

Sustainability and Energy Statement

incorporating a BREEAM Pre assessment

Reading Retail Park, Reading

Prepared for Threadneedle UK Property Authorised Investment Fund, June 2022



envision

The logo for 'envision' features the word in a lowercase, sans-serif font. Below the text is a graphic element consisting of two wavy lines: a green one on top and a blue one on the bottom, both curving from left to right.

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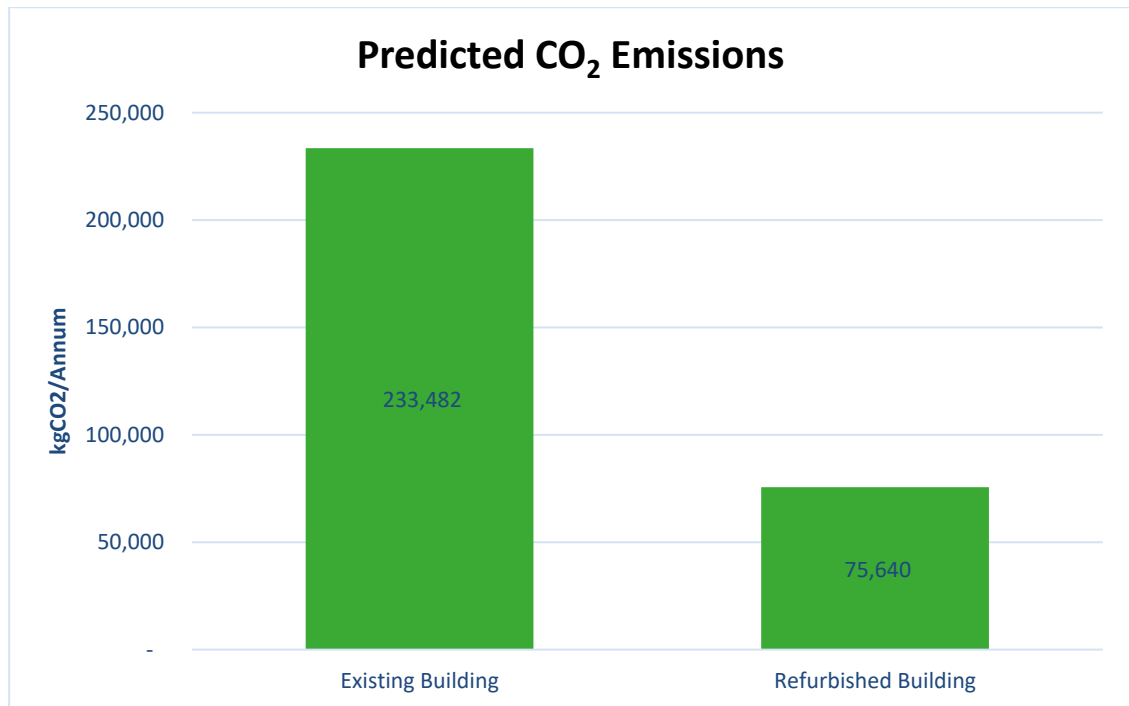
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EXECUTIVE SUMMARY

1. This Sustainability and Energy Statement, incorporating a BREEAM Pre Assessment has been prepared by Envision on behalf of Threadneedle UK Property Authorised Investment Fund (the Applicant), and is submitted to support a full planning application at the Reading Retail Park, 709 - 731 Oxford Road, Reading, RG30 1PR. The planning application seeks to make amendments to the end terrace to amalgamate the existing units occupied by Halfords (Units 6) and Carpetright (Unit 2) by removing party walls between these units to create a single unit. The scheme will enable a food store operator to take a lease on the larger unit.
2. The primary purpose of this document to explain how the Applicant has sought to address Reading Borough Council's sustainability policies. Envision has undertaken a review of the relevant policies and worked with the design team to determine and agree the relevance and approach that should be taken to fulfil each policy.
3. Policy CC2 relates to BREEAM standards for new development. It requires that all major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible. The proposed development is being taken forward by the Applicant as a speculative project with no operator yet named, and whilst early discussions are being held, no tenant is currently agreed. The scope of the Applicant's work involves relatively minor alterations to the external envelope, and internal modifications, such as the removal of partition walling. The tenant will be responsible for the installation of new services, and all fit out items. As set out by this Statement, whilst BREEAM Excellent is required by policy CC2 for a development of this scale, this target is not expected to be practical. This statement includes a predictive assessment which demonstrates how the scheme could meet a BREEAM Very Good rating against Part 1 of BREEAM Refurbishment and Fit Out (2014). This is considered to be reasonable given the modest nature of the proposal and limited scope of the Applicant's involvement in relation to BREEAM.

BREEAM Rating					
	Credits available	Credits achieved	% Credits achieved	Weighting	Category score
Man	15.0	10.0	66.67%	17.80%	11.86%
Hea	13.0	5.0	38.46%	18.41%	7.08%
Ene	4.0	1.0	25.00%	4.78%	1.19%
Tra	9.0	6.0	66.67%	12.46%	8.30%
Wat	0.0	0.0	0.00%	0.00%	0.00%
Mat	12.0	9.0	75.00%	23.97%	17.97%
Wst	10.0	5.0	50.00%	12.98%	6.49%
Le	0.0	0.0	0.00%	0.00%	0.00%
Pol	6.0	4.0	66.67%	9.59%	6.39%
Inn	10.0	0.0	0.00%	10.00%	0.00%
Total	79.0	40.0	50.63%	-	59.31%
Rating	-	-	-	-	Very Good

4. An energy assessment has also been completed based on the Applicants scope of works. The assessment considers the energy performance of the building before and after refurbishment based on illustrative fit out specifications for a food operator, and demonstrates how savings in annual carbon dioxide emissions of up to 68% could be expected which supports BREEAM and demonstrates alignment with local policy.



Energy Consumption by End-Use (kWh/m ²)		
End-Use	Existing Building	Refurbished Building
Heating	51.9	10.12
Cooling	29.43	7.0
Auxiliary	1.43	2.76
Lighting	60.2	15.88
Hot Water	2.08	2.08
Total Energy Demand (kWh/m²)	145.04	37.84
BER (kg.CO₂/m²)	60.5	19.6
Total Area	3,859.2	3,859.2
Total kg.CO₂.annum	233,482	75,640
Improvement (kg.CO ₂ .annum)	157,841	
% Improvement	68%	

1. INTRODUCTION

- 1.1 Envision has been appointed by Threadneedle UK Property Authorised Investment Fund (The Applicant) to prepare a Sustainability and Energy Statement, incorporating a BREEAM Pre Assessment to support a planning application seeking full consent for the amalgamation of Units 2&6, with alterations to the façade and service yard, at Reading Retail Park, RG30 1PR.

Scope

- 1.2 This statement provides information on the sustainable design and construction commitments of the project. This statement is structured as follows:
- Section 2 provides a description of the main sustainability & energy policies relevant to the application;
 - Section 3 provides a sustainability statement, structured against the requirements of the sustainability policies examined in Section 3 and in particular RBC's sustainable design and construction checklist (2019);
 - Section 4 provides a concluding summary;
 - The BREEAM PRE Assessment is provided as Appendix I; and
 - The Energy Statement and supporting calculations is provided in Appendix II.

Location & Existing Situation

- 1.3 The Reading Retail Park is located to the west of Reading City Centre on the Old Bath Road. The existing retail park comprises 10,827 sq. m of floorspace. The general arrangements of the existing site are shown in figure 2.1. The red line for the application concerns Units 2&6, its service yard and the car parking area to the east.



