Energy and Sustainability Statement

Junion Group

4-6 Ham Street
Richmond
Richmond Upon Thames
TW10 7HT

SRE

Version	Revision	Date	Author	Reviewer	Project Manager
1	A	14.04.2022	Owen Brookes	Yin Mui Tang	Owen Brookes
1	B	19.04.2022	Owen Brookes	-	Owen Brookes
2	A	11.01.2024	Elsa Withnell	Findlay Matheson	Elsa Withnell
2	B	12.01.2024	Elsa Withnell	Findlay Matheson	Elsa Withnell

The figures within this report may be based on indicative modelling and an assumed specification outlined within the relevant sections. Therefore, this modelling may not represent the as built emission or energy use of the Proposed Development and further modelling may need to be undertaken at detailed design stage to confirm precise performance figures. Please contact SRE should you have any questions, or should you wish further modelling to be undertaken post planning.

SRE Main Office | Greenforde Farm

Stoner Hill Road | Froxfield

Petersfield | Hampshire | GU32 1DY

01730 710044

info@sre.co.uk

www.sre.co.uk

Contents

Executive Summary

Executive Summary

This Energy and Sustainability Statement has been written to demonstrate the measures incorporated into the design of the Proposed Development at 4-6 Ham Street, Richmond, which will deliver lower energy and water use, lower carbon emissions and lower operational costs than a Building Regulations compliant design.

The energy strategy has been developed by following the GLA Energy Hierarchy of Lean, Clean, Green and Seen. The chosen energy strategy includes Lean passive and active design measures and Green LZC technologies to achieve a minimum 35% reduction in CO_2e emissions over Building Regulations in line with the London Borough of Richmond upon Thames (LBRUT) Local Plan. As shown in Table 1 the Proposed Development will achieve an overall 35.60% reduction in CO_2e emissions over Building Regulations meeting and exceeding the requirements of LBRUT policy.

Scenario	CO_2e emissions (tCO_2e/year)	Improvement over Building Regulations 2021(%)
Baseline	5.00	-
Lean	3.92	21.60
Green	3.22	35.60

Table 1 - Summary of regulated carbon dioxide savings

Proposed Energy Strategy

- Upgraded building fabric including walls and roofs
- Passive and active design measures
- High efficiency air source heat pump (ASHP) variable refrigerant volume/flow (VRV/VRF) system to provide cooling and space heating
- High efficiency gas-fired combinational boiler for water heating
- Rooftop PV array

The LBRUT Sustainable Construction Checklist has also been completed for planning (Appendix C), with the Proposed Development achieving a C rating with a score of 44, in compliance with the supplementary planning documentation (SPD) Policy.

Introduction

1.0 Introduction

This Energy and Sustainability Statement has been written by SRE on behalf of Junion Group (the Client) to demonstrate the measures incorporated into the design of the change of use development at 4-6 Ham Street, Richmond (the Proposed Development), which will deliver lower energy and water use, lower carbon emissions and lower operational costs than a Building Regulations Compliant design.

The statement compares the predicted actual building energy requirements with a Building Regulations compliant design, outlines passive and active design measures, and assesses the suitability of low and zero carbon (LZC) technologies specific to this site to address the relevant planning policy requirements.

The statement also analyses how the Proposed Development will integrate with its surrounding environment within the context of sustainability to ensure it benefits the surrounding area socially, environmentally and economically.

The Proposed Development shown in Figure 1 consists of the conversion of an existing 2 no. storey pub into a nursery, with external play area, on-site parking, cycle storage and associated landscaping. The site is surrounded predominantly by residential buildings with Strathmore School playing fields to the rear of the site. Further architectural details are provided in Appendix A.

Figure 1 - Front Elevation of the Proposed Development (Planning by Design Ltd)

1.1 Planning Policy

The site is located in the London Borough of Richmond therefore the following planning policies shown in Table 2 are applicable to the site.

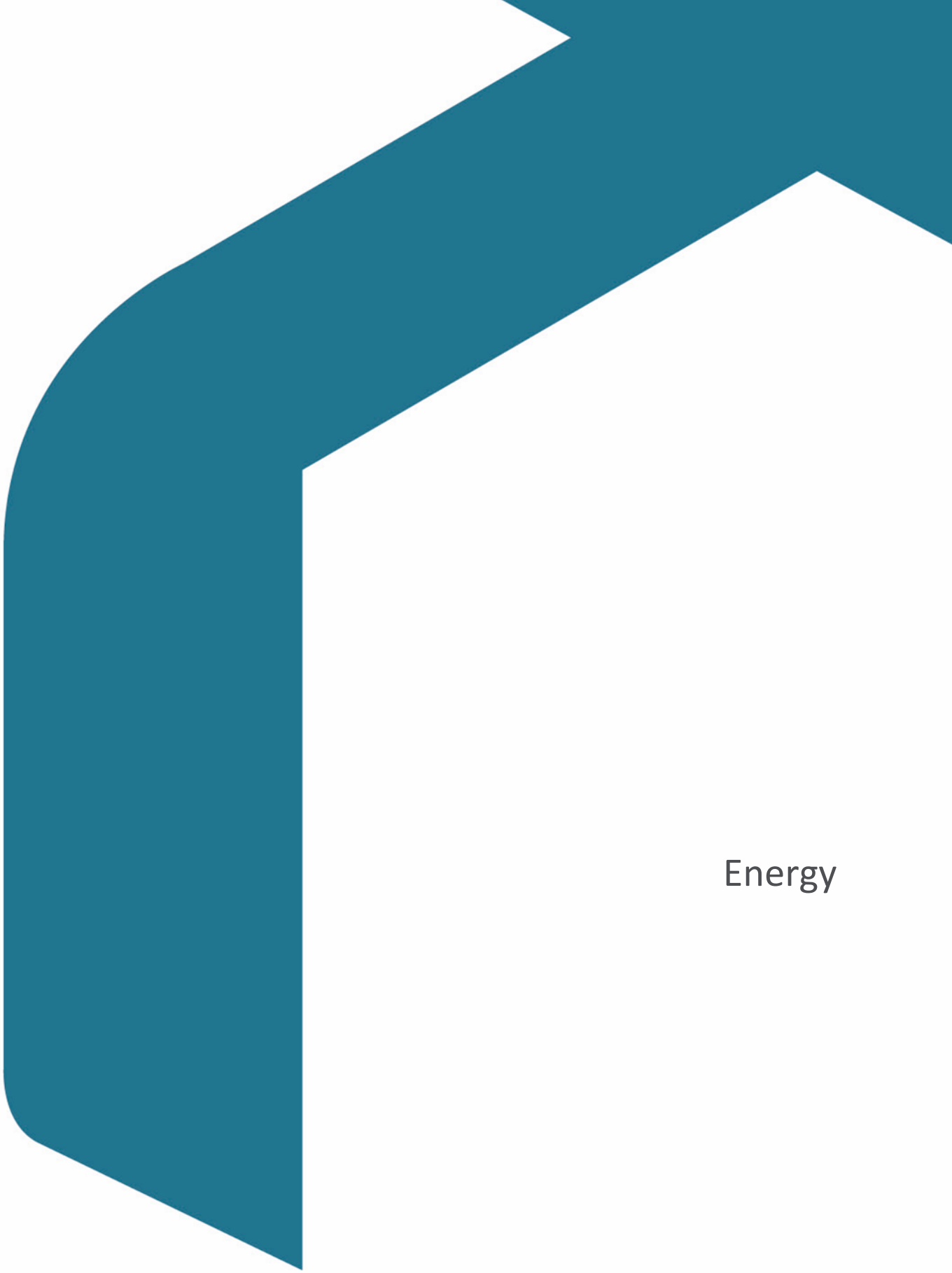
Plan	Requirement
Adopted London Borough of Richmond upon Thames (LBRUT) Local Plan (2018-2033)	<u>Policy LP 22 – Sustainable Design and Construction</u> Sustainable Design and Construction: - Developments of 1 dwelling unit or more, or 100m^2 or more of non-residential floor space (including extensions) will be required to complete the Sustainable Construction Checklist Supplementary Planning Documentation (SPD). A completed Checklist has to be submitted as part of the planning application. Reducing Carbon Dioxide Emissions: - All non-residential buildings over 100m^2 should achieve a 35% reduction. From 2019 all major non-residential buildings should achieve zero carbon standards in line with London Plan policy. - Targets are expressed as a percentage improvement over the target emission rate (TER) based on Part L of the 2013 Building Regulations. This should be achieved by following the Energy Hierarchy: 1. Be lean: use less energy 2. Be clean: supply energy efficiently 3. Be green: use renewable energy Decentralised Energy Networks: - Applicants are required to consider the installation of low, or preferably ultra-low, NO_x boilers to reduce the amount of NO_x emitted in the borough. - Local opportunities to contribute towards decentralised energy supply from renewable and low-carbon technologies will be encouraged where appropriate.
Adopted London Plan (2021)	<u>Policy SI 2 – Minimising Greenhouse Gas Emissions</u> Major development should be net zero-carbon. This means reducing greenhouse gas emissions and minimising energy demand in accordance with the energy hierarchy. Major development proposals should include an energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy. A minimum on-site reduction of at least 35% beyond Building Regulations is required for major developments. Non-residential developments should achieve 15% through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either: 1) through a cash in lieu contribution to the borough's carbon offset fund, or 2) off-site provided that an alternative proposal is identified and delivery is certain.

Table 2 - Summary of relevant local planning policy requirements

The Proposed Development classifies as a minor non-residential development, in-line with the GLA definition of major non-residential development having a floor space of 1,000m^2 or more. As a result, the London Plan requirements do not apply to the Proposed Development, and only LBRUT local planning policy applies.

In-line with the LBRUT Local Plan Policy LP22, the Proposed Development will achieve a >35% reduction in CO_2e emissions compared to a Building Regulations Part L compliant scheme.

A Sustainable Construction Checklist SPD has also been completed and will be submitted as part of the planning application.



Energy

2.0 Energy

2.1 Method

The energy strategy design follows national policy guidance[1] and seeks to be Lean, Clean, Green and Seen, as shown in Figure 2.

