benefits:

- Minimal maintenance
- Unobtrusive technology
- Flexible installation options
- Income generated from Renewable Heat Incentive scheme (RHI)

Limitations:

- Large area required for horizontal pipes
- Full ground survey required to determine geology
- More beneficial when cooling is required

Feasibility for site: No

- Prohibitively expensive installation costs
- Intrusive to adjacent area
- Space limitations

4. *Air Source Heat Pump (ASHP)*

Electric or gas driven ASHP's extract thermal energy from the surrounding air and transfer it to the working fluid (air or water).

Benefits:

- Efficient use of fuel
- Relatively low capital costs
- Income generated from Renewable Heat Incentive scheme (RHI)

Limitations:

- Specialist maintenance
- More beneficial when cooling is required

Feasibility for site: Yes- High

- Available outdoor space
- Carbon reduction achieved

5. *Wind Turbine (Stand-alone)*

Wind generation equipment operates on the basis of wind turning a propeller, which is used to drive an alternator to generate electricity. Small scale (1kW – 15kW) wind turbines can be pole or roof mounted.

Benefits:

- Low maintenance
- Minimum wind speed available
- Excess electricity can be exported to grid

Limitations:

- Planning issues
- Aesthetic impact and background noise
- Space limitations on site
- Wind survey to be undertaken to verify 'local' viability

Feasibility for site: No

- Not suitable on this site

6. *Wind Turbine (Roof mounted)*

Benefits:

- Low maintenance
- Minimum wind speed available
- Excess electricity can be exported to grid

Limitations:

- Planning issues
- Aesthetic impact and background noise

- Structural/ vibration impact on building to be assessed
- Proximity of other buildings raises issues with downstream turbulence
- Wind survey to be undertaken to verify ‘local’ viability

Feasibility for site: No

- Not suitable on this site

7. Combined Heat and Power

A Combined Heat and Power (CHP) installation is effectively a mini on-site power plant providing both electrical power and useful heat. CHP is strictly an energy efficiency measure rather than a renewable energy technology.

Benefits:

- Potential high CO2 saving available
- Efficient use of fuel
- Excess electricity can be exported to the grid
- Benefits from being part of an energy center/district heating scheme

Limitations:

- Maintenance intensive
- Sufficient base thermal and electrical demand required
- Some additional plant space required
- In case of biomass, large area needed for fuel delivery and storage

Feasibility for site: No

- Not viable for this site

Appendix B: Part L SAP reports

Evidence submitted under separate cover