Figure 2.1 – Existing Site Arrangements

The Proposed Development

- 1.4 The Applicant proposes to make amendments to the end terrace to amalgamate the Halfords (Unit 2) and Carpetright (Unit 6) by removing party walls between these units. The scheme will enable a new operator to take a lease on the larger unit.
- 1.5 The amalgamation of the units and the introduction of a new food store will be facilitated with modest external works. This will include some amendments to the entrance, alongside the potential to upgrade the existing roof covering and wall cladding to enhance energy efficiency and weatherproofing. In addition, the scheme proposes:
 - New trolley storage and goods deliveries, including level loading;
 - Amendments to the existing car parking arrangements within the site;
 - Modifications to the frontage of the unit for customer access;
 - Minor extension to the rear of the building to accommodate vehicle servicing.

Reading Retail Park | Sustainability & Energy Statement, Incorporating a BREEAM Pre Assessment
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2. SUSTAINABILITY POLICY CONTEXT

- 2.1 A key mechanism for delivering the principles of low-carbon development lies within the UK planning system, which is implemented through national guidance along with regional and local planning policies. A review of all the relevant policy documents was undertaken in order to gain an understanding of the guiding policies for sustainable design.

National Planning Policy Framework

- 2.2 The National Planning Policy Framework (NPPF) was updated on 19th February 2019. It sets out the framework for all planning policy in England and how these are expected to be applied. The NPPF sets out a presumption in favour of sustainable development, and the need to support economic growth through the planning system.
- 2.3 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 a well-designed and safe built environment, 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 contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.
- 2.4 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 the economic, social and environmental dimensions of sustainable development. The NPPF does not include detailed measures on sustainable design codes and standards to apply, although 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.

Reading Borough Council Planning Policy

2.5 The most relevant policies which need to be considered when assessing the scheme's compliance to sustainability policy are those provided within local development documents. Reading Borough Council (RBC) is currently working to two primary documents relating to sustainability:

1. Reading Borough Local Plan (Adopted November 2019);
2. Sustainable Design & Construction SPD (Adopted December 2019).

2.6 The policies and guidance pertinent to the sustainability of the development from the aforementioned policy documents are as follows:

Policy CC2: Sustainable Construction and Design

2.7 This policy states that proposals for new development, including the refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

2.8 As part of this:

- All major non-residential developments or conversions to residential are required to meet the most up to date BREEAM 'Excellent' standards, where possible;
- All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Non-residential development should include recycling greywater and rainwater harvesting where systems are energy and cost effective.

2.9 The Sustainable Design & Construction SPD provides further clarification on the attainment of BREEAM. Table 3.1 'Requirement level of sustainability standard' states:

Non-residential refurbishment (including refurbishment for non-C3 residential)	Minor (less than 1,000 sq. m of floorspace)	BREEAM 'Very Good'
	Major (1,000 sq. m of floorspace or more)	BREEAM 'Excellent'

2.10 The BREEAM standards that are technically applicable to non-domestic refurbishment works are the BREEAM UK Non-domestic Refurbishment and Fit Out (2014). According to the SPD, the development should target BREEAM Excellent based on the floorspace proposed.

Policy CC3: Adaptation to Climate Change

- 2.11 This policy requires proposals for new development to incorporate measures to adapt to climate change, including;
- Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, etc.
 - Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and
 - All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change.
- 2.12 The proposed development is able to respond to a number of climate adaptation principles, however many identified in CC3 are geared towards the location, design and optimisation of new buildings. By their nature, existing buildings are less able to respond to layout and siting principles, however this statement provides a review of climate change adaptation principles proposed by the application.

Policy CC4: Decentralised Energy

- 2.13 Policy CC4 encourages decentralised energy. It requires:
- Developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source, including CHP.
 - Any development of more than 20 dwellings and/ or non-residential development of over 1,000 sq. m shall consider the inclusion of a CHP plant, or other form of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision.
 - Where there is existing decentralised energy provision present within the vicinity of an application site, further developments of over 10 dwellings or non-residential development of 1,000 sq. m will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.

- 2.14 The Reading Retail Park site is leased to tenants that include their own equipment. There is no centralised equipment on site, nor is the site located within 1 of the 4-heat network 'clusters' shown in the SPD. The proposals will therefore not propose compatibility with a district energy network.

Policy CC5: Waste Minimisation & Storage

- 2.15 Development should demonstrate measures to minimise the generation of waste in the construction, use and life of buildings and promote more sustainable approaches to waste management, including the reuse and recycling of construction waste and the promotion of layouts and designs that provide adequate, well-designed space to facilitate waste storage, reuse, recycling and composting.

Sustainable Design Checklist (Sustainable Design & Construction SPD)

- 2.16 For major applications, a Sustainability Statement based on a sustainability checklist should be submitted at the submission stage. The sustainable design and construction checklist is based on the BREEAM standards but are not a complete repetition of these requirements. They are intended to help provide pointers as to the type of considerations that the development should be taking into account in order to achieve relevant standards of the BREEAM and thereby comply with policies CC2-CC5 and EN18.¹

¹ The sustainability checklist forms the structure of the sustainability statement.

3. SUSTAINABILITY STATEMENT

3.1 This section provides an account of the sustainability benefits of the proposed development, and how relevant policy will be addressed in the development proposals. The section is structured against the Sustainability Checklist as detailed in Appendix 1 of the Reading Borough Council (RBC) Sustainable Design & Construction SPD, thereby demonstrating compliance with policies CC2-CC5 and EN18 of the RBC Local Plan.

Non-Residential Sustainability Checklist

Table 4.1 – Sustainability Checklist (Non-Residential)

Management	
<i>Aim: To recognise and encourage environmentally and socially considerate development.</i>	
Criteria	Design & Construction Commitments
Will guidance for the non-technical building user be provided so they can understand and operate the building efficiently and understand how the design reduced the overall environmental impact of the building and raise environmental awareness?	The proposed development is being taken forward on a speculative basis. The future building occupier is expected to put in place measures to ensure the building operates efficiently. It is expected that the lease of the unit would be taken by a chain food store operator, who would be expected to have policies and procedures in place to secure this.
What consideration has been given to resource use, energy consumption and pollution in terms of the construction site impacts?	The principal contractor will be required to deliver high standards of sustainable construction, which will be achieved through the following: • Registering the site against the Considerate Constructors Scheme; • Managing the construction site to reduce environmental effects, this will include adopting best practice measures to protect water and air quality, monitoring water and energy use from construction activities.
Will site investigation and appropriate remedial action be undertaken?	The site has been subject to a Phase 1 environmental review by Fairhurst. There is no requirement for remedial actions.

Will the community and stakeholders be involved in the design process encouraging flexibly designed buildings which cater for shared use with the local community?	The application proposes internal modifications to the existing buildings to facilitate a food store. This is to reflect the changing nature of commerce at the site and the opportunities for food provision in the area. In general no community consultation has been deemed necessary at the site to facilitate the design of the building.
How has the building been designed to reduce the opportunity for and the fear of crime?	The proposed development is being taken forward with input from a professional design team with experience in designing safe and secure environments. The building will include a secure service yard and external lighting to maintain security at night. The site will be enabled for CCTV. No formal consultation has occurred with a security consultant.
What consideration has been given to the maintenance of the building?	The building will be brought forward speculatively, although initial conversations have been held with a prospective operator of the site. The development will be designed to be institutionally acceptable and able to be leased to a range of future occupiers. Maintenance will be the obligation of the tenant, however design considerations will inform the future maintenance strategy to ensure that the building is safe and easy to run.
Health & Wellbeing	
<i>Aim: To ensure a good quality amenity level is afforded to occupants of buildings</i>	
Criteria	Design & Construction Commitments
How has the development been designed to ensure users have sufficient daylight, an external view, adequate and appropriate lighting, ventilation, air quality and drinking water?	The development makes use of an existing building however amendments to the façade and existing openings are proposed to facilitate the building for a food retailer. In general good levels of daylight are though possible with the alterations. Proposals for ventilation, indoor air quality and drinking water would be up to the future tenant, albeit that the scheme will be flexible to enable these features.