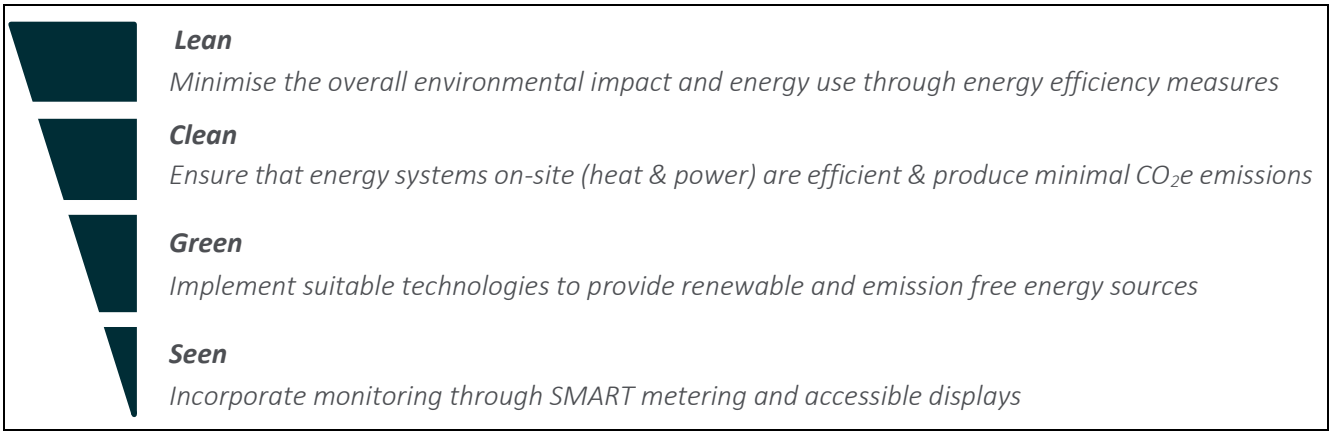


Figure 2 - The Energy Hierarchy

The scheme has been assessed under Building Regulations 2021 Part L V2 and the energy modelling has been calculated using the Integrated Environmental Solutions Virtual Environment (IES VE) 2023 software. The CO_2e Conversion Factors shown in Table 3 are from the Building Regulations 2021. However, within the IES VE 2023 dynamic modelling, the CO_2e conversion factor for electricity varies over the course of the year due to the changing mix of inputs to the electricity grid, i.e., increased photovoltaic (PV) generation in the summer months.

Energy Source	CO_2 Conversion Factor ($kgCO_2/kWh$)
Electricity (mains)	0.519
Electricity (offset)	-0.519
Gas (mains)	0.216

Table 3 - CO_2e conversion factors by energy source

The notional building provides the energy baseline and is the exact size and shape of the Proposed Development, but the U-values and fixed building services follow the guidance in paragraph 11.7 of Approved Document L, Volume 2, 2021[2]. The notional building U-values for the floor, walls and roofs have been upgraded to the improved u-values in Table 4.2 of Approved Document Part L[4]. The fixed building services within the notional building follow the standards in Section 5 and 6 of Approved Document L[4] with the space heating system the same as the Proposed Development but based on the notional standards for the system performance.

[1]The London Plan 2021 https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan

[2] Approved Document L, Conservation of fuel and power, Volume 2: Buildings other than dwellings, 2021 edition incorporating 2023 amendments

Scenario	CO_2e emissions (t/yr)
Baseline	5.00

Table 4 - Baseline CO_2e emissions

2.2 LEAN – Demand Reduction

The Proposed Development incorporates passive and active design measures to reduce the energy demand as discussed below. As discussed in Section 2.1, the notional building has been modelled using the same heating system as the Proposed Development in line with Part L guidance. As air source heat pumps (ASHPs) are proposed as the space heating strategy, the lean improvements cannot be entirely separated from the green improvements associated with the ASHP however, the results in Table 5 show the lean improvements before the inclusion of additional renewable technologies.

Scenario	CO_2e emissions (t/yr)	Improvement (%)
Baseline	5.00	-
Lean	3.92	21.60

Table 5 - Lean CO_2e emissions

2.2.1 Passive Design Measures

All glazed areas of the building will have elements of shading provided by the building form or internal curtains or blinds. The building orientation and design maximises natural light and positive solar gains with glazing on the South East and South West elevations. Glazing on the North East elevation is limited, minimising overall heat loss.

The external fabric of the Proposed Development is not being changed from the existing building. This consists of traditional load bearing masonry construction, with solid brick walls. The external walls are proposed to be drylined with insulated plasterboard to reduce the heat losses through this element and achieve a minimum U-value of 0.30W/m^2K in line with Part L guidance. The flat ceiling below the vaulted pitched roof is proposed to be insulated at ceiling level to achieve a minimum U-value of 0.12W/m^2K. The existing ground floor and pitched and flat roof are not proposed to be changed. The U-Values applied to the energy modelling of the Proposed Development are provided within Table 6 along with the notional compliance U-values; see the indicative Building Performance Specification in Appendix B for details of the proposed building fabric.

The overall building should have a medium thermal mass subject to finishes as a result of the masonry construction. A medium thermal mass will balance providing high energy efficiency and limiting overheating during the summer months.

Element	Notional Compliance U-value (W/m^2K)	Proposed U-value (W/m^2K)
Ground Floor	0.25	0.58
External Walls	0.28	0.30

Element	Notional Compliance U-value (W/m^2K)	Proposed U-value (W/m^2K)
Pitched Roof (insulation at joists)	0.11	0.12
Flat Roof and Pitched Roof (insulation at rafters)	0.11	2.30
Pitched Roof (insulation at rafters)	2.30	2.30
Windows	3.10	3.10
Solid Doors	3.00	3.00
Air Tightness @ 50 Pa	25 ($m^3/hr/m^2$)	25 ($m^3/hr/m^2$)

Table 6 - Fabric energy efficiencies

2.2.2 Active Design Measures

The Proposed Development will utilise 100% low energy/LED lighting in excess of Building Regulation requirements with passive infrared (PIR) in spaces only briefly occupied. All external lighting will positioned to avoid excessive light pollution and be supported by PIR/daylight sensor and time controls with a maximum lamp capacity of 150W (equivalent) for essential security lighting.

Hot water for the building will be provided by a high efficiency gas boiler (minimum efficiency of 98%). A high efficiency maximises the amount of heat generated for a given amount of fuel.

Time, temperature and zonal controls will be installed as a minimum to allow the control of individual zones/rooms throughout the building.

In modern air-tight buildings, careful consideration needs to be given to the specification of ventilation systems to ensure moisture is removed and ventilation standards are met to ensure a healthy standard of internal air. Standard extract ventilation is provided to all wet-rooms throughout the Proposed Development. Openable windows will also provide purge ventilation when required.

2.2.3 Cooling

The cooling hierarchy has been used to ensure that passive building design has been optimised to reduce the cooling load for the Proposed Development, as shown below in Table 7.

Cooling Hierarchy	Potential Design Measures
Minimising internal heat generation through energy efficient design	All primary pipework to be insulated, therefore low system losses. Low energy lighting throughout.
Reducing the amount of heat entering the building in summer	Shading and internal blinds are to be provided to minimise solar gain.

Cooling Hierarchy	Potential Design Measures
Use of thermal mass and high ceilings to manage the heat within the building	Thermal mass is anticipated to be medium subject to finishes with some element of exposed mass.
Passive Ventilation	Openable windows will be provided to all rooms and cross ventilation is possible.
Mechanical Ventilation	Standard extract ventilation in wet rooms.

Table 7 - Design measures following the cooling hierarchy

Active cooling is present through the combined heating and cooling Variable Refrigerant Flow (VRF) system which will be provided to all main occupied areas and communal areas to prevent overheating during the summer months.

2.3 CLEAN – Heating Infrastructure

Connection of the Proposed Development to a district heating system is not currently feasible, therefore has not been proposed. The London Heat Map shown in Figure 3 shows that the Proposed Development is within an area of low heat density and is not located near any existing heat network areas.

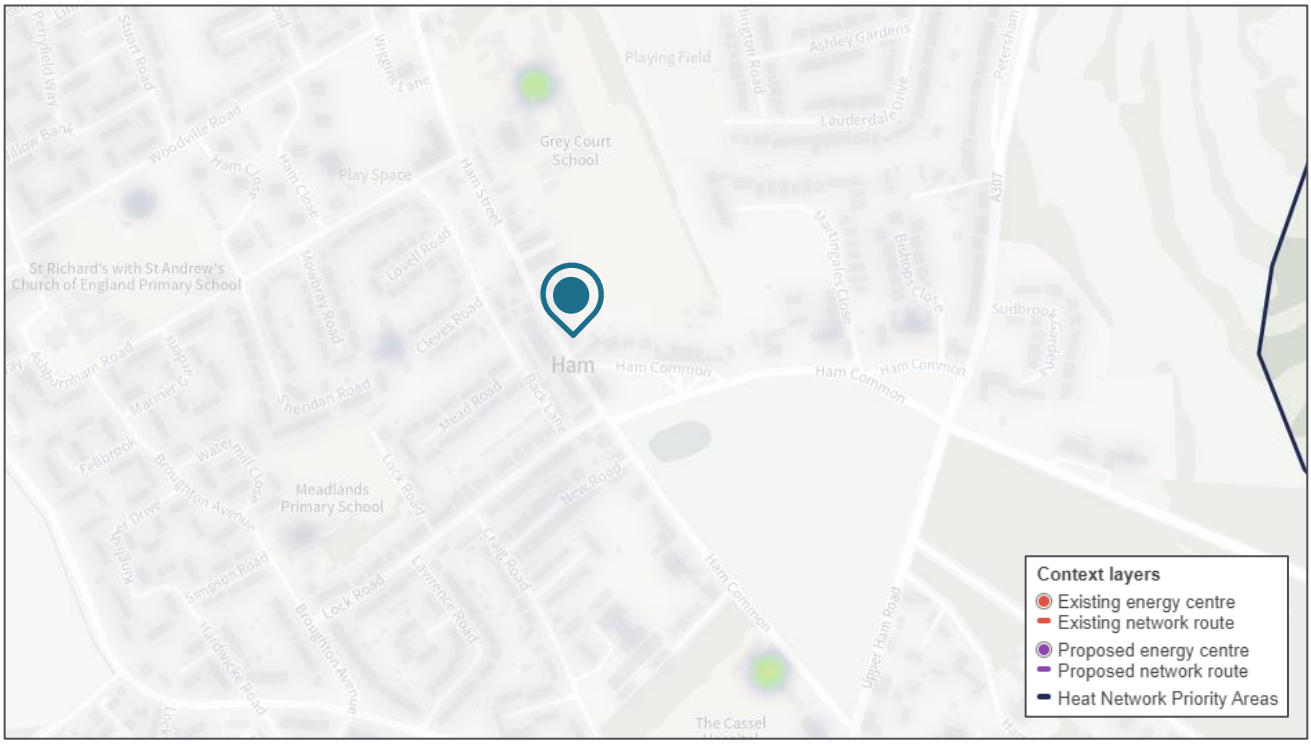


Figure 3 – London Heat Map (https://maps.london.gov.uk/heatmap/)

Furthermore, the heat map shows there are also currently no proposals for a network nearby. Therefore, there is no further improvement of 'Clean' measures above the 'Lean' scenario.

2.4 GREEN – Low Carbon and Renewable Energy

The addition of 'Green' technologies can provide a significant reduction in CO_2e emissions and enable the Proposed Development to meet the threshold of a minimum 35% improvement over Building Regulations, in-line with LBRUT Local Planning Policy LP 22. A combination of air source heat pumps (ASHP) and photovoltaic (PV) are proposed.

Scenario	CO_2e emissions (tCO_2e/year)	Improvement (%)
Baseline	5.00	-
Green	3.22	35.60

Table 9 - Green CO_2e emissions and improvement over Baseline

2.4.1 Air Source Heat Pumps

The use of heat pumps is often the most direct method of reducing CO_2e emissions for a Proposed Development with minimal change in aesthetics or the way in which a building is designed. Often a 'straight swap' alternative for a gas system boiler, the use of heat pumps has the potential to provide significant offset in CO_2e emissions.

All Heat Pump systems consume electricity to operate - the Coefficient of Performance (CoP) of the system is the ratio of heat energy emitted to electrical energy consumed. Generally, a CoP of 3 or 4 can be achieved, meaning 3 or 4 units of thermal energy are produced for each unit of electricity consumed.

