ENERGY & SUSTAINABILITY REPORT

492 West Green Gate

London, N15 3DA

9th July 2024

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EXECUTIVE SUMMARY

1. This Energy and Sustainability Report has been prepared by Hanley Taite Design Partnership on behalf of JKL Properties Ltd. (The Applicant) and is submitted to support a planning application seeking consent for the redevelopment of a mixed use site at 492 West Green Gate. The redevelopment would involve:

    - Retention of top floor apartment with elevational changes
    - four-storey rear extension in order to provide a total of 4no. additional self-contained units to existing mixed use building (Public house on the ground floor with residential use of the upper floors)
    - slight raising of the original parapet
    - all associated site works.

The building is a locally listed pub with residential upper floors on the edge of a town centre / common.

2. The primary purpose of this document is to explain how the scheme can meet with sustainability and energy policies held within the Haringey Local Development Scheme.

3. Hanley Taite Design Partnership has reviewed the relevant policies to determine and agree on the relevance and approach that should be taken to fulfil each policy.

Summary of Sustainable Strategy

4. The scheme will deliver a series of sustainability measures which are compatible with Haringey London Borough Council's requirements for sustainable design and construction:

- Sustainable material selections with timber to be procured with Forest Stewardship Council accreditation and the main contractor to adopt best practice measures to reduce water and energy use through construction;
- The development of a Site Waste Management Plan to ensure waste generation is minimised during construction;
- Water conservation measures within the units to comply with 110 litres / bedspace per day;
- SuDs strategy to achieve a run-off rate of 1 l/s in line with Surrey SuDS guidance, with flows attenuated via green / blue roofs and permeable paving;
- A comprehensive ecological strategy to deliver a net gain in biodiversity alongside ecological protection measures;

Summary of Energy Strategy

5. To minimise energy consumption by the development and to ensure compliance with relevant energy policies, the following design measures are recommended. They will need to be incorporated into the detailed design:

- Building fabric construction U-values significantly improved compared with standard Building Regulations U-values;
- Reduced Air Permeability in proposed new construction, lower than standard Buildings Regulations, and in accordance with prospective development building occupiers:
- High-efficiency, communal air source heat pumps providing efficient space and water heating to each dwelling on site,
- HVAC system controls ensure installed equipment will be operating efficiently and include automatic monitoring and targeting with alarms for out-of-range values;
- High-efficiency LED lighting utilising low-energy control systems such as daylight dimming and occupancy sensing;

1. INTRODUCTION

The primary purpose of this report is to explain how best practice sustainable design and construction measures would be incorporated in the proposed development located at 492 West Green Road, London N15 3DA, to ensure alignment with local planning policy.

This report is structured as follows:

- The Executive Summary contains a summary of the sustainability features for the proposed development;
- Section 2 provides details of the proposed development
- Section 3 describes the main policies relevant to the development's sustainability and energy standards;
- Section 4 contains the sustainability statement as required by local policy;
- Section 5 provides a summary of the energy assessment, including the concept strategy to address energy compliance;
- Section 6 provides a concluding summary;

2. PROPOSED DEVELOPMENT

3.1 Location and Existing Situation

The development site is located on West Green Road in North London. It is situated on the edge of a local centre / high street. The application site is only about 266 sqm. The site is very well served by retail, schools, religious, and transport services within 5 minutes' walking time.

Figure 1: Site location

The site is occupied by a three-storey 1930s building containing a public house downstairs and residential accommodation upstairs which is typical to this building type. The roof used to be a small loft space with a dormer but was recently erroneously converted into a habitable unit within a mansard. This was done under mistaken belief that the roof conversion was exempt from planning under class AA of the permitted development rights. There is no parking allocated to the building. The original building is locally listed and retains many original features on their front and side elevations; however.

Figure 2: Current streetview: (Source: Google Maps)

West Green Road is characterised by mixed use with stretches of residential street which turn into a high street with commercial shopfronts, the pub in question being one of the locations where this switch occurs. The site is on a corner with Willow Walk and falls slightly towards the cul-de-sac. The site is located within the urban stretch of the road at the edge of a local centre, as indicated on the Haringey Local Plan, 2017 Policies Map.

Figure 3: Pre-existing, existing and proposed front elevation

3.2 Proposed development

The public house has been a local landmark and meeting spot since the late 1800s, albeit in a different iteration.

A pub with residential upper floors is not uncommon and even in the past would be the premise of an inn (temporary accommodation above a public house – food and lodging for travellers). The footprint of the pub is, however, about double that of the upper floors, which leaves room for a relatively significant increase in residential accommodation

Therefore, this proposal is for the:

- Retention of top floor apartment with elevational changes
- four-storey rear extension in order to provide a total of 4no. additional self-contained units to existing mixed use building (Public house on the ground floor with residential use of the upper floors)
- slight raising of the original parapet
- all associated site works.

The development consists of:

- partial demolitions of existing walls,
- erection of a new four-storey extension at the rear
- raising of parapet to original building,
- new public entrance to rear building
- internal alterations,
- creation of a refuse bay and
- all associated site works.

Figure 4: Proposed floor plans

The unit areas reach the nationally prescribed standards for space for permanent accommodation and private outdoor amenity.

A formal pre-planning process was undertaken with the representatives of the Haringey planning department.

The built-up area (footprint) presents a small increase compared to the original, to accommodate refuse, circulation and secure cycle storage, however the original site is almost fully built-up, with only a concrete yard at rear. There is increase but also a small reduction of external massing facing Willow Walk, guided the design decisions, where the Willow Walk wall is straightened so as not to project to the side and more space is given to the parterre.

The top floor is set in, both on the new extension and on the original building and constructed in reflective glass. Both the setback and the material are chosen specifically to reduce the bulk of the top floor so it sits comfortably on the host building.