Energy & CO₂ Reduction

Aim: To conserve energy, in particular carbon dioxide emissions and maximise the use of energy efficient techniques.

Criteria	Design & Construction Commitments
How has the building been designed to minimise CO₂ emissions associated with their operational energy consumption?	The building will be designed to be energy efficient in line with the requirements for BREEAM. Under a 4-part BREEAM RFO assessment, the scheme would need to meet 6 credits to achieve an Excellent rating, however as the scheme is only a Part 1 assessment, the building does not need to meet this. There are no minimum standards for Ene 01. An energy assessment has been undertaken which considers how the proposals will be designed to be energy efficient.
How has the development been designed to optimise the use of the energy from the sun, natural daylighting and controlled natural ventilation?	In general, the level of external vertical glazing will increase through the proposals, however the scheme proposes to remove rooflights to facilitate an environment conducive for food sales. The scheme in general is expected to use highly efficient lighting and ventilation to meet its operational demand.
How has the development been designed to optimise natural daylighting, energy efficient lighting, external lighting and natural ventilation?	In general, the level of external vertical glazing will increase through the proposals, however the scheme proposes to remove rooflights to facilitate an environment conducive for food sales. The scheme in general is expected to use highly efficient lighting and ventilation to meet its operational demand.
How will the design of the building make efficient use of energy? (e.g. use of thermally massive materials, levels of insulation, energy efficient white goods and use of green/brown roofs etc.).	The building is being taken forward speculatively, with the fit out being the responsibility of the future tenant.
Have renewable energy sources or decentralised energy been considered for this development and if so, how would they be incorporated within the development?	The unit will be fitted out by a future tenant. Renewable energy generation is expected to be provided in the form of air-source heat-pumps, which will provide high-efficiency space heating, with the option of cooling.

Transport

Aim: To reduce the need to travel through appropriately located development.

Criteria	Design & Construction Commitments
How has the design and layout incorporated measures to reduce the need to travel, especially by car, and promote alternative and sustainable modes of transport such as walking, cycling and the use of public transport?	The planning application is submitted with a Transport Statement and Travel Plan which explains the approach taken to promote sustainable forms of transport. In terms of cycle parking, Reading Retail Park benefits from six cycle parking spaces from a total of 16 cycle parking spaces, in the form of three sheltered Sheffield stands in the vicinity of the application site frontage and five sheltered Sheffield stands in the vicinity of the nearby Wickes store.
How have deliveries and the manoeuvring of delivery vehicles been considered?	Whilst the building envelop largely remains unchanged, the scheme proposes a modest rear extension and amendments to the service yard. Within the service yards there is good provision for turning and manoeuvring space. No further analysis has been required for the existing service yard.

Water

Aim: To improve efficiency in the use of water, conserve water resources and minimise vulnerability to flooding.

Criteria	Design & Construction Commitments
How will the development incorporate the use of water saving devices to achieve a maximum consumption of 5.5 cubic m per year per person for office developments? (or the most appropriate benchmark for other types of development).	The scheme is being brought forward on a speculative basis, with water consuming fittings being installed by the future tenant. Water consumption is therefore outside the scope of the planning application, albeit that the consumption could be expected to increase with the introduction of a food store. The future tenant will be expected to implement a scheme of water efficiency measures. This will include low flow taps and WCs.
Will the development and access to and from it such as roads and paths be located away from areas of potential flooding?	The site is located in Flood Zone 1. The local authority flood maps do not show the site or its access to be located in a higher risk zone.
How will the development incorporate harvesting and re-use of rainwater?	

Does this development meet the requirements of EN18?	EN18 directs development away from areas that are liable to flood. In areas of lower risk, development may move forward if it passes the exception test in the NPPF. It also requires major developments to incorporate Sustainable Drainage Systems (SuDS). The scheme demonstrates alignment with this policy. The site is within Flood Zone 1 with no worsening of the existing situation. There will be no increase in impermeable surfaces as part of the scheme, which mainly makes modifications to the internal parts of the building to facilitate its use.
Materials <i>Aim: To retain local character and promote the use of materials with a low environmental impact.</i>	
Criteria	Design & Construction Commitments
How will the selected materials help retain local character, ensure long life and ensure a low environmental impact?	The proposals will substantially retain the exist building and therefore there should not be an impact on local character. The Applicant will ensure the following standards are met in the development: • Developing a sustainable procurement plan for the development, with the objective to reduce transport miles wherever possible. • All timber and timber products are to be sourced from accredited Forest Stewardship Council (FSC) or Programme for the Endorsement of Forestry Certification (PEFC) scheme; • No construction materials are to be used which will release toxins into the internal environment, including those that deplete stratospheric ozone. • Materials and construction details will be assessed with regard to a durability and robustness study.
What consideration has been given to reusing materials in-situ, responsibly sourcing materials and re-using existing structures?	The proposals fully meet this. The development reuses materials in situ.

Waste	
<i>Aim: To minimise the production of waste and maximise re-use and recycling.</i>	
Criteria	Design & Construction Commitments
Has an audit of the materials present on the site been conducted with an assessment of the extent to which materials could be re-used?	A pre refurbishment audit will be undertaken before detailed design progresses and prior to internal strip out works to consider what options exist to recover materials.
How will the development make the maximum use of construction, demolition waste and recycled materials?	A site waste management strategy will be prepared for the construction phase of the development, which identifies measures to minimise construction waste, and maximise the use of demolition and construction waste. This is expected to generally be for off-site applications due to restrictions on site.
How will provision be made for the storage and recycling of waste for all users of the site?	Commercial waste storage space would take account of the requirement for BREEAM, including for provision of suitable space for separate general and recyclable waste streams internally.
Land Use & Ecology	
<i>Aim: To retain, protect and enhance wildlife habitats and natural features.</i>	
Criteria	Design & Construction Commitments
How have the wildlife habitats and natural features on and adjacent to the site been considered and how will they be retained, protected and enhanced?	A tree survey has been undertaken by Encon Associates with the objective of retaining trees where possible. The design proposal requires the removal of one TPO tree which has been categorised as B2 “moderate quality”. A replacement tree will be planted to provide sufficient visual amenity to make the loss of the single tree of negligible arboricultural impact.
What consideration has been given to not using previously undeveloped land?	The site is located within an urban area and on previously developed land.