Heat pumps will only deliver low grade heat (up to ~55°C) efficiently, and therefore HP systems alone are generally relatively inefficient in providing hot water, as this requires additional electrical input (immersion or increased compressor use).

An air-to-air, variable refrigerant flow (VRF) heat pump system has been proposed, providing space heating and cooling for the scheme through ceiling/wall cassettes. The hot water for the Proposed Development will still be provided via a high efficiency combinational gas boiler.

ASHPs tend to generate some noise and therefore the location/space in which the pump is positioned would need to be adequately sound insulated or appropriately located to prevent disturbances to the occupants of this and/or neighbouring buildings.

2.4.2 Photovoltaics (PV)

PV panels convert energy from daylight into direct (DC) electrical current that is then converted to alternating (AC) electrical current via an inverter, or a series of inverters subject to the size of the array. The panels are generally roof mounted and provide electrical generation which can either be utilised directly on-site (or nearby) by ASHPs, lighting and other electrical equipment, stored in batteries, or exported back to the National Grid. Noise will not be an issue – A PV system does not feature moving parts and is silent during operation.

The installation of PV could be used to offset electrical demand within the Proposed Development. As such a number of roof mounted PV arrays will be connected into the electrical system.

To meet the 35% improvement over Building Regulations, a PV array is proposed on the first floor roof. An indicative investigation into the roof area shows there is significant space available for PV. To minimise the visual impact, the PV is prioritised to be located to the rear of the building on the first floor flat roof and north-east

facing pitched roof indicated in red in Figure 4 below. It is estimated that approximately 6 and 7 panels can be fit on the rear flat and pitched roof respectively taking into account spacing, fixings and the boundary from the edge of the roof. An additional 6 no. panels are estimated to be required on the south-east or south-west facing pitched roof to meet the 35% improvement over Building Regulations. Table 8 summarises the proposed PV array. The PV arrangements and quantities are indicative at this stage and will need to be reviewed by a PV specialist to confirm an array meeting the 35% carbon reduction.

Location	Approximate no. Panels @2m^2	Active Area (m^2)	Pitch (degrees)	Orientation
Rear Flat Roof	6	12	10	South-east
Rear North-East facing pitched roof	7	14	~48	North-west
South-East or South-West facing pitched roof	6	12	~48	South-east or South-west

Table 8 – Proposed PV Array Summary to the Proposed Development

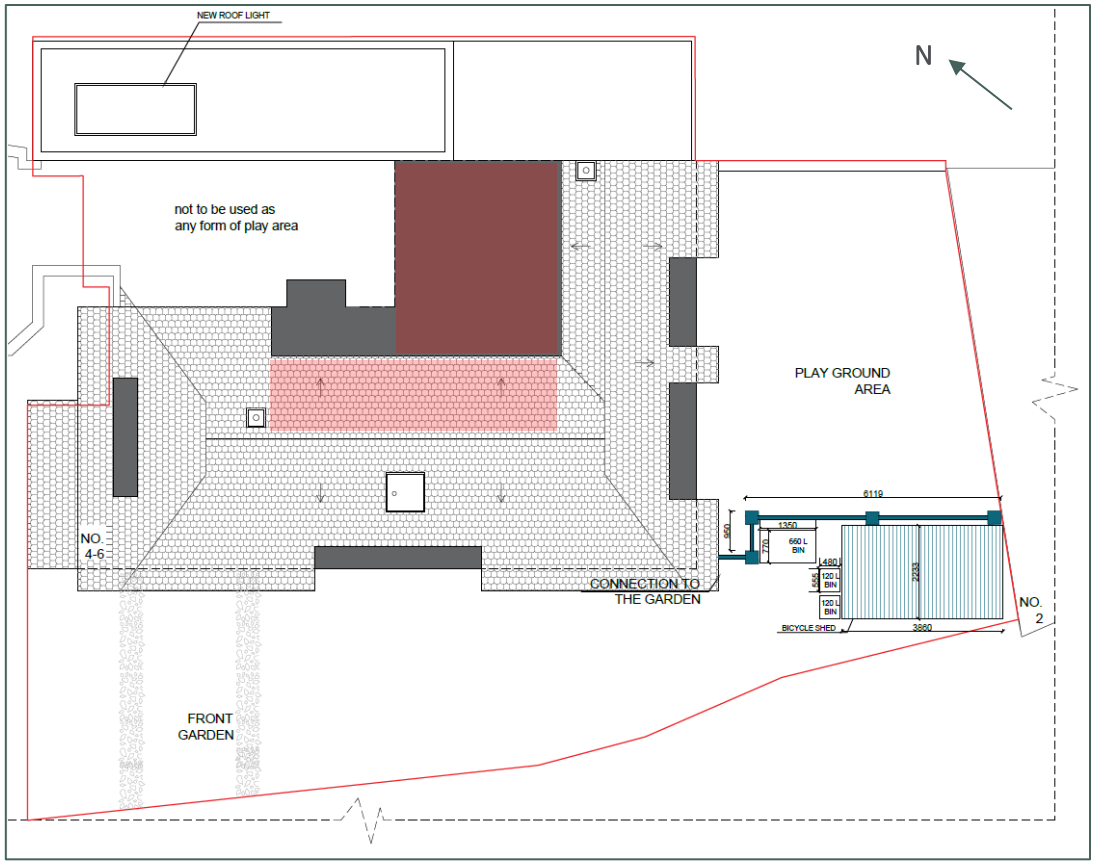


Figure 4 - Roof Plan

2.5 Carbon Offsetting

The London Plan requires all major developments to be net-zero carbon.

The Proposed Development is not a major development and is not required to meet the zero-carbon target.

2.6 SEEN – In-use Monitoring

It is recommended that the Proposed Development will be supplied with Smart Meters (where available from the utility supplier) along with associated internal energy displays. This will further improve energy efficiency by allowing building managers to observe their energy use in 'real time' and manage it more effectively.

2.7 Energy Conclusions

The Proposed Development will deliver passive and active energy demand reduction measures along with low and zero carbon technologies in order to reduce energy demand and associated CO_2e emissions resulting from the Proposed Development's operation.

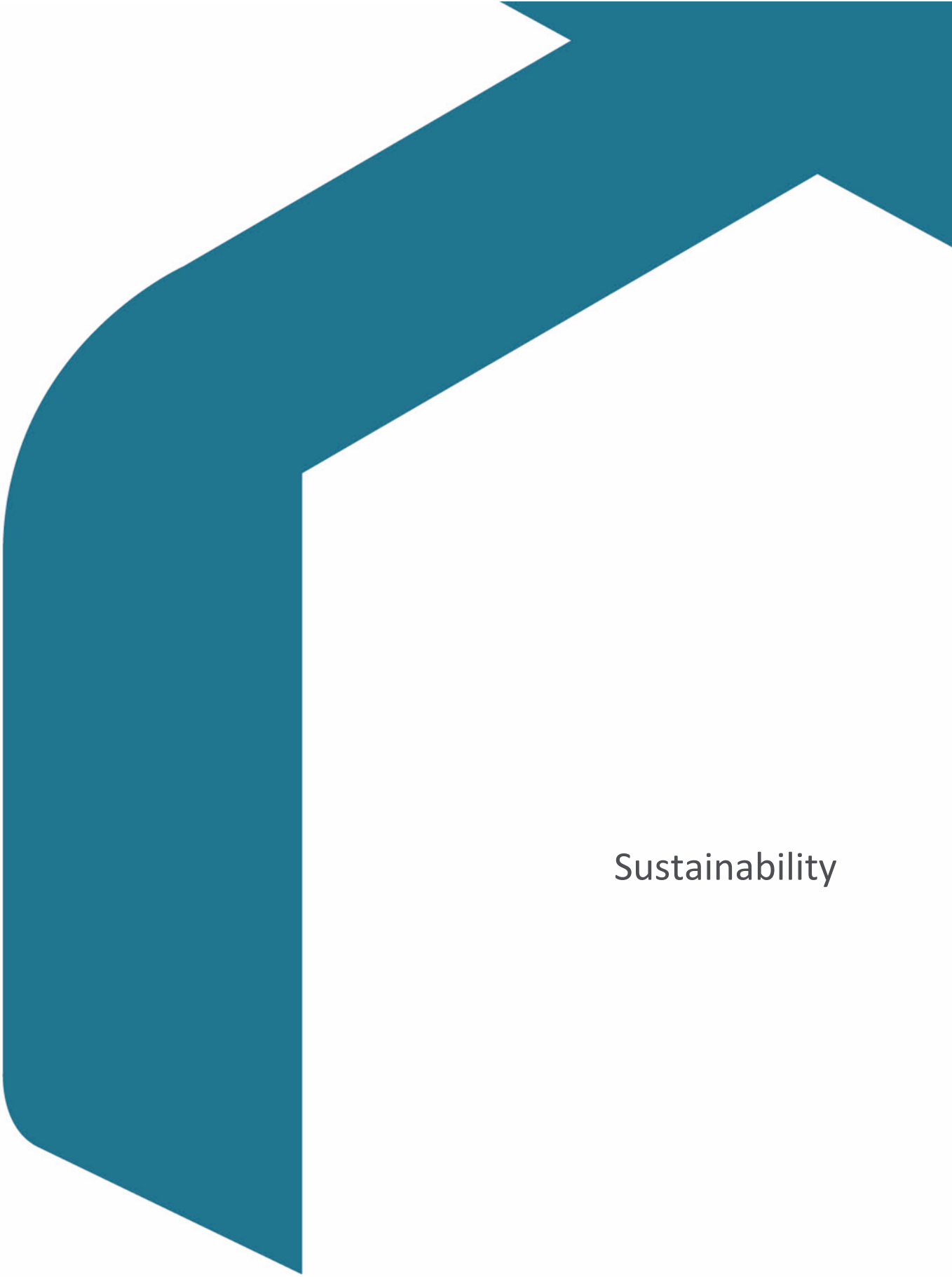
The calculations undertaken demonstrate that the Proposed Development will successfully exceed Building Regulations Part L V2 compliance by >35%, achieving the emissions reductions requirements set by the LBRUT Local Plan and Building Regulations 2021 Part L V2 ensuring it is well within compliance requirements.

Scenario	CO_2e emissions (tCO_2e/year)	Improvement over Baseline (%)
Baseline	5.00	-
Lean	3.92	21.60
Green	3.22	35.60

Table 10 - Summary of CO_2e emissions and improvement over Baseline

In delivering the Green energy strategy, the Proposed Development provides:

- Upgraded building fabric including walls and roofs
- Passive and active design measures
- High efficiency ASHP (VRV/VRF) system to provide cooling and space heating
- High efficiency gas-fired combinational boiler for water heating
- Rooftop photovoltaic (PV) array



Sustainability

3.0 Sustainability

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

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

3.1 Pollution

3.1.1 Air

The Proposed Development is located within an Air Quality Management Area – as is the whole Borough of Richmond – due to the historically high levels of Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}). Figure 5 displays the NO_2 levels of the local area on the UK Nitrogen oxides (NO_x) emissions map.