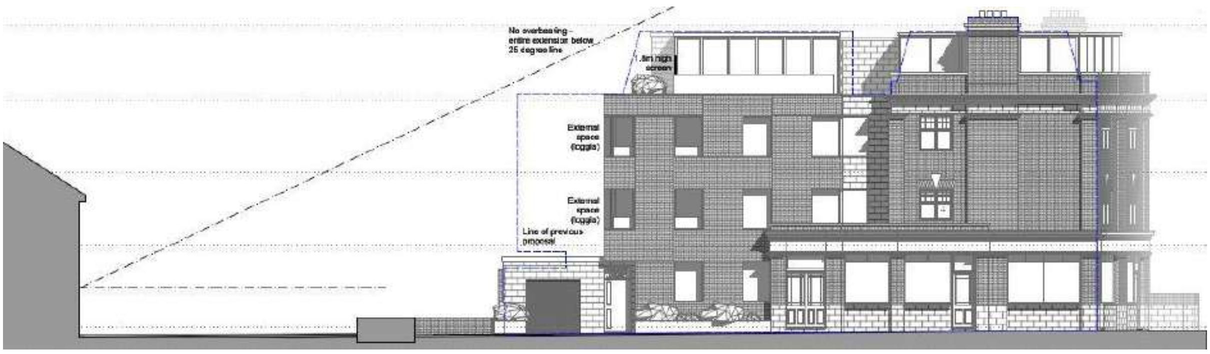


Figure 5: Side elevation

Figure 6: Proposed side elevation

The service areas, refuse and cycle storage are accommodated on the ground floor of the rear extension.

Figure 7: Proposed changes from Willow Walk

3. SUSTAINABILITY AND ENERGY POLICY CONTEXT

3.1 National Policy

The revised National Planning Policy Framework (NPPF) was released in 2023. This replaces the previous National Planning Policy. It sets out the framework for all planning policies in England and how they are expected to be applied. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs. At a similarly high level, members of the United Nations – including the United Kingdom – have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being and environmental protection.

The NPPF sets out a presumption for sustainable development and the need to support economic growth through the planning system. Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

- an economic objective – to help build a strong, responsive and competitive economy by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
- a social objective – to support strong, vibrant and healthy communities by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations and by fostering well-designed, beautiful and safe places with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
- an environmental objective—to protect and enhance our natural, built, and historic environment. This includes making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low-carbon economy.

Planning plays a key role in helping shape places to radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to sustainable development's economic, social and environmental dimensions. The NPPF does not include detailed measures on sustainable design codes and standards to apply, although it expects that when setting any local requirement for a building's sustainability, local planning authorities should do so in a way consistent with the national technical standards.

Particular account is also taken of:

- Decision-making (Section 4);
- Delivering a sufficient supply of homes (Section 5);
- Promoting sustainable transport (Section 9);
- Making effective use of land (Section 11);
- Achieving well-designed and beautiful places (Section 12);

3.2 Local Policy

The Haringey Local Plan Policies referred to hereunder are considered relevant to the proposed development.

Policy SP0 - Presumption in Favour of Sustainable Development

A ‘presumption in favour of sustainable development’ will be applied to development management decisions. Wherever possible, the Council will work proactively and positively with all applicants to help shape development proposals to deliver growth and sustainable development that can be approved without delay.

A. Planning permission will be granted where applications accord with local plan policies (and, where relevant, with policies in neighbourhood plans) when taken as a whole, unless other material considerations indicate otherwise.

B. The Council will require all new developments in the borough to enhance a sense of place and preserve or improve the area's character. Development proposals should respond to and enhance local character, the natural environment, heritage assets, and the identity of the Borough. The Council will seek to encourage growth and sustainable development and manage change to create a network of connected, sustainable, high-quality, locally distinctive and healthy places.

Growth in homes, jobs and services that constitute sustainable development will be welcomed, provided the growth is directed to places with good concentrations of existing infrastructure or areas where there is capacity to grow with further sustainable infrastructure investment within the plan period to 2031. The Strategic Allocations and Luton Town Centre will be the primary location for growth, with District and Neighbourhood Centres also playing a substantial role as the heart of the communities of Luton.

Sustainable Development Principles

To enable the delivery of sustainable development and sustainable communities, all development proposals will, where applicable, consider relevant plan policies.

Policy SP2 - Housing

The Council will aim to provide homes to meet Haringey's housing needs and to make the full use of Haringey's capacity for housing by maximising the supply of additional housing to meet and exceed the minimum target of 19,802 homes from 2011-2026 (820 units per annum from 2011-2014 and 1,502 units per annum).

Policy SP4 ‑ Working Towards a Low Carbon Haringey

Over the lifetime of the Local Plan, reducing energy use in buildings and working towards a low carbon borough will be one of the key challenges facing Haringey. The Council will promote the measures outlined below to reduce carbon emissions from new and existing buildings.

1. In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation.
2. 2. The Council will promote low- and zero-carbon energy generation.

Some of the strategies to be employed towards these goals are outlined in this document.

Policy SP11 - Design

All new development should enhance and enrich Haringey's built environment and create places and buildings that are high quality, attractive, sustainable, safe and easy to use. To achieve this all development shall:

- Be of the highest standard of design that respects its local context and character and historic significance, to contribute to the creation and enhancement of Haringey's sense of place and identity;
- Ensure impacts on health, climate change, natural resources and biodiversity are minimised by adopting and improving sustainable design and construction techniques;
- Incorporate solutions to reduce crime and the fear of crime, such as promoting social inclusion; creating well-connected and high quality public realm that is easy and safe to use; and by applying the principles set out in 'Secured by Design' and Safer Places;
- Promote high quality landscaping on and off site, including improvements to existing streets and public spaces;
- Seek the highest standards of access in all buildings and places; and
- Ensure buildings are designed to be flexible and adaptable – and able to integrate services and functions.

Policy SP12 – Conservsation

The Council shall ensure the conservation of the historic significance of Haringey's heritage assets, their setting, and the wider historic environment. The borough's heritage assets include Statutory Listed Buildings, Conservation Areas, Registered Parks and Gardens, Archaeological Priority Areas, and other locally important heritage assets such as Locally Listed Buildings, Local Historic Green Spaces and Sites of Industrial Heritage Interest. Where archaeological excavation is required, findings should be published, disseminated, and used as the basis for archaeological interpretation on site.