What consideration has been given to the removal of contamination from the land?	The site has been subject to a phase 1 risk preliminary risk assessment to consider ground conditions and the requirements for remediation. Further details are set out in that report.
Pollution <i>Aim: To minimise damage to the environment through air, ground/surface water, land, noise or light pollution.</i>	
Criteria	Design & Construction Commitments
What measures have been incorporated to ensure that noise and light pollution will be minimised through the development?	The development is not of the scale that would require an Environmental Impact Assessment (EIA), however the measures as outlined in this section, and subsequently implemented, will ensure that any potential impacts can be appropriately controlled in order to demonstrate compliance with Local Plan Policy EN16: Pollution & Water Resources. The proposed development requires alteration to existing external car parking arrangements to facilitate manoeuvring. In general, the scheme can be taken forward with limited alteration to external lighting. Any new lighting will be designed in compliance with Table 1 and accompanying notes of ILE Guidance Note for reduction of obtrusive light. All non-safety/security lighting will be automatically switched off between 2300hrs and 0700hrs.
What consideration has been given to reducing refrigerants and minimising nitrogen oxide emissions?	All refrigerants are outside of the Applicants control and will be installed by the future tenant.
What measures have been incorporated to reduce the release of pollution into the atmosphere?	Based on market advice the scheme is designed to operate without gas and therefore gas connections are to be removed from the existing building as part of the works. Therefore, there will therefore be no release of atmospheric pollution from any heating or hot water.

4. CONCLUSION

- 4.1 This Sustainability and Energy Statement, incorporating a BREEAM Pre Assessment has been prepared by Envision on behalf of Threadneedle UK Property Authorised Investment Fund (the Applicant), and is submitted to support a full planning application at the Reading Retail Park, 709 - 731 Oxford Road, Reading, RG30 1PR. The planning application seeks to make amendments to the end terrace to amalgamate the Halfords (Unit 2) and Carpetright (Unit 6) by removing party walls between these units. The scheme will enable a new operator to take a lease on the larger unit.
- 4.2 A key policy test in Reading is for major developments, including buildings subject to refurbishment to meet with BREEAM Excellent. A BREEAM Predictive Assessment made against Part 1 identifies that the development of this type and nature would align with a BREEAM 'Very Good' rating. This does not detract from the sustainability of the building, but rather demonstrates the limitations BREEAM certification has in this particular case. The proposals will facilitate the upgrade of the existing building by delivering thermally efficient modern glazing. The reuse of the structure and majority of building envelope, save for the replacement of the roof membrane, accords with principles of Policy CS1 which is to use energy, minerals, materials and other natural resources appropriately. The reuse of the existing building would typically have a lower life cycle impact than demolition and new build from the perspective of embodied carbon, waste minimisation and resource depletion. Furthermore, the operational efficiency of the building is also expected to improve by attracting new tenants who will be required to install efficient building services which will at least be in line with Part L2b of Building Regulations 2022 (thus conserving energy) and equivalent standards for water conservation. This will clearly lead to efficiencies from the current building.
- 4.3 The departure from BREEAM Excellent is considered justifiable and in line with the council's position elsewhere. Indicator 3 of the Council's annual monitoring report² relates to major new non-residential developments permitted to meet with BREEAM Excellent standards. Of the permission granted, 33% met this standard. The council's monitoring report recognises in paragraph 5.6, that although policy CC2 does apply to all development including refurbishments, changes of use and conversions, each case would need to be considered on its merits and the level of alteration to the fabric of the building taken into account.
- 4.4 To further promote sustainable design and construction of the development and to ensure compliance with Reading Borough Council (RBC) policy CC2, the following design measures are proposed:
- Committing to meet a BREEAM Very Good rating against Part 1 of BREEAM RFO 2014.
 - Requiring the contractor to adopt environmental management principles.
 - Employment of a sustainability champion through the further design and build phases.

² ANNUAL MONITORING REPORT 2020-2021 December 2021

- Conducting thermal comfort analysis of the building to review comfort levels achievable for a future tenant.
- Undertaking a thermographic survey of the fabric alterations to ensure that these are well constructed and have avoided thermal bridging.
- Engaging an acoustic consultant to ensure that internal noise is limited through the specification.
- Conduct a durability review and explore options to protect the building from physical damage.
- Conducting a pre refurbishment audit to consider what materials can be removed and recycled, with the objective to promote resource efficiency.

4.5 The development is therefore considered to comply with the sustainability & energy requirements outlined in the Reading Borough Council Local Plan (adopted November 2019) and the Reading Borough Council Sustainable Design & Construction SPD (Adopted December 2019).

APPENDIX I – BREEAM PRE-ASSESSMENT

1. BREEAM assessments provide a sustainability rating for non-domestic buildings by considering a range of criteria. This includes principles of Management, Health & Well Being, Energy, Transport, Water, Materials, Waste, Land Use & Ecology and Pollution. Innovation credits are also available, representing new or exemplary performance in a specific sustainability issue.



Figure 1.1 – Scope of BREEAM

2. Policy CC2: Sustainable Construction and Design (Local Plan, November 2019) states that proposals for new development, including the refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.
3. As part of this:
 - All major non-residential developments or conversions to residential are required to meet the most up to date BREEAM 'Excellent' standards, where possible;
 - All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Non-residential development should include recycling greywater and rainwater harvesting where systems are energy and cost effective.
4. The Sustainable Design & Construction SPD provides further clarification on the attainment of BREEAM. Table 3.1 'Requirement level of sustainability standard' states:

Non-residential refurbishment (including refurbishment for non-C3 residential)	Minor (less than 1,000 sq. m of floorspace)	BREEAM 'Very Good'
	Major (1,000 sq. m of floorspace or more)	BREEAM 'Excellent'

5. The BREEAM standards that are technically applicable to non-domestic refurbishment works are the BREEAM UK Non-domestic Refurbishment and Fit Out (2014). According to the SPD, the development should target BREEAM Excellent based on the floorspace proposed.
6. Set out below in table 1 is a review against the BREEAM Refurbishment and Fit-out (2014) assessment scope. The assessment method provides a modular set of criteria that can be applied depending upon the scope of works for a particular project. There are four parts to a BREEAM refurbishment assessment as shown in the table below. The relevance to the developers works are considered against each.

Table 1 – Assessment of the application of BREEAM Refurbishment 2014

Section	Comment	Relevance to the Application
Part 1 – Fabric & Structure	This part applies where major alterations to the building façade, roof or windows are being undertaken and where the area to be renovated is greater than 50% of the surface of the individual element or 25% of the total building envelope.	The refurbishments proposed by the application is envisaged to substantially reuse the building envelope, however upgrades to roof lining and glazing is proposed. On this basis Part 1 is potentially applicable.
Part 2 – Core Services	BREEAM considers 'core services' as services that supply multiple areas and will generally be centralised plant. Part 2 is relevant for the assessment of fully fitted buildings, where at least two M&E systems are to be installed or upgraded.	Core services will be a responsibility of the future tenant, and therefore do not fall within the scope of the works undertaken by the Applicant. Subsequently these cannot be included in a BREEAM assessment. Part 2 is not applicable.
Part 3 – Local Services	Part 3 applies to fully fitted assessments, where at least two fixed building services are to be installed or upgraded within the assessed building.	As above, local services will be the responsibility of the future tenant and cannot form part of the assessment. Part 3 is not applicable.
Part 4 – Interiors Design	Part 4 applies where the refurbishment or fit-out works involve changes to the decoration of the refurbishment or fit-out area. This is only applicable to fully fitted buildings.	Interior design will be the responsibility of the future tenant and cannot form part of the BREEAM assessment for the shell works. Part 4 is not applicable.