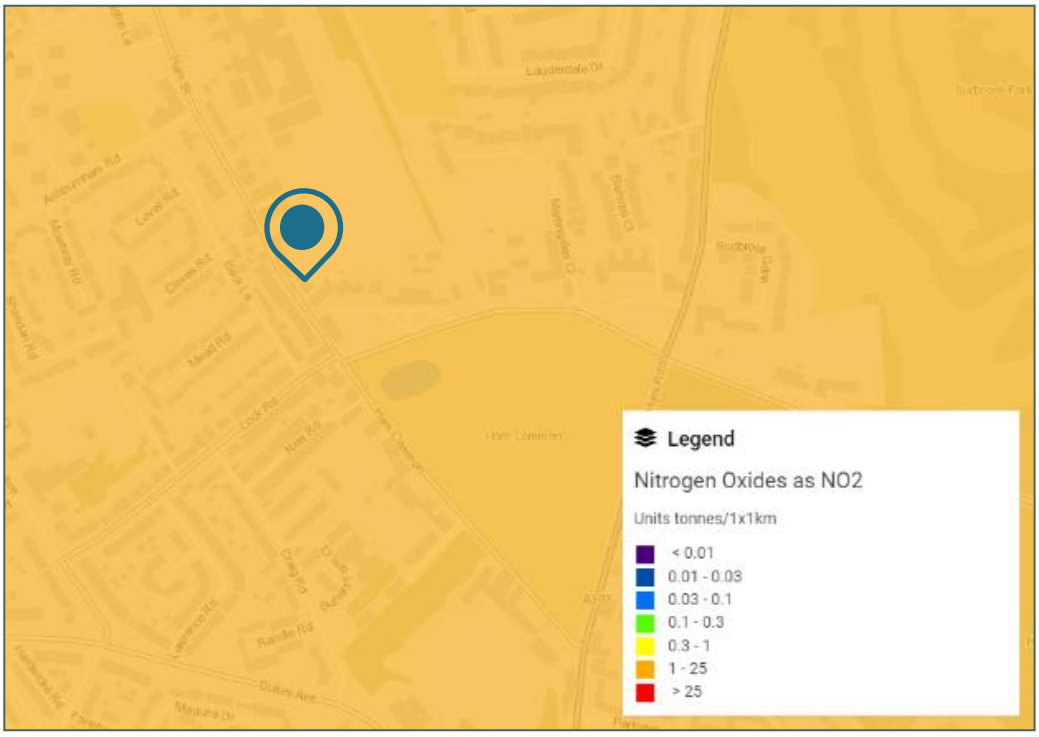


Figure 5 – UK Air Pollution Map showing pollution from Nitrogen Oxides as NO_2 (https://naei.beis.gov.uk/emissionsapp/)

Local Plan Policy LP 10 states that:

> *'…developers should secure at least 'Emissions Neutral' development. To consider the impact of introducing new developments in areas already subject to poor air quality, the following will be required:*
>
> 1. *an air quality impact assessment, including where necessary, modelled data;*
> 2. *mitigation measures to reduce the development's impact upon air quality, including the type of equipment installed, thermal insulation and ducting abatement technology;*
> 3. *measures to protect the occupiers of new developments from existing sources;*
> 4. *strict mitigation for developments to be used by sensitive receptors such as schools, hospitals and care homes in areas of existing poor air quality; this also applies to proposals close to developments used by sensitive receptors.'*

The Proposed Development will therefore have mitigation measures in place to reduce the impact on local air quality, providing an 'emissions neutral' development.

To mitigate the impact on local air quality, a low NO_x boiler will be installed for hot water generation, and a VRF system to provide space heating and cooling. The VRF system will emit no onsite NO_x emissions but consumes grid electricity. As the NO_x emissions resulting from the production of electricity decreases at the national scale, the resulting theoretical emissions from the Proposed Development will do also.

The installation of a low NO_x boiler and VRF system will reduce pollutant emissions compared to the existing development on the site, which uses a lower efficiency gas boiler for space and water heating. As a result, the Proposed Development will have a net positive impact on local air quality, in-line with the requirement of an at least 'Emissions Neutral' development.

3.1.2 Noise

The Proposed Development is located on the site of an existing pub and the proposed nursery is not expected to produce any greater noise pollution than was generated during the operation of the previous building.

The Proposed Development is situated close to existing residential houses. However, it once again is anticipated that the Proposed Development will not have a significant noise pollution impact and therefore will not affect the quality of life for neighbouring properties and the surrounding area.

The positioning of any equipment for the Proposed Development will be carefully considered to avoid nuisance to surrounding dwellings. This will include the positioning of the ASHP external condenser units which will need to be placed considerately to avoid any inadvertent noise intrusion into habitable spaces.

3.1.3 Light

Natural daylight will be provided to the Proposed Development through the use of glazing in appropriate areas of the building. The windows of the Proposed Development will have light-coloured curtains or roller blinds, to enable glare control and privacy.

Light Pollution will be minimised where possible through the careful specification and positioning of external lighting around the Proposed Development, ensuring minimal light pollution from the site. Special attention will be given to security lighting (where fitted) to ensure it is appropriately focused and controlled.

All external space lighting will be provided through low energy fittings, with security lighting being PIR and daylight/timer controlled. Any external signage, where installed and lit, will be installed and controlled in line with best practice.

3.2 Flood Risk

The selected site is at very low risk of flooding from rivers and seas (Figure 6) and low risk of flooding from surface water (Figure 7). As a result, no flood risk mitigation measures are required for the Proposed Development.

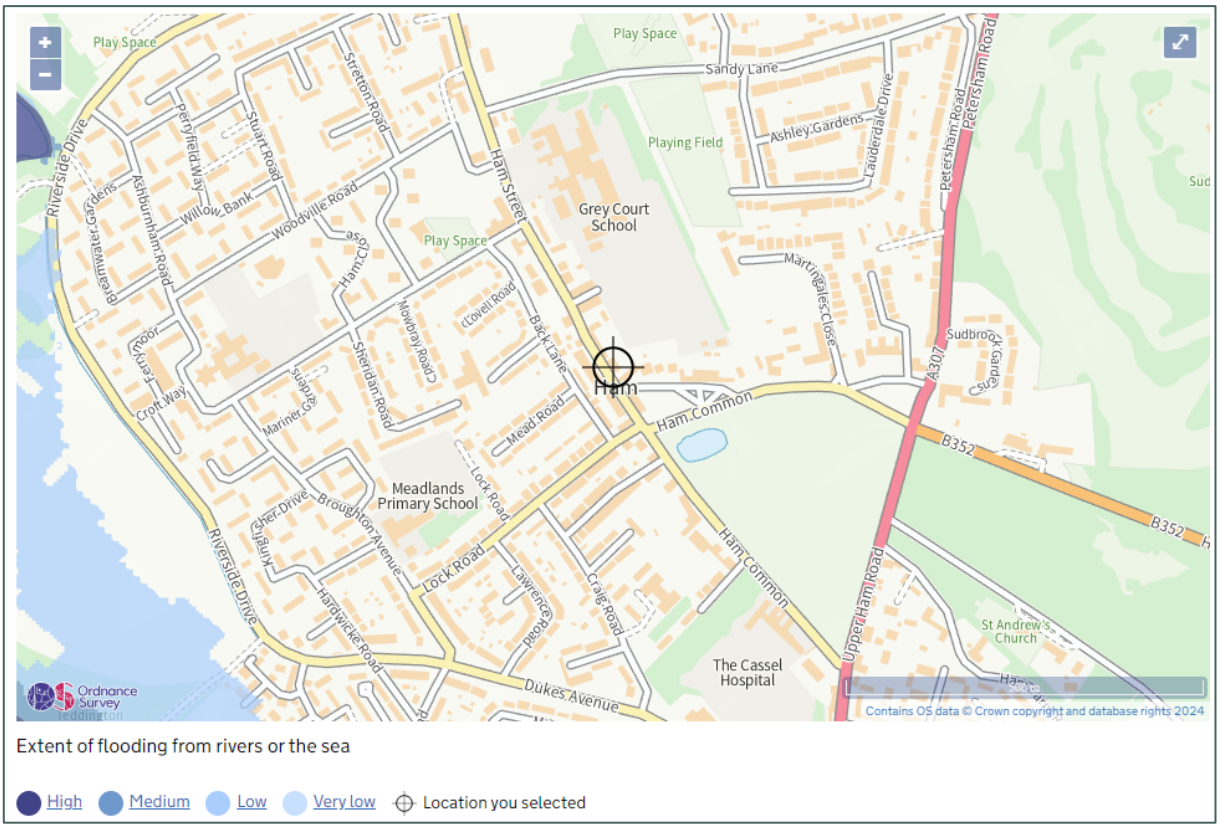


Figure 6 – Flood map showing risk of flooding from rivers or the sea (https://flood-warning-information.service.gov.uk/long-term-flood-risk/map)

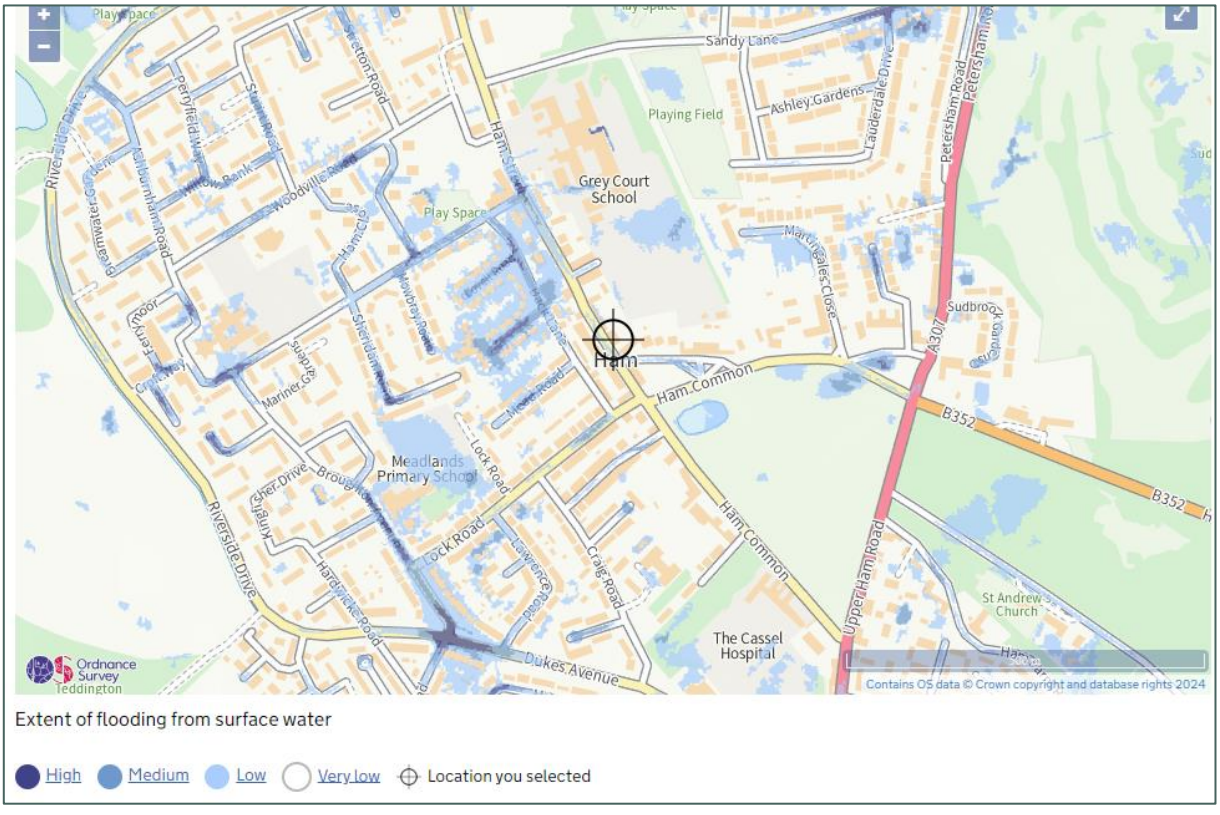


Figure 7 - Flood map showing risk of flooding from surface water (https://flood-warning-information.service.gov.uk/long-term-flood-risk/map)

3.3 Transport

3.3.1 Public Transport

The Proposed Development is approximately 2km from both Strawberry Hill and Twickenham railway stations. Strawberry Hill station is on the Kingston Loop Line, connecting the Waterloo-Reading Line to the South West Main Line. It runs 2 no. trains per hour to London Waterloo via Richmond, and 2 no. per hour via Wimbledon.