The Historic Environment should be used as the basis for heritage-led regeneration and as the basis for good design and positive change. Where possible, development should help increase accessibility to the historic environment. All development shall protect the Strategic view from Alexandra Palace to St Paul's Cathedral as protected in the London Mayoral "London View Management Framework" Revised SPG, July 2010, and key local views.

4. SUSTAINABILITY STATEMENT

4.1 Minimizing the energy requirements of construction

The project's building phase could significantly influence the site's quality and surroundings, impacting the local environment, nearby residents, employees, and the public. Sustainable construction entails using resources wisely, managing the construction process efficiently, and considering potential adverse environmental effects on sensitive local areas.

The construction phase is anticipated to not cause a significant disturbance, especially given the surrounding land uses. However, the contractor will implement various measures to minimise any potential disruption. The primary contractor must ensure high standards of sustainable construction, achieved through actions such as registering the site with the Considerate Constructors Scheme and managing the construction site to mitigate environmental impacts, including protecting water and air quality and monitoring water and energy usage during construction activities.

Ensuring the sustainability of every material employed in the construction process will be paramount from the project's inception. Incorporating the reuse of several significant existing building components will contribute positively to the overall environmental performance of the development. This approach minimises waste and reduces the demand for new resources, aligning with the project's commitment to environmental stewardship. By maximising the utilization of existing materials, the project can significantly lessen its ecological footprint while promoting a more sustainable and responsible approach to construction.

4.2 Material choices at the design stage

In our commitment to sustainability, we have prioritised eco-friendly and energy-efficient materials during the design stage of our construction project. Our material selections focus on reducing environmental impact, promoting energy conservation, and supporting local economies. We have opted for materials with low carbon footprints, incorporating recycled content and renewable resources wherever possible. By choosing locally sourced materials, we aim to minimise transportation emissions and support community businesses. Our design also emphasises energy-efficient insulation, high-performance windows, and reflective roofing to enhance the building's energy performance and reduce long-term operational costs. Complying with environmental standards and certifications, our material choices reflect our dedication to creating a sustainable and responsible building that benefits both the environment and its occupants.

The development project will prioritise optimising material sustainability in its design and construction phases. The client has set stringent standards to ensure the development adheres to environmentally responsible practices. These standards include:

- **Timber Sourcing**: At least 50% of all timber and timber products used in the construction will be procured from sources accredited by the Forest Stewardship Council (FSC) or the Programme for the Endorsement of Forestry Certification (PEFC) scheme. This commitment to utilising responsibly sourced timber promotes forest conservation and supports sustainable forestry practices.

- **Toxicity-Free Materials**: Strict measures will be taken to ensure that no construction or insulation materials are employed that could emit harmful toxins into both the internal and external environments. This encompasses substances that have the potential to deplete the stratospheric ozone layer. By prioritising the use of non-toxic materials, the project aims to safeguard the health and well-being of occupants and minimise its environmental impact.

- **Recycled steel:** Recycled steel has emerged as a cornerstone of environmentally conscious construction, offering many benefits beyond structural integrity. Utilising recycled steel in construction conserves natural resources, reduces energy consumption, significantly reduces greenhouse gas emissions and pollutants released during traditional steel manufacturing processes, and also diverts waste from landfills, mitigating the environmental impact of steel production. Moreover, recycled steel maintains the same structural integrity and performance standards as its virgin counterpart, making it an attractive choice for builders seeking both environmental responsibility and structural reliability.

- **Concrete:** By incorporating recycled materials such as fly ash, slag, and recycled aggregates into cement and concrete production, these innovative materials reduce the environmental impact associated with traditional manufacturing processes. Not only do they help alleviate the strain on natural resources, but they also divert waste from landfills, addressing the pressing issue of waste management. Additionally, utilising recycled content in cement and concrete production reduces greenhouse gas emissions and energy consumption, contributing to mitigating climate change.

- **Insulation:** For existing and proposed buildings, environmentally friendly insulation materials, such as wood fibre, cellulose, hemp, etc., should be used instead of polymer-based insulations, such as PIR, PUR, EPS, etc. Selected insulation materials made from recycled content, such as recycled fibreglass or cellulose, reduce the environmental impact of insulation production.

By implementing these standards, the development emphasises its dedication to environmental sustainability and strives to set a benchmark for responsible construction practices within the industry. This commitment aligns with broader efforts to mitigate environmental degradation and promote the long-term health of both ecosystems and communities.

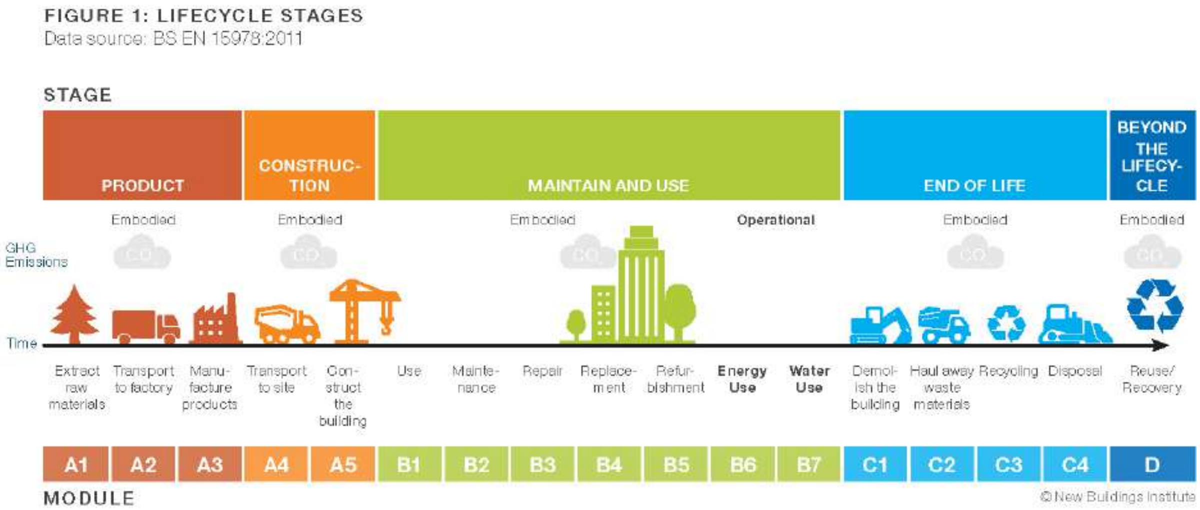


Figure 8: Embodied and operational carbon (Source: newbuildings.org)