7. As can be seen in Table 1, from a technical standpoint only part 1 of the BREEAM non-domestic refurbishment scheme is directly applicable to application. The Applicant will subdivide and refurbish the existing Units B& C of the retail Park to a shell only level, with the tenant completing the final fit out and the installation of all MEP equipment and internal finishes. This will be undertaken by a separate design team and fit out contractor appointed by the tenant, who is not yet identified. Given this, it is important to ensure any BREEAM assessment is able to be satisfied by the Applicant's scope of works alone. Therefore, the only practical option would be to achieve certification against a shell only assessment. The approach is consistent with the approach agreed with RBC on the House of Fraser Oracle (application ref 191841/FUL) and the Broad Street Shopping Mall (190099/FUL) which followed similar principles, whereby the BREEAM assessment was to focus on the Applicant's works alone.
8. With regard to the target of Excellent, the predictive assessment considers the availability of credits based on the scope of the Applicants work to facilitate the amalgamation of the units. The predictive assessment, made against Part 1 only of BREEAM RFO, demonstrates that a BREEAM Very Good target would be possible, given the constraints of BREEAM standards.

BREEAM Rating					
	Credits available	Credits achieved	% Credits achieved	Weighting	Category score
Man	15.0	10.0	66.67%	17.80%	11.86%
Hea	13.0	5.0	38.46%	18.41%	7.08%
Ene	4.0	1.0	25.00%	4.78%	1.19%
Tra	9.0	6.0	66.67%	12.46%	8.30%
Wat	0.0	0.0	0.00%	0.00%	0.00%
Mat	12.0	9.0	75.00%	23.97%	17.97%
Wst	10.0	5.0	50.00%	12.98%	6.49%
Le	0.0	0.0	0.00%	0.00%	0.00%
Pol	6.0	4.0	66.67%	9.59%	6.39%
Inn	10.0	0.0	0.00%	10.00%	0.00%
Total	79.0	40.0	50.63%	-	59.31%
Rating	-	-	-	-	Very Good

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
Man 01 – Stakeholder Consultation	1	1		A clear sustainability brief developed prior to concept design. Identify and define roles, responsibilities and contribution of project team for key phases of the project delivery.	The project team have been working to develop the scheme to accommodate a future tenant. This includes a sustainability brief to adequately address local policy and to ensure flexibility for a future food store operator.
Man 01 – Stakeholder Consultation (Third Party)	1		1	Design team to consult 3 rd party stakeholders prior to completion of detailed design – feedback to all relevant parties given and received.	The requirement to undertake formal public consultation is of limited value for the application. The Applicant has been in consultation with other tenants of the retail park and agents, as well as prospective tenants of the unit, however this does not meet the formal requirements of BREEAM.
Man 01 – Sustainability Champion	1	1		Appointment of sustainability champion to the project.	Envision is a BREEAM AP organisation and has provided early advice, as set out in this statement.
Man 01 – Sustainability (Champion Monitoring Progress)	1	1		Sustainability Champion to monitor and report progress against agreed BREEAM performance targets.	Envision is a BREEAM AP organisation and can oversee commitments through further design.
Man 02 – Elemental Life Cycle Cost	2		2	An outline, entire asset elemental life cycle cost plan has to be carried out at RIBA stage 2 in line with 'Standardised method of life cycle costing for construction procurement.	As the scope of shell works is very limited, the benefit of undertaking this on the minimal shell works is reduced.

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
Man 02 - Component Level Life cycle Cost	1		1	A component level LCC plan has been developed by the end of Process Stage 4.	As the scope of shell works is very limited, the benefit of undertaking this on the minimal shell works is reduced. In addition, most components relevant to the assessment are associated with the fit out, outside of the Applicant's control.
Man 02.2 – Capital Cost Reporting	1	1		Report the capital cost for the fit-out works in pounds per meter square (£/m ²) via the BREEAM Assessment Scoring and Reporting tool.	Capital cost reporting assumed feasible to achieve.
Man 03 – (Prerequisite) Legally Harvest and Traded Timber		Y		All timber and timber-based products used on the project is 'Legally harvested and traded timber'	This is standard and will be incorporated into the future contractors work requirements.
Man 03 – Environmental Management	1		1	Principal contractor operates ISO 14001 EMS.	This is standard and will be incorporated into the future contractors work requirements.
Man 03 – Construction Stage Sustainability Champion	1	1		A Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria, and therefore BREEAM target, during the Construction, Handover and Close Out stages.	This is standard and will be incorporated into the future contractors work requirements.
Man 03 – Considerate Contractors Scheme	2	2		Principal contractor achieves score >35 under the Considerate Contractors Scheme (CCS)	This is standard and will be incorporated into the future contractors work requirements.

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
Man 03 – Monitoring of Refurbishment or Fit-Out Site Impacts (Energy and Water)	1	1		Construction contractors monitor energy and water consumption on site.	This is standard and will be incorporated into the future contractors work requirements.
Man 03 – Monitoring of Refurbishment or Fit-Out Site Impacts (Transport of Construction Materials and Waste)	1	1		Contractor to monitor fuel consumption of transport of materials and waste to/from site.	To be included in Principal Contractor requirements.
Man 04 – Commissioning Building Fabric	1	1		Commission building fabric, including a thermographic survey	This is assumed feasible however the scope of this should be limited to work undertaken as part of the refurbishment. It should focus on the installation of new glazing and openings only.
Hea 01 – Daylighting	3		3	Up to three credits are available depending on the percentage of relevant building areas that comply with the following: The relevant building areas meet good practice daylight factor OR the relevant building areas meet good practice average and minimum point daylight illuminance criteria	Credit not expected to be achievable based on the existing building footprint and depth, although this could be further explored through modelling at detailed design. The loss of rooflights to accommodate a prospective food retailer will restrict the ability to achieve credits.

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
				1 credit – 17.5% of sales area achieves point daylight factor of 2% or more and all other occupied areas achieve average daylight factor of 2% or more 2 credits – 25% of sales area achieves above 3 credits – 35% of sales achieves above	
Hea 01 – View out	2		2	For relevant building areas, 95% of floor area within 8m of external wall with window, and window size >20% of surrounding wall area.	The internal layouts presented at planning are illustrative, however do not show office areas to benefit from natural daylight or a view out. In general, these credits are not appropriate for this type of building type.
Hea 01 – Internal and external lighting levels, zoning and control	1	1		All fluorescent and compact fluorescent lights fitted with high frequency ballasts. Internal lighting designed to provide lux levels in accordance with SLL Code for Lighting, CIBSE Lighting Guide 7 and other relevant industry standards; and zoned to allow occupant control. Separate zoning required in retail space for display and counter areas (PIR controls must include manual over-ride). External lighting designed in accordance with BS5489 and BS EN 12464-2:2-14	Any lighting proposed by the Applicant would comply with these standards.
Hea 02 – Indoor air quality (IAQ) plan	1	1		Site specific (IAQ) plan produced and implemented, the plan must be produced and implemented. The objective is to minimise indoor air quality during the design, construction and occupation of the building	IAQ plan assumed achievable, must be produced at earliest opportunity before construction. Requires an IAQP to be produced.

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
Hea 02 – Ventilation	1		1	Designed to minimise the indoor concentration and recirculation of pollutant in the building. Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation	The level of compliance remains unknown, however it is envisaged that the tenants intakes and exhausts likely to be too close to achieve credit. Assumed not feasible.
Hea 04 – Thermal modelling	1	1		Thermal modelling in accordance with CIBSE AM11 Inc. full dynamic thermal analysis, winter temp ranges in accordance with CIBSE Guide A, and building designed to limit risk of overheating.	The thermal comfort analysis is more practical for buildings subject to fully fitted assessments or for buildings designed to be naturally ventilated with no cooling. Whilst there is limited benefit to this exercise, the study is technically feasible and can be undertaken. Tenants would be expected to size HVAC correctly to ensure comfortable temperatures.
Hea 04 – Thermal Modelling – Future Climate	1	1		Above thermal comfort analysis informs temperature control strategy, and strategy provides compliant zoning and controls	As above
Hea 05 – Acoustic performance	2	2		Meet relevant acoustic performance standards for sound insulation, indoor ambient noise levels and reverberation	This is practical and can be undertaken post planning to ensure that good levels of acoustic protection are provided between the neighbouring unit. An acoustic consultant will be required to feed into this process.
Hea 06 – Security of site and building	1		1	Security Needs Assessment (SNA) undertaken during RIBA Stage 2 and design embodies recommendations.	A formal third-party security needs assessment is not expected to be beneficial for the development, however the proposals have been subject to consultation with the retail parks own managing agents. The proposals are therefore considered to align with the requirements in general.