Twickenham Railway Station is on the Waterloo-Reading, Waterloo-Windsor, Hounslow Loop and Kingston Loop lines. There are 12 no. trains per hour to London Waterloo, with 8 no. of these running via Clapham Junction. There are 2 no. trains per hour to Reading and 2 no. per hour to Windsor and Eton Riverside.

The closest London Underground Station is Richmond, approximately 3km from the Proposed Development, in which the District Line runs through. There is also a London Overground Station at Richmond.

The Proposed Development is also located less than 300m from the closest bus stop on Ashburnham Road, with multiple other stops within a 500m radius. The buses which pass through these stops include the 371, 65 and N65 night bus. The 371 runs between Kingston upon Thames and Richmond, whereas the 65 runs between Kingston upon Thames and Ealing, via Richmond and Brentford. The N65 is the night bus of the 65 and has the same route, however extends further south than Kingston upon Thames, to Chessington.

The Proposed Development has road access to the A307 from Ham Street. This connects to the A316 which has road access into Central London to the East, the M3 to the West, and the M4 to the North. Access is then available to the wider national road network.

3.3.2 Parking

LBRUT Local Plan Policy LP45 states that:

> *'The Council will require new development to make provision for the accommodation of vehicles in order to provide for the needs of the development while minimising the impact of car based travel including on the operation of the road network and local environment, and ensuring making the best use of land. It will achieve this by:*
>
> - *Requiring new development to provide for car, cycle, 2 wheel and, where applicable, lorry parking and electric vehicle charging points, in accordance with the standards set out in Appendix 3. Opportunities to minimise car parking through its shared use will be encouraged.'*

The Transport for London WebCAT tool indicates that the Proposed Development has a Public Transport Accessibility Level (PTAL) of 1b. Appendix 3 of the LBRUT Local Plan the states that for the appropriate use class of the Proposed Development (D1 – Day nurseries), developments within PTALs 0-3 have a parking standard of 1 no. space per 2 staff. The Proposed Development has the provision for 4 no. parking spaces assuming 8 no. staff. This includes 1 no. disabled bay. The limited on-site parking will promote the use of public transport by visitors and staff.

3.3.3 Electric Vehicle Charging

The LBRUT Local Plan states electric vehicle charging must be provided in-line with the requirements set out in the London Plan. For non-residential developments 10% of parking spaces must have active provision, with a further 10% passive provision (infrastructure in place for future charging facilities to be installed). Since the Proposed Development has limited parking (only 3 no. spaces), no active or passive electric charging provision is required in-line with this policy.

3.3.4 Cycle Storage

Appendix 3 of the LBRUT Local Planning Policy LP45 states that for the appropriate use class of the Proposed Development, the cycle parking standards of the Proposed Development must follow the London Plan

requirements. This states that for the D1 – nursery, a minimum of 1 no. space is required per 8 no. staff members, and a minimum of 1 no. space per 8 no. students.

A secure and covered cycle shed is being provided, which will provide 9 no. spaces, which in-line with the minimum cycle parking standards allows for a combined total of 72 staff and students.

3.4 Biodiversity

Biodiversity is generally considered to be the variety of life forms within a certain ecosystem. The Proposed Development currently consists of an existing pub and is therefore expected to be of low ecological value.

The current site has limited biodiversity so it is predicted that the Proposed Development will have an overall positive impact on the biodiversity of the area, by increasing the amount of green space, planting and incorporating native species where possible.

3.5 Resource Efficiency

3.5.1 Construction Phase Waste Management

The Proposed Development will aim to minimise the waste produced from the site during the construction phase.

A comprehensive Construction Management Plan will be implemented from the outset of site works and will follow the principles of the waste hierarchy, with targets set in relation to volume of construction waste and diversion from landfill.

The construction waste generated as part of the redevelopment will be segregated and monitored as per best practice, with suitable materials being recycled as part of this process, either to be reused on site or introduced back into the supply chain through recycling by a Licensed Contractor, therefore minimising the amount of waste being disposed of in landfill sites.

Reusing materials on site will reduce the embodied energy of the development through the reuse of the energy that exists in that material. Transportation of new material to the site will be reduced, reducing the CO_2e emissions associated with transportation and material manufacture.

Where waste will need to be disposed of, this will be done in line with the Waste Hierarchy shown in Figure 8, with as much as practicable being recycled, and the remainder being dealt with through a specialist waste recycling contractor. Nominal construction waste should be sent to landfill or for incineration unless this is unavoidable due to the materials found on the existing site.

Appropriate targets and benchmarks will be set in line with best practice requirements.

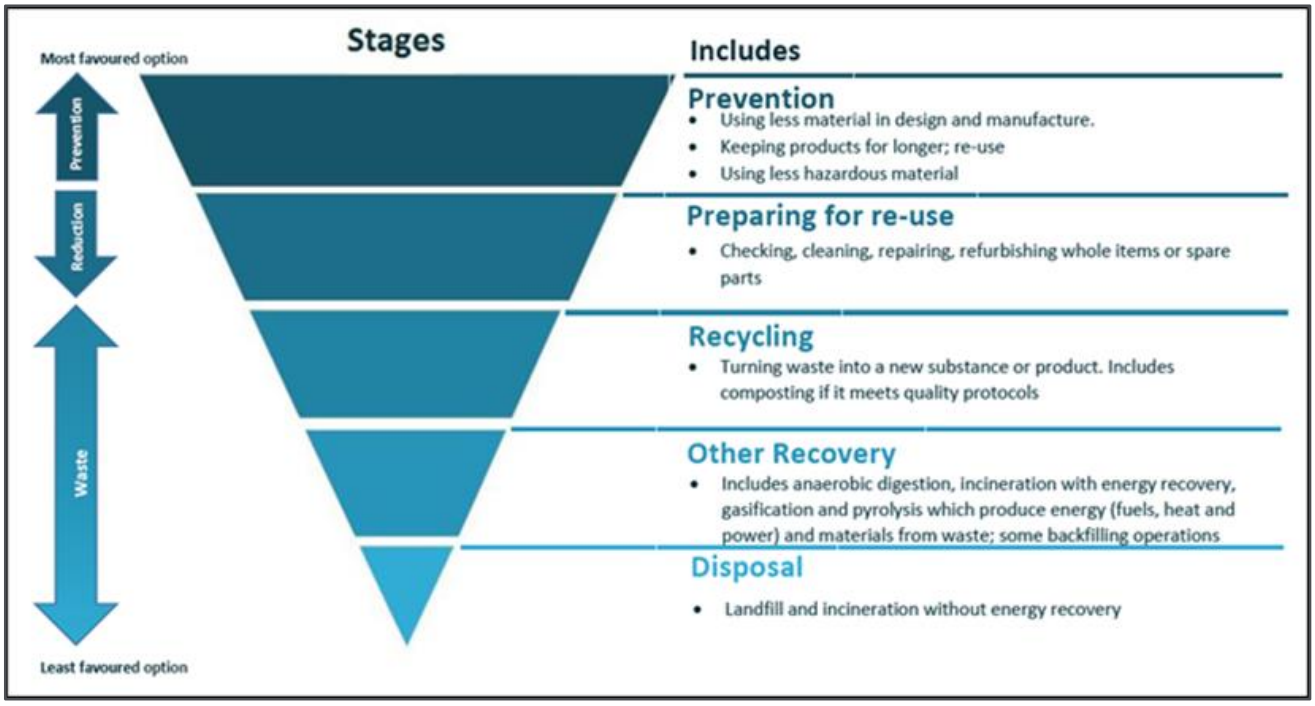


Figure 8 - The waste hierarchy

3.5.2 Resource Management

Policies will be put in place for management of site impacts such as air and water pollution in line with industry best practice. Monitoring and reporting on carbon emissions and water use from site related activities will take place in line with national benchmarks.

The overall management of the construction waste will be monitored through the Considerate Constructors Scheme as part of Best Practice Site Management.

3.5.3 Materials

The Proposed Development is to use high quality, low impact materials in order to minimise the overall impact on the environment as far as possible.

The existing fabric is to be retained and the form of construction is of traditional load bearing masonry construction.

All timber materials for finishing elements will be sourced from FSC and/or PEFC sources and all other materials sourced from suppliers who have an accredited Environmental Management System (EMS) (ISO14001, BS8555 or BES6001) for the extraction and process stages of the material manufacturing, ensuring that any environmental impact caused by the building materials is analysed and mitigated where possible.

All timber and timber-based products use on-site will be legally sourced with appropriate Chain of Custody certification to confirm this.

As standard industry best-practice, all insulation on the site will have an Ozone Depletion Potential (ODP) of zero, and a Global Warming Potential (GWP) of <5, further minimising the Proposed Developments effect on global Climate Change.

3.5.4 Water

Areas of the South East of England have been declared areas of 'serious water stress', particularly Greater London. Water is a vital resource and also has an associated CO_2e footprint with $0.344kgCO_2e/m^3$, arising for mains water and efficient usage should be encouraged in all buildings. The Proposed Development aims to significantly reduce mains water use through a combination of efficiency measures, including the use of fittings with a low capacity or flow restrictors to reduce water use and PIR sensors linked to water shut-offs valves to reduce the chances of water waste.

Water use will be reduced in line with LBRUT Local Plan Policy LP 22, which states non-residential developments should incorporate best practice water saving and recycling measures as outlined in the Sustainable Construction Checklist SPD. An indicative specification is given below, in-line with these standards:

- WCs: 4.00 litre effective flush volume
- If 1 urinal only: 2.00 litres/bowl/hour
- If 2 or more urinals at the site: 1.50 litres/bowl/hour
- Hand wash basin taps: 4.50 litres/min
- Kitchenette taps: 5.00 litres/min
- Showers: 6.00 litres/min
- Baths: 140 litres
- Domestic sized dishwashers (if installed) 12.00 litres/cycle
- Domestic sized washing machines (if installed) 40.00 litres/use
- Commercial sized dishwashers (if installed) 5.00 litres/rack
- Commercial sized washing machines (if installed) 7.50 litres/kg dry load

3.6 LBRUT Sustainable Construction Checklist SPD

The LBRUT Sustainable Construction Checklist (Appendix C) has been completed for the Proposed Development in-line with Local Plan Policy LP22, which states that the checklist must be completed for non-residential developments with a floor space of $100m^2$ or more, and submitted as part of the planning application.