Foundation

In our pursuit of reducing the carbon footprint of this project, one of the significant changes we implemented was replacing traditional Portland cement with low-carbon alternatives and supplementary cementitious materials (SCMs). Portland cement production is known for its high energy consumption and significant carbon emissions, making it a major contributor to the construction industry's environmental impact.

Low-carbon concrete with additives such as GGBS (ground granulated blast furnace slag, a byproduct of steel production) or fly ash (a byproduct of coal burning) should be used. These alternatives are often produced using innovative manufacturing processes that utilize less energy or alternative raw materials that generate fewer emissions during production. Between 30% and 70% of cement can be replaced with these materials, resulting in a significant reduction of embodied carbon while maintaining its strength. By choosing low-carbon cement alternatives, we significantly reduced the embodied carbon of the concrete used in our project.

Ground floor slab

Reducing the carbon footprint while constructing a ground floor slab involves implementing sustainable practices and selecting environmentally friendly materials. One approach is to use alternative cementitious materials or low-carbon concrete mixes that replace a portion of Portland cement with supplementary cementitious materials like fly ash or slag. These alternatives significantly reduce the carbon emissions associated with concrete production. Additionally, optimising the design to minimise the amount of concrete used by incorporating efficient structural layouts and utilising post-tensioned or reinforced slab systems can further reduce the embodied carbon of the ground floor slab.

Choosing locally sourced aggregates and reducing transportation distances for materials is crucial in lowering the carbon footprint. Finally, incorporating insulation beneath the slab to improve thermal performance can reduce heating and cooling demands, leading to energy savings and decreased carbon emissions over the building's lifespan. By adopting these strategies, it's possible to construct a ground floor slab that is both structurally sound and environmentally responsible, contributing to a more sustainable building project.

Wall structure

Sustainable external wall structures are essential for creating environmentally responsible and energy-efficient buildings. One approach to sustainability in wall construction is utilising **insulated concrete forms (ICFs)**, which combine concrete's strength and durability with foam's insulating properties. ICFs provide excellent thermal performance, reducing heating and cooling needs and associated energy consumption. **Structural insulated panels (SIPs)** are another sustainable option, consisting of an insulating foam core sandwiched between two structural facings. SIPs offer high insulation levels, rapid construction, and minimal thermal bridging, contributing to energy efficiency and comfort. **Reclaimed or recycled materials**, such as reclaimed bricks or recycled metal panels, can be used to construct external walls, reducing the demand for new resources and minimising waste. By adopting these sustainable approaches to external wall structures, we can create buildings that are energy-efficient, durable, and harmonious with their environment.

Stud external structures offer a sustainable alternative to traditional external walls by optimising material use, enhancing thermal performance, and promoting energy efficiency. Unlike traditional masonry or concrete walls, stud walls are constructed using a framework of **timber or metal studs**, which are then filled with insulation and covered with cladding materials. This construction method reduces the amount of material required for the wall, leading to less waste and lower embodied carbon. Additionally, the cavity within stud walls allows for thicker insulation layers, improving the wall's thermal performance and reducing heating and cooling needs, lowering energy consumption and carbon emissions over the building's lifespan. Furthermore, the lightweight nature of stud walls simplifies transportation and installation, reducing transportation emissions and construction time. The flexibility of stud wall construction also allows for easier integration of renewable energy technologies and sustainable cladding options.

Aerated concrete, also known as autoclaved aerated concrete (AAC), offers a sustainable alternative to traditional external walls due to its unique properties and environmental benefits. AAC is lightweight yet strong, consisting of cement, lime, sand, and water mixed with an expanding agent that forms millions of tiny air bubbles throughout the material. This cellular structure provides excellent thermal insulation properties, reducing heating and cooling demands and associated energy consumption. Compared to traditional concrete or masonry walls, AAC requires less raw material and has a lower density, reducing transportation emissions and embodied carbon. Additionally, AAC production generates fewer greenhouse gas emissions due to its lower cement content and the use of lime, which absorbs CO_2 during the curing process. The lightweight nature of AAC also facilitates easier handling, transportation, and installation, reducing environmental impact. Moreover, AAC is durable, fire-resistant, and offers good sound insulation, contributing to a longer lifespan and improved indoor comfort. Overall, aerated concrete stands out as a sustainable choice for external walls, combining energy efficiency, reduced environmental impact, and long-lasting performance to create more eco-friendly buildings.

Insulation

Insulation is crucial in improving a building's energy efficiency by reducing heat loss or gain and decreasing the need for heating and cooling. Recognising the environmental impact associated with traditional insulation materials, we specified insulation materials made from recycled content for this project.

One of the insulation materials we chose is **recycled fibreglass insulation**. Fiberglass insulation is typically made from sand and recycled glass. By opting for insulation that incorporates recycled content, we divert waste materials from landfills and reduce the demand for virgin materials. Recycling fibreglass insulation consumes less energy and generates fewer emissions than producing fibreglass from raw materials. Fiberglass insulation is known for its durability and long lifespan, further contributing to sustainability by reducing the need for frequent replacements.

Another sustainable insulation option we selected is **recycled cellulose insulation**. Cellulose insulation is primarily made from recycled paper, including newspapers, cardboard, and other paper products. By utilising recycled paper as a raw material, we help reduce the environmental impact of paper waste and support recycling efforts. Cellulose insulation is treated with fire retardants and fungicides to enhance its performance and durability. It offers excellent thermal resistance and soundproofing qualities and is a cost-effective insulation solution.