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
Ene 01 – Elemental Energy Assessment	2	1		A calculation of the energy score using the BREEAM Refurbishment and Fit-out energy model must be carried out based on the BREEAM method.	1 credit is awarded based on the upgrades proposed to the glazing and the proposal to re-undertake an air test
Ene 04 – Passive Design Analysis	1		1	First, the first credit within issue Hea 04 Thermal comfort has been achieved. Then analysis of the existing building fabric, form, site location and outline scheme design is carried out to identify potential passive design solutions and retrofit measures that reduce demands for energy consuming building services. The building uses passive design measures to reduce the total heating, cooling, mechanical ventilation and lighting loads and energy consumption in line with the findings of the passive design analysis.	First credit not achieved, albeit that the removal of the rooflights with the introduction of highly efficient LED lighting (by the future tenant) would be expected to reduce heating and cooling loads in the building.
Ene 04 – Free Cooling	1		1	The passive design analysis carried out under criterion 2 includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions.	There is limited benefit here.
Tra 01 – Sustainable Transport	5	3		The public transport Accessibility Index (AI) for the assessed building is calculated and BREEAM credits awarded according to the building type. The Accessibility Index is determined by entering the following information into the BREEAM Tra 01 calculator: - The distance (m) from the main building entrance to each compliant public transport node - The public transport type(s) serving the compliant node, e.g., bus or rail	Details to be provided from the Transport assessment and potentially developer's assessment of the shell. The nearest bus stops are on Northcot Way, providing services east and west, with a frequency of up to 12 an hour across different bus routes. This should achieve an AI of 8, equivalent to 3 credits

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
				c. The average number of services stopping per hour at each compliant node during the operating hours of the building for a typical day	
Tra 02 – Proximity to Amenities	1	1		Where the development is within 500 meters of appropriate amenities.	The site is within 500 meters of a cash point and food outlet.
Tra 03 – Cyclise Facilities	2	1		Compliant cycle spaces are included for the first credit and adequate: Showers Changing facilities Lockers Drying spaces.	Existing sheltered facilities within the site are available and adequate to award credits. The provision of other measures is out of scope of the Applicant.
Tra 05 – Travel Plan	1	1		A travel plan has been developed as part of the feasibility and design stages.	A travel plan has been prepared by the Applicant.
Mat 01 – Life Cycle Impacts	6	5		Robust environmental performance information has been collected for newly specified materials or where materials are retained in situ.	It is assumed that all new materials used internally can be supported with robust environmental performance data. A whole life cycle assessment is being progressed to inform material selections on the items which are in scope for a Part 1 assessment.
Mat 03 – (Prerequisite) Legally harvested and traded timber	-	Y		Minimum requirement for all timber products to be legally sourced.	To be included in Principal Contractor requirements
Mat 03 – Enabling sustainable procurement	1	1		Produce a sustainable procurement plan by the design team to guide specification towards sustainable construction products in place before Concept Design. Following the process set out in BS ISO 20400:2017.	To be included in Principal Contractor requirements

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
Mat 03 – Measuring responsible sourcing	3	2		Achieve 36% of the points available in the Mat 03 calculation.	To be included in Principal Contractor requirements.
Mat 05 – Designing for durability and resilience	1	1		The building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal elements. This must include, but is not necessarily limited to: a. Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc.). b. Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas.	This will be addressed through design development as far as practical within the scope of the Applicants control.
Mat 06 – Material Efficiency	1		1	Opportunities have been identified, and appropriate measures investigated and implemented within the scope of refurbishment or fit-out works, to optimise the use of materials through building design, procurement, refurbishment, maintenance and end of life.	The scope of the materials used is generally very limited. A Materials efficiency study is not expected to add value in this case. Consideration should be given to reusing elements for the building, for example the escalators
Wst 01 – Pre Refurbishment Audit	NA	1		Ensure that a pre-refurbishment audit of all existing buildings, hard surfaces within the scope of the refurbishment or fit-out zone is completed. The audit should be carried out at the Concept Design Stage (equivalent to RIBA stage 2) prior to strip-out or demolition works in order to use the audit results to guide the design, consideration of materials that can be reused, and to set targets for waste management and ensure all	Undertake a pre refurbishment audit of aspects which will not be removed by the amalgamation of the units. This should be undertaken once access is available.

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
				contractors are engaged in the process of maximising high grade reuse and recycling opportunities.	
Wst 01 – Reuse and Direct Recycling	2			Where waste material types are either directly re-used on-site or off-site or are sent back to the manufacturer for closed loop recycling	Continue to explore this.
Wst 01 – Resource Efficiency	3	2		Prepare a compliant Resource Management Plan (RMP) and a construction waste resource efficiency benchmark of 4.5m ³ (or 1.2 tonnes) of construction waste generated per 100m ² GIFA.	Relevant requirements to be included in Principal Contractor requirements.
Wst 01 – Diversion from Landfill	1	1		Prepare a compliant Resource Management Plan (RMP) and divert at least 85% by volume or 90% of waste from landfill.	Target should be achievable.
Wst 03 – Operational waste	1	1		A dedicated central space for storage of recyclable waste, clearly labelled and accessible to building occupants/ facilities operators.	Assumed achievable. Potential that central recycling centre for whole development, however space exists back of house and can be labelled accordingly.
Wst 06 – Design for disassembly and functional adaptability	1		1	Carry out and implement a functional adaptation appraisal at concept design.	Not considered relevant for the project.
Pol 03 – Flood Risk Management	2	2		A site-specific FRA is undertaken confirming the development's flood zone.	Low Flood Risk as confirmed by EA flood maps, however a formal, simplistic assessment will be required in due course to award credits.
Pol 03 – Surface Water Run off	2	1		There is no increase in the impermeable surfaces as a result of the refurbishment works;	There is no increase however it is not possible to provide further attenuation.

Credit Title	Available Credits	Targeted Credits	Unachievable Credits	BREEAM Requirements	Project Specific Comments
Pol 03 - Minimising water course pollution	1		1	There is no discharge from the developed site (includes new and existing hard landscaping and buildings) for rainfall up to 5mm (confirmed by the Appropriate Consultant). Where suitable pollution prevention measures are put in place (or already exist) for the different sources of pollution present on the assessed site, in accordance with compliance note.	Storage of the first 5mm is not possible for this scheme. No additional attenuation is possible.

APPENDIX II - ENERGY ASSESSEMENT AND STATEMENT

1 ENERGY STATEMENT

- 1.1 Policy CC2 of the Reading Borough Council Local Plan requires proposals for new development, including the redevelopment and refurbishment of existing building stock, to be designed to ensure they; “..use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.”