The Proposed Development achieves a score of 44, equating to a C rating for non-residential developments. The Proposed Development therefore complies with SPD Policy for a minimum rating of 40 for non-residential developments.

The checklist document states that a C rating signifies 'minimal effort to increase sustainability beyond general compliance'. The Proposed Development is a change of use building where a large proportion of the existing site is being retained, for example the entire outer shell of the building. As a result, there is limited scope for achieving some of the credits outlined in the checklist document. The Proposed Development will have a net positive impact on sustainability compared to the existing development, since the small number of changes that will be made will increase the sustainability of the site.

3.7 Sustainability Conclusions

Through a considered approach to sustainability, the Proposed Development is aiming to deliver a highly sustainable non-residential development which is within an appropriate area for this use and at an appropriate scale. The Proposed Development will make maximum use of the Application Site, providing a nursery, in line with the Adopted LBRUT Local Plan and London Plan requirements.

The adoption of a sustainable approach to the design and construction has allowed the Proposed Development to provide:

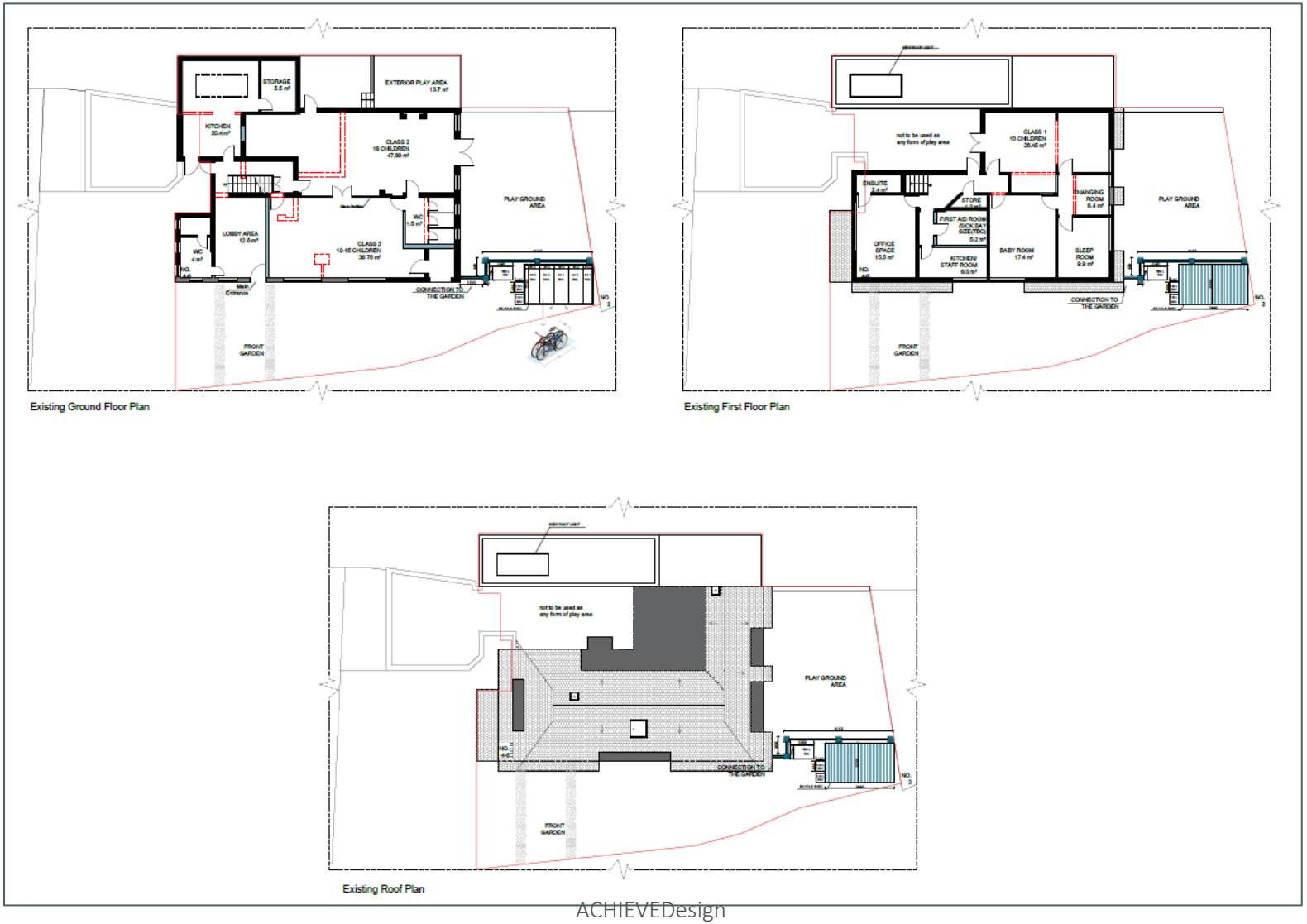
- Development which is suitable for the site with access to public transport and services
- Low internal water use

- Low impact development with minimal noise, light and air pollution
- Consideration of biodiversity on the site within the landscaping design
- Comprehensive site waste management during construction and operation.

The LBRUT Sustainable Construction Checklist (Appendix C) has also been completed for planning with the Proposed Development achieving a C rating with a score of 44, therefore complying with SPD Policy.

Appendices

Appendix A – Floor Plans



ACHIEVEDesign

Appendix B – SBEM Summary Sheet

Ham Brewery Tap

Building Regulations 2021												
Building Type	**Address**				**As-Designed/ As-Built Drawings**		**SBEM Level**	**Weather File**	**BER/TER Improvement (%)**	**BPER/TPER Improvement (%)**	**Draft EPC**	
D1: Community/Day Centre	4-6 Ham Street, Richmond, TW10 7HT				As Designed		5	London	35.60	51.28	27B	
Construction Element	**U-Value**	**Notional***	**Description**									
External Wall	0.28	0.30	Solid brick as built drylined with internal insulation to achieve minimum u-value of 0.30W/m^{2}K									
Pitched Roof (insulation at ceiling level)	0.11	0.16	Insulation between and above joists to achieve minimum u-value of 0.16W/m^{2}K									
Pitched Roof (insulation at rafter level)	2.30	0.18	Flat roof, U-value as per SAP Appendix S, Table S10**									
Flat Roof	0.11	0.18	Insulation added to achieve u-value of 0.16W/m^{2}K									
Ground Floor	0.58	0.25	Existing uninsulated solid ground floor, U-value as per SAP Appendix S									
Construction Element	**U-Value**	**Notional***	**G Value**	**Frame Factor**	**Description (manufacturer, make and model)**							
Windows	3.10	3.10	0.76	10%	Existing Double glazed window, whole window U-Value as per Appendix S, Table S14							
Glazed Doors	3.10	3.10	0.76	10%	Existing Double glazed door, whole window U-Value as per Appendix S, Table S14							
Skylight	3.30	3.30	0.76	10%	Existing Double glazed roof window, whole window U-Value as per Appendix S, Table S14							
Solid Door	3.00	3.00	n/a	n/a	Existing Whole door U-Value as per SAP Appendix S							
Construction Notes	**U-Value**											
Construction Details												
Air-permability	25 m^3/hr/m^2				Default air permeability for buildings built to Building Regulations pre 1995							
Heating and Cooling	**System Details**				**Emitter**		**Controls**					
Heating System	VRF heating/cooling: Average SEER 6.1, EER 3.23, SCOP 4 1 x Midea M3OF27HFN8-Q: SEER 6.1, EER 3.23, SCOP 4 2 x Midea M4OE-28HFN8-Q : SEER 6.1, EER 3.21, SCOP 4 1 x Midea M2OD-18HFN8-Q: SEER 6.1, EER 3.24, SCOP 4				Ceiling/Wall cassettes		Central time control and local temperature control					
Hot Water	**System Details**				**Secondary Circulation**	**Circulation Losses (W/m)**	**Pump Power (kW)**	**Loop Length (m)**	**Storage Tank (l)**	**Storage Losses (kWh/l.day)**	**Delivery Efficiency**	
Hot Water System	Gas combi boiler: Minimum efficiency of 91%				Y	10 (tbc)	0.2	40	20 (tbc)	0.0047 (tbc)	0.95	
Ventilation	**System Details**				**SFP (W/l/s)**	**DCV Type**		**Heat Recovery**	**Heat Recovery Efficiency (%)**	**Heat Recovery Type**	**Variable HR**	
Mechanical Ventilation	Standard extract from WC and kitchen				0.40	N/A		N	N/A	N/A	N/A	
Electrical Flow Control	**0.4**											
Power Correction Factor	N		<0.9									
Separate Metering	N		N									
Renewables	**Description**											
PV	PV to meet 35% improvement											
Solar Water Heating	N											
Wind Turbine	N											
Lighting	**Description**											
Lighting	Average light efficacy of 120Lm/W, LOR=1											
Lighting Controls	PIR sensors auto-on-off in store rooms, WCs and circulation in line with Part L											
Parasitic Power	N/A											
Notes	*Fabric improved in line with guidance in paragraph 11.7, Part L V2 **Assumed built in 1934											
Sign Off details		**Name**	Elsa Withnell	**Date**	10.01.2024	By signing this document, I declare that the aforementioned details are all correct as per the final "as designed" specifications:	**Name**		**Date**			
							Sign					

Appendix C – LBRUT Sustainable Construction Checklist SPD

LBRUT Sustainable Construction Checklist - June 2020

This document forms part of the Sustainable Construction Checklist SPD. This document **must** be filled out as part of the planning application for the following developments: all residential development providing **one or more new residential units (including conversions leading to one or more new units)**, and all other forms of development providing **100sqm or more of non-residential floor space**. Developments including new non-residential development of less than 100sqm floor space, extensions less than 100sqm, and other conversions are strongly encouraged to comply with this checklist. Where further information is requested, please either fill in the relevant section, or refer to the document where this information may be found in detail, e.g. Flood Risk Assessment or similar. **Further guidance** on completing the Checklist may be found in the Justification and Guidance section of this SPD.