By choosing insulation materials made from recycled content, such as recycled fibreglass or cellulose, we significantly reduced the environmental impact associated with insulation production. These sustainable insulation choices conserve natural resources and contribute to energy savings over the building's lifespan. Improved insulation reduces heating and cooling demands, lowering energy consumption and greenhouse gas emissions associated with building operations. Furthermore, by prioritising recycled content insulation, we demonstrate our commitment to environmental stewardship and sustainable building practices, setting a positive example for future construction projects.

These sustainable insulation choices conserve natural resources and contribute to energy savings over the building's lifespan. Improved insulation reduces heating and cooling demands, lowering energy consumption and greenhouse gas emissions associated with building operation.

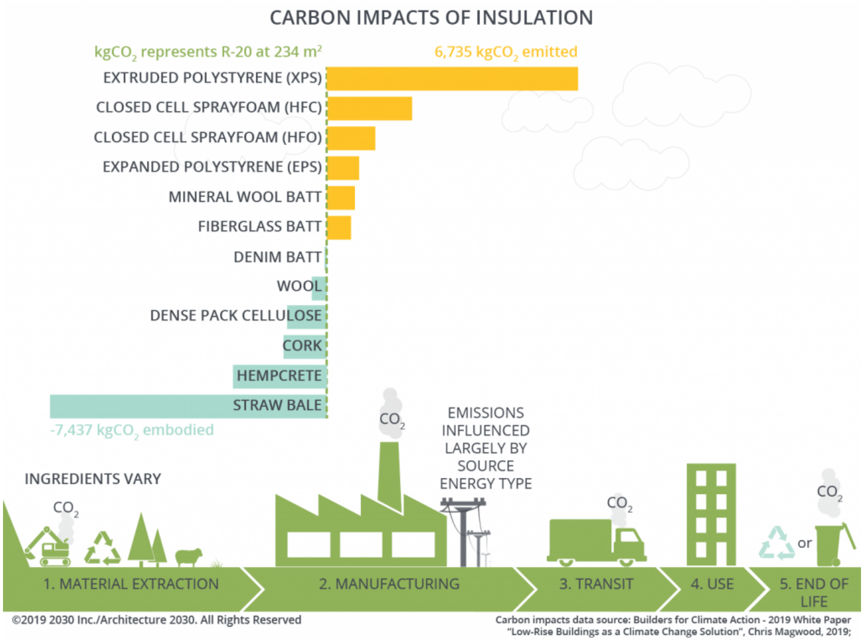


Figure 9: Carbon impacts of Insulation (Source: zeroenergyproject.com)

By choosing insulation materials made from recycled content like recycled fibreglass or cellulose, we significantly reduced the environmental impact associated with insulation production.

Cladding

Sustainable cladding options play a pivotal role in enhancing the environmental performance and aesthetic appeal of a building. One popular sustainable cladding material is **reclaimed wood** from old barns, factories, or other structures. Reclaimed wood gives a unique character to buildings while reducing the demand for new timber, thus preserving forests. **Timber from responsibly managed forests**, certified by is another eco-friendly choice. This ensures that the wood is harvested in a manner that maintains the forest's biodiversity and supports local communities. **Fibre cement** is a durable and low-maintenance alternative made from a mix of cellulose fibres, cement, and sand. It is resistant to rot, fire, and pests, making it a long-lasting cladding option. **Recycled metal**, such as aluminium or steel, offers a sleek and modern aesthetic while being highly durable and recyclable at the end of its life. **Brick and stone** are natural cladding materials with excellent thermal mass properties, providing insulation and reducing energy consumption. Lastly, **composite materials** made from a combination of recycled plastics and wood fibres offer the look of wood with less maintenance and a longer lifespan. By choosing sustainable cladding options, we can reduce environmental impact, enhance building performance, and contribute to a more eco-conscious built environment.

Openings

Windows are pivotal in a building's energy performance, influencing its thermal comfort and energy efficiency. Recognising the significant impact windows can have on heating and cooling requirements, we made strategic choices to enhance the energy performance of our building's fenestration. We specified windows with double or triple glazing and low-emissivity coatings to improve energy efficiency, reduce heating and cooling needs, and reduce associated carbon emissions.

In addition to multi-layered glazing, we incorporated **low-emissivity (Low-E) coatings** on our windows. Low-E coatings are microscopically thin, virtually invisible metal or metallic oxide layers deposited on the window glass. These coatings reduce the emissivity of the glass, meaning they reflect a significant portion of infrared heat to its source, whether inside the building during the winter or outside during the summer. By controlling heat transfer and solar gain, Low-E coatings help maintain a comfortable indoor temperature year-round without over-reliance on heating or cooling systems.

Interior

In our commitment to sustainability, we carefully selected interior finishes that prioritize using bio-based materials or recycled content. This conscious choice serves multiple purposes: it reduces the environmental impact associated with the production and disposal of building materials. It lessens our reliance on petroleum-based products, which have a higher carbon footprint and contribute to climate change.

One of the interior finishes we opted for is **recycled glass countertops**. These countertops are made from crushed, post-consumer glass mixed with a binder to create a durable, aesthetically pleasing surface. By choosing recycled glass countertops, we divert waste from landfills and reduce the energy and resources required to produce new materials. Additionally, the reflective nature of glass can enhance natural lighting within the space, reducing the need for artificial lighting and lowering energy consumption.

Another sustainable choice we made is **bio-based paints**. Unlike traditional paints with high levels of volatile organic compounds (VOCs) and other harmful chemicals derived from petroleum, bio-based paints are made from renewable resources such as plant oils, resins, and natural pigments. These paints emit fewer VOCs, improving indoor air quality and creating a healthier environment for occupants. Bio-based paints have a lower carbon footprint than their petroleum-based counterparts, requiring less energy and fewer resources to manufacture.