Methodology

- 1.2 Under BREEAM non domestic refurbishment, credit Ene 01 requires that improvements demonstrated by considering improvements from the existing building. Where buildings are subject to change of use guidance note GN21 and Knowledge Base Process note KBCN0574 provide clarifications.
- 1.3 BREEAM guidance requires that the energy model for the existing building in a change of use project should include the physical characteristics of the existing building, but, with the use class of the proposed refurbished building. This enables a comparison to be made between the performances of the building before and after refurbishment.
- 1.4 In order to accurately demonstrate the improvement in energy performance between the existing and proposed building, whilst still producing outputs that can be assessed in BREEAM, the development has been modelled as follows:
1. The existing building will be modelled with A1 use class throughout, and M&E inputs in line with typical arrangements and efficiencies for a fit out of that age;
 2. The proposed internal modification will be modelled, with M&E inputs in line with typical discount food store fit-out requirements;
 3. The existing building CO₂ emissions and refurbished building CO₂ emissions can then be compared on a like for like basis.
- 1.5 This methodology will allow the applicant to:
1. Demonstrate how the refurbishments will significantly reduce CO₂ emissions when compared to the existing building;
 2. Still allow calculation of ENE 01 credits under BREEAM Non-Domestic refurbishment guidance.
- 1.6 In accordance with NCM guidance, the appropriate methodology for calculating the energy performance of the existing and refurbished building is through a Simplified Building Energy Model (SBEM). The SBEM was produced using DesignBuilder software version 6.1.8.021, which is a DCLG approved software and methodology for undertaking SBEM.
- ## Step 1 – Determine the Energy Demand of Existing Building
- 1.7 The existing building to be refurbished comprises of a Carpetright and Halfords located within the Reading Retail Park. For the purposes of this Energy Assessment, both retail units were modelled to determine the existing building energy performance.

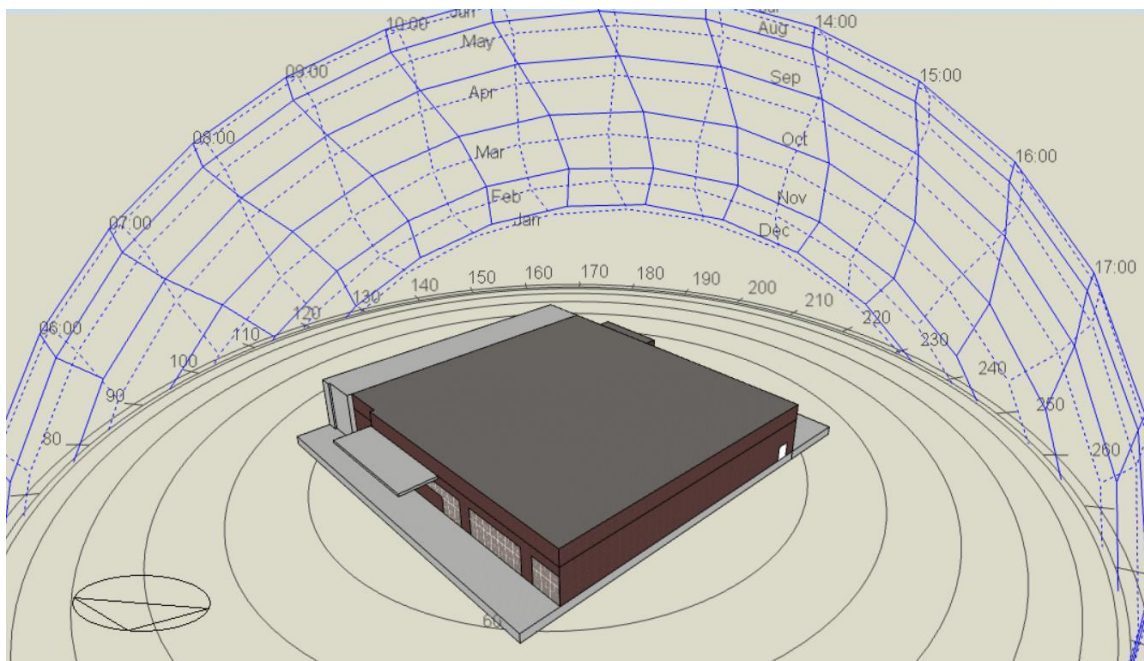


Fig A2.1 – DesignBuilder model of Existing units (not aesthetic representation of building)

- 1.8 Scale drawings of the existing property were provided by the scheme architect and were used as the basis for modelling the existing building.

Determining Existing Thermal Values

- 1.9 Without undertaking a full fabric infiltration analysis, determining u-values for existing properties can be challenging. In order to provide an accurate representation of thermal values, the planning history of the building was researched. The existing units, and wider retail park have undergone a number of planning applications and design changes since it was first constructed, however desktop research has confirmed that the retail park was subject to an application for major alterations in 2006, which brought the site into its current configuration.
- 1.10 Therefore, inference u-values from 2006 English Building Regulations and entered as follows:

Table A2.1 – U-Values of Existing Building

Element	Existing Building U-Values (W/m ² K)	Comment
External Wall	0.35	Built to 2006 Building Regulations ¹
Roof	0.25	
Ground Floor	0.25	
Windows/doors	3.43	

¹ https://www.planningportal.co.uk/info/200135/approved_documents/74/part_1_-_conservation_of_fuel_and_power/7

Determining Existing Air Tightness

- 1.11 Non-domestic EPC conventions for England & Wales (Issue 7.1) states in Section 2.03 that buildings built to 2002 English Building Regulations are to have an Air Permeability Rate of 15 m³/h.m²

Building Services

- 1.12 The building services input data has been based on standard details applicable to retail units of this age. Where data was unavailable, default figures from EPC Conventions and the Non-Domestic Building Services Compliance Guide (2010) were entered.

Table A2.2 – Existing Building Service Inputs

Element	System	Efficiency	Comment
Heating to BOH Areas	Gas-Fired Boiler	89%	System & efficiencies taken as SBEM defaults.
Cooling/heating to Retail/Office Areas	Heat Pump	EER – 2.5	System & efficiencies taken as SBEM defaults.
Supply & Extract Ventilation System to office areas	Air Handling Unit assumed	Extract & Supply – 2.2 W/(l/s) HR Efficiency – 50%	System & efficiencies taken as SBEM defaults.
WC Extract-Only System	n/a	Extract SFP – 0.5	Efficiencies are pegged to 2010 compliance guide.
Lighting	n/a	Default T8 efficiency assumed	No lighting data available, therefore default SBEM efficiency has been assumed.
Hot Water System	Electric point of use	100%	System & efficiencies taken as SBEM defaults.

Existing Building Energy Demand Results

- 1.13 Using the figures and information as determined above, the following summarises the energy demand and CO₂ emissions of the existing retail units:

Table A2.3 – Existing Building Energy Demand

Energy Consumption by End-Use (kWh/m ²)		
End-Use	Existing Building	Refurbished Building
Heating	51.9	
Cooling	29.43	
Auxiliary	1.43	
Lighting	60.2	
Hot Water	2.08	

Total Energy Demand (kWh/m²)	145.04	
BER (kg.CO₂/m²)	60.5	
Total Area	3,859.2	
Total kg.CO₂.annum	233,482	

- 1.14 The figures above for the existing building of **233,482kg/CO₂/annum** demonstrates the indicative performance of the retail units before the refurbishment and merger of the units.