Property Name (if relevant):	Ham Brewery Tap	Application No. (if known):	
Address (include. postcode)	Ham Brewery Tap, 4-6 Ham Street, Richmond, TW10 7HT		
Completed by:	Owen Brookes - SRE Ltd and amended by Elsa Withnell - SRE Ltd		
For Non-Residential		*For Residential*	
Size of development (m2)	183.3	Number of dwellings	

1 MINIMUM COMPLIANCE (RESIDENTIAL AND NON-RESIDENTIAL)

Energy Assessment

Has an energy assessment been submitted that demonstrates the expected energy and carbon dioxide emissions saving from energy efficiency and renewable energy measures, including the feasibility of CHP/CCHP and community heating systems? If yes, please select TRUE.	TRUE	

Carbon Dioxide emissions reduction

What is the on site carbon dioxide emissions reduction against a Building Regulations Part L (2013) baseline *Policy LP 22 B. and Draft London Plan Policy 9.2.5 require a 35% onsite reduction in CO_2 emissions beyond Building Regulations 2013.*	35.6	%
What is the percentage reduction from efficiency measures alone *Policy LP 22 C. and Draft London Plan Policy 9.2.6 require a 10% onsite reduction in CO2 emissions beyond Building Regulations 2013 from efficiency measures for residential and 15% for non-residential.*	21.6	%
Percentage of **total** site CO2 emissions saved through renewable energy installation?	14.0	%
What is the total remaining carbon to be offset *Policy LP 22 B. and Draft London Plan Policy 9.2.4 require Major developments to achieve Zero Carbon after offsetting.*	0	Tonne
Are remaining emissions going to be offset through offset fund payment in accordance with current guidelines issued for the cost per tonne of CO2?	FALSE	
What is the total predicted cost of offset? *The London Plan sets this as £95/tonne per year over 30 years, this should be updated based on As Build calculations.*	0	£

1A MINIMUM POLICY COMPLIANCE (NON-RESIDENTIAL AND DOMESTIC REFURBISHMENT)

Please check the Guidance Section of this SPD for the policy requirements

Environmental Rating of development:

Non-Residential new-build (100sqm or more)			
BREEAM Level	Please Select	Have you attached a pre-assessment to support this?	Please Select:
Excellent required under Policy LP22 A 3			
Extensions and conversions for residential dwellings			
BREEAM Domestic Refurbishment	Please Select	Have you attached a pre-assessment to support this?	Please Select:
Excellent required under Policy LP22 A 4			
Extensions and conversions for non-residential buildings			
BREEAM Level	Please Select	Have you attached a pre-assessment to support this?	Please Select:
Excellent required under Policy LP 22			

Score awarded for Environmental Rating:	**Subtotal**	0
BREEAM: Good = *0*, Very Good = 4, Excellent = *8*, Outstanding = *16*		

1B MINIMUM POLICY COMPLIANCE (RESIDENTIAL)

Water Usage

	Score	
Internal water usage after gray/rainwater systems limited to 105 litres person per day. (Excluding an allowance 5 litres per person per day for external water consumption). Calculations using the water efficiency calculator for new dwellings have been submitted. *110l/p/d Required for new dwellings under Policy LP22 A 2 105l/p/d required under Draft London Plan Policy SI5*	*1*	Please Select:
	Subtotal	0

2. ENERGY USE AND POLLUTION

2.1 Need for Cooling

		Score	
a.	How does the development incorporate cooling measures? Tick all that apply:		
	Energy efficient design incorporating specific heat demand to less than or equal to 15 kWh/sqm	6	TRUE
	Reduce heat entering a building through providing/improving insulation and living roofs and walls	2	FALSE
	Reduce heat entering a building through shading	3	TRUE
	Exposed thermal mass and high ceilings	4	TRUE
	Passive ventilation	3	TRUE
	Mechanical ventilation with heat recovery	1	FALSE
	Active cooling systems, i.e. Air Conditioning Unit	0	TRUE
	See Draft London Plan SI4		

2.2 Heat Generation

		Score	
b.	How have the heating and cooling systems, with preference to the heating system hierarchy, been selected (defined in London Plan policy **SI3)** Tick all heating and cooling systems that will be used in the development:		
	Connection to existing heating or cooling networks powered by renewable energy	6	FALSE
	Connection to existing heating or cooling networks powered by gas or electricity	5	FALSE
	Site wide CHP network powered by renewable energy	4	FALSE
	Site wide CHP network powered by gas	3	FALSE
	Communal heating and cooling powered by renewable energy	2	FALSE
	Communal heating and cooling powered by gas or electricity	1	FALSE
	Individual heating and cooling	0	TRUE
	See Draft London Plan SI3		

2.3 Pollution: Air, Noise and Light

a.	Does the development plan to implement reduction strategies for dust emissions from construction sites?	2	TRUE
b.	Does the development plan to include a biomass boiler?		FALSE
	If yes, please refer to the biomass guidelines for the Borough of Richmond, please see guidance for supplementary information. If the proposed boiler is of a qualifying size, you may need to complete the information request form found on the Richmond website.		
c.	Has an air quality impact assessment been provided		Please Select:
	If yes, has 'Emissions Neutral' been achieved	1	Please Select:
	If yes, have occupants of new development been protected from existing pollution	1	Please Select:
	If no to any of the above are there any sensitive receptors as defined in Policy LP 10 present?	-1	Please Select:
	see Policy LP 10		
d.	Please tick only one option below		
	Has the development taken measures to reduce existing noise and enhance the existing soundscape of the site?	3	TRUE
	Has the development taken care to not create any new noise generation/transmission issues in its intended operation?	1	TRUE
	see Policy LP 10		
e.	Has the development taken measures to reduce light pollution impacts on character, residential amenity and biodiversity?	3	TRUE
	see Policy LP 10		
f.	Have you attached a Lighting Pollution Report?	-	
		Subtotal	**25**

Please give any additional relevant comments to the Energy Use and Pollution Section below

3. TRANSPORT

3.1 Provision for the safe efficient and sustainable movement of people and goods

a.	Does your development provide opportunities for occupants to use innovative travel technologies?		TRUE

Please explain:

Cycle parking provided in-line with LBRUT and London Plan requirements to encourage staff and visitors to use sustainable transport alternatives.

		Score	
b.	Does your development provide for 100% active provision for electric vehicle charging point(s) and have you successfully demonstrated that it would be able to operate satisfactorily in the future expectation of all vehicles being electrically powered?	2	FALSE
c.	**For major developments ONLY**: Has a Transport Assessment been produced for your development based on TfL's Best Practice Guidance?		
	If you have provided a Transport Assessment as part of your planning application, please tick here and move to Section 3 of this Checklist.	5	Please Select:
	See policy LP44		
d.	**For smaller developments ONLY**: Have you provided a Transport Statement?	5	TRUE
e.	Does your development provide cycle storage? (Standard space requirements are set out in the Council's Parking Standards - Local Plan Appendix 3)	2	TRUE
	If so, for how many bicycles?	4	
	Is this shown on the site plans?		TRUE
	See Local Plan Appendix 3		
f.	Will the development create or improve links with local and wider transport networks? If yes, please provide details.	2	FALSE
		Subtotal	**7**

Please give any additional relevant comments to the Transport Section below

Cycle parking is limited because of the nature of the development. Visitors will need to bring animals to the veterinary practice, therefore cycling to the site may not be practicable.

4 BIODIVERSITY

4.1 Minimising the threat to biodiversity from new buildings, lighting, hard surfacing and people

a.	Does your development involve the loss of an ecological feature or habitat, including a loss of garden or other green space? (Indicate if yes)			-2		FALSE
	If so, please state how much in sqm?				sqm	
b.	Does your development involve the removal of any tree(s)? (Indicate if yes)					FALSE
	If so, has a tree report been provided in support of your application? (Indicate if yes)					Please Select:
c.	Does your development plan to add (and not remove) any tree(s) on site? (Indicate if yes)					TRUE
d.	Please indicate which features and/or habitats that your development will incorporate to improve on site biodiversity:					
	Pond, reedbed or extensive native planting	6	Area provided:		sqm	FALSE
	An extensive green roof	5	Area provided:		sqm	FALSE
	An intensive green roof	4	Area provided:		sqm	FALSE
	Garden space	4	Area provided:	25	sqm	TRUE
	Additional native and/or wildlife friendly planting to peripheral areas	3	Area provided:		sqm	FALSE
	Additional planting to peripheral areas	2	Area provided:	8.5	sqm	TRUE
	A living wall	2	Area provided:		sqm	FALSE
	Bat boxes	0.5				FALSE
	Bird boxes	0.5				FALSE
	Swift boxes	0.5				FALSE
	Other	0.5				FALSE
e.	Does your development use at least 70% of available roof plate as green/brown roof			1		FALSE
	Policy LP 17 requires 70%					
				Subtotal		**6**

Please give any additional relevant comments to the Biodiversity Section below

he limited outdoor space at the site of the Proposed Development means biodiversity enhancement is limited. There will be an overall positive effect on biodiversity compared to the existing pub

5	**FLOODING AND DRAINAGE**					
5.1 Mitigating the risks of flooding and other impacts of climate change in the borough						
a.	Is your site located in a high flood risk zone (Zone 3)? (Indicate if yes)			-2		FALSE
		Have you submitted a Flood Risk Assessment? (Indicate if yes)				Please Select:
b.	Which of the following measures of the drainage hierarchy are incorporated onto your site? (tick all that apply)					
		Store rainwater for later use		5		FALSE
		Use of infiltration techniques such as porous surfacing materials to allow drainage on-site		3		FALSE
		Attenuate rainwater in ponds or open water features		4		FALSE
		Store rainwater in tanks for gradual release to a watercourse		3		FALSE
		Discharge rainwater directly to watercourse		2		FALSE
		Discharge rainwater to surface water drain		1		TRUE
		Discharge rainwater to combined sewer		0		TRUE
		Have you submitted a Drainage Statement (Indicate if yes)				Please Select:
	See Policy LP 21 and Draft London Plan SL 13					
c.	Please give the change in area of permeable surfacing which will result from your development proposal:		33.5	sqm		
	Please provide details of the permeable surfacing below		*please represent a loss in permeable area as a negative number*			
				Subtotal	**1**	
Please give any additional relevant comments to the Flooding and Drainage Section below						
Increase in permeable surface area comes from garden and additional planting.						
6	**IMPROVING RESOURCE EFFICIENCY**					
6.1 Reduce waste generated and amount disposed of by landfill though increasing level of re-use and recycling						
a.	Will demolition be required on your site prior to construction? *[Points will only be awarded if 10% or greater of demolition waste is reused/recycled]*			1		FALSE
		If so, what percentage of demolition waste will be reused in the new development?			%	
		What percentage of demolition waste will be recycled?			%	
b.	Does your site have any contaminated land?			1		FALSE
		Have you submitted an assessment of the site contamination?		2		Please Select:
		Are plans in place to remediate the contamination?		2		Please Select:
		Have you submitted a remediation plan?		1		Please Select:
		Are plans in place to include composting on site?		1		Please Select:
c.	Will a waste management plan and facilities be in place in line with Policy LP24		Yes			
6.2 Reducing levels of water waste						
a.	Will the following measures of water conservation be incorporated into the development? (Please tick all that apply):					
		Fitting of water efficient taps, shower heads etc		1		TRUE
		Use of water efficient A or B rated appliances		1		TRUE
		Rainwater harvesting for internal use		4		FALSE
		Greywater systems		4		FALSE
		Fit a water meter		1		TRUE
				Subtotal	**3**	
Please give any additional relevant comments to the Improving Resource Efficiency Section below						
7	**ACCESSIBILITY**					
7.1	**Ensure flexible adaptable and long-term use of structures**					
a.	**If the development is residential,** will it meet the requirements of the nationally described space standard for internal space and layout?			1		Please Select:
		If the standards are not met, in the space below, please provide details of the functionality of the internal space and layout				
AND						
b.	**If the development is residential**, will it meet Building Regulation Requirement M4 (2) 'accessible and adaptable dwellings'?			2		Please Select:
		If this is not met, in the space below, please provide details of any accessibility measures included in the development.				
		For major residential developments, are 10% or more of the units in the development to Building Regulation Requirement M4 (3) 'wheelchair user dwellings'?		1		Please Select:
OR						
c.	**If the development is non-residential,** does it comply with requirements included in Richmond's Local Plan LP1, LP28.B, LP30 & LP45			2		TRUE
		Please provide details of the accessibility measures specified in the Local Plan that will be included in the development				
		LP1 - Limited change to exterior of existing building so will not affect local character. LP28.B - Provides a beneficial service to the local area. LP30 - Cycle parking provided to reduce car dependancy. Conversion from existing pub has net positive impact on local health and wellbeing. LP45 - Parking standards in-line with local planning policy, for car parking and cycle parking.				
				Subtotal	**2**	
Please give any additional relevant comments to the Design Standards and Accessibility Section below						