By incorporating these bio-based and recycled interior finishes into our design, we contribute to environmental conservation and promote a healthier and more sustainable living or working environment for the building's occupants. These choices align with our broader sustainability goals and demonstrate our commitment to responsible material selection throughout construction.

Other

One of the cornerstones of our sustainability strategy was prioritising materials sourced from **local suppliers** and manufacturers. This deliberate choice aligns with our commitment to reducing the environmental impact of our construction project fosters economic growth within our community, and supports local businesses.

4.3 Renewable energy

Renewable energy sources

In this project, we aim to integrate renewable energy solutions to reduce dependency on fossil fuels, lower carbon emissions, and promote sustainability. The integration of renewable energy technologies not only aligns with our environmental goals but also offers long-term economic benefits and enhances the quality and value of the housing units.

One of the primary renewable energy sources we specified for the project is **solar photovoltaic (PV)** systems. We proposed solar panels on the rooftops to harness solar energy and convert it into electricity. This clean and abundant energy source helps offset each apartment's electricity consumption, reducing reliance on the grid and lowering utility bills for residents. By generating electricity from solar PV systems, we can significantly reduce carbon emissions associated with conventional electricity generation.

In addition to solar PV systems, we specified **solar thermal systems** for domestic hot water heating. These systems utilise solar collectors to absorb sunlight and convert it into heat, then heat water for showers, laundry, and other household needs. Solar thermal systems reduce the demand for electricity or gas-powered water heaters, decreasing energy consumption and carbon emissions.

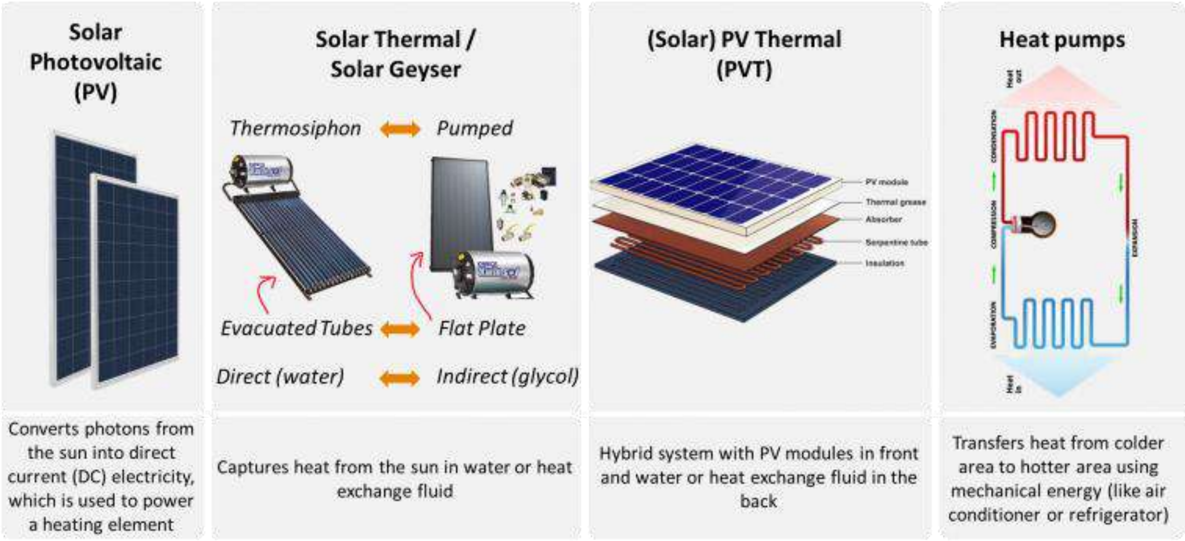


Figure 10: Water heating options: terminology (Source: poweroptimal.com)

We designed an **air-to-water heat pump** in each housing unit, which significantly enhances sustainability by harnessing renewable energy from the ambient air to provide efficient heating and hot water solutions. This technology efficiently transfers heat from the outside air to heat water for domestic use, reducing the demand for traditional heating systems powered by fossil fuels. By leveraging this renewable energy source, air-to-water heat pumps reduce carbon emissions and lower energy consumption.

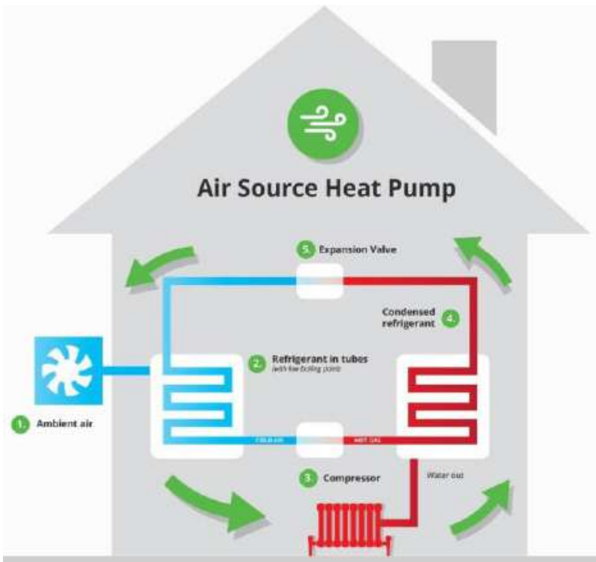
1. **AMBIENT AIR** Heat is extracted from the ambient air.

2. **REFRIGERANT IN TUBES** As the ambient air is pulled through the evaporator, refrigerant is circulated through the evaporator.

3. **COMPRESSOR** This raises the temperature of the refrigerant and turns the liquid refrigerant to gas.

4. **CONDENSED REFRIGERANT** The hot gas is then passed through a condenser where the heat is passed onto water.

5. **EXPANSION VALVE** Once the heat has been removed the hot gas turns back into a liquid to start the cycle again.



4.4 Waste management

This section has considered all the requirements set out under Core Strategy Policy CS 6, which requires development proposals to; "incorporate waste management processes, for example, for the recycling of water and waste."

Waste, both through construction and building operation, can harm a building's overall sustainability and environmental performance. Instead, the Government's "Our Waste, Our Resources: A Strategy for England (2018)" document sets targets to reduce the amount of waste going to landfill sites.

Construction Waste

The principles of the Waste Hierarchy will be reflected during the site clearing and enabling works phase. This will include an audit by the demolition contractor to fully evaluate opportunities for reusing excavation materials on-site.

Targets will be established within a Site Waste Management Plan that accords with the Government's waste strategy. The targets will be set during the detail design phase.

Operational Waste

Residential waste storage space would take account of the requirement of BS5906:2005. This requires that suitable refuse and recycling space provision is allocated for the 6no. residential apartments in a centralised waste store. The necessary provision as for the units at rear is follows:

- 1no. 1100L eurobins for domestic waste
- 1no. 1100L eurobin for recycling
- 1no. 360L eurobin for food waste

In accordance with storage requirements in BS5906:2005, 50% of this quantity of waste should be recyclable waste, and 75% should be general municipal waste. This over-provision of storage capacity will ensure that sufficient space is always allocated to cater to waste volumes.

Adequate provision has been allocated for refuse and recycling materials, meeting the council's guidance. The bin store is enclosed to minimise odour and noise.

4.5 Pollution

The inherent nature of construction entails the potential for adverse environmental effects, a consideration thoroughly addressed during the planning stages of this proposal. While the scale of the development does not necessitate a comprehensive Environmental Impact Assessment (EIA), measures outlined in this section and subsequently enacted are designed to manage and mitigate any potential impacts effectively. This approach aims to minimise pollutant emissions into the wider environment, encompassing noise, water, and light pollution.

Regarding noise, the residential character of the existing development, coupled with associated traffic, results in minimal noise pollution in the surrounding area. Anticipated construction activities like building a residential block are expected to generate minimal noise concerns. Moreover, selecting low-decibel emitting models for external condensing units further mitigates potential noise disturbances. An assessment within the Transport Statement confirms that any increase in vehicular movements will be invisible against background traffic levels.

Concerning external lighting, the development's location in an area featuring diverse building uses requires careful consideration. To minimise light pollution and avoid adverse impacts on surrounding properties, new external lighting will be strictly limited to safety and security purposes. Additionally, adherence to ILE guidance on the Reduction of Obtrusive Light will ensure that upward light spillage is effectively mitigated.

4.6 Water management

Within Core Strategy Policy CS6, a mandate exists for new residential developments to actively contribute to reducing water consumption. In alignment with this policy, the forthcoming residential units will be meticulously constructed to meet a stringent water efficiency target of 110 litres per person per day, adhering to industry best practices. This objective will be achieved by implementing various water-saving measures, including installing aerating flow restrictors on taps, dual flush toilets, and low-flow showerheads. These measures align with regulatory requirements and exemplify a proactive approach toward sustainable water management, ensuring that the development minimises its environmental impact and promotes responsible resource usage. By integrating these water-saving features into the design and construction of the residential units, the development aims to set a precedent for environmentally conscious building practices while providing residents with modern, efficient amenities.

4.7 Ecology and Green Infrastructure

The site is fully built-up with little space for landscaping, however, planters and green roofs are proposed on several levels to assist with biodiversity gain and to slow the surface water runoff.

A report by Arbtech, which accompanies this application outlines some basic proposals on improving on the current situation.

4.8 Sustainable transport

Encouraging sustainable modes of transportation, such as public transit, cycling, and walking, takes precedence over private car usage. The development is located in a 6a PTAL zone with excellent public transport and it is to be car-free. Cycle parking is provided in excess of the requirement.

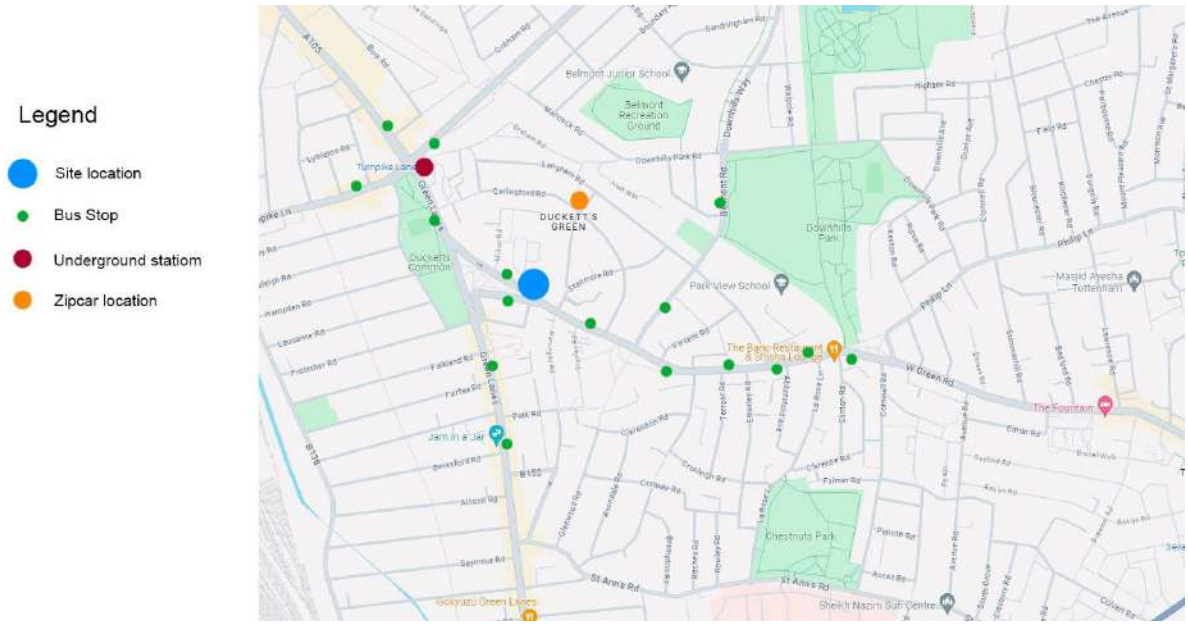


Figure 5: Public transportation in the area

5. ENERGY ASSESSMENT

The Development Management Policies Document of the Luton Borough Council underscores the importance of new developments striving to minimize energy consumption, efficiently utilize and provide energy, and incorporate renewable energy sources whenever feasible. This section aims to illustrate how the development will contribute to reducing CO_2 emissions by implementing energy-efficient design features and integrating renewable energy solutions.

5.1 Methodology

The methodology for assessing the development's energy performance adheres to "The Government's Standard Assessment Procedure for Energy Rating of Dwellings." This procedure was carried out using Stroma FSAP 10 (Version - 1.0.75 | PCDB Version - 510), an approved software and methodology by the Department for Communities and Local Government (DCLG) for conducting SAP assessments, ensuring compliance with Part L 2021 (Volume 1) of the Building Regulations. Various apartment types exist within the development. To analyse energy performance, one representative dwelling of each typology was selected for assessment through SAP. Key figures assessed in SAP calculations include:

- The Dwelling Emission Rate (DER).
- Target Emission Rate (TER).
- Dwelling Primary Emission Rate (DPER).
- Target Primary Energy Rate (TPER).

These figures, derived from SAP calculations, determine whether a dwelling meets its emission targets. The TER and TPER represent the target CO_2 emissions and primary energy demand the proposed dwelling must achieve based on a notional dwelling of similar type, size, and heating fuel. Compliance with SAP criteria, encompassing factors like building fabric, design, controlled services, and fittings, determines whether the dwelling passes or fails. These metrics are measured in kilograms of CO_2 per square meter and kilowatt-hours of primary energy use per square meter.

5.2 Step 1.: Establishing Target Emission Rate

Establishing a target emissions rate for a building at the design stage involves a systematic approach that considers various factors and benchmarks to ensure the building's energy efficiency and sustainability. The following criteria was followed during the design process:

Regulatory Requirements:

Understand and comply with local building codes, standards, and regulations related to energy efficiency and emissions reduction, such as Part L in the UK or local green building certifications.

Benchmarking:

To set a realistic target, compare the proposed building's performance metrics with similar buildings or industry standards. Use tools like Energy Performance Certificates (EPCs), Building Energy Modelling (BEM), or software like EnergyPlus or IES VE for simulations.

Energy Modelling:

Use building energy modelling software to simulate the building's energy performance based on its design, materials, systems, and orientation. This helps predict energy consumption, identify potential improvement areas, and set energy targets.

Target Setting:

Establish a target emissions rate based on the energy modelling results, aiming for a specific reduction percentage or emissions rate (e.g., kgCO2/m2/year). Consider factors like building type, size, occupancy, and function when setting targets.

Incorporate Renewable Energy:

Renewable energy systems like solar panels, wind turbines, or geothermal heat pumps should be included in the design to offset the building's energy consumption and reduce emissions.

Material Selection:

Choose sustainable and low-carbon materials with a reduced environmental impact throughout the building's lifecycle, including construction, operation, and end-of-life phases.

Design Optimization:

Optimise the building's design for energy efficiency by considering passive design strategies, such as orientation, shading, natural ventilation, and daylighting, to minimise energy demand and emissions.

Monitoring and Verification:

Implement a monitoring and verification plan to track the building's energy performance against the set targets post-construction. This will help identify deviations and implement corrective measures.

Documentation and Reporting:

Document the target emissions rate, design strategies, and performance metrics in the project documentation. This information is essential for stakeholders, certification processes, and regulation compliance.

By following these steps and integrating energy modelling, renewable energy systems, sustainable materials, and design optimisation into the building's design process, it's possible to establish a realistic and achievable target emissions rate for the building at the design stage. This proactive approach ensures that the building is designed with energy efficiency and sustainability, leading to reduced carbon emissions, lower operating costs, and a healthier indoor environment for occupants.

5.3 Step 2.: Complying with Part L 2021 of Building Regulations

Complying with Part L 2021 of the Building Regulations is crucial for ensuring energy efficiency and sustainability in new and renovated buildings in the UK. Part L sets out requirements for the conservation of fuel and power, aiming to reduce carbon emissions and improve the energy performance of buildings. The 2021 update focuses on achieving a 31% reduction in CO_2 emissions compared to the previous standards, emphasising the importance of building fabric performance, energy-efficient heating systems, and renewable energy technologies. To meet these requirements, buildings must incorporate high insulation levels, airtightness measures, and efficient heating and cooling systems. Additionally, Part L 2021 encourages using renewable energy sources like solar panels or heat pumps to reduce carbon emissions further. By adhering to these updated regulations, developers, architects, and builders play a vital role in advancing sustainable construction practices and creating a greener built environment for the future.

6. CONCLUSION

Hanley Taite Design Partnership has prepared this Energy and Sustainability Report on behalf of JKL Properties Ltd. (referred to as "The Applicant"), which accompanies a planning application aimed at obtaining consent for:

- Retention of top floor apartment with elevational changes
- four-storey rear extension in order to provide a total of 4no. additional self-contained units to existing mixed use building (Public house on the ground floor with residential use of the upper floors)
- slight raising of the original parapet
- all associated site works.

The proposed development represents a comprehensive approach to sustainable construction and energy efficiency, carefully designed to align with national and local policy contexts. Located in an area with existing infrastructure and amenities, the development aims to enhance the built environment while minimising its environmental footprint.

The Sustainability Statement outlines a holistic strategy beyond mere compliance with regulations. By focusing on minimising energy requirements, making informed material choices, implementing effective waste management practices, mitigating pollution, conserving water, enhancing green infrastructure, and promoting sustainable transport options, the development aims to be an example of environmentally responsible construction.

The Energy Assessment provides a detailed roadmap for achieving energy efficiency targets, starting with establishing a Target Emission Rate and culminating in compliance with Part L 2021 of the Building Regulations. The development is poised to significantly reduce carbon emissions and energy consumption through rigorous methodology and careful consideration of building fabric performance, heating and cooling systems, airtightness measures, and renewable energy technologies.