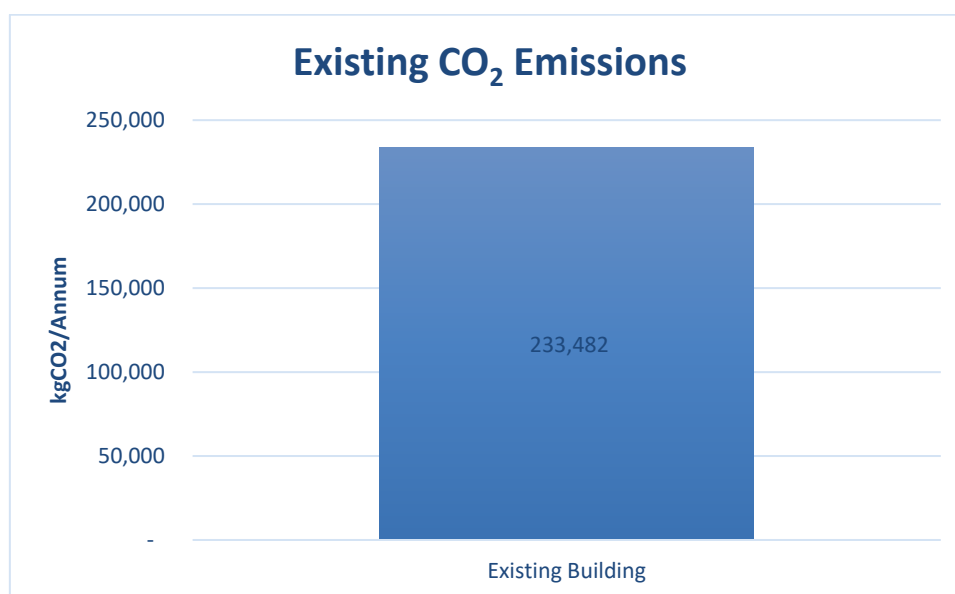


Fig A2.2 – Existing Building Emissions

Determine CO₂ emissions for Refurbished Building - Methodology

- 1.15 The development proposes the amalgamation of the two units to facilitate the fit out of a discount food store assumed to offer a sales floor, bakery, stores and back of house areas.
- 1.16 Typical layouts and building services configurations have been used to inform the energy calculations for the proposed discount food store. This includes typical efficiencies that have been extrapolated from similar applications.

Step 2 – Apply Energy Efficiency Measures

- 1.17 U-Values, are used to measure how effective elements of a building's fabric are as insulators. That is, how effective they are at preventing heat from transmitting between the inside and the outside of a building. The lower the U-value of an element of a building's fabric, the more slowly heat is able to transmit through it, and so the better it performs as an insulator. Very broadly, the better

(i.e. lower) the U-value of a buildings fabric, the less energy is required to maintain comfortable conditions inside the building.

- 1.18 All new elements in the refurbished development (which are limited) will meet with the requirements as set out in the table A.4:

Table A2.4 – Proposed U-Values

Elements	Part L2b Limiting Fabric Parameters – W/m ² K	Comment
External Wall	0.35	n/a
Ground Floor	0.25	n/a
Roof (Flat & Pitched)	0.25	n/a
External Glazing	2.2	n/a
External Solid Doors	2.2	n/a

Air Permeability

- 1.19 The designed Air Permeability Rate (APR) has been retained at 15 m³/h.m² @ 50Pa.

Lighting

- 1.20 This energy demand in the new portion of the development will be limited by the application of more efficient lighting, photocell daylight control and use of LED lighting throughout. The following lighting design requirements have been assumed:

Table A2.5 – Lighting Datasheet

Lighting zone	Luminaire Lumens / Circuit Watt	Light Output Ratio	Photocell Dimming (Parasitic Power – W/m ²)	Occupancy Sensing – On/Off (Parasitic Power – w/m ²)
Retail & circulation areas	95	1	No	No
BOH Areas	95	1	No	Yes (0.3 W/m ²)

Ventilation Strategy

- 1.21 The ventilation strategy has been detailed to match the type of typical system specified in for discount food stores. The following strategy is proposed:

Table A2.6 – Summary of Ventilation Strategy

Ventilation Zone	System	Specific Fan Power	Heat Recovery (Efficiency)
Retail & office areas	Air-Handling Unit	1.6	Yes (75%)
WCs	Basic Extract Fan (remote from zone)	0.4	No
Store Rooms, Stairwells and BOH Circulation	Natural Ventilation	n/a	n/a

Heating & Cooling Systems

1.22 The following assumptions have been made on the incoming tenant's heating & cooling:

Table A2.7 – Summary of Heating & Cooling Strategy

Heating/Cooling System	Area Served	Efficiency	Comment
Heat Pump providing heating & cooling	Customer Areas & Office Areas	SCOP – 4.5 SEER – 4.5 EER – 4.5	Sub-Metered
Electric Radiators	WCs	100%	Sub-Metered

Hot Water

1.23 All areas are assumed to be served by an instantaneous electric water heater.

Refurbished Building – Predicted CO₂ Reductions

- 1.24 The following tables and graphs represent the predicted CO₂ emissions for the refurbished development over the existing building baseline:

Table A2.8– Refurbished Building Energy Demand

Energy Consumption by End-Use (kWh/m ²)		
End-Use	Existing Building	Refurbished Building
Heating	51.9	10.12
Cooling	29.43	7.0
Auxiliary	1.43	2.76
Lighting	60.2	15.88
Hot Water	2.08	2.08
Total Energy Demand (kWh/m²)	145.04	37.84
BER (kg.CO₂/m²)	60.5	19.6
Total Area	3,859.2	3,859.2
Total kg.CO₂.annum	233,482	75,640
Improvement (kg.CO ₂ .annum)	157,841	
% Improvement	68%	

- 1.25 The figures above demonstrate that through the application of the energy efficiency measures detailed in this section will result in a 68% reduction in CO₂ emissions in the refurbished building when compared to the existing arrangement.

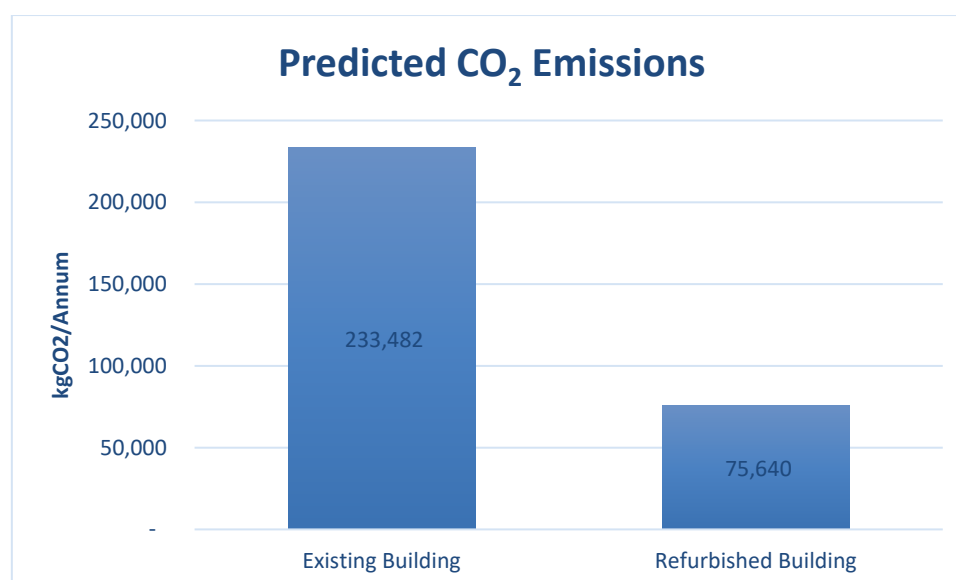


Fig A2.3 – Refurbished Building Emissions