LBRUT Sustainable Construction Checklist- Scoring Matrix for *New Construction* **(Non-Residential and domestic refurb)** ***TOTAL*** ***44***

Score	Rating	Significance
84 or more	*A+*	Project strives to achieve highest standard in energy efficient sustainable development
75-83	*A*	Makes a major contribution towards achieving sustainable development in Richmond
56-74	*B*	Helps to significantly improve the Borough's stock of sustainable developments
40-55	*C*	Minimal effort to increase sustainability beyond general compliance
39 or less	*FAIL*	Does not comply with SPD Policy

LBRUT Sustainable Construction Checklist- Scoring Matrix for New Construction **Residential new-build**

Score	Rating	Significance
85 or more	A++	Project strives to achieve highest standard in energy efficient sustainable development
68-84	*A+*	Project strives to achieve higher standard in energy efficient sustainable development
59-67	*A*	Makes a major contribution towards achieving sustainable development in Richmond
39-58	*B*	Helps to significantly improve the Borough's stock of sustainable developments
24-38	*C*	Minimal effort to increase sustainability beyond general compliance
23 or less	*FAIL*	Does not comply with SPD Policy

Authorisation:

I herewith declare that I have filled in this form to the best of my knowledge

Signature Owen Brookes - SRE Ltd amended by Elsa Withnell - SRE Ltd **Date** 14/04/2022 amended 11/01/2023

Appendix D – Building Regulations UK Part L (BRUKL) Document

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Ham Street Nursery Green (Proposed)

As built

Date: Fri Jan 12 14:28:26 2024

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.24

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.24

BRUKL compliance module version: v6.1.e.1

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Foundation area [m^2]: 116.86

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	15.24	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	12.31	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	104.75	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	69.07	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.28	0.28	12000000:Surf[0]
Floors	0.18	0.58	0.58	12000000:Surf[5]
Pitched roofs	0.16	0.11	0.11	33000000:Surf[0]
Flat roofs	0.18	0.09	0.11	12000000:Surf[6]
Windows** and roof windows	1.6	3.1	3.1	12000000:Surf[1]
Rooflights***	2.2	3.3	3.3	RM000008:Surf[2]
Personnel doors^	1.6	3	3	RM000001:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	10

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- VRV Heating/Cooling

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	4	6.1	0	-	-
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

1- DHW Gas

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	0.98	0.005
Standard value	0.91	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	**System type in the Approved Documents**
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	**SFP [W/(l/s)]**									**HR efficiency**	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
Kitchen/Staff Room	-	-	0.3	-	-	-	-	-	-	-	N/A

General lighting and display lighting	**General luminaire**	**Display light source**	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Classroom	120	-	-
Baby Room	120	-	-
Classroom	120	-	-
Office Space	120	-	-
Lobby	120	120	1.125
Sleep Room	120	-	-
Kitchen/Staff Room	120	-	-
First Aid Room	120	-	-
WC	120	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Stairs	120	-	-
WC	120	-	-
WC	120	-	-
WC	120	-	-
Storage	120	-	-
Classroom	120	-	-
Changing Room	120	-	-
Storage	120	-	-
Kitchen	120	-	-
Storage	120	-	-
Corridor	120	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Classroom	NO (-37.6%)	NO
Baby Room	NO (-4.3%)	NO
Classroom	NO (-11%)	NO
Office Space	NO (-58.8%)	NO
Lobby	NO (-50.6%)	NO
Sleep Room	NO (-48.3%)	NO
Kitchen/Staff Room	NO (-10.2%)	NO
First Aid Room	N/A	N/A
Stairs	N/A	N/A
Classroom	NO (-64.8%)	NO
Changing Room	NO (-2%)	NO
Kitchen	NO (-17.7%)	NO
Corridor	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	261.9	261.9
External area [m^2]	675.2	622.7
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	10	3
Average conductance [W/K]	320.57	243.25
Average U-value [W/m^2K]	0.47	0.39
Alpha value* [%]	29.21	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
11	**Residential Institutions: Residential Schools**
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
89	**Non-residential Institutions: Community/Day Centre**
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	15.84	16.15
Cooling	1.97	2.44
Auxiliary	0.08	2.94
Lighting	7.92	6.3
Hot water	53.2	54.79
Equipment*	15.61	15.61
TOTAL**	**79.01**	**82.62**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	20.93	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*20.93*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	243.28	202.22
Primary energy [kWh_{PE}/m^2]	69.07	104.76
Total emissions [kg/m^2]	12.31	15.24

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	238.2	34.4	17.8	2.2	0	3.73	4.33	4	6.1
	Notional	181.1	45.5	18.1	2.7	0	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Ham Street Nursery Lean

As built

Date: Fri Jan 12 14:36:14 2024

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.24

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.24

BRUKL compliance module version: v6.1.e.1

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Foundation area [m^2]: 116.86

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	15.24	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	14.96	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	104.75	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	99.74	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.28	0.28	12000000:Surf[0]
Floors	0.18	0.58	0.58	12000000:Surf[5]
Pitched roofs	0.16	0.11	0.11	33000000:Surf[0]
Flat roofs	0.18	0.09	0.11	12000000:Surf[6]
Windows** and roof windows	1.6	3.1	3.1	12000000:Surf[1]
Rooflights***	2.2	3.3	3.3	RM000008:Surf[2]
Personnel doors^	1.6	3	3	RM000001:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	10

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- VRV Heating/Cooling

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	4	6.1	0	-	-
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

1- DHW Gas

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	0.98	0.005
Standard value	0.91	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	**System type in the Approved Documents**
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	**SFP [W/(l/s)]**									**HR efficiency**	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
Kitchen/Staff Room	-	-	0.3	-	-	-	-	-	-	-	N/A

General lighting and display lighting	**General luminaire**	**Display light source**	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Classroom	120	-	-
Baby Room	120	-	-
Classroom	120	-	-
Office Space	120	-	-
Lobby	120	120	1.125
Sleep Room	120	-	-
Kitchen/Staff Room	120	-	-
First Aid Room	120	-	-
WC	120	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Stairs	120	-	-
WC	120	-	-
WC	120	-	-
WC	120	-	-
Storage	120	-	-
Classroom	120	-	-
Changing Room	120	-	-
Storage	120	-	-
Kitchen	120	-	-
Storage	120	-	-
Corridor	120	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Classroom	NO (-37.6%)	NO
Baby Room	NO (-4.3%)	NO
Classroom	NO (-11%)	NO
Office Space	NO (-58.8%)	NO
Lobby	NO (-50.6%)	NO
Sleep Room	NO (-48.3%)	NO
Kitchen/Staff Room	NO (-10.2%)	NO
First Aid Room	N/A	N/A
Stairs	N/A	N/A
Classroom	NO (-64.8%)	NO
Changing Room	NO (-2%)	NO
Kitchen	NO (-17.7%)	NO
Corridor	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	261.9	261.9
External area [m^2]	675.2	622.7
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	10	3
Average conductance [W/K]	320.57	243.25
Average U-value [W/m^2K]	0.47	0.39
Alpha value* [%]	29.21	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
11	**Residential Institutions: Residential Schools**
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
89	**Non-residential Institutions: Community/Day Centre**
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	15.84	16.15
Cooling	1.97	2.44
Auxiliary	0.08	2.94
Lighting	7.92	6.3
Hot water	53.2	54.79
Equipment*	15.61	15.61
TOTAL**	**79.01**	**82.62**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	243.28	202.22
Primary energy [kWh_{PE}/m^2]	99.74	104.76
Total emissions [kg/m^2]	14.96	15.24

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	238.2	34.4	17.8	2.2	0	3.73	4.33	4	6.1
	Notional	181.1	45.5	18.1	2.7	0	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Ham Street Nursery SBEM

As built

Date: Tue Jan 09 15:39:50 2024

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.24

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.24

BRUKL compliance module version: v6.1.e.1

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Foundation area [m^2]: 116.86

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	15.25	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	19.11	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	104.86	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	138.27	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.3	0.3	12000000:Surf[0]
Floors	0.18	0.25	0.25	12000000:Surf[5]
Pitched roofs	0.16	0.18	0.18	33000000:Surf[0]
Flat roofs	0.18	0.17	0.18	12000000:Surf[6]
Windows** and roof windows	1.6	3.1	3.1	12000000:Surf[1]
Rooflights***	2.2	3.3	3.3	RM000008:Surf[2]
Personnel doors^	1.6	3	3	RM000001:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	25

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- VRV Heating/Cooling

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	2.5	5	0	-	-
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

1- DHW Gas

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	0.91	0.005
Standard value	0.91	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	**General luminaire**	**Display light source**	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Classroom	95	-	-
Baby Room	95	-	-
Classroom	95	-	-
Office Space	95	-	-
Lobby	95	90	1.5
Sleep Room	95	-	-
Kitchen/Staff Room	95	-	-
First Aid Room	95	-	-
WC	95	-	-
Stairs	95	-	-
WC	95	-	-
WC	95	-	-
WC	95	-	-
Storage	95	-	-
Classroom	95	-	-
Changing Room	95	-	-
Storage	95	-	-
Kitchen	95	-	-
Storage	95	-	-
Corridor	95	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	**Solar gain limit exceeded? (%)**	**Internal blinds used?**
Classroom	NO (-34.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Baby Room	YES (+0.2%)	NO
Classroom	NO (-6.7%)	NO
Office Space	NO (-57.1%)	NO
Lobby	NO (-48.3%)	NO
Sleep Room	NO (-46%)	NO
Kitchen/Staff Room	NO (-5.8%)	NO
First Aid Room	N/A	N/A
Stairs	N/A	N/A
Classroom	NO (-63.3%)	NO
Changing Room	YES (+2.3%)	NO
Kitchen	NO (-16.4%)	NO
Corridor	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	261.9	261.9
External area [m^2]	675.2	622.7
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	25	3
Average conductance [W/K]	521.57	243.25
Average U-value [W/m^2K]	0.77	0.39
Alpha value* [%]	15.54	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
11	**Residential Institutions: Residential Schools**
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
89	**Non-residential Institutions: Community/Day Centre**
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	35.11	16.15
Cooling	2.15	2.44
Auxiliary	0.19	3.01
Lighting	10.08	6.3
Hot water	57.31	54.79
Equipment*	15.61	15.61
TOTAL**	**104.84**	**82.69**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	321.97	202.22
Primary energy [kWh_{PE}/m^2]	138.27	104.86
Total emissions [kg/m^2]	19.11	15.25

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	329.9	30.9	39.3	2.4	0	2.33	3.55	2.5	5
	Notional	181.1	45.5	18.1	2.7	0	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

SRE Registered Office | Greenforde Farm
Stoner Hill Road | Froxfield
Petersfield | Hampshire | GU32 1DY
01730 710044
info@sre.co.uk
www.sre.co